Treasury Board of Canada Secretariat
Secrétariat du Conseil du Trésor du Canada

CLASSIFICATION STANDARD

COMPUTER SYSTEM ADMINISTRATION

ADMINISTRATIVE AND FOREIGN SERVICE CATEGORY

Canada

CONTENTS

INTRODUCTION

This standard describes the point rating plan to be used to evaluate jobs allocated to the Computer Systems Administration Group. It consists of an introduction, general definitions of the Administrative and Foreign Service Category and the occupational group, point rating scales and bench-mark position descriptions.

Point rating is an analytical, quantitative method of determining the relative value of jobs. It is particularly suited to heterogeneous occupational groups in which jobs consist of varied combinations of tasks. Essentially, point rating plans define characteristics or factors common to the jobs being evaluated. They define degrees of each factor and allocate point values to each degree. The total value determined for each job is the sum of the point values assigned by the raters.

All methods of job evaluation require the exercise of judgment and the orderly collection and analysis of information in order that consistent judgments can be made. The point rating method facilitates rational discussion and resolution of differences in determining the relative worth of jobs.

Factors

The combined factors do not describe all aspects of jobs. They deal only with those characteristics that can be defined and distinguished and that are useful in determining the relative value of jobs.

Four factors are used in this plan. Most factors have more than one dimension and have been defined in terms of two or three related elements. The factors and elements are

Knowledge	- Education - Experience - Continuing Study
Decision Making	- Scope for Decisions - Impact of Decisions
Responsibility for Contacts	
Supervision	- Level of Employees Supervised - Numbers Supervised

Point Values

Maximum point value assigned to each factor reflects its relative importance. Similarly, point values have been assigned to the degrees of the factors.

Point values increase arithmetically as the degrees of the factor increase. The minimum point value for each factor, with the exception of supervision, is one-fifth of the maximum value. The ranges of point values are

	Minimum	Maximum
Knowledge		
Education and Experience	60	300
Continuing Study	20	100
Decision Making	70	350
Responsibility for Contacts	20	100
Supervision	-	150
	170	1,000

Bench-mark Positions

Bench-Mark position descriptions are used to exemplify degrees of each factor or element. Each description consists of a brief summary, a list of the principal duties, with the percentage of time devoted to each, and a specification describing duties, with the percentage of time devoted to each, and a specification describing each of the point rating factors and elements as it appears in the job. The bench-mark positions have been evaluated, and the degree and point values assigned to each factor are shown in the specifications.

The rating scales identify the bench-mark position descriptions that exemplify each degree. These descriptions are an integral part of the point rating plan and are used to ensure consistency in application of the rating scales.

Use of the Standard

There are six steps in the application of this classification standard.

1. Allocation of the position to the category and the group is confirmed by reference to the definitions and the descriptions of inclusions and exclusions.
2. The position description is studied to ensure understanding of the position as a whole and of each factor. The relation of the position being rated to positions above and below it in the organization is also studied.

3. Tentative degrees of each factor in the job being rated are determined by comparison with degree definitions in the rating scales. Uniform application of degree definitions requires frequent reference to the descriptions of factors and the notes to raters.
4. The description of the factor in each of the bench-mark positions exemplifying the degree tentatively established is compared with the description of the factor in the position being rated. Comparisons are also made with descriptions of the factor in bench-mark positions for the degrees above and below the one tentatively established.
5. The point values for all factors are added to determine the tentative total point rating.
6. The position being rated is compared as a whole to positions to which similar total point values have been assigned, as a check on the validity of the total rating.

Determination of Levels

The ultimate objective of job evaluation is to determine the relative value of jobs in each occupational group in order that employees carrying out the jobs may be paid at rates consistent with the relationship indicated. Jobs that fall within a designated range of point values will be regarded as of equal difficulty and value and will be allocated to the same level.

Minimum Qualifications

Each of the group definitions in the category includes a statement of "Minimum Qualifications". These requirements are to apply without modification to all new entrants to the labor force, that is, students who have just completed their full-time studies and young people commencing full-time employment. With respect to experienced workers who may not possess the formal education prescribed in the definitions, the statements are intended to indicate the norms against which the qualifications of the individual may be assessed, in order to judge whether or not the combination of his education, training and experience provides, for the particular job being filled, qualifications equal to or higher than those prescribed in the "Minimum Qualifications" of the relevant occupational group.

CATEGORY DEFINITION

Occupational categories were repealed by the Public Service Reform Act (PSRA), effective April 1, 1993. Therefore, the occupational category definitions have been deleted from the classification standards.

GROUP DEFINITION

For occupational group allocation, it is recommended that you use the Occupational Group Definition Maps, which provide the 1999 group definition and their corresponding inclusion and exclusion statements. The maps explicitly link the relevant parts of the overall 1999 occupational group definition to each classification standard.

RATING SCALES

COMPUTER SYSTEMS ADMINISTRATION GROUP

FACTOR	POINTS
Knowledge	
- Education and Experience	300
- Continuing Study	100
Decision Making	350
Responsibility for Contacts	100
Supervision	150
	1,000

POINT BOUNDARIES

LEVELS	POINTS
CS 1	170 to 300
CS 2	301 to 450
CS 3	451 to 600
CS 4	601 to 750
CS 5	751 to 900
CS 6 (EX)	901 to 1000

GLOSSARY OF TERMS

Various terms, definitions and abbreviations used in the discipline are provided below. The selection aims primarily at assisting personnel people in using this standard. Some of the terms and definitions are peculiar to the need of this standard. However, and as much as possible, the terms and their definitions have been aligned with the more comprehensive series of terms and definitions appearing in the "Electronic Data Processing Glossary" (GES/NGI-12/G02) prepared, published and issued by the Government EDP Standards Committee. (The Glossary can be obtained from the Canadian Government Publishing Center, Supply and Services Canada.)

Note: Information pertaining to the Government's information policy, management, security and standards are contained in the Treasury Board Administrative Policy Manual - Chapter 440: Electronic Data Processing.

Acceptance testing: The running of a complete system against a predetermined series of specified information to arrive at a predictable result for the purpose of establishing acceptability.

Address: A character or group of characters that identifies a register, a particular part of storage, or some other information source or destination.

ADP: Abbreviation for: automatic data processing.

Algorithm: A finite set of well-defined rules for the solution of a problem in a finite number of steps.

Analog Computer: A computer capable of performing operations on physical entities represented in analog form. (Analog: Pertaining to representation of physical quantities by means of signals that vary continuously.)

Analysis: The methodical investigation of a problem, and the separation of the problem into smaller related units for further detailed study.

Analyst: A person who defines problems and develops algorithms and procedures for their solution.

Application: Any user problem to which information processing techniques are applied.

Array: An arrangement of elements in one or more dimensions.

Artificial intelligence: The capability of a device to perform functions that are normally associated with human intelligence.

Artificial language: A language whose rules are explicitly established prior to its use.

Assemble: To prepare a machine language program from a symbolic language program by substituting absolute operation codes for symbolic operation codes and absolute or relocatable addresses for symbolic addresses.

Assembler: A computer program used to assemble.

Assembly language: A computer-oriented language which must go through an assembly in order to be converted into the machine code required for operation on a computer and whose instructions are usually in one-to-one correspondence with computer instructions.

Assembly program: Synonym for: assembler.

Audit: To conduct a review and examination of the records and activities of an operational information processing system in order to test the adequacy and effectiveness of procedures for data security and data integrity. See also: computer systems audit.

Audit trail: A manual or computerized means for tracing the transactions affecting the contents of a record.

Automation: (1) The carrying out of processes by automatic means.
(2) The conversion of a procedure, process or equipment to automatic operation.

Automatic data processing: Information processing predominately performed by automatic means. Abbreviation: ADP.

Batch processing: The processing of information or the accomplishment of jobs, accumulated in advance, in such a manner that the user cannot further influence its processing while it is in progress.

Benchmarking: Synonym for: benchmark testing.

Benchmark problem: A problem used to evaluate the performance of hardware or software or both.

Benchmark testing: A procedure using a standard problem designed to evaluate the performance of computer systems relative to one another.

Bit: (1) The abbreviation of binary digit.
(2) A single pulse in a group of pulses.

Block: A string of records, a string of words or a character string formed for technical or logic reasons to be treated as an entity.

Block diagram: A diagram of a system, of an instrument, or of a computer, in which the principal parts are represented by suitably annotated geometrical figures to show both the basic functions of the parts and the functional relationships between them.

Bootstrap: A procedure in which simple preset computer operations are used to load instructions which in turn cause further instructions to be loaded until the complete computer program is in storage.

Buffer: A synchronizing element between two different forms of storage normally used to compensate for differences in the rate of flow of data. Same as: buffer storage.

Byte: A binary character string operated upon as a unit and usually shorter than a computer word.

Central Processing Unit: A unit of a computer that includes circuits controlling the interpretation and execution of instructions. Abbreviation: CPU
Same as: central processor.

Channel: In data transmission, a means of simplex transmission in a pre-assigned direction. In communication theory, that part of a communication system that connects the message source with the message sink.

Character: A member of a set of elements upon which agreement has been reached and that is used for the organization, control or representation of information (data).

Character set: A finite set of different characters upon which agreement has been reached and that is considered complete for some purpose.

Character subset: A selection of characters from a character set, comprising all characters that have a specified common feature.

Checking program: A computer program that examines other computer programs or sets of data for mistakes of syntax.

Checkpoint: A place in a computer program at which a check is made or at which a recording of data is made for restart purposes.

Checksum: The sum of a group of data items, computed when the data are recorded and appended to the group for checking purposes. Same as: control data.

Code: A set of unambiguous rules specifying the manner in which information may be represented in a discrete form. Same as: coding scheme.

Code: To represent data or a computer program in a symbolic form that can be accepted by an information processor. NOTE: Sometimes used interchangeably with "encode".

Coded representation: The representation of an item of information established by a code or the representation of a character established by a character set. Same as: code element; code value.

Coder: A person mainly involved in writing but not defining computer, programs.

Code Set: The complete set of coded representations defined by a code or by a coded character set.

Command language: A set of procedural operators, with a related syntax, used to indicate the functions to be performed by an operating system. Same as. control language.

Communication: Synonym for: data communications.

Communication theory: The branch of leaning dealing with the mathematical probabilities of the transmission of messages in the presence of noise and any other disturbances.

Compile: To translate a computer program expressed in a problem-oriented language (i.e. symbolic or high level) into a computer-oriented language (i.e. a machine language).

Compiler: A computer program used to compile.
Same as: compiling program.

Compiler generator: A translator or an interpreter used to construct compilers.

Computer: A device capable of accepting information, applying prescribed processes to the information and supplying the results of these processes with minimal human intervention during a run.

Computer graphics: Methods and techniques for converting information to or from graphic display via computers.

Computer instruction: An instruction that can be recognized by the central processing unit of the computer for which it is designed. Same as: machine instruction.

Computer language: Synonym for: machine language.

Computer network: A system consisting of interconnected computers.

Computer-oriented language: A language that has mnemonics that directly correspond to machine language instructions. Same as: low-level language.

Computer program: A program expressed in a form suitable for execution by a computer.

Computer system audit: An audit of the controls in a computer system to evaluate their relative effectiveness and to recommend improvements.

Concentrator: In data transmission, a functional unit that permits a common transmission medium to serve more data sources than there are channels currently available.

Configuration: The arrangement of a computer system as determined by the nature, number and chief characteristics of its functional units.

Consistency check: A check to detect that specific items of information are compatible.

Contingency procedure: A procedure that is entered as an alternative to the normal path of a process in the event of an unusual but anticipated situation during the process.

Control data: Synonym for: checksum.

Control function: An action that affects the recording, processing, transmission or interpretation of information.
Same as: control operation.

Control language: Synonym for: command language.

Control objectives: A statement of the factors relating to an acceptable level of integrity required of an information processing system.

Control program: A computer program designed to schedule and to supervise the execution of programs in a computer system.

Control specifications: A description of the rules and regulations to e applied within a computer system in order to ensure the required level of integrity.

Control standards: Control specifications accepted as a basis for preventing, detecting and correcting errors or omissions.

Convert: To change the representation of data from one form to another, without changing the information they convey, e.g., code conversion; analog to digit conversion.

Control techniques: Procedures, in a given information processing installation, which maintain integrity.

CPU: Abbreviation for: central processing unit.

Data: The representation of facts, concepts or instructions in a formalized manner suitable for communications, interpretation or processing by human or automatic means.

Data acquisition: In scientific/technological applications, the gathering of raw source process data by means of a data acquisition and control system designed to gather, from multiple remote locations at a certain computing facility, raw source data of either a primary numerical nature relating to scientific problems, observations or phenomena, or technological or process control variable raw source data such as signals, often in analog form, from sensing and/or measuring devices or instrumentation systems. System includes a large family of real-time process I/0 devices.

Data bank: A set of libraries of data.

Database: A set of data, part or the whole of another set of data and consisting of at least one file, that is sufficient for a given purpose or for a given information processing system. A repository of organized data managed using direct access.

Database control system: Software required by a computer program written in a computer language to direct the processing of a database. Abbreviation: DBMS.

Data capture: The process of transcribing information from source documents to a computer readable medium.

Data code: A set of rules and conventions according to which the signals representing data should be formed, transmitted, received and processed.

Data communication: Data transfer between data source and data link via one or more data links according to a link protocol. Same as: communication.

Data contamination: A deliberate or accidental process or act that destroys the data integrity.
Same as: data corruption.

Data degradation: A reduction of the quality of information.

Data element: A unique collection of data items grouped together on the basis of a single shared or common functional attribute.

Data flow: A pipeline along which information of known composition is passed.

Data flowchart: A flowchart that represents the path of data in the solving of a problem and that defines the major phases of the processing as well as the various data media used.

Data flow diagram: A graphic representation of the flow of data through a system showing the external entities which are sources or destinations of data, the processes which transform data, and the places where data are stored. Also: Schematics.

Data independence: The concept that the definition of data should be independent of computer programs which write and/or read that data.

Data integrity: The quality of data that exists as long as accidental or malicious destruction, alteration or loss of data are prevented. The concept that a method is available to prevent the storage of invalid data.

Data network: The assembly of functional units that establishes data circuits between terminals.

Data processing: The systematic execution of operations upon information, e.g. handling, merging, sorting, computing.

Data processor: A device capable of performing information processing, such as a desk calculator, a punched card machine or a computer.

Data protection: The concept that a method is available to restrict access to stored data.

Data reduction: The transformation of raw data into a more useful form.

Data terminal equipment: Abbreviation: DTE. Synonym for: terminal.

Data transmission: The conveying of data from one place for reception elsewhere by signals transmitted over a channel. Same as: transmission.

Data transmission interface: A shared boundary defined by common physical interconnection characteristics, signal characteristics, and functional characteristics of the interchange circuits.
Same as: interface.

DBCS: Abbreviation for: database control system. DBMS:

Abbreviation for: database management system.

Debug: To detect, to trace and to eliminate mistakes in computer programs or in other software.
NOTE: In the English language, "trouble shoot" and "trouble shooting" may be used in lieu of "debug" and "debugging".

Decision content: A logarithmic measure of the number of decisions needed to select a given event among a finite number of mutually exclusive events.

Decision instruction: An instruction of the class of instructions that comprises branch instructions and conditional jump instructions. Same as: discrimination instruction.

Descriptor: In information retrieval, a key used to categorize or index information.
Same as: keyword.

Decision table: A table of all contingencies that are to .be considered in the description of a problem together with the action to be taken.

Diagnostic program: A computer program that recognizes, locates and explains either a fault in equipment or a mistake in a computer program.

Diagnostic routine: A routine used to detect and isolate a malfunction or mistake.

Diagnostic program: A computer program that recognizes, locates and explains either a fault in equipment or a mistake in a computer program.

Digit: A symbol that represents one of the non-negative integers smaller than the radix. In decimal notation, a digit is one of the characters 0 to 9. Same as: numeric character.

Digital computer: A computer capable of performing operations on information presented in the digital form.

Directory: A table of identifiers and references to the corresponding items of information.

Disk drive: A mechanism for moving a disk pack or a magnetic disk and controlling its movement.

Documentation: A collection of documents on a given subject.

Dump: The operation of writing the contents of a storage, or of part of a storage, usually from an internal storage into an external medium, for a specific purpose such as to allow other use of the storage, as a safeguard against faults or errors, or in connection with debugging. Data that have been dumped.

Dump routine: A utility routine that dumps.

Dynamic parameter: Synonym for: program-generated parameter.

Edit: To prepare data for a later operation.
NOTE: Editing may include the re-arrangement or the addition of data, the deletion of unwanted data, format control, code conversion, and the application of standard processes such as zero-suppression.

EDP: Abbreviation for: electronic data processing.

Direct access: The facility to obtain data from a storage device or to enter data into a storage device in such a way that the process depends only on the location of that data and not on a reference to data previously accessed.

Direct access storage: A storage device that provides direct access to data. Same as: random access storage.

Electronic data processing: Automatic data processing performed predominately by electronic devices.

Emulate: To imitate one system with another so that the imitating system accepts the same data, executes the same computer programs, and achieves the same results as the imitated system.

Encode: To convert data by the use of code or a coded character set in such a manner that re-conversion to the original form is possible. Sometimes used interchangeably with "code".

Entry: Synonym for: entry point. See also: remote job entry.

Entry point: The address or the label of the first instruction executed upon entering a computer program, a routine or a sub-routine.

Error: A discrepancy between a computed, observed or measured value or condition and the true, specified or theoretically correct value or condition.

Error control: In data communication, that part of the link protocol controlling detection, and possibly the correction, of transmission errors.

Execution: The process of carrying out an instruction or the instructions of a computer program by a computer.

Executive program: Synonym for: supervisory program.

External program parameter: In a computer program, a parameter that must be bound during the calling of the computer program.

Failure: An event which leads to the termination of the ability of a functional unit to perform its required function.

Fault: An accidental condition that causes a functional unit to fail to perform its required function or that causes it to perform at reduced efficiency.

Field: In a record, a specified area used for a particular category of data.
Example: A group of card columns in which a wage rate is recorded.

File: A set of related records treated as a unit.
Example: In stock control, a file could consist of a set of invoices; also: audit review file; backup file; job-recovery file; job-recovery control file; main file; master file; transaction file.

File layout: The arrangement and structure of data or words in a file, including the order and size of the components of the file.

File maintenance: The activity of keeping a file up to date by adding, changing or deleting data.

Firmware: Set of micro programs loaded in a control storage, unmodifiable during execution, that allows a system to operate in a given mode.

Flowchart: A graphical representation of the definition, analysis or method of solution of a problem in which symbols are used to represent operations, data, flow, equipment, etc. Also: Schematics.

Format: The arrangement or layout of data on a data medium.

Functional design: The specification of the working relationships among the part of an information processing system.

General purpose computer: A computer that is designed to operate upon a wide variety of problems.

Generation: In information processing, hardware, software or files having many similarities or developed from a previous model. See also: system generation.

Hardware: Physical equipment used in information processing systems, as opposed to computer programs, procedures, rules and associated documentation.

Heuristic method: Any exploratory method of solving problems in which an evaluation is made of the progress towards an acceptable final result using a series of approximate results, for example by a process of guided trial and error.

High-level language: A language in which each program instruction or statement corresponds to one or more machine-executable instructions. Example: COBOL, FORTRAN.

Housekeeping operation: An operation that facilitates the execution of a computer program without making a direct contribution.
Examples: The initialization of storage areas; the execution of a calling sequence.

Hybrid computer: A computer capable of performing operations on both analog and digital representations of data through the intermixing of analog and digital devices.

Image graphics: A technique that involves the projection and positioning of selectable fixed images.

Information: The meaning that a human being assigns to data by means of the conventions used in their representation.

Information measure: A suitable function of the probability of occurrence of an event or of a sequence of events from a set of possible events. In information theory, the term "event" is to be understood as used in the theory of probability.

Information processing: processing of information performed predominately by electronic devices.

Information retrieval: The action of recovering information on a given matter from stored data. Methods and procedures for recovering information on a given matter from stored data.

Information theory: The branch of learning concerned with the study of information measures and their properties.

Input: Pertaining to a device, process or channel involved in an input process, or to the data or states involved in an input process. The word "input" may be used in place of "input data", input signal", input terminal", etc. Synonym for: input process.

Input data: Data being received or to be received into an information processing system or into any part of it.

Input-output: Pertaining to a device, process or channel involved in an input process and in an output process, concurrently or not. The phrase "input-output" may be used in place of "input-output data", "input-output signals", "input-output terminal", etc.
Abbreviation: I/0.

Input-output device: Synonym for: input-output unit.

Input-output unit: A device in an information processing system by which data may be entered into the system, received from the system or both. Same as: input-output device.

Input process: The process that consists of the reception of data into an information processing system or into any part of it. Same as: input.

Input program: A utility program that organizes the input process of a computer.

Input routine: A device in an information processing system by which data can be entered into the system.
Same as: input device.

Input validation: An input control technique used to detect input data which are inaccurate incomplete or unreasonable. Same as: input data validation.

Instruction: A meaningful expression that specifies one computer operation and identifies its operands, if any.

Instruction code: A code used to represent the instructions in an instruction set. Same as: machine code.

Instruction format: The part of the basic machine code of the computer that specifies the way in which the digits or characters are allocated to represent the functional codes of the computer's instructions repertoire.

Instruction set: The set of the instructions of a computer, of a programming language or of the programming languages in a programming system.

Integrated data processing: Information processing in which the coordination of all data acquisition and other stages of information processing within an organization are combined in a coherent information processing system. Abbreviation: IDP.

Interactive mode: Synonyme for: conversational mode.

Interface: The place at which independent systems meet and act upon or communicate with each other - The mean by which interaction or communication is effected at an interface - A common boundary between information processing systems or the parts of a single system - The boundary between two systems or two devices.

Interpreter: A computer program used to interpret.
Same as: interpretive program.

Item: An element of a set of data.
Example: A file may consist of a number of items such as records which in turn may consist of other items.

Iterative operation: The repetition of the algorithm for the solution of a set of equations with successive combinations of initial conditions or other parameters; each successive combination is selected by a subsidiary computation based on a predetermined set of iteration rules. Same as: automatic sequential operation.

Job: (Computing Service) A unit of work that is defined by a user and that is to be accomplished by a computer. Loosely, the term "job" is sometimes used to refer to a representation of job. This representation may include a set of computer programs, files, and control statements to the operating system.

Job-recovery control file: A file that contains all data pertaining to jobs being run on a computer system which can be used to restart jobs in the event of a system failure during the run.

Job stream: The sequence of jobs or parts of jobs submitted to an operating system.
Same as: input stream; run stream.

Keyword: Synonym for: descriptor.

Language: A set of characters, conventions and rules that is used for conveying information, e.g., algorithmic language, artificial language, assembly language; command language; computer language; computer-oriented language; control language; language; problem-oriented language; procedural language; procedure-oriented language; programming language; source language; stratified language; target language; unstratified language.

Language processor: A computer program that performs such functions as translating, interpreting and other tasks required for processing a specified programming language.
Examples: A FORTRAN processor; a COBOL processor.

Library of data: A set of related files.
Example: In stock control, a set of inventory control files may form a library of data.

Library program: A computer program in or from a program library.

Link: In computer programming, a part of a computer program, in some cases a single instruction or an address,. that passes control and parameters between separate portions of the computer program. Same as: linkage. To provide a link.

Link protocol: A set of rules for data communication over a data link specified in terms of a transmission code, a transmission mode, and control and recovery procedures.

Load module: A program unit that is suitable for loading into main storage for execution; it is usually the output of a linkage editor.

Logic design: A functional design that uses formal methods of description, such as symbolic logic.

Logic diagram: A graphic representation of a logic design.

Logic element: A device that performs an elementary logic operation. Same as: switching element.

Logic function: Synonym for: switching function.

Logic instruction: An instruction in which the operation part specifies a logic operation.

Logic operation: (1) An operation that follows the rules of symbolic logic. (2) An operation in which each character of the result depends only on the corresponding character of each operand.

Logic unit: A part of a computer that performs logic operations and related operations. Arithmetic and logic unit,

Loop: A set of instructions that may be executed repeatedly while a certain condition prevails.

Low-level language: Synonym for: computer-oriented language.

Machine code: Synonym for: instruction code.

Machine instruction: Synonym for: computer instruction.

Machine language: A language that is used directly by a machine. Instructions written in machine code which can be obeyed by a computer without conversion.
Same as: computer language.

Macrodefinition: A declaration that provides the skeletal code which a macrogenerator uses in replacing a macroinstruction.
Same as: macrodeclaration.

Macrogenerator: A computer program that replaces macroinstructions in the source language with the defined sequence of instructions in the source language.
Same as: macro-generating program.

Macroinstruction: An instruction in a source language that is to be replaced by a defined sequence of instructions in the same source language.

Magnetic core storage: A magnetic storage in which data are stored by the selective polarization of magnetic cores.

Magnetic disk storage: A magnetic storage in which data are stored by magnetic recording on the flat surfaces of one or more disks that rotate in use.

Magnetic drum storage: A magnetic storage in which data are stored by magnetic recording on the curved surface of a cylinder that rotates in use.

Magnetic ink character recognition: Character recognition of characters printed with ink that contains particles of magnetic material. Abbreviation: MICR.

Magnetic tape drive: A mechanism for moving magnetic tape and controlling its movement. Same as: magnetic tape transport mechanism; drive; tape drive; tape transport.

Magnetic tape storage: A magnetic storage in which data are stored by magnetic recording on the surface of a tape that moves longitudinally in use.

Magnetic tape unit: A device containing a tape drive, magnetic heads and associated controls. Same as: tape deck.

Maintenance: (Hardware/equipment) Any activity intended to retain a functional unit in, or to restore it to, a state in which it can perform its required function. Includes keeping a functional unit in a specified state by performing activities such as tests, measurements, replacements, adjustments and repairs. See also: File maintenance, maintenance project.

Mask: To use a pattern of characters to control the retention or elimination of portions of another pattern of characters.

Mass storage: Storage having very large storage capacity.

Master file: A file that is used as an authority in a given job and that is relatively permanent, even though its contents may change. Same as: main file.

Matching: The technique of comparing the keys of two records to select items for a particular stage of processing or to reject invalid records.

Mathematical logic: Synonym for: symbolic logic.

Matrix: An array of elements, arranged in rows and columns, that may be manipulated according to the rules of matrix algebra.

Memory: Synonym for: internal storage.
Also: read-only memory; virtual memory.

Memory device: Synonym for: storage device.

Merge: To combine the items of two or more sets that are each in the same given order into one set in that order.

Message: (1) In information theory and communication theory, an ordered series of characters intended to convey information. (2) In data communication, a group of characters and control sequences transferred as an entity, from a data source to a data sink, whose arrangement of characters is determined by the data source-.

Message mode: A manner of operating a data network by means of message switching.

Message sink: That part of a communication system in which messages are considered to be received.

Message source: That part of a communication system from which messages are considered to originate.
Same as: information source.

Message switching: The process of routing messages by receiving, storing, and transmitting complete messages within a data network.

Metalanguage: A language that is used to specify a language or languages.

Microform: A medium that contains microimages.

Micrographics: That branch of science and technology concerned with methods and techniques for converting any form of information to or from microform.

Microprogram: A sequence of elementary instructions that corresponds to a specific computer operation, that is maintained in special storage, and whose execution is initiated by the introduction of a computer instruction into an instruction register of a computer.

Microprogramming: The preparation or use of microprograms.

Minimum delay programming: A method of programming in which storage locations for instructions and data are chosen so that access time is reduced and minimized.

Mirror: To reflect all or part of a display image; the image is rotated 180 degrees about a line in the place of the display image.

Mnemonic symbol: A symbol chosen to assist the human memory.
Example: The abbreviation "myp" for "multiply".

Modem: A functional unit that modulates and demodulates signals.

Monitor: A functional unit that observes and records selected activities within an information processing system for analysis. See also: system monitor.

Monitor program: A computer program that observes, regulates, controls or verifies the operations of an information processing system. Same as: monitoring program.

Multiplexer: In data transmission, a functional unit that permits two or more data sources to share a common transmission medium such that each data source has its own independent channel.

Multiprocessing: A mode of operation that provides for parallel processing by two or more processors of a multiprocessor.

Multiprocessor: A computer including two or more central processing units that have access to a common main storage.

Multiprogramming: A mode of operation that provides for the interleaved execution of two or more computer programs by a single processor.

Multitasking: A mode of operation that provides for the concurrent performance, or interleaved execution of two or more tasks.

Natural language: A language whose rules are based on current usage without being explicitly prescribed.

Node: In a data network, a point where one or more functional units interconnect data transmission lines.

Notation: A set of symbols, and the rules for their use, for the representation of data.

Object language: The intended and desired output from the conversion of one language to another.
Same as: target language.

Object module: A program unit that is the output of an assembler or a compiler and that is suitable for input to a linkage editor.

Object program: A computer program that is the output of a conversion from one language to another. Same as: target program.

Offline: Pertaining to the operation of a functional unit when not under the direct control of the computer.

Online: Pertaining to the operation of a functional unit when under the direct control of the computer.

Operand: An entity on which an operation is performed.

Operational analysis: Synonym for: operation research.

Operating system: Software for controlling the execution of computer programs and that may provide scheduling, debugging, input/output control, accounting, compilation, storage allocation, data management and related services. Abbreviation: OS.

Operation: A well-defined action that, when applied to any permissible combination of known entities, produces a new entity.

Operation analysis: Synonym for: operation research.

Operations research: The design of mathematical models for complex problems concerning the optimal allocation of available resources, and the design or application of mathematical methods for solving those problems. Abbreviation: OR. Same as: operational research; operation analysis.

Operation table: A table that defines an operation by listing all appropriate combinations of values of the operands and indicating the result for each of these combinations.

Output: Synonym for: output data; output process. Pertaining to a device, process or channel involved in an output process, or to the data or states involved in an output process. The word "output" may be used in place of "output data", "output signal", "output terminal", etc.

Output data: Data being delivered or to be delivered from an information processing system or from any part of it.

Output device: Same as output unit.

Output process: The process that consists of the delivery of data from an information processing system or from any part of it.

Output program: A utility routine that organizes the output process of a computer.

Output routine: A utility routine that organizes the output process of a computer.

Output unit: A device in an information processing system by which data can be received from the system.
Same as: output device.

Overlay: In the execution of a computer program, to load a segment of the computer program in a storage area hitherto occupied by parts of the computer program that are not currently needed.

Packet: Data and a sequence of control bits arranged in a specified format and transferred as an entity that is determined by the process of transmission.

Packet mode: A manner of operating a data network by means of packet switching.

Packet sequencing: A process of ensuring that packets are delivered to the receiving data station in the same sequence as they were received by the data network from the sending data station.

Packet switching: The process of routing and transferring data by means of addressed packets so that a channel is occupied during the transmission of the packet only and, upon completion of the transmission, the channel is made available for the transfer of other packets.

Parallel operation: A processing mode in which operations are performed either concurrently in a single device, or concurrently or simultaneously in two or more devices.

Parameter: A variable that is given a constant value for a specified application and that may denote the application. Example: dynamic parameter; external program parameter; preset parameter; program generated parameter.

Parity check: A check which ensures that any one group of binary digits conforms to the parity (either odd or even) required by that particular computer or computer system.

Password: A protected code or signal that identifies a user.

Patch: To make an improvised modification.

Pattern recognition: The identification of shapes, forms, or configurations by automatic means.

Peripheral control unit: Synonym for: input-output controller.

Peripheral equipment: In an electronic data processing system, any equipment, distinct from the central processing unit, which may provide the system with outside communication or additional facilities.

Port: A functional unit of a node through which data can enter or leave a data network.

Postmortem dump: Dumping that is performed at the end of a run, usually for purposes of debugging, auditing or documentation.

Postprocessor: A computer program that effects some final computation or organization.

Precision: A measure of the ability to distinguish between nearly equal value. Examples: Four-place numerals are less precise than six-place numerals; nevertheless a properly computed four-place numeral may be more accurate than an improperly computed six-place numeral.

Preset parameter: A parameter that is bound when the computer program is constructed, for example, when it is flowcharted, coded or compiled.

Preventive maintenance: Maintenance performed specifically to reduce the incidence of faults. Also: routine maintenance; periodical maintenance.

Privacy: The right of individuals and organizations to control the collection, storage and dissemination of their data or data about themselves.

Privacy protection: The establishment of appropriate administrative, technical and physical safeguards to ensure the security and confidentiality of data against any anticipated threats or hazards to privacy.

Problem description: A statement of a problem, perhaps including a description of the method of solving it, the procedures and algorithms, etc.

Problem-oriented language: A programming language that is especially suitable for a given class of problems.
Examples: Procedure-oriented language such as FORTRAN, ALGOL; simulation languages such as GPSS, SIMSCRIPT; list processing languages such as LISP, IPL-V; information retrieval languages.

Procedural language: Synonym for: procedure-oriented language.

Procedure: A description of a course of action taken for a specific purpose. See also: contingency procedure; recovery procedure.

Procedure-oriented language: A program-oriented language that facilitates the expression of a procedure as an explicit algorithm. Examples: FORTRAN, ALGOL, COBOL, PL/1.
Same as: procedural language.

Process: A course of events occurring according to an intended purpose or effect. To perform operations on data according to an intended purpose or effect.

Processor: Software, hardware or firmware which is capable of performing processing.

Program: A schedule or plan that specifies actions which may or may not be taken.
Variant: program.
Also: assembly program; checking program; compiling program; computer program; control program; diagnostic program; executive program; input program; interpretive program; library program; macro generating program; monitoring program; monitor program; object program; output program; reenterable program; relocatable program; resident control program; reusable program; self-adapting program; self-organizing program; service program; snapshot program; snapshot trace program; source program; supervisory program; target program; trace program; translating program; utility program.

Program: To design and/or to write (code) and test/debug computer programs.

Program-generated parameter: A parameter that is bound during the execution of a computer program. Same as: dynamic parameter.

Program library: An organized collection of computer programs.

Programmatics: The branch of learning that is concerned with the study and development of computer programming methods and languages.

Programmed check: A check that is carried out by a series of instructions in a program.

Programming: The designing, writing and testing and documenting of computer programs.

Programming flowchart: A flowchart representing the sequence of operations in a program.

Programming language: An artificial language established for expressing computer programs.

Programming science: Synonym for: programmatics.

Programming system: One or more programming languages and the necessary software for using these languages with particular information processing equipment.

Program testing: The running of a program against a predetermined series of users specified data to arrive at a predictable result for the purpose of establishing program acceptability.

Protection: An arrangement for restricting access to the use of all or part of a computer system.
See also: privacy protection; storage protection.

Pseudocode: A code that requires translation prior to execution. Pseudocode can be used as an aid in program development by using English-like terms to describe program structures.

Rate: The number of bits, bytes or characters per unit of time which pass a given point in a given channel or which a device can accept (input) or deliver (output).

Read: To obtain data from a storage device, from a data medium, or from another source.

Reading: The obtaining of data from a storage device, from a data medium, or from another source.

Real time: Pertaining to the processing of information by a computer in connection with another process outside the computer according to time requirements imposed by the outside process. The term "real time" is also used to describe systems operating in conversational mode and processes that can be influenced by human intervention while they are in progress.

Real-time operation: In analog computing, an operation or other response in which programmed responses to an event are simultaneous with the event itself.

Reconfiguration: A change to the configuration of a computer system, effected manually and/or automatically, that can be used to maintain system integrity.

Record: A set of related data or words treated as a unit. Example: In stock control, each invoice could constitute one record.

Record layout: The arrangement and structure of data or words in a record, including the order and size of the components of the record.

Redundancy: In information theory, the amount by which the decision content exceed the entropy.

Redundancy check: Any checking operation which depends on extra characters or bits that are attached to data to permit the automatic detection of errors. The extra characters or bits do not themselves contribute to the significant content of the data.

RJE: Abbreviation for remote job entry.

Reliability: The ability of a functional unit to perform a required function under stated conditions for a stated period of time.

Remote batch entry: Submission of batches of data through an input unit that has access to a computer through a data link.

Remote batch processing: Batch processing in which input-output units have access to a computer through a data link.

Remote job entry: Submission of one or more jobs through an input unit that has access to a computer through a data link. Abbreviation: RJE.

Restart: The resumption of the execution of a computer program using the data recorded at a checkpoint.

Result: An entity produced by the performance of an operation.

ROM: Abbreviation for: read only memory.

Routine: A computer program, or part thereof, that may have some general or frequent use.

Run: A performance of one or more jobs or programs.

Segment: A self-contained portion of a computer program that may be executed without the entire computer program necessarily being maintained in the internal storage at any one time. To divide a computer program into segments.
Same as: partition, section.

Self-organizing program: A program that has the ability to make re-arrangements in its internal structure.

Sequential: Pertaining to the occurrence of events in time sequence, with no simultaneity or overlap.

Service program: Synonym for: utility program.

Service routine: Synonym for: utility program.

Setup: In a computer which consists of an assembly of individual computing units, the arrangement of interconnections between the units and the adjustments needed for the computer to operate upon a given problem.

Signal: A value attached to an event that conveys information.

Simulation: The representation of features of the behavior of a physical or abstract system by the behavior of another system. Examples: (1) The representation of a physical phenomenon by means of operations performed by a computer. (2) The representation of operations of a computer by those of another computer.

Simulator: A device, information processing system or computer program for representing features of the behavior of a physical or abstract system.

Software: Computer programs, procedures, rules and any associated documentation concerned with the operation of an information processing system.

Sort: To segregate items into groups according to specified criteria. NOTE: Sorting involves ordering, but need not involve sequencing, for the groups may be arranged in an arbitrary order.

Source language: A language in which a problem is programd for a computer which requires conversion before processing.

Source program: A computer program expressed in a source language.

Snapshot program: (Synonym: snapshot trace program) A trace program that produces output data only for selected instructions or for selected conditions.

Statement: In a programming language, a meaningful expression that may describe or specify operations and is usually complete in the context of this language.

Storage: The action of placing data into a storage device. The retention of data in a storage device.

Storage capacity: The amount of data that can be contained in a storage device measured in binary digits, bytes, characters, words or other units of data.

Storage device: A functional unit into which data can be placed, in which they can be retained, and from which they can be retrieved. Same as: storage unit; memory unit; memory device.

Storage protection: Limitation of access to a storage device, or to one or more storage locations, by preventing writing or reading or both.

Statified language: A language that cannot be used as its own metalanguage. Example: FORTRAN.

Subroutine: A sequenced set of statements that may be used in one or more computer programs and at one or more points in a computer program.

Supervisory program: A computer program, usually part of an operating system, that controls the execution of other computer programs and regulates the flow of work in information processing systems. Same as: executive program; supervisor.

Swapping: A process that interchange the content of an area of main storage with the content of an area in auxiliary storage.

Symbol: A conventional representation of an idea or a representation of a concept upon which agreement has been reached.

Symbolic logic: The discipline in which valid arguments and operations are dealt with using an artificial language designated to avoid the ambiguities and logical inadequacies of natural languages.
Same as: mathematical logic.

Syntax: The relationships among characters or group of characters, independent of their meanings or the manner of their interpretation and use.

System: An independent collection of persons, machines, methods and procedures organized to accomplish a specific set of functions.

System generation: The process of selecting optional parts of an operating system and of creating a particular operating system tailored to the requirements of an information processing installation.
Abbreviation: sysgen.

System monitor: One or more computer programs that monitor the activities of a computer system.

System resilience: That quality of a computer system that enables it to continue to function correctly despite the existence of a fault or faults in one or more of its component parts.

System security (EDP): Technological and managerial safeguards designed to protect computer hardware, software and data from unauthorized or accidental modification, destruction or disclosure.

System testing: The running of a system against a predetermined series of users specified data to arrive at a predictable result for the purpose of establishing system acceptability.

Table: An array of data each item of which may be unambiguously identified by means of one or more arguments.

Tape deck: Synonym for: magnetic tape unit.

Tape drive: Synonym for magnetic tape drive.

Target program: Synonym for: object program.

Task: In a multiprogramming or multiprocessing environment, one or more sequences of instructions treated by a control program as an element of work to be accomplished by a computer.

Telecommunications: Data transmission between a computing system and remotely located devices via a unit that performs the necessary format conversion and controls the rate of a transmission. (Also: communications; data communication).

Terminal: An input-output unit by which a user communicates with an information processing system. The functional unit of a data station that serves as a data source or a data link and ensures that the data communication control function is performed in accordance with link protocol.

Throughput: A measure of the amount of work performed by a computer system over a given period of time.
Example: Number of jobs per day.

Time sharing: An operating technique of a computer system that provides for the interleaving in time of two or more processors in one processor.

Trace program: A computer program that performs a check on another computer program by exhibiting the sequence in which the instructions are executed and usually the results of executing them.

Trace routine: A routine designed to check or demonstrate the operation of a program. The output of such a routine usually includes some or all of the instructions in the program being checked, and their immediate results, arranged in the sequence in which they are executed.

Translate: In computer graphics, to more a display element, display group, or display image on the display space from one location to another location without rotating the image.

Translate: To transform from one language to another language.

Translator: A computer program that translates from one language into another language and in particular from one programming language into another programming language.
Same as: translating program.

Utility program: A computer program in general support of the processes of a computer.
Examples: An input routine; a diagnostic program; a trace program; a sort program.
Same as: service program.

Utility routine: A routine in general support of the processes of a computer.
Examples: An input routine; a diagnostic program; a trace program; a sort program.
Same as: service routine.

Variable: (1) In computer programming, a character or group of characters that refers to a value and, in the execution of a computer program, corresponds to an address. (2) A character or group of characters that can assume any of a given set of values.

Virtual memory: Synonym for: virtual storage.

Virtual storage: The storage space that may be regarded as addressable main storage by the user of a computer system in which virtual addresses are mapped into real addresses.

KNOWLEDGE

This factor is used to measure the amount of education and experience required to undertake the duties of the position, and the requirement for continuing study.

Definitions

"Education" refers to the level of academic or other formal training required to provide the basis for the development of the skill and knowledge needed in the position.

"Experience" refers to the minimum length of time an employee requires, under optimum conditions, to acquire the administrative knowledge and skill needed to carry out the duties of the position.

"Continuing study" refers to the requirement for maintaining a knowledge of trends and developments in one or more fields related to the duties of the position.

Notes to Raters

For purposes of this standard the time needed to acquire clerical and other skills, to gain working knowledge of the regulations and directives, and to determine the capacity to perform administrative work is not to be considered in the evaluation of the Experience element of the Knowledge factor.

In tentatively selecting the degree of the Experience element, consideration is to be given to the length of time needed to develop the specialized knowledge and general administrative knowledge required to carry out the duties of the position. General administrative knowledge is gained through experience in such responsibilities as

1. formulating ideas and expressing them orally or in written form;
2. carrying out studies and preparing reports on specific aspects of existing or proposed activities;
3. making critical analyses of methods and procedures with a view to recommending improvements;
4. performing advisory duties that require a knowledge of the program objectives of the organization served and plans of action developed to achieve them;
5. planning programs of work to meet the requirements of the organization served; and
6. supervising and directing staff.

The degrees of the Experience element assigned to the bench-mark positions have been established by ranking on the basis of such considerations as those mentioned above. The degree of the Experience element tentatively selected is to be confirmed by direct comparison of the position being rated with the duties and specifications of the bench-mark positions.

The second degree of the Education element is to be assigned when the duties of the position

1. require university graduation in a specialized field,

or

2. require understanding and appreciation of the principles and concepts of two or more specialized fields for which the knowledge is normally acquired through university training and which are directly associated with the duties performed,

or

3. require systematic study and analysis of complicated general problems and their solution by the application of specialized knowledge acquired through extensive post-secondary school study or training rather than through experience.

In positions with duties that meet conditions 2 and 3, the incumbents will not necessarily be university graduates.

KNOWLEDGE

RATING SCALE - EDUCATION AND EXPERIENCE

Experience Requirement and Degree		Education and Degree Completion of Secondary School Education A		University Graduation B	
		60	Page	135	Page
Up to and including 2 years	1	Computer Systems Programmer	75		
		87		162	
Up to and including 4 years	2			Analyst/Designer/Programmer, Technological Applications Systems Computer Systems Programmer, Computer Science Division	49 78
		114		189	
Up to and including 6 years	3	Programmer-Analyst, Information Processing Applications Section Systems Analyst	116 143	Head, Computer and Communications Center Project Leader Supervisor, Information Processing Applications Section	94 119 140
		141		216	
Up to and including 8 years	4			Head, Information Processing Hardware Service Head, Systems Analysis and Programming Section, Central Computer Division	101 108
		169		244	
Up to and including 10 years	5			Chief, Central Computer Division, Central Ser. Br. Chief, Customer Service Chief, Information Processing Service	53 57 62
		197		272	
Up to and including 12 years	6			Director, Information Processing Service, Materiel Command H.Q.	90
		225		300	
More than 12 years	7				

KNOWLEDGE

RATING SCALE - CONTINUING STUDY

Nature of Continuing Study, and Degree		Points	Bench-mark Position Descriptions	
				Page
The work requires knowledge of (a) trends and developments in computer systems programming techniques and practices, OR (b) the capabilities, requirements and capacities of departmental and contractor information processing facilities, and the regulations and procedures governing their use, gained by continuing study of directives, manuals, texts, journals and periodicals, and by attendance at government and industry sponsored training courses.	1	20	Computer Systems Programmer Computer Systems Programmer, Computer Science Division	75 78
The work requires knowledge of (a) trends and developments in computer systems analysis techniques and practices, OR (b) trends and developments in information processing technology and in the direction, planning and co-ordination of information processing operations, gained by continuing study of texts, journals and periodicals, consultations with officials of other information processing services, suppliers and manufacturers, and attendance at seminars, conferences and training courses.	2	60	Head, Information Processing Hardware Service Head, Systems Analysis and Programming Section, Central Computer Division Project Leader	101 108 119
The work requires knowledge of trends and developments in the administration and operation of information processing services and of the interrelationships of information processing and general management requirements, gained by continuing study of texts, journals and periodicals, consultations with officials of suppliers and manufacturers, and attendance at seminars, conferences and training courses. It also requires continuing study to develop and maintain knowledge of the objectives, operations and long-range information processing requirements of users.	3	100	Chief, Central Computer Division, Central Services Branch Chief, Information Processing Service Director, Information Processing Service, Materiel Command Headquarters	53 362 90

DECISION MAKING

This factor is used to measure the difficulty of the duties of the position as indicated by the scope for decision making and by the impact of the decisions.

Definitions

"Decisions" refers to decisions to take particular courses of action within the authority delegated to the position, to recommendations to superiors and users, and to shared decisions and recommendations in which the incumbent is an effective participant.

"Scope for decision making" refers to the freedom to make decisions. It is measured in terms of the judgment, initiative and discretion required to identify and resolve problems, the availability of direction, and the difficulty of determining the implications of possible courses of action.

"Impact of decisions and recommendations" refers to the importance of the decisions and recommendations in terms of their effect on the utilization and development of information processing services, staff and facilities, and on the programs of the organizations serviced.

Notes to Raters

The four degrees of the Impact of Decisions element are illustrated by the bench-mark position descriptions. The following characteristics of the work are to be considered in determining a tentative degree for this element:

1. The complexity and size of the user programs affected by information processing services.
2. The extent to which user operations are dependent upon information processing services.
3. The influence of the position on the economy and efficiency achieved in providing information processing services.
4. The extent to which the incumbent is the effective recommending authority, which is usually related to the level of the position in the organization.
5. The consequences of an error of judgment in making a decision or recommendation.

Any one characteristic is only an indication of the impact of the decisions and recommendations, and the whole context within which the work is performed is to be considered. The job as a whole is then to be compared to the descriptions of the bench-mark positions exemplifying the degree of decision making that has been tentatively established.

RATING SCALE - DECISION MAKING

		Scope for Decision Making, and Degree			
Impact of Decisions, and Degree	Some judgment, initiative and discretion is required in the identification of problems, in the application of information processing practices and techniques, and in the selection of alternative courses of action. The implications of possible courses of action are usually apparent from precedents. Unusual problems are referred to superiors.	A moderate degree of judgment, initiative and discretion is required in the identification of problems, in the modification and application of information processing techniques, and in the selection of alternative courses of action to meet information requirements of users. The implications of possible courses of action may not be readily apparent. Direction is sought when the apparent solutions to problems are not within the intent of established practiced	A significant degree of judgment, initiative and discretion is required in the identification of problems, in the negotiation of revisions to information requirements of users, and in the development and recommendation of alternative solutions to information processing problems. Recommendations are made to effect changes in, or establish limits to, the information processing services provided. The implications of possible courses of action are often difficult to determine.	A high degree of judgement, initiative and discretion is required in the development of solutions to diverse and interrelated problems. Substantial contributions are made to the planning and developing of information processing services. Recommendations and decisions affect the acquisition, allocation and utilization of information processing resources, and must anticipate changes in technology and demands for information processing services. Implications of actions taken or proposed are complex and often cannot be determined with certainty.	
	A	B	C	D	
	70 Page	116 Page	162 Page	208	Page
Limited 1	Computer Systems Programmer 75	Analyst/Designer/ Programmer, Technological Applications Systems 49			
Moderate 2	117 Computer Systems Programmer, Computer Science Division 78	163 Head, Computer and Communications Centre 94 Senior Technical Consultant 131	209 Chief, Production Software 66 Chief, Technical Services Section 71	255	
Significant 3	164	210 Supervisor, Information Processing Applications Section 140	256 Chief, Customer Service 57 Head, Systems Analysis and Programming Section, Central Computer Division 108	302	
Major 4	211	257	303 Chief, Central Computer Division, Central Services Branch 53 Chief, Information Processing Service 62	350 Director, Information Processing Service, Materiel Command H.Q.	90

RESPONSIBILITY FOR CONTACTS

This factor is used to measure the difficulty and importance of contacts that occur as an integral part of the work and the requirements imposed by these contacts to work and communicate with others in person, by telephone or in writing.

Notes to Raters

Only those contacts that are an integral part of the work and that result from the duties assigned or sanctioned by management are to be considered.

Points are to be assigned for written contacts only if the duties of the position being rated include responsibility for signing letters or memoranda.

RATING SCALE - RESPONSIBILITY FOR CONTACTS

Nature of Contacts, and Degree		Points	Bench-mark Position Descriptions	
				Page
To give, obtain and exchange information requiring discussion, explanation and co-operation.	1	20	Computer Systems Programmer Computer Systems Programmer, Computer Science Division	75 78
To persuade and obtain assistance or agreement requiring action by others.	2	46	Project Leader Systems Analyst Telecommunications Advisor	119 143 146
To represent a central agency or a departmental information processing service at formal meetings when differences of interest may be expected, with authority to discuss problems of some significance and seek common ground on which to base solutions.	3	73	Head, Systems Analysis and Programming Section, Central Computer Division Supervisor, Information Processing Applications Section	108 140
To represent a central agency or a departmental information processing service at formal meetings, with authority to participate in the formulation of information processing policies and to undertake commitments to provide information processing services.	4	100	Chief, Information Processing Service Director, Information Processing Service, Materiel Command H.Q.	62 90

SUPERVISION

This factor is used to measure the continuing responsibility that the incumbent of the position assumes for the work and guidance of other employees. The two elements of the factor are the level of employees supervised and the numbers supervised.

Definitions

"Level of employees supervised" refers to the highest level supervised.

"Numbers supervised" refers to the total number of employees for whom the incumbent of the position exercises supervisory responsibility directly or through subordinate supervisors.

Notes to Raters

A position whose incumbent does not have a continuing and substantive responsibility for the supervision of the work of others is not to be assigned points under this factor. Characteristically, "substantive responsibility" includes allocating staff to various work projects, proposing disciplinary action, informing staff of their strengths and weaknesses, proposing changes in the numbers and classification of positions, and ensuring that work standards are maintained.

Occasional supervision, such as that performed during absences of the supervisor on annual or sick leave, is not to be rated.

For the purpose of the standard, "numbers supervised" includes the total of the following:

1. The number of employees in the department or agency for whom the incumbent has continuous supervisory responsibility.

2. The number of man-years of work performed by casual, part-time and seasonal employees who are supervised by the incumbent.

3. The number of employees in the department or agency for whom the incumbent has responsibility for functional supervision.

4. The maximum number of employees usually supervised by the incumbent where the work is organized on a project basis and where the number supervised varies according to the requirements of each project.

The term "functional supervision" applies to staff of units for which the incumbent of the position being evaluated

1. has authority to prescribe objectives or programs and the methods and procedures to be followed in carrying out a specialized function,

and

2. has responsibility for ensuring adherence to established programs, methods and procedures,

and

3. has authority to make effective recommendations on employment, promotions or transfers.

In 3 above, the term "has authority" refers to established practices that require senior officials to exercise significant influence on the employment, promotion or transfer of employees who are not under their direct supervision. It does not imply, however, authority to impose their views on line officers.

Employees at all levels are to be included in the numbers subject to functional supervision, although the third criterion may not apply to those at junior levels to the same degree as to more senior employees.

RATING SCALE - SUPERVISION

	Numbers Supervised and Degree						
Level of Employees Supervised, and Degree	1 - 3	4 - 10	11 - 25	26 - 50	51 - 100	101 - 175	176 or over
	A	B	C	D	E	F	G
1	15	32	49	67	85	103	121
2	29	46	63	81	99	117	135
3	44	61	78	96	114	132	150

Level of Employees Supervised, and Degree		Bench-mark Position Descriptions	
			Page
Supervises employees in the administrative support category or junior employees in other categories.	1		
Supervises intermediate employees in the administrative and foreign service, or other categories.	2	Project Leader Senior Analyst, Systems Software Supervisor, Information Processing Applications Section	119 122 140
Supervises senior employees in the administrative and foreign service, or other categories.	3	Chief, Central Computer Division, Central Services Branch Chief, Information Processing Service Director, Information Processing Service, Materiel Command H.Q.	53 62 90

Bench-mark Position Description Index

In Bench-mark Numerical Order

Bench-mark Position Description Index In Ascending Order of Point Values

BENCH-MARK POSITION DESCRIPTION

Bench-mark Position Number: 1 Level: 2

Descriptive Title: Analyst/Designer/Programmer, Technological Applications Systems Point Rating: 384

Summary

Under the direction of the Head, Perception Group, determines the feasibility of designs of proposed system software on a mini-microcomputer facility, of new or modifications to generalized system software; evaluates mini-microcomputer system software and of generalized application oriented system software; determines extent of modifications identified; provides technical advice on acquisition of specialized hardware processors, and on hardware and software packages to be developed; and performs other significant duties.

Duties	% of Time
Determines the feasibility of, designs, implements and installs, on a mini-microcomputer facility, new or modifications to generalized system software, custom made application software and technological information processing applications systems to produce general design specifications and make decisions on future status of proposed software - by identifying, defining and reviewing actual and projected requirements of. proposed system software or for specific application software, - by determining the functional characteristics of systems, - by researching vendor-supplied software to determine suitability, - by determining hardware/software requirements and relevant costs, - by assessing impact of new software on overall resources of the facility, and - by recommending appropriate action.	25
Reviews general design specifications and packages functional specifications into computer system modules by inputs, outputs and processes of each module to produce design specifications - by clarifying general design specifications,	20

% of Time

- by packaging functional specifications into computer system modules,
- by preparing detailed computer program specifications,
- by preparing test and conversion plans,
- by estimating costs, and
- by recommending modifications to general design specifications.

Evaluates, installs and modifies vendor-supplied mini-microcomputer system software and generalized application oriented system software to decide on selection of system software — 20

- by determining software characteristics through analysis of hardware interfaces, communication network and special peripherals requirements,
- by determining characteristics of system software under evaluation and comparing these to identified requirements,
- by assessing the impact of the proposed system software on the capacity of computing facilities, and
- by recommending acquisition of system software.

Determines extent of modifications identified in the selection process or in the sponsor's requests to provide the system software required for the efficient and effective use of the hardware facility — 20

- by identifying locations of modifications within the vendor-supplied system software,
- by generating the code to replace existing code or to create new modules,
- by generating the system software incorporating vendor supplied options, modified code and new modules into a single package, and
- by assessing performance of package and conducting acceptance tests of software.

Provides technical advice on acquisition of specialized hardware processors to implement special algorithms, and on hardware and software packages to be developed through industrial research contracts to support research projects and to ensure compatibility with mini-microcomputer facility — 10

- by reviewing and discussing requirements with project scientists and engineers,

% of Time

- by explaining current and potential capabilities of the existing facility,
- by defining the interfacing requirements to be met to be compatible with existing facility, and
- by generating technical inputs for development or contract specifications.

Performs other significant duties 5

- by acting as technical authority on the software aspects of industrial research contracts.

Specifications	Degree	Points
Knowledge - Education and Experience	B2	162

The work requires an in-depth knowledge of the design principles and programming techniques used in computer operating systems, the logical functioning of computer hardware mainframe and peripheral equipment and the external specifications of language processors and utilities, for all sizes of computers. Familiarity with manufacturer's procedures for maintaining their operating systems is required, as is the ability to communicate effectively, both orally and in writing, on technical subjects. A knowledge of departmental operations and aims **is** required to better anticipate user requirements and to forecast the impact of proposed system changes on users. This is necessary to ensure efficient implementation of the computerized system. Extensive experience in working at the highest level of technical competence in projects requiring a sophisticated and complex operating system design and programming techniques must be demonstrated. This should include work in several areas of specialization, e.g. input/output drivers, inter-computer communications, and graphics. Furthermore, extensive experience with a multiprogramming, real-time operating system of mini computers is required. This knowledge and experience is normally acquired through university graduation in science/ engineering/computer science or equivalent in a related discipline and three year's experience in computer programming in high level languages and assembly languages, systems analysis and software design, at least half of which pertained directly to multiprogramming real-time mini computer systems.

	Degree	Points
Knowledge - Continuing Study	2	60

This position requires a knowledge of trends and developments in applications and programming of mini-computers and technological advances in hardware and software systems. Knowledge and study of the scientific objectives of each project is essential. This knowledge is acquired through i) personal contacts with peers, manufacturers, and user groups. ii) study of manufacturer's literature, technical and scientific journals and periodicals. iii) attendance at seminars, conferences and training courses.

Decision Making	B1	116

The work requires sound judgment in proposing and selecting alternative solutions to complex technical problems in computer systems technology, including quick diagnosis and solution of system software and hardware problems, and decisions relating to performance and operational enhancements. Any hardware failure must be countered by an appropriate configuration change as quickly as possible. Recovery action is nearly always required before the remedial manufacturer support can arrive. Recommendations are made to management pertaining to in-house, central computer reconfiguration, auxiliary equipment selection, outside communications facilities selection and software selection.

Contacts	2	46

The work requires daily contacts with systems analysts, working level scientists, and technical staff in the computer user community to resolve technical problems and provide consultation. Frequent contacts are made with manufacturer's sales and technical representatives to acquire technical information and resolve problems in applying their products. Contacts with staff and non-government agencies are made periodically as are briefings to management in areas of the incumbent's special competence.

Supervision	-	-

Supervision of the work of other staff is not a regular requirement. Occasional guidance and work leadership may be provided to junior programmers.

BENCH-MARK POSITION DESCRIPTION

Bench-mark Position Number: 2 Level: 5

Descriptive Title: Chief, Central Computer Division, Central Services Branch Point Rating: 879

Summary

Under general direction of the Director, Central Services Branch, plans, directs and co-ordinates the activities of the Central Computer Division, which include the provision of information processing services associated with cheque issuing, processing of accounts payable and related accounting functions; advises user officials on the use and requirements of information processing; and performs other related duties.

Duties	% of Time
Plans, directs and co-ordinates the activities of the Central Computer Division, with an establishment of 140 positions, large mainframe computers and extensive peripheral and auxiliary equipment installations, and engaged in computer systems analysis and programming, planning of information processing systems, operation of information processing equipment, and associated co-ordinating, scheduling and administrative activities, to ensure the economic and efficient satisfaction of user information requirements and use of staff, equipment and contract resources - by establishing information processing workload requirements through discussions with user officials in the department, - by developing forecasts of staff and equipment requirements, - by establishing priorities, in co-operation with user officials, to facilitate detailed scheduling of information processing operations, - by reviewing proposed applications to establish their overall technical and economic feasibility, - by negotiating major revisions to information requirements of users, to expedite processing operations or to improve the technical or economic feasibility of applications, - by developing and establishing production and quality control procedures,	60

% of Time

- by assigning staff and equipment resources to the conduct of feasibility studies and the development and implementation of information processing systems, and
- by reviewing production, operating and administrative reports to ensure the maintenance of production and quality standards and to assess supervisory staff performance.

Advises user officials and the Director, Central Services Branch, of the capabilities, capacities, availability, costs, benefits and requirements of information processing services and of the policy and resource requirements of the division, to assist users in obtaining maximum benefit from information processing services and to facilitate the development of the facilities and services of the division 30

- by informing user officials of priorities, availability of staff and equipment, and costs and benefits of alternative processing arrangements,
- by planning alternative methods of meeting information requirements of users to accommodate changing priorities or specifications of users,
- by developing and recommending the implementation of policies and procedures relating to the administration and operation of information processing services,
- by reviewing technological and administrative trends, developments and innovations in information processing for possible utilization in operations of the division, and
- by preparing reports, including annual estimates and establishment presentations to Treasury Board, on the identification and substantiation of own staff and equipment requirements.

Performs other related duties, such as participating in the selection, assessment and training of computer systems programming and analysis staff and preparing memoranda, correspondence and reports associated with administrative and advisory responsibilities. 10

Specifications	Degree	Points
Knowledge - Education and Experience	B5	244
The work requires a thorough knowledge of the capabilities and capacities of information processing equipment and of computer systems analysis and programming practices and techniques. A good knowledge of the regulations and practices governing the payment of salary, pension, supplier and other accounts, and maintenance of related records is also required. Skill in planning, co-ordinating and scheduling information processing operations and in the supervision and training of staff is required. This knowledge and skill are normally acquired through university graduation and 10 years of progressively responsible experience in administration, computer systems analysis, and information processing.		
Knowledge - Continuing Study	3	100
The work requires knowledge of trends and developments in computer systems analysis and programming, information processing technology and the administration of information processing services, gained through continuing study of texts, journals and periodicals and by attendance at courses and seminars. Continuing study of regulations and procedures contained in departmental directives and manuals is also required.		
Decision Making	C4	303
Judgment and discretion are required in the assignment of information processing resources and choice of optimum methods of meeting information requirements of users. Decisions are made on priorities, information processing techniques and the allocation of staff and equipment to information processing applications. Recommendations are made on the acquisition and use of staff and equipment. Errors in judgment may adversely affect the economy and efficiency of applications involving the use of large scale information processing systems which control the accuracy and promptness of salary and other payments to government employees and outside suppliers. Problems arising from revised or conflicting priorities are referred to the Director, Central Services Branch.		

	Degree	Points
Contacts	4	100

The work requires contacts with user officials within the Central Services Branch to make commitments for the provision of information processing services. Contacts are made to provide advice, determine requirements and recommend alternative methods of meeting information requirements of users, and may involve persuading users to modify their requirements or operating and administrative procedures. Contacts are also made with officials of government and industry to obtain and provide information on technological and administrative innovations in information processing and assistance in the resolution of technical and administrative problems.

Supervision	F3	132

The work requires supervision of 120 full-time and 20 casual employees, including section heads and unit supervisors, at the senior, intermediate and junior levels of the administrative and foreign service and administration support categories. Supervisory duties include participation in assessment, selection, promotion, and discipline of staff.

BENCH-MARK POSITION DESCRIPTION

Bench-mark Position Number: 3 Level: 5

Descriptive Title: Chief, Customer Service Point Rating: 814

Summary

Under the direction of the Director, Computer Science Center, plans and manages the services provided by the Center on its computer; continually monitors the quality of these services and their relevance; refines those services to meet changing needs; ensures good communication between the Center and its clients; plans and implements all new services provided by the Center; assists the Director in the overall management of the Center.

Duties	% of Time
Plans and manages the activities of the Customer Service Division of the Computer Science Centre. The Division is responsible for the implementation and support of all general purpose application software and for the development of the operating system used on the Centre's computer system. The Division currently provides remote batch entry and interactive (timesharing) services on two large scale multiprogramd computers. These services are currently made available to the Department and to other Government Departments. - by managing the Computation Bureau which operates the Centre's computer and remote batch terminals, production control and transcription services. The Centre's computer currently provides service on a 24 hour day, 6 day a week basis, - by managing the Software Development Section which maintains and develops the operating system and its product set for the computers, - by managing the Customer Support Section which provides consultant, technical support and training on application software services to well over 600 users,	40
Plans and supervises the implementation of all new software and hardware - by ensuring that sufficient resources are available to support the package or equipment,	20

	% of Time
- by ensuring that both software and hardware meet their acceptance tests, - by ensuring that training is provided to those who need it, - by studying new developments in software, hardware and operational techniques with a view to their potential usefulness and installation.	
Ensures that users are aware of the Centre's services and that the Centre is aware of user's requirements - by establishing and maintaining user working groups in the various areas of Centre expertise, - by ensuring that the Centre's publications are accurate and timely, - by publicizing and otherwise promoting the availability of various software and hardware services, - by maintaining personal contacts with senior representatives in a number of Government Departments.	20
Monitors and refines the services supplied by the Centre - by reviewing the services provided in the light of the Centre's and user's objectives, - by refining the services to overcome problems and shortcomings, - by analysis of revenues and system performance.	5
Ensures that security requirements for information processed via EDP facilities either within or outside the department are identified and that appropriate safeguards are applied as outlined in the RCMP's Security Standards and Practices manual.	5
Assists the Director in establishing objectives for the Centre and participates in the development of long range plans and the formulation of policy decisions.	5
Assists in recruitment, selection, training, appraisal and career development of the staff of the Centre and of information processing staff in the rest of the Department.	5

		Degree Points
SPECIFICATIONS		
Knowledge - Education and Experience:	B5	244

The work requires a thorough knowledge of computing as applied in the processing of scientific information in a number of government departments. A sound knowledge is required of the organization of the major customer Departments, their administration and research programs and the government policies and regulations covering the administration of computing organizations. It also requires skill in administration and in communicating on technical matters with staff throughout a number of Departments. Knowledge of the impact to user's projects of changes to software and hardware is absolutely essential. The work requires skill in the planning and co-ordinating of complex technical operations the forecasting of staff and equipment requirements, and the direction of staff. The required knowledge and skills are normally acquired through University graduation, followed by ten years of relevant experience in administration and computing with at least four years in a senior supervisory position.

Knowledge - Continuing Study	3	100

The work requires continuing study of developments and trends in computing hardware and software, operation of computer services, application software and general administration with particular attention being given to their relationship to the scientific and engineering community in a number of different Government departments. As well, the incumbent must relate his knowledge of specialized trends within scientific computing to changes in government policies and practice. This knowledge is maintained by study of government directives and guidelines, technical texts and trade publications, and from attendance at seminars and conferences. In addition, it is essential that meetings are held with user representatives, commercial suppliers and university centers to ensure that the Center’s Computing Services are up-to-date and are sufficient to meet the users' objectives.

	Degree	Points
DECISION-MAKING	C3	256

The work requires the management of a centralized inter departmental computer service which is operated on 24-hour day, 6-day week, and which provides both batch and interactive processing capabilities to in excess of 600 users. The services are used for processing large volumes of data and for general problem solving in the fields of scientific research, regulatory, administrative and operational programs of several Departments. These programs often involve contracts with the private sector and provincial governments and failures to meet deadlines for computer produced output can have a serious impact on the reputation of the Departments. Although not in direct competition with the private sector, it is essential that the services provided by the Division are of equal standard to those available in the private sector. The work involves the exercise of judgment, initiative and, in particular, tact and discretion. Almost all problems encountered are unique and decisions have to be made on the spot without reference to existing directives. The Division operates on a cost recovery basis with a total recovery of $4,000,000 per annum. Decisions and commitments are made which can have a significant impact on these revenues and on the efficiency of the Center and its clients. The incumbent will be expected to do the short and medium term planning, up to one year, of the development of all the computing services offered by the Center to ensure that they meet the needs of its clients. He will be called upon for the evaluation of all hardware and system software acquisitions and for their acceptance. Errors in judgment at this time will adversely affect the quality of the services offered by the Center and can greatly affect its comparative position with relation to other service organizations. In addition, the incumbent must plan the development of system software and performance, to this end he must commit his limited staff to projects of many person-months in implementing new features. The demand for these features is always well in excess of the resources available and a significant degree of insight into the probable return from new developments in hardware and software is essential.

	Degree	Points
CONTACTS	4	100

The work requires frequent contacts with Division Chiefs, Branch Directors and scientists throughout several Departments and also with computer manufacturers and software suppliers. At most meetings the incumbent will act as a representative of the Center with authority to make a commitment on behalf of the Center with regard to its computing services.

SUPERVISION	E3	114

The incumbent is responsible for the supervision of a staff of 54 permanent staff and 3 casuals. These staff are at senior, intermediate and junior levels of the Administrative and Administrative Support categories. Supervisory duties include participation in the selection, assignment, assessment, training and discipline of staff.

BENCH-MARK POSITION DESCRIPTION

Bench-mark Position Number: 4 Level: 5

Descriptive Title: Chief, Information Processing Service Point Rating: 879

Summary

Under the general direction of the Director General, Administration, plans and directs the activities of the departmental Information Processing Service, which include the planning, development and processing of mass data and problem-solving applications using departmental and outside contract facilities; advises user and departmental management officials on the use and development of information processing services; and performs other related duties.

Duties	% of Time
Plans and directs the activities of the Information Processing Service of the Department, with an establishment of 141 positions, a large computer, peripheral equipment and an auxiliary equipment installation, to ensure the satisfaction of departmental requirements for mass data and problem-solving applications and the efficient and economical use of depart mental information processing staff, equipment and contract resources - by determining workload requirements and available service and contract resources through liaison with departmental officials, subordinates and service contractors, - by developing forecasts of requirements for staff, equipment and contract resources, - by developing administrative and operational procedures governing the provision of departmental information processing services, - by assigning analysts and programmers to the planning and development of computer applications, - by authorizing and co-ordinating the use of contract facilities, - by scheduling and co-ordinating departmental information processing operations, and - by reviewing completed information processing systems and production, progress and administrative reports to ensure that quality and production standards are maintained and to assess staff performance.	75

	% of Time
Advises user and departmental management officials on the use and development of departmental information processing resources, to assist users in obtaining the maximum benefit from information processing and to ensure consideration of information processing in the development of departmental administrative practices - by informing users of the costs, capabilities and requirements of departmental and outside contract information processing services, - by recommending alternative information processing arrangements or revisions to information requirements of users, to improve the technical or economic feasibility of approved applications or to accommodate changes in processing or deadline specifications of users, - by developing and recommending implementation of departmental policies governing the use of information processing resources, and - by assessing administrative and technological innovations in information processing, and the capabilities of outside contract services, with a view to recommending the adoption of procedures, the acquisition of equipment, or the use of contract facilities of potential value in the provision or development of departmental information processing services.	15
Performs other related duties, such as participating in the selection, assessment and discipline of information processing staff, representing the Director General at departmental and interdepartmental meetings on information processing administration and preparing reports, memoranda and correspondence, including estimates and submissions to Treasury Board, associated with the administration and development of the departmental Information Processing Service.	10

Specifications	Degree	Points
Knowledge - Education and Experience	B5	244

The work requires a thorough knowledge of information processing techniques and practices and the capacities and capabilities of departmental and contractor information processing facilities. It also requires a good knowledge of the content, objectives and information processing

	Degree	Points
requirements of departmental research, administrative and operational programs and a good knowledge of departmental and government policies and regulations governing the administration of information processing services. An appreciation of the scientific and technological disciplines involved in the conduct of departmental research and operational programs is a further requirement. The work requires skill in the planning and co-ordinating of complex technical operations, the forecasting of staff, equipment and financial requirements, the development and presentation of advice, and the direction of staff. This knowledge is normally acquired through completion of university education and 10 years of progressively responsible administrative and information processing experience.		
Knowledge - Continuing Stud	3	100
The work requires continuing study of trends and developments in the administration and operation of information processing services, including the interrelationships of information processing, general management and scientific research requirements of the Department, through reading of texts, journals and periodicals, consultations with manufacturers and attendance at various seminars, conferences and training courses.		
Decision Making	C4	303
The work requires the direction and administration of a centralized departmental information processing service engaged in the development and processing of mass data and problem-solving applications associated with scientific research, regulatory, administrative and operational programs of the Department. The work also requires the provision of advice to departmental user and management officials on information processing matters. The departmental computer is mainly used in problem-solving applications related to scientific research programs. Most computer mass data applications are referred to service contractors, and information processing applications are usually undertaken by the departmental Information Processing Service. Field research stations usually contract locally for required information processing services. Decisions affect the amount and nature of departmental and contract information processing services available to departmental users in		

	Degree	Points

Ottawa. Recommendations influence departmental management decisions on the use of departmental and outside contract information processing services.

Recommendations also influence the acquisition and development of headquarters information processing staff and facilities and the development and implementation of departmental information processing policies. Errors in judgment can adversely affect the efficiency and economy of departmental information processing services. Recommendations are made to the Director General, Administration.

Contacts	4	100

The work requires contacts with senior departmental officials to plan and co-ordinate the provision of information processing services, to establish information processing priorities and to advise on the development of departmental information processing policies. Contacts are also initiated with central agencies and service contractors to arrange for outside contract services, and with government and industry officials to obtain information on technological and administrative developments in information processing.

Supervision	F3	132

The work requires the supervision of 141 employees at the senior, intermediate and junior levels of the administrative and foreign service and administrative support categories, including four section chiefs. Supervisory duties include participation in the selection, assignment, assessment, and discipline of staff.

BENCH-MARK POSITION DESCRIPTION

Bench-mark Position Number: 5 Level: 4

Descriptive Title: Chief, Production Software Point Rating: 604

Summary

Under the general direction of the Director, Computer Operations, ensures that the department's computer systems make efficient use of hardware and software facilities; conducts production acceptance testing of systems software, applications systems, and telecommunications systems; controls the release and implementations of new software, and ensures the integrity of the production software environment.

Duties	% of Time
Advises the Director, Computer Operations and other senior staff of the department's Systems and Services and Regional Computer Centres on the efficient and effective use of equipment, communications facilities, system software and application programs to meet the Department's program objectives - by developing and applying a comprehensive computer systems performance measurement program, using both system, analysis and programming, hardware and software monitor facilities to identify the resources consumed by the various software elements, - by directing the preparation using both systems analysis and programming, execution and analysis of representative benchmark programs, - by analyzing the results of monitor runs and benchmark programs to develop the requirements for further measurement experiment and ultimately to develop specific recommended changes in the software which will improve the efficiency of the systems, - by analyzing results of monitor runs to identify the impact on resources of new hardware, communications facilities, and new releases of system software and application programs to ensure that the headquarters' and Regional Computer Centres are not adversely impacted by the introduction of the change, - by approving operating standards and guidelines to be applied and propagated for the release of production applications, system software and equipment for implementation at all departmental computer centres, and	30

% of Time

- by writing evaluation reports and making recommendations to senior management (e.g. - new equipment requirements to optimize processing, and new software requirement to increase efficiency).

Conducts production acceptance testing of operating systems software, telecommunications software and applications systems — 20

- by acquiring and maintaining a thorough knowledge of EDP standards, and system specifications,
- by directing and participating in the design and construction and programming of benchmarks and tests to measure performance characteristics of operating systems, telecommunications, software and applications systems,
- by reviewing the evaluation of the operational viability of the new software to ensure that it does not place undue involvement or responsibility on the operators, that the exception handling and recovery procedures and facilities work, and that the performance and turn-around standards are not jeopardized by the introduction of the new software,
- by recommending to senior management the acceptance or rejection of the system as a production system,
- by recommending specific software changes or improvements to the operations system software which the developer should consider prior to re-submission for production acceptance testing. These changes pertain in the internals of the systems and involve specific analyses of the programs submitted for acceptance testing, and
- by representing the directorate at formal meetings with senior management and technical staff with authority to discuss and resolve problems relating to the acceptability of application software.

Controls the release for implementation of new software — 15

- by the review of specifications and documentation, to ensure that the software meets the specifications and is properly documented,
- by confirming that the software passes production acceptance,
- by ensuring that each Computer Centre has adequate resources to run the new release,

% of Time

- by developing in concert with Regional Computer Centre managers, system developers and client management, a schedule for the implementation of the new release,
- by developing and managing control systems involving software maintenance and distribution procedures,
- by providing operational training on new releases, to Operational Software Support in the field and to operations personnel in the field and headquarters, and
- by liaison with Systems Directorate on implementation schedules.

Ensures the ongoing integrity of the production software environment — 15

- by directing the development, documentation and implementation of manual and computerized diagnostic procedures,
- by directing the development and auditing of control procedures to safeguard production program libraries, production data libraries and production network control tables, which are key elements of the production software environment,
- by directing the analysis of production software trouble reports from the field,
- by recommending to software suppliers, and Systems Directorate staff specific programs and changes to ensure the integrity of the production software,
- by ensuring the promulgation of reports to the field on the current status of software problems,
- by directing the development of procedures for network restart and recovery, degradation diagnostics, problem isolation and network control for both headquarters and Regional networks,
- by directing the development of network security-related facilities and procedures, and network operating procedures, and
- by directing the development of standards of operations of terminals, network-related facilities and system availability.

Specifies and implements computer programs and systems to support the operation of the Computer Centres in areas such as, resource accounting systems, diagnostic aids, scheduling efficiency aids, monitoring and control aids, utilization and effectiveness reporting, service level reporting, etc — 10

% of Time

- by analyzing and documenting requirements raised by management and line operating personnel of the Directorate,
- by directing the design, programmation, implementation and documentation of the required programs, and
- by evaluating results of the systems and programs and refining them to continue to support operation functions in an optimal fashion.

Manages a staff of 8 employees 10

- by evaluating training needs and developing training programs,
- by evaluating staff performance,
- by providing advice, guidance and instruction to staff, and
- by recommending disciplinary action, as necessary.

SPECIFICATIONS	Degree	Points
Knowledge - Education and Experience	B4	216

The position requires knowledge and expertise sufficient to identify the data required and the method of obtaining and analyzing the data to determine the actual performance of a hardware/software/communication system and make recommendations for changes to either the hardware configuration, the systems software or the applications design. A thorough knowledge of computer systems analysis, programming techniques and practices and of the capabilities and limitations of electronic data processing equipment in general and of departmental equipment in particular, coupled with a sound understanding of the organization, objectives and practices of the Department. A well-developed ability in analysis and evaluation of existing and proposed systems and in the design of new systems through the supervision of a small, highly skilled staff. A sound knowledge of the relationship between the constantly developing E.D.P. systems and existing manual systems and also of present and future staff and equipment requirements. This knowledge and skill is normally acquired and the ability developed through university graduation and eight years of progressively responsible experience in administration, data processing and systems analysis.

	Degree	Points
Knowledge - Continuing Study	2	60

There is a requirement for a knowledge of trends and developments in computer systems' methods, techniques and equipment, and also for an awareness of accounting developments and Departmental organization objectives and requirements which can only be acquired through the continuing study of texts and periodicals, Departmental reports and directives, participation in training courses and seminars and by discussion with the staff of equipment suppliers and manufacturers.

Decision Making	C2	209

The position has the authority to commit resources to special hardware/software acquisition process and evaluations of specific EDP applications systems and to approve the conclusions of these performance measurement evaluations. The findings of the Section and the consequent recommendations to the Director relate directly to the efficiency of the operations with a consequent requirement for a considerable degree of judgment and initiative, particularly in the performance of assigned feasibility studies and in the assignment of study areas to project teams in the development of alternative information processing systems. These recommendations influence the decisions made in the allocation of staff and in the acquisition and directly affect the utilization of the major equipment operated by the Department. The contribution of this section to the development and improvement of Departmental systems is significant.

Contacts	3	73

Contacts are with senior Departmental staff to obtain assistance in conducting feasibility studies and in the design or modification of computer or manual systems and in order to persuade them to adopt progressive concepts. In addition there are regular contacts with the equivalent counterpart in other government departments with information processing activities have an interdepartmental implication, and in some instances contacts with the counterparts in the governments of other nations. There are also contacts with suppliers and manufacturers.

Supervision	B2	46

Four to ten staff are supervised, including staff at the intermediate level.

BENCH-MARK POSITION DESCRIPTION

Bench-mark Position Number: Level: 4

Descriptive Title: Chief, Technical Services Section Point Rating: 604

Summary

Under the general direction of the Assistant Director, Information Processing Division, plans, directs and administers the work of the Technical Services Section which is responsible for providing technical support to users of the Information Processing Division's computer services; manages the department's telecommunications network; plans, implements and maintains the department's in-house time-sharing computing facilities; evaluates, implements and maintains department owned software packages; and performs other related duties.

Duties	% of Time
Plans and manages the Technical Services Section, which provides department-wide technical support services to information processing operations - by developing administrative procedures and the associated reporting structure for effective and efficient use of resources, - by developing and implementing software packages and procedures, - by developing standards and associated documentation on usage of various software facilities and programming aides, - by reviewing reports on equipment capacity and capability produced from software packages and hardware monitors to determine when expansion/ deletion to the installation is required, - by making firm recommendations on short-term and long-term equipment proposals to the Assistant Director, - by maintaining and updating various software packages utilized in the operating systems of the various mini-system configurations, - by initiating and conducting meetings with central site communications and remote terminal suppliers to form and maintain integrated trouble isolation and support structure organizations, - by participating in the negotiation of contracts for terminals, communications and central site equipment, and	40

% of Time

- by standardizing problem determination procedures at central and remote sites.

Provides a specialist and consulting service to the users of the Information Processing Division facilities in the areas of hardware, software and telecommunications, as well as up-grading the technical education service for both Division personnel and Departmental users — 30

- by defining objectives and establishing priorities and completion target dates for various projects and by coordinating their execution,
- by assigning tasks to project teams and determining their degree of participation in studies related to computing equipment, software packages, programming languages and new system concepts,
- by ensuring that selected features and modules are properly generated into operating systems, that they are properly documented and back-up provided, that the currently utilized operating systems are maintained through necessary modifications and new versions generated and implemented as required,
- by issuing publications, amendments and memoranda advising Division personnel and Departmental users of technical problems and their resolutions,
- by liaising with technical personnel of manufacturers and service bureaus for the purpose of obtaining clarification, operational instructions and performance specifications on their software and hardware products used by the Division, and
- by ensuring the continuing technical quality of staff in this group through training plans, contacts with colleagues in other installations, provision of pertinent literature and attendance at conferences on relevant subjects.

Maintains a satisfactory knowledge of trends in computer technology and of developments in other government installations — 15

- by reviewing appropriate publications and periodicals,
- by attending demonstrations of equipment and programming packages,
- by participating in the activities of professional societies and seminars, workshops and conferences, and
- by maintaining contact and exchanging views with colleagues in other departments.

	% of Time
Performs other related duties such as selection, discipline and appraisal of staff, preparation of supporting documents for submissions to Treasury Board, handling of employee complaints and acting as a level in the grievance procedure, writing job descriptions and acting as a member of classification and personnel evaluation boards.	15

Specifications	Degree	Points
Knowledge - Education and Experience	B4	216
The work requires a thorough knowledge of information processing techniques and practices and the capacities and capabilities of departmental and contractor information processing facilities. A thorough knowledge of the practices, capacities and performance of mini-computers and telecommunications networks is a necessity. It also requires a good knowledge of the content, objectives and information processing requirements of departmental research, administrative and operational programs, and a good knowledge of departmental and government policies and regulations governing the administration of information processing services. The work requires skill in the planning and co-ordinating of complex technical operations, the forecasting of equipment and financial requirements, and the development and presentation of advice. This knowledge is normally acquired through completion of university education and eight years of progressively responsible administrative and information processing experience.		
Knowledge - Continuing Study	2	60
The work requires continuing study of trends and developments in the administration and operation of information processing services, including the inter-relationships of information processing, general management and research requirements of the Department, through reading of texts, journals and periodicals, consultations with manufacturers and attendance at various seminars, conferences and training courses.		
Decision Making	C2	209
The work requires the planning and co-ordinating of information processing activities of centralized computer systems with a large number of remote terminals located in Research Stations, the Department Data Centre and Headquarters.		

	Degree	Points

Systems equipment configurations are contracted to multiple computer, peripheral, and communications suppliers and determination of accountability necessitates the use of good judgment. The frequent resolution of conflicts between multiple computer suppliers, software and common carriers of telecommunications networks is an important function of the work. Decisions affect the effectiveness and efficiency of services provided to users and development personnel. Because the on-line systems are meant to provide an improved information service to users at regional offices across Canada, the credibility of the Department will be measured to some extent by the efficiency of the system and decisions taken in co-ordinating the role of its different components. Recommendations influence the acquisition and usage of computer equipment and facilities and the implementation of departmental information processing policies.
Errors in judgment can adversely affect the efficiency and economy of departmental information processing services. Recommendations are made to the Assistant Director, Information Processing Division.

Contacts 3 73

The work requires contacts with senior departmental officials in headquarters and regional Research Stations to plan and co-ordinate the provision of information processing services, to establish priorities and to advise on the development of departmental information processing policies. Contacts are also initiated with officials of computer equipment suppliers during negotiation of contracts and when resolving problems encountered during the term of contracts. Contacts with other government and industry officials are maintained to obtain information on technological and administrative developments in information processing.

Supervision B2 46

The work requires the supervision of nine positions at the intermediate level of the administrative and foreign service category. The incumbent is responsible for selection, training, promotion and disciplinary action with regard to this staff. From time to time a staff of management consultants also requires supervision.

BENCH-MARK POSITION DESCRIPTION

Bench-mark Position Number: 7 Level: 1

Descriptive Title: Computer Systems Programmer Point Rating: 170

Summary

Under the supervision of a programming team leader (programmer-analyst), develops and writes programs and machine operating instructions for a computer installation; collects and documents information required for future reference to completed computer systems programs; modifies continuing computer systems programs; and performs other related duties.

Duties	% of Time
Develops programs, machine operating instructions and associated documentation for applications processed on large mainframe computers and peripheral equipment, to control the automatic performance of machine processing actions in required sequences	85

- by examining computer systems analysts' flow charts and program logic diagrams to determine the combination and sequence of machines to be used, the format of input and output records, the type and extent of information to be transferred from storage units, the variety of items to be processed, the steps required in machine processing and their sequence, the requirements for testing and assembling programs, and the procedures for phasing program segments into a system,
- by designing detailed program block diagrams to indicate the machine processing actions required to provide for all possible conditions arising out of the data to be processed,
- by writing instructions in symbolic language, using standard techniques, to indicate required machine processing operations,
- by selecting and arranging utility programs and routines developed by machine manufacturers, to carry out segments of the program and to maintain continuity between segments,
- by writing instructions in standard format for key punching and machine set-up operations, to ensure compatibility of these operations with the program specifications, and

	% of Time
- by constructing limited and volume tests of programs, arranging for test processing on the computer system, and correcting programming errors to ensure valid processing of the real data.	
Collects such documents as specifications, flow charts, diagrams, coding and operating instructions required for future reference to programs.	5
Modifies the form and content of programs for established applications, as directed.	5
Performs other related duties, such as overseeing the phasing into production of specified systems, demonstrating solutions of programming problems for trainee programmers, and attending training sessions to receive instruction in new programming methods, the characteristics of new computing devices and the use of packaged programs.	5

Specifications	Degree	Points
Knowledge - Education and Experience	Al	60

The work requires knowledge of the techniques and practices of computer systems programming. It also requires knowledge of the capabilities, limitations and range of alternative operations for which the machines in the installation may be combined. Familiarity with available utility programs and the administrative procedures for requisitioning testing and key punching services and establishing work priorities is required. This knowledge is normally acquired through completion of secondary school education and two years of related experience.

Knowledge - Continuing Study	1	20

The work requires continuing study of manuals, periodicals and technical directives and attendance at computer programming courses and study groups to keep abreast of programming techniques for new machines and of new utility programs written by manufacturers.

Decision Making	Al	70

Decisions are made to select the best ways to use computing devices to meet prescribed system requirements, to design or select the most suitable series of computer instructions,

	Degree	Points
and to select the coding language necessary to convey programming instructions. Guidance and supervision are provided by senior programmers and computer systems analysts; problems are solved in accordance with established guide-lines, directives and precedents. Programs are tested by trial runs on computing devices before they are adopted for use. Decisions affect the efficiency of segments of the computer operation. Errors in designing or selecting machine instructions may result in delay during the testing phase of operations.		
Contacts	1	20
The work requires contacts with user officials to clarify details of specifications and with supervisors of machine operators to arrange tests of programs.		
Supervision	-	-
Supervision of the work of others is not a regular requirement. There may be a requirement to assist in the training of programmers by demonstrating programming techniques and assisting trainees to solve programming problems.		

BENCH-MARK POSITION DESCRIPTION

Bench-mark Position Number: 8 Level: 2

Descriptive Title: Computer Systems Programmer, Computer Science Division Point Rating: 319

Summary

Under the supervision of a section chief, Computer Science Division, prepares electronic computer programs and machine operating instructions for problem-solving and mass data applications for processing in the division or on outside contractors' computers; adapts or revises computer programs written for various computer installations; and performs other related duties.

Duties	% of Time
Under the supervision of a section chief, Computer Science Division, writes computer programs, machine operating instructions and associated documentation for problem-solving and mass data applications relating to departmental survey, scientific research and administrative programs, to be processed on the department's large mainframe computer or on outside contractors' computers - by examining specifications and logic diagrams prepared by computer systems analysts and research scientists, to determine the combinations and sequences of machine processes, the format of input and output records, and the testing, assembling and program phasing procedures required, - by establishing the capacities, capabilities and programming requirements of the computer to which the application has been assigned, - by designing detailed block diagrams to indicate the required machine processing actions, - by writing procedural instructions for the operation of the assigned computing device, in symbolic language and using standard techniques, - by adapting utility routines to carry out segments of the program and maintain continuity between segments, - by writing instructions in standard format for key punching and machine set-up operations, in accordance with program specifications and the requirements of the assigned computing devices, and	60

% of Time

- by developing program testing procedures, arranging for test runs, and correcting errors or deficiencies in the computer program.

Adapts and revises computer programs written for earlier applications and a variety of computers, to meet the requirements of the computer by which the application will be processed and to assist departmental users to obtain processing efficiency or reduce processing costs 30

- by reviewing program documentation and processing specifications to establish the objectives, processing requirements and programming techniques of the application,
- by identifying the capabilities and requirements for programming documentation of the assigned computer including requirements for symbolic language, utility routines and machine operating instructions,
- by conferring with departmental user officials to clarify objectives and processing requirements, which are frequently stated in problem-solving applications in terms of complex mathematical expressions,
- by developing, and recommending to user officials alternative programming techniques, and
- by re-writing computer programs, test procedures and associated documentation.

Performs other related duties, such as advising scientists and computer systems analysts in other departmental units on programming techniques, available processing services and requirements of contract computer services, evaluating and adapting utility routines, revising computer programs to meet changing information requirements of users, and advising junior programmers on technical problems. 10

Specifications	Degree	Points
Knowledge - Education and Experience	B3	162

The work requires a thorough knowledge of computer systems programming techniques and practices and a good knowledge of the capacities, capabilities and requirements of a variety of computers and peripheral equipment. It also requires a good knowledge of departmental information processing resources and the procedures associated with the

	Degree	Points
provision of information processing services to departmental users. Knowledge of advanced mathematical techniques, such as those involved in the solution of simultaneous and differential equations, and skill in developing and presenting advice to user officials engaged in scientific research activities are further requirements. This knowledge and skill are normally acquired through university graduation and three years of varied and progressively responsible experience in computer systems programming.		
Knowledge - Continuing Study	1	20
The work requires knowledge of trends and developments in programming techniques and practices and of the capabilities, requirements and capacities of information processing facilities of the department and of contractors. This knowledge is gained by continuing study of departmental directives, equipment manuals, texts and periodicals and by attendance at government and industry-sponsored training courses.		
Decision Making	A2	117
The work requires the exercise of judgement, initiative and discretion in the development and adaptation of computer programs for problem-solving and mass data applications assigned to various government and outside computer instal lations for processing. Advice and assistance provided to departmental research scientists in the development of computer programs affect the processing time, costs and efficiency of problem-solving applications. Recommendations are made on the use of programming techniques and the specification of machine operating and machine processing requirements. Errors in judgement can adversely affect the efficiency and quality of programming services of the Computer Science Division. Advice and assistance on technical problems are available from colleagues and superiors in the Computer Science Division and from departmental user personnel who are familiar with information processing techniques and information requirements of users. Recommendations and unusual problems are referred to a section chief in the Computer Science Division.		

	Degree	Points
Contacts	1	20

The work requires contacts with computer systems analysts and departmental research scientists, to obtain and provide information and assistance in the development and writing of computer programs.

Supervision	-	-

Supervision of the work of others is not a continuing requirement. Occasional guidance and work leadership may be provided to junior programmers.

BENCH-MARK POSITION DESCRIPTION

Bench-mark Position Number: 9 Level: 3

Descriptive Title: Data Base Administrator Point Rating: 504

Summary

Under the direction of the Assistant Director, Technical Support (Data Administrator), plans and directs the work of four computer systems analysts and two administrative support positions, providing internal support services to design, develop, implement and enhance the effective use of the portfolio databases; maintains the databases interface system; develops procedures for the maintenance of the integrity of the databases; prepares and maintains a comprehensive data dictionary; provides specialist database and data analysis support to portfolio managers and development projects; administers access to all databases; performs other related duties.

Duties	% of Time
Plans, directs, controls and supervises the work of computer systems personnel in developing, monitoring and implementing both database and data management systems and procedures for increased efficiency and economical use of departmental databases - by analyzing, designing, testing and implementing new data structures, - by providing internal support services to ensure the effective and efficient use of the Database Management System, - by developing, maintaining and documenting the database interface system, - by preparing, documenting and enforcing procedures for the maintenance of the integrity of the database, - by providing guidelines, standards and general assistance in support of all data conversions from current to future systems, - by selecting, implementing, developing and maintaining a comprehensive data dictionary of all data elements and values used in systems supported by the department, and - by controlling and monitoring access to all databases.	40
Supervises the work of four computer system analysts and two administrative support staff	20

% of Time

- by participating in the selection, assessment, training, assignment and discipline of staff,
- by investigating and resolving data base related anomalies,
- by providing guidance to application system design and application system programming personnel, and
- by answering questions on the facilities of the DBMS, on the meaning of certain standards or techniques.

Provides information and advice to senior officials, and assistance to systems development and support staff, in the utilization, understanding and appreciation of the corporate databases 30

- by providing technical and generalized training in the Database Management System and techniques,
- by reporting statistics relative to the use and content of the database,
- by providing detailed instructions and explanations related to database systems additions or modifications,
- by coordinating all automated data management activities within the department,
- by conferring with client representatives to establish current and long term data requirements, and
- by providing technical specialist support to the requirements for data management and database systems as they relate to the department.

Performs other duties such as liaison with suppliers; representing the Technical Support Section on ad-hoc depart mental committees; participating in the EDP Standards Committee; and by representing the Department at conferences and seminars. 10

SPECIFICATIONS	Degree	Points
Knowledge - Education and Experience	B3	189

The work requires a good knowledge of the capacities and capabilities of computers, information processing, database technologies (DBMS), and the organization, functions and database requirements of a complex organization. A general knowledge of data communications is required. It also requires a good knowledge of the policies and practices of the Department and related Agencies and the Government

	Degree	Points

which effect the administration of automated data services, and a general knowledge of the technical and social aspects of the departmental programs. Skill in the planning, direction and coordination of large, complex database systems, the provision of advice, and the supervision and development of staff are required. This knowledge and skill is normally acquired through university graduation in one of the sciences, mathematics, business administration, computer science or a related field and six years of progressively responsible experience in the field of automated information processing, with at least one year involvement in database systems.

Continuing Study	2	60

Continuing study of government, departmental and related agencies publications, policy directives, and data processing texts, journals and periodicals is required, as well as consultations with manufacturers and attendance at various conferences, seminars and training courses, to maintain an awareness of trends and developments in information processing administration and technology.

Decision Making	B2	163

The work involves the planning and coordinating of database systems development and coordination of automated data usage supporting Portfolio programs. The work also requires the provision of advice and information to senior departmental and government officials on matters relating to the development of automated data systems. Decisions and recommendations may affect the commitment and use of extensive information processing and data communications equipment installations, the use and development of staff, and the amount and nature of information processing services available to users. This includes the initiation, negotiation and liaison for procurement of specific external information processing services. Recommendations and advice influence management decisions on the use and development of automated data services and the implementation of information processing policies and procedures in the Portfolio. Recommendations also influence the acquisition, leasing and use of equipment and the assignment and training of staff. Recommendations are made to colleagues and superiors at the senior and intermediate level. Problems are referred to the Assistant Director, Technical Support.

	Degree	Points
Contacts	2	46

The work requires contacts with users and systems development staff to undertake, plan, coordinate and implement database oriented applications, and with superiors and colleagues to resolve administrative and technical problems, and plan the development of information processing systems. Contacts are also maintained with suppliers and officials of other information processing organizations such as the Department of Supply and Services, to obtain and provide information on technological and administrative developments.

Supervision	B2	46

The work requires direct supervision of four computer system analysts and two administrative support staff. Supervisory duties include participation in the selection, assessment, training, assignment and discipline of staff.

BENCH-MARK POSITION DESCRIPTION

Bench-mark Position Number: 10 Level: 3

Descriptive Title: Data Base Designer Point Rating: 458

Summary

Under the direction of the Manager, Software Maintenance & Development, co-ordinates the design, development, testing, documenting and implementing of data bases in support of various information processing systems; co-ordinates the development, maintenance and documentation of back-up and recovery procedures for the production data bases; contributes to and implements standards; assists in developing data base management policies and plans, and implements security and privacy procedures for computer-stored information; and performs other related duties.

Duties	% of Time
Co-ordinates the design, development, testing, documenting and implementing of data bases - by analyzing detailed user requirements to design the different types of records required to make up the data base, and to determine the inter-relationship of records, their quantity, system overhead and system frequency, - by documenting, testing and creating newly designed or modified data bases, - by developing programs to be used in the analysis of data base requirements to determine desirable record structure, record priority and inter-relationships, - by designing data conversion routines and initial data base load routines, - by developing standards and parameters to be used for the selection of record sizes, their makeup and the considerations for decisions to carry data redundantly, and - by collaborating with the application program development staffs in the communication of data base standards to all user agencies.	50
Co-ordinates the development, maintenance and documentation of back-up and recovery procedures for the production data bases	20

% of Time

- by developing programs to be used in the scanning of data bases to determine data base integrity,
- by reviewing system performance reports and plans and reorganizing data bases to increase system performance,
- by collaborating with the application program development staff in the communication of data base standards to all users,
- by using judgment based on an understanding of data base systems and detailed knowledge of system applications to effect back-up and recovery of the production data bases, and
- by documenting, testing and implementing newly designed or modified data bases to meet production schedules.

Contributes to and implements standards, assists in developing data base management policies, and plans and implements security and privacy procedures for computer stored information — 15

- by interpreting departmental data management policies and procedures,
- by developing and submitting for approval new policies and procedures for effective data administration of the system,
- by developing security, control and audit procedures to prevent and detect unauthorized access to computer stored data and to provide for recovery procedures to ensure system integrity,
- by developing and enforcing standards,
- by developing and maintaining a data dictionary, and
- by conducting analysis of data base performance and implementing efficiency and security improvement measures.

Instructs data base personnel and provides data base technical advice to other staffs — 10

- by planning activities in accordance with overall programs and objectives to ensure an effective work flow,
- by advising juniors and associates on approaches to problems and techniques to employ in their solution,
- by reviewing activities regularly in order to exercise effective control, and
- by directing training of personnel within the section.

	% of Time
Performs other related duties such as designing courses and instructing section personnel in the concepts of data base management systems; contributing to the development of statements of requirement for systems; and representing the section on data base matters at meetings with industry and other government agencies.	5

SPECIFICATIONS	Degree	Points
Knowledge - Education and Experience	B3	189

The work requires a thorough knowledge of information processing practices and techniques, and a thorough, detailed knowledge of data base management systems such as "MULTICS" and data base design techniques. It also requires a good knowledge of department and government policies and practices that affect the administration of information processing services and a general knowledge of the technical aspects of manufacturing, cost accounting, forecasting and personnel management systems. The work also requires the capability to train the staff in data base management techniques. This skill and knowledge is usually acquired through completion of a university degree or equivalent training and employment at the operational and managerial level, specialized training through courses and five years of progressively responsible experience in automatic data processing.

Knowledge - Continuing Study		60

The work requires continuing study of industry journals, reports, texts and periodicals, attendance at seminars, conferences and courses to develop and maintain knowledge of data base applications and techniques; and a continual awareness of changes in department and government policies. The assessment of the impact of these changes on the data base and the initiation of modifications necessitated by these changes is required.

Decision-making	B2	163

The data base analyst is the technical expert in all matters relating to data bases. The incumbent will be required to design, develop, create, test and implement data bases to support various information processing systems. The decisions will affect the design and composition of the data bases which in turn will affect the following: the upward compatibility of the data base with those other data bases under

	Degree	Points
concurrent development, the processing time and techniques required to obtain information from the data bases, the flexibility of the data bases to meet new management require ments, the quality and amount of information available to management, and the ability of the data bases to function as required by management. Errors can seriously degrade system performance to a point where user requirements are not satisfied.		
Contacts	2	46
The work requires contacts with data base customers and, in collaboration with supervisors and colleagues, the recommen- dation for the commitment of resources and the planning and coordination of data processing services. In addition, it is necessary to contact other Government departments, equipment manufacturers and software companies to exchange or obtain data base management information. The incumbent represents the Section at meetings within and outside the Section in the areas of data base characteristics to resolve problems where conflicting views of the Section and these other agencies exist.		
Supervision	-	-
The work requires the supervision of a contracted data base designer. There is also a requirement for co-ordinating and approving the work of other assigned members of a project team.		

BENCH-MARK POSITION DESCRIPTION

Bench-mark Position Number: 11 Level: 6 (EX)

Descriptive Title: Director, Data Processing Service, Materiel Command Headquarters Point Rating: 972

Summary

Under general direction, plans and directs the activities of the Information Processing Service of Materiel Command, which include the planning, development and processing of information processing applications associated with inventory cataloguing, maintenance, reprovisioning and control programs covering Canadian Armed Forces establishments and military supply depots in Canada and foreign countries; advises senior military and government officials on matters relating to information processing; and performs other related duties.

Duties	% of Time
Plans and directs the activities of the Information Processing Service, with an establishment of over 200 military and civilian employees engaged in computer systems analysis and programming, information processing operations, data communications operations and administrative support services, and using large mainframe computers and extensive. peripheral, auxiliary and data communications equipment installations, to ensure the efficient and economical use of staff and equipment of the Information Processing Service - by determining workload requirements and available information processing resources through liaison with military and departmental user officials, and discussions with subordinate supervisors, - by developing forecasts of staff and equipment requirements, - by developing administrative and operational procedures for the provision of information processing services, - by undertaking, or authorizing commitments to provide information processing services, - by authorizing the development and implementation of information processing systems and establishing priori ties and completion deadlines for major applications,	50

of Time

- by developing and implementing procedures for the recording and review of proven techniques, completed programs, and utility routines to facilitate their identification, assessment and use in the development of new applications,
- by assessing administrative and technological innovations in information processing and authorizing the adaptation of new procedures or recommending the acquisition or rental of new equipment,
- by participating in the training of programmers and analysts, and
- by reviewing production, progress and administrative reports to ensure that production and quality standards are maintained and to assess the performance of supervisory staff.

30

Advises user officials, colleagues and senior officials in the armed services, the Department and other government departments on the use and development of information processing resources, to assist users of information process ing services in obtaining maximum benefits from information processing

- by developing and recommending changes to information requirements of users to improve the technical or economic feasibility of applications,
- by reviewing administrative and operating procedures and practices to determine methods of improving efficiency or economy in the provision of information processing services,
- by providing information on costs, capabilities, requirements and benefits of information processing services, and
- by participating in discussions of military, departmental and interdepartmental committees concerned with the planning of information processing services.

20

Performs other related duties, such as participating in the selection, assessment and discipline of staff, preparing memoranda, correspondence and reports, and participating in departmental management meetings, briefings and committees.

	Degree	Points
Specifications		
Knowledge - Education and Experience	B6	272

The work requires a good knowledge of the capacities and capabilities of information processing and data communications equipment, of the organization, functions and information processing requirements of the Materiel Command, and of the organization and operations of the Canadian Armed Forces and the Department of National Defence. It also requires a good knowledge of military, departmental and government policies and practices that affect the administration of information processing services and a general knowledge of the technical aspects of military logistics and operations research. Skill in the planning, direction and co-ordination of large, complex information processing and data communications operations, the development and provision of advice, and the supervision and development of staff are required. This knowledge and skill are normally acquired through university graduation and 11 years of progressively responsible administrative experience, including experience in information processing.

Knowledge - Continuing Study	3	100

Continuing study of military and departmental publications, policy directives, and military and information processing texts, journals and periodicals **is** required, as well as consultations with manufacturers and attendance at various conferences, seminars and training courses, to maintain an awareness of trends and developments in Canadian military operations, military logistics and administration, and implementation processing administration and technology.

Decision Making	D4	350

The work involves the planning, administration and co-ordination of the information processing services supporting armed forces materiel supply programs in Canada and foreign countries. The work also requires the provision of advice and information to senior military and government officials on matters relating to the administration and development of information processing services. Decisions affect the commitment and use of extensive information processing and data communications equipment installations, the use and

	Degree	Points

development of staff, and the amount and nature of information processing services available to users. Recommendations and advice influence management decisions on the use and development of information processing services and the implementation of information processing policies in Materiel Command Headquarters and outside departments. Recommendations within Materiel Command also influence the acquisition, leasing and use of equipment and the assignment and training of staff. Errors in judgment can adversely affect the efficiency and economy of information processing operations servicing military supply and inventory management programs. Recommendations are made to military and civilian colleagues and superiors at the senior administrative level.

Contacts 4 100

The work requires contacts with users to undertake, plan and co-ordinate information processing applications and with superiors and colleagues to resolve administrative and technical problems and to plan the development of information processing services. Contacts are also maintained with manufacturers and officials of other information processing organizations to obtain and provide information on techno logical and administrative developments.

Supervision G3 150

The work requires supervision and direction of 226 military and civilian employees engaged in the development of information processing systems and the operation of information processing and data communications equipment, through three subordinate supervisors. Employees supervised are at the senior, intermediate and junior levels of the administrative and foreign service and administrative support categories and at equivalent levels in the military service. Supervisory duties include participation in the selection, training, assessment and discipline of staff.

BENCH-MARK POSITION DESCRIPTION

Bench-mark Position Number: 12 Level: 3

Descriptive Title: Head, Computer and Communications Centre Point Rating: 521

Summary

Under the general supervision of the Chief Regional Forecasts, performs the following duties:

Manages the operation of the Edmonton computer and communication centre; maintenance of manufacturer supplied multiprogramming, real-time operating system software; design and implementation of modifications and enhancements to the hardware and software components of the system to meet new requirements for computer service and access and to improve the general operating efficiency of the in-house facility; technical consultation to programmers, scientists, technical specialists and regional management on all aspects of computer operating system software design, and implementation, machine assembler and systems level languages, and the application of computer systems technology to research projects; participates as project leader on systems development projects undertaken in the Region; evaluation of computers and peripheral equipment as part of existing and proposed configurations; liaison with suppliers of computer systems, communication products and outside government and non-government agencies; evaluation of equipment and system malfunctions requiring remedial action and/or notification of the appropriate service personnel; and training for users in command languages and procedures for batch and real-time access.

Duties	% of Time
Manages the operation of the Edmonton computer and communication center - by planning, directing and controlling, all systems and operational activities in the units, - by supervising systems analysts and the senior communicator, - by establishing local standards for efficient utilization of computer facility, - by establishing directives and procedures for effective day to day operation of the computer and communication facilities, - by preparing specifications and monitoring contracts for computer maintenance, hardware and software acquisitions, communications and supplies,	30

% of Time

- by participating in budget preparation and control related to computer systems and all operations, of the unit,
- by preparing annual information processing reports, quarterly information processing activity status reports, budget and operational plans related to computer and communication activities,
- by monitoring and tuning system performance to maximize system efficiency and user convenience in response to varying work configurations and loads,
- by ensuring that automatic procedures for system re-initialization after system crashes or shutdown function well and that operators are properly trained to effect successful re-initialization,
- by doing appraisals and participating on review committee for the subordinate staff, participating on rating boards, and
- by participating in Forecast management meetings.

Maintains manufacturer-supplied multiprogramming, real-time operating system software — 15

- by configuring software systems to requirements of installed hardware and operations procedures, using modules supplied by the manufacturer and other depart mental sources,
- by verifying that performance is consistent with specifications,
- by updating the operating system by incorporating corrective code supplied by the manufacturer and other departmental sources, and
- by diagnosing faults in software and designing, implementing and testing corrective code, or advising manufacturer of same and suggesting corrective code through manufacturers' technical support channels.

Designs and implements modifications and enhancements to the hardware and software components of the system to meet new requirements for computer service and access, imposed by changing functional requirements and to improve the general operating efficiency of the in-house facility — 10

- by recognizing deficiencies in respect to new operational requirements and to existing operating procedures,
- by evaluating alternative solutions,
- by designing and coding new software modules, using assembly and higher level languages,

% of Time

- by specifying and implementing new hardware and configurations,
- by testing these modifications and enhancements in a complex 24 hour per day concurrent operations environment, and
- by assigning specific design, coding and debugging tasks to a systems programmer.

Provides technical consultation to programmers, scientists, technical specialists and regional management on all aspects of computer operating system software design, and implementation, machine, assembler and systems level languages, and the application of computer systems technology to research projects — 10

- by maintaining an up-to-date knowledge of the design concepts, implementation, and performance of all systems in use,
- by maintaining an up-to-date knowledge of information being communicated, so that all relevant information can be made available to the professional and technical staff,
- by understanding and providing optimizations for local system,
- by suggesting new applications of computer technology in users' research projects,
- by providing advice to users in program design and debugging, and
- by ensuring that a systems programmer is conversant with the commonly used systems, and that users have access to the incumbent for consulting purposes.

Participates as project leader on local systems development projects — 10

- by carrying out, as leader or member of systems project group, design, development and documentation of systems software related to the computerized production system,
- by developing and implementing enhancements to the system software,
- by producing and refining documentation of the implementation requirements and procedures for approved systems projects,
- by distributing and assisting in implementation of systems project results in other regional offices,
- by evaluating suggestions for modifications and implementing if desirable,

% of Time

- by testing system project results,
- by maintaining up-to-date knowledge of remote systems software to ensure effectiveness of distributed system and other systems projects, and
- by evaluating manufacturers enhancements to their distributed system software to ensure that there is an advantage in maintaining our own software.

Evaluates computers and peripheral equipment as part of existing and proposed configurations — 10

- by studying technical literature to obtain equipment performance specifications,
- by conducting studies of relative performance of different equipment configurations, for whole machines, complete subsystems and incremental changes,
- by obtaining opinions of users at other installations who have experience with the same or similar equipment to that proposed,
- by participating in benchmark studies on a variety of alternative equipment,
- by recommending to management the optimal configuration to enhance system performance and user acceptability,
- by providing specifications for the acquisition of equipment,
- by assigning specific evaluation and information gathering tasks to a systems programmer, and
- by considering long-range goals of the Service and relevant departmental policy.

Liaises with suppliers of computer systems, communication products, computer related products, and outside government and non-government agencies to acquire technical information on state-of-the-art hardware and software — 5

- by written, personal and telephone communication with manufacturers' marketing and technical representatives, as well as other personnel with related interests,
- by membership in and communication with manufacturers' users groups,
- by technical liaison visits to manufacturers and outside agencies, and
- by attendance at conferences and seminars.

Evaluates equipment and system malfunctions requiring remedial action and/or notification of the appropriate service personnel — 5

of Time

- by responding to operating system error messages, operator or user queries,
- by adjusting hardware configuration in emergencies in order to support the 24 hour operational needs,
- by performing diagnostic tests where and when appropriate, and
- by notifying service personnel, if necessary, and monitoring their progress in fault isolation and solution.

Provides training for users in command languages and procedures for batch and real-time access 5

- by giving informal seminars on existing, modified, or enhanced system features,
- by demonstrating the use of remote batch terminals, time-sharing terminals and other remote communications equipment,
- by assisting users with specific problems relating to computer system access and procedures, and
- by preparing documentation for existing, modified, or enhanced system features as nearly coincident as possible with the release of the associated system features.

Specifications	Degree	Points
Knowledge - Education and Experience	B3	189

The work requires an in-depth knowledge of the design principles and programming techniques used in computer operating systems, the logical functioning of computer hardware mainframe and peripheral equipment and the external specifications of language processors and utilities, for all sizes of computers. Familiarity with manufacturers' procedures for maintaining their operating systems is required, as is the ability to communicate effectively, both orally and in writing, in technical subjects. Good knowledge of management and supervising techniques is essential. A knowledge of the organization's functional aims is required to better anticipate user requirements and to forecast the impact of proposed system changes on users. This is necessary to ensure efficient implementation of systems. Extensive experience in working at the highest level of technical competence in projects requiring sophisticated and complex operating system design and programming techniques must be demonstrated. This should include work

	Degree	Points

in several areas of specialization, e.g. input/output drivers, inter-computer communications, and graphics. Furthermore, extensive experience with a multiprogramming, real-time operating system on mini computers is required. Experience in communications protocols and local specialized equipment as well as information format and content is essential. This knowledge and experience is normally acquired through university graduation in science/engineering/ computer science or equivalent in a related discipline and six years' experience in computer programming in high level languages and assembly languages, systems analysis and software design, at least half of which pertained directly to multiprogramming real-time mini computer systems.

Knowledge - Continuing Study — 2 — 60

This position requires a knowledge of trends and developments in applications and programming of mini-computers and technological advances in hardware and software systems. Knowledge of the physical sciences and familiarity with the operational requirements to support regional functions is required to ensure that the unit continues to meet the real-time operational needs. Knowledge and study of the scientific objectives of each project is essential. This knowledge is acquired through personal contacts with peers, manufacturers, and users groups, study of manufacturers' literature, technical and scientific journals and periodicals, and attendance at seminars, conferences and training courses.

Decision Making — B2 — 163

The work requires sound judgment in proposing and selecting alternative solutions to complex technical problems in computer systems technology, including quick diagnosis and solution of system software and hardware problems, and decisions relating to performance and operational enhancements. Computer downtime or degraded user access must be minimized because of the 24 hour operation. The computer system is an integral part of critical regional operations. Any hardware failure must be countered by an appropriate action as quickly as possible. Recovery action is nearly always required before the remedial manufacturer support can arrive. Regional numerical models and other aids run on the computer are a high priority in regional operations. Recommendations are made to management pertaining to in-house, central computer reconfiguration, auxiliary equipment

	Degree	Points
selection, outside communications facilities selection and software selection. These recommendations strongly influence the cost effectiveness of the use of unit hardware resources valued at over $750,000. Participation in financial management, planning and reporting is essential to ensure effective and efficient operations.		
Contacts	2	46
The work requires daily contacts with programmers, working level scientists, and technical staff in the computer user community to resolve technical problems and provide consultation. Frequent contacts are made with manufacturers' sales and technical representatives to acquire technical information and resolve problems in applying their products. Contacts with staff of other departmental computing and communications centers and non-government agencies are made periodically as are briefings to management in areas of the incumbent's special competence.		
Supervision	C2	63
The work requires the direct supervision of five systems analysts/programmers as well as eight staff members involved in computer/communication operation through a subordinate supervisor. The latter is a 24 hour operation. The responsibilities include assignment of work, performance evaluation, training and recommendation of advancement or disciplinary action.		

BENCH-MARK POSITION DESCRIPTION

Bench-mark Position Number: 13 Level: 4

Descriptive Title: Head, Information Processing Hardware Service Point Rating: 605

Summary

Under the general direction of the Chief, Software/Hardware Division, plans, controls and directs the activities of the Hardware Services Section; directs the planning, configuration, evaluation, selection, acquisition and monitoring of Computer Systems Hardware; directs the evaluation, selection and acquisition of data conversion/data entry and information processing related equipment; directs the acquisition of Data Communications Network facilities, to meet the needs of the Department; provides an advisory service' to senior management on hardware and network components; manages a staff of up to five analysts and five consultants in a matrix organization; and performs other duties.

Duties	% of Time
Plans, controls and directs the activities of the Hardware Services Section engaged in the planning, configuration, evaluation, selection, acquisition and monitoring of Computer Systems Hardware, Data Conversion/Data Entry and other information processing related equipment, the acquisition of Data Communications Network facilities, and provides information processing advisory and training services, to meet the needs of the Department in an efficient and effective manner:	20

(Computer Systems Hardware encompasses ALL Information Processing (EDP) equipment from computer mainframes to terminals, including items such as: disk drives, tape drives, printer systems, data communications hardware, and other peripherals.)

- by participating in the planning, with the Division Chief and other officers, the long range information processing needs of the Department,
- by developing work plans and priorities (up to) four senior hardware/planning analysts, and one hardware/ planning analyst.
- by selecting and managing (up to) five senior consultants on a project management basis,

% of Time

- by setting objectives for senior analysts and consultants in the planning, configuration, evaluation, selection, acquisition and monitoring of computer systems hardware, data conversion/data entry and other information processing related equipment,
- by setting objectives for senior analysts in the research, development, preparation and submission of information processing hardware reports to the Department and Central Agencies, (i.e.: Treasury Board and Supply and Services Canada),
- by allocation of tasks to senior analysts and consultants and ensuring timely completion,
- by establishing terms of reference and developing and enforcing appropriate procedures for the orderly provision of services by the Section, and
- by conducting the activities of the Section in accordance with and within the directives and guidelines contained in the Treasury Board Administrative Policy Manual Chapter 440 regarding Information Processing.

Directs the planning, configuration, evaluation, selection, acquisition and monitoring of Computer Systems Hardware to ensure that the Department's needs are met in an efficient and effective manner: 20

- by establishing and maintaining an up-to-date knowledge of the computer systems hardware industry,
- by developing and maintaining long-range procurement plans for the acquisition of information processing systems hardware, and effective equipment maintenance/ repair services,
- by reviewing requests affecting computer systems hardware configurations and acquisitions and recommending appropriate courses of action,
- by planning and directing the conduct of tenders, Request for Proposal, and contract terms and conditions for the acquisition of computer systems hardware and maintenance/repair services,
- by co-ordinating the preparation and development of requirement specifications for information processing systems hardware required, for manufacturers and suppliers,
- by directing the preparation and execution of benchmark methodologies and procedures in order to assess the technical and economic effectiveness of manufacturer/ supplier proposals, and actual hardware attributes, r1aim-, and performance.

% of Time

- by analyzing the results of evaluations, benchmark and performance reviews and recommending to senior management, the acquisition/modification/termination of hardware and maintenance/repair services,
- by initiating the approved acquisition/modification/ termination process, and ensuring that the required activities are performed, and documentation prepared in accordance with acceptable and established Department /DSS/Treasury Board guidelines, directives and procedures,
- by constantly monitoring performance reports, both technical and financial, of manufacturer/supplier hardware, and maintenance/repair services, to ensure compliance with contractual agreements,
- by establishing and maintaining an up-to-date knowledge of current information processing policies and directives affecting the acquisition and application of computer systems hardware and equipment maintenance, and
- by serving as an information processing advisor in the selection and use of computer systems hardware and equipment maintenance/ repair services.

Directs the evaluation, selection and acquisition of data conversion/data entry and other information processing related equipment. (i.e. CADE 1900 and Key Edit System): 15

- by meeting with officials from the various manufacturers/ suppliers to explain Department requirements and to ascertain what the manufacturers/suppliers can provide,
- by setting standards for senior analysts to follow in evaluating and monitoring the manufacturers/suppliers' equipment,
- by ensuring the preparation and running of comprehensive benchmarks on proposed/selected equipment,
- by overseeing the analysis of benchmark results, and the maintenance of records of various equipment capabilities and costs,
- by discussing equipment selection with senior analysts in Software/Hardware Division and Information Systems Directorate,
- by endorsing recommendations for the selection of equipment and confirming/clarifying the terms and conditions of Purchase/Rental/Maintenance and other services, and
- by establishing equipment monitoring procedures and activities to ensure that equipment systems continue to meet Department needs, and that timely compatible

% of Time

data conversion/data entry media are available for the ever changing field of computer systems hardware and other information processing related equipment.

Directs the acquisition of Data Communications Network facilities: 15

- by interpreting requirements and discussing needs with the Head, Data Communications Software Section,
- determining availabilities of lines and services from common carriers (i.e.: CN/CP, Bell),
- establishing effective deliveries and hook-up for hardware. (i.e.: modems, switches, cables, adapters), and
- ensuring acquisition, contracting, and approval documentation is properly effected.

Provides an advisory service to senior management on information processing hardware and network components: 10

- by participating in meetings with suppliers and management to determine requirements and offerings,
- by analyzing requests for facilities and services and recommending appropriate courses of action,
- by liaising with senior management at NHQ and the Regions in the development of plans and acquisitions,
- by participating in Software/Hardware Division and Information Systems Directorate meetings to determine problems with hardware and network components presently in use, and to explain new equipment and services that will be available,
- by evaluating hardware and data communications services to advise management on their effectiveness,
- by preparing plans for the introduction or integration of new/proposed/upgraded/existing information processing Hardware, equipment and/or components,
- by participating in information processing Hardware Review committees to recommend courses of action in information processing Hardware matters,
- by recommending improvements in policies, procedures and standards, and
- by participating on Steering Committees involved in Systems and information processing Hardware matters.

Provides for and may participate in technical training on Hardware and Network components to systems users. 5

% of Time

Acquires and maintains an up-to-date knowledge of new developments in information processing equipment by attendance at Computer Conferences, presentations by vendors, and suppliers' demonstrations, and continuing study of texts, journals and periodicals.

Manages a staff of up to five analysts and five consultants in a matrix organization: 5

- by assigning projects and reviewing work performance, recommending where necessary and applicable, re-assignment, or dismissal, and
- by participating in appraisal and staffing Boards.

Performs other duties such as: 5

- preparing memoranda, correspondence and reports associated with all aspects of information processing Hardware services and administration,
- participating in the negotiations of external contract services for consultants,
- acting as the Hardware Services Section liaison with other branch members in matters of mutual liaison,
- representing Department on inter-governmental committees such as: Government EDP Standards, and
- investigates information processing plans, policies, programs and trends of other organizations and levels of government at national and international levels in the area of information processing systems and Hardware technology to determine their significance and applicability within the Department.

Specifications	Degree	Points
Knowledge - Education and Experience	B4	216

Knowledge is required of governmental and departmental policies and regulations related to information processing installations. More specifically, the work requires a thorough understanding of departmental programs and organization, projected workload volumes, and types of work to be handled, in order to recommend the most suitable information processing hardware and communications systems. The position incumbent must be knowledgeable in the areas of budgeting and fiscal planning, to recognize monetary restraints and to balance equipment performance against potential cost to plan for maximum cost economy. The work requires a detailed

	Degree	Points

knowledge of practices and techniques related to information processing hardware, communications, environment, and security. It also requires a thorough knowledge of the basic technical aspects of computer systems, including necessary interrelationships between hardware, software, and applications. Experience is required in the procurement, installation and implementation, and the evaluation of equipment and systems in the areas of hardware, communications and environment. The position incumbent is required to lead a section of up to 11 highly technical personnel in three specialty groups, assigning and critiquing the work of the Section, as well as providing technical advice and guidance. The position incumbent must coordinate the work of the Section with that of applications and software specialists: therefore, an appreciation of the requirements and priorities of these areas is a pre-requisite. This skill and knowledge is normally acquired through university graduation in computer systems and eight years experience in a range of information processing Specialty areas (hardware, software, communications, security, environment).

Knowledge - Continuing Study — 2 — 60

Continuing study is required of texts, journals, periodicals and manufacturers' literature to maintain an awareness of trends and developments in information processing. The position's research is particularly concentrated in the areas of hardware, communications and environmental support equipment and techniques, but an appreciation of developments in software is a pre-requisite to planning for information processing hardware. Consultations with suppliers and manufacturers and with colleagues at similar installations in government and industry is essential, as is attendance at industry-sponsored demonstrations and conferences. The position must continually review departmental objectives and policies e.g. increased emphasis on security of data in information processing files generates study into specialized security equipment and techniques.

Decision Making — B3 — 210

The position is effectively the departmental expert on information processing hardware, communications, and environ mental support. Recommendations are made to the Chief, System Hardware/Software Service in the areas of procurement and contract administration, planning for site and equipment

	Degree	Points

configurations, and security for a Head Office information processing installation. Similar recommendations are made to management in the regions as computer installations are established in each. Finally, the position participates as hardware specialist on inter-divisional committees with applications and software specialists to plan major procurement and long-range development of equipment and systems, for approval by the Systems Directorate and senior Operations Management. Decisions made on a daily basis affect the timely maintenance of hardware and environmental equipment and, subsequently, the loss of computer time to problem solving and testing exercises. Errors in judgment can quickly cost many thousands of dollars in lost computer time, damaged equipment, and the salaries of operators and system users. Security of information is a major departmental priority and recommendations as to physical security are made by this position. Finally, the position is responsible for the fire and emergency measures which affect the lives of operators and the preservation of valuable equipment.

Contacts	3	73

The work requires representing the department at formal meetings with suppliers to enforce contractually stipulated levels of service, with authority to terminate the contract. Particularly sensitive negotiations are required to ensure satisfactory security measures are employed by common carriers. Further negotiations involve planned, non-tendered procurement and participation as a team member in major negotiations. The work also requires frequent contact with senior officials of industry to obtain information on technological or administrative developments. Contacts are made with other government departments, private industry and educational institutions for lectures and other presentations.

Supervision	B2	46

The work requires the direct supervision of the Supervisor, Hardware Administration, Supervisor, Communications Administration, Supervisor, Environment Administration and the 2 assistants, Hardware Administration.

BENCH-MARK POSITION DESCRIPTION

Bench-mark Position Number: 14 Level:

Descriptive Title: Head, Systems Analysis and Programming Section, Central Computer Division Point Rating: 686

Summary

Under the direction of the Chief, Central Computer Division, directs the activities of a Computer Systems Analysis and Programming Section, in which 30 computer systems analysts, programmers and clerks are employed in the development and maintenance of applications for processing data of public service pay and annuities and accounts payable, and the preparation of financial statements, using large mainframe computers; provides information and advice to senior officials of the Central Services Branch and user departments; and performs other related duties.

Duties	% of Time
Directs the activities of the Computer Systems Analysis and Programming Section engaged in developing and revising information processing systems and computer programs for mass data applications such as the issue of public service pay, superannuation and accounts payable cheques, the accounting for such payments, and the preparation of financial statements for departmental users - by reviewing information requirements with officials of the department and user departments, and negotiating changes required to achieve economies and to conform to directives defining the responsibilities and the limitations on the activities of the Central Computer Division, - by allocating assignments to and co-ordinating the work of systems analysts and programmers in four project teams, to meet changing workloads and to ensure the full use and development of staff, - by establishing and implementing guide-lines and documentation standards to be followed in planning applications, and by advising project leaders on methods of resolving technical problems in analysis and programming, - by developing work measurement standards and implementing follow-up procedures to assure that priorities and deadlines are met,	75

% of Time

- by reviewing the reports and recommendations of systems analysts to determine the technical and economic feasibility of proposed applications and to authorize development and programming activities, and
- by establishing and implementing procedures to ensure the validity and accuracy of input data and the conformity of processing operations and output to user specifications.

Provides information and advice to senior officials of the Central Services Branch and user departments to assist in the development of long- and short-range plans for the use of information processing services — 20

- by explaining the capabilities, limitations and costs of the systems analysis and programming services available in the Section and of the information processing facilities within and outside the Central Services Branch,
- by participating in reviews of the use of the facilities of the Central Computer Division and of the adequacy of staff and equipment resources in relation to forecast requirements for information processing services,
- by recommending changes in numbers, classifications and assignments of systems analysis and programming staff, and
- by compiling information on and assessing developments in systems analysis and programming techniques and information processing equipment.

Performs other related duties, such as directing the development and maintenance of utility routines and directing the training and development of computer systems analysts and programmers.

Specifications	Degree	Points
Knowledge - Education and Experience	B4	216

The work requires a thorough knowledge of computer systems analysis and programming techniques and practices and of the capabilities and capacities of information processing equipment. It also requires a good knowledge of the organization, methods and procedures, and requirements of the divisions of the Central Services Branch, the department and departments served. Skill is required in supervising staff, planning and co-ordinating the activities of project

	Degree	Points

teams, and participating in the determination of staff and equipment requirements. This knowledge and skill are normally gained through university graduation and eight years of progressively responsible experience in computer systems analysis, programming and administration.

Knowledge - Continuing Study — 2 — 60

The work requires knowledge of trends and developments in computer systems planning and programming techniques and in computing devices and services, gained through continuing study of texts, manuals and periodicals and attendance at courses and seminars. It also requires continuing study of departmental reports and directives to ensure understanding of the objectives and the accounting and other requirements of user units.

Decision Making — C3 — 256

The work requires the exercise of judgment, initiative and discretion in recommending that the section undertake the development of applications and in evaluating alternative systems and methods. Decisions made on the assignment of work to project teams and priorities affect the ability of the section to meet requirements of users. Standards governing work methods, documentation and production affect the efficiency and economy with which extensive information processing facilities are used on three shifts. Errors in judgement may adversely affect the efficiency and economy of computer applications controlling the preparation of cheques issued to large numbers of employees and suppliers, and the financial information required by the department and a number of departments for budgeting, cash forecast and fiscal accounting purposes.

Contacts — 3 — 73

The work requires contacts with user officials in the Central Services Branch,. the department, and departments to determine computer systems analysis and programming requirements and to identify priorities and deadlines. Contacts may require persuading user officials to modify information requirements and the form and content of input data.

	Degree Points	
Supervision	D2	81

The work requires the supervision of 30 computer systems analysts, programmers and clerks at the intermediate and junior levels of the administrative and foreign service and administrative support categories. Supervisory duties include selection, training, assignment and assessment of staff.

BENCH-MARK POSITION DESCRIPTION

Bench-mark Position Number: 15 Level: 3

Descriptive Title: Information Processing Facilities Planner Point Rating: 458

Summary

Under the direction of the Section Chief, Systems Planning and Research Division, co-ordinates studies of the current and projected use of the departmental information processing facilities; assists in the testing of new computer systems; provides technical support to department user organizations and technical advice to senior department management; periodically supervises a project team of assigned systems analysts and performs other duties.

Duties	% of Time
Co-ordinates studies to determine the current and future use of departmental information processing facilities either individually or as the head of a project team - by measuring the existing system parameters through the use of hardware and/or software monitors, system logs, test drivers, and other performance measurement tools, - by projecting the results of measurement studies to determine the effects of new systems and/or changes to existing systems, - by identifying ways of improving the systems and equipment used by the department, - by developing and using computer simulation models of automated and manual systems, - by preparing project team work plans and forecasts, - by assigning project responsibilities, - by coordinating the activities of a project team, and - by reviewing assigned work and activities.	20
Devises new methods and techniques for assessing the performance of systems and equipment - by studying and reviewing technical publications, - by meeting with users both within and outside of the government, and - by attending seminars and training courses.	15

	% of Time
Researches methods and techniques for use in the information processing measurement, performance and simulation activities - by examining and reviewing new projects and services as they become available, - by preparing and disseminating reports on results of studies to other departmental groups concerned with information processing acquisitions and systems development, - by maintaining contact with suppliers and consultants who are active in this area, and - by maintaining membership in technical and user groups.	15
Assists in the testing of new computer programs - by designing drivers, bench-marks and other test vehicles, - by preparing test files, in co-operation with users, for operation with such test vehicles, and - by researching test vehicles prepared by others.	15
Provides technical support to department user organizations - by responding to requests for simulation modeling of automated and manual systems, computer load forecasting, and systems/application sizing, and - by co-operating with other sections in studies that require such services.	15
Provides technical advice to senior department management on their current systems capacity and on the possibility or desirability of systems additions or modifications - by participating in meetings and discussions concerning the departmental use of information processing facilities and the planning of new projects.	10
Performs other duties such as - monitoring current departmental operations and requirements, - maintaining a broad knowledge of the information processing field through study and training, - participating in equipment evaluation studies, and	10

	% of Time
- allocating work assignments to project teams to ensure the timely completion of studies and the development of staff, and making recommendations to the Section Chief, in the areas of performance, training, leave, and discipline.	

SPECIFICATIONS	Degree	Points
Knowledge - Education and Experience	B3	189

The work requires a thorough knowledge of information processing technology, hardware and software, systems measurement and modelling techniques, knowledge of real time computer capabilities, and experience in the analysis or measurement of information processing systems, computer systems design, equipment evaluation, systems implementation, and report writing. This knowledge is normally acquired through university graduation and six years of experience in the management of computer applications, or through secondary school graduation and extensive experience in systems analysis and software fabrication.

Knowledge - Continuing Study	2	60

The work requires continuing study of departmental directives and manuals, texts, journals and periodicals, and attendance at government and industrially sponsored training courses, to maintain an awareness of departmental information processing requirements, and of trends and developments in analysis and computer technology.

Decision Making	B2	163

The exercise of tact, judgment, initiative and discretion is required in the conduct of simulation and measurement studies, the dissemination of system measurement and modeling data, the testing of new systems and the provision of advice to user officials. Decisions are made on the scope and depth of studies to be undertaken and on the methods, procedures, and tools to be used in the performance measurement and simulation activities. Recommendations are made on the feasibility and desirability of proposed system changes or additions, hardware selections, and machine configurations, and on methods for optimizing current and projected future systems performance and utilization.

	Degree	Points
Errors in judgment can result in inefficient or uneconomic use of departmental information processing resources, and can adversely affect the completion of computer applications relating to administrative functions. Recommendations are made to the Section Chief and to user officials.		
Contacts	2	46
The work requires contacts with analysts, programmers, superiors, and officials of departmental user units in the planning and development of computer systems and the conduct of measurement and performance studies of proposed computer applications. It also requires contacts with manufacturers, other researchers, colleagues, and other officials in outside organizations to provide and obtain information relating to computer systems measurement and information processing techniques and practices.		
Supervision	-	-
The work requires periodic supervision of a project team of assigned systems analysts, including the scheduling and allocation of work assignments, to meet deadlines and provide for the development of staff. The incumbent makes recommendations to the Section Chief in the areas of work performance, training leave, and disciplinary action.		

BENCH-MARK POSITION DESCRIPTION

Bench-mark Position Number: 16 Level: 2

Descriptive Title: Programmer-Analyst, Information Processing Applications Section

Point Rating: 383

Summary

Under supervision, develops systems proposals, estimates the cost of analysis, programming and processing services and designs information processing systems for departments and agencies requesting service; programs, tests and documents applications; and performs other related duties.

Duties	% of Time
Develops systems proposals, estimates the cost of analysis, programming and processing services, and designs specific systems where exhaustive analysis is not required, for a wide variety of applications using large mainframe computers and peripheral equipment, for departments and agencies requesting services - by discussing the objectives and requirements of the programs, the availability of data, and existing methods of processing with officials of the client departments, - by determining, through experimental flow charting and consideration of the capabilities of various computer facilities, the most efficient and economical methods of meeting information requirements of clients, - by estimating the person-hours required for computer systems development, programming and processing, and calculating the application costs at established rates, - by submitting the systems proposals and cost estimates for approval of the Chief of Departmental Applications, - by examining in detail input data and output requirements for assigned projects to clarify specifications and identify required revisions to clients' input forms, and - by designing flow charts and general block diagrams to depict and specify required equipment configurations, processing operations and required input and output formats.	40

	% of Time
Develops programs for processing on departmental or commercial installations	55

- by designing detailed diagrams to indicate the logical steps and decisions that provide for all conditions likely to arise in processing information,
- by writing instructions in symbolic and higher languages, utilizing standard instructions to call for the use of utility routines,
- by selecting and incorporating available software programs to save programming time and reduce the possibility of error,
- by writing instructions, usually in standard format, for key punching and machine set-up operations to ensure that they conform with the systems design,
- by testing instructions, using simulated data and constructing volume tests of real data, to identify and correct errors in programs, and
- by assembling specifications, flow charts, diagrams, layouts, and programming and operating instructions to document applications for later modification or reference.

Performs other related duties, such as maintaining job-time records to relate progress of jobs to time and cost budgets and collecting, discussing and exchanging information to solve analysis and programming problems.	5

Specifications	Degree	Points
Knowledge - Education and Experience	A3	114

The work requires a good knowledge of the components and capabilities of various electronic computer systems,, a good knowledge of systems analysis techniques and a thorough knowledge of programming. It also requires skill in the planning and conduct of detailed studies on a variety of subject matter, often in co-operation with departmental officials unfamiliar with computer operations. The work requires skill in communicating and establishing effective working relations with officials of departments and agencies. This knowledge and skill are normally acquired through the completion of secondary school education and five years of progressively responsible experience in computer systems programming and analysis.

	Degree	Points
Knowledge - Continuing Study	2	60

The work requires a knowledge of trends and developments in computer systems programming and analysis for a variety of computer systems, gained by reading equipment manuals, texts, journals and periodicals and attending government and industry-sponsored training courses.

Decision Making	B2	163

The work requires the identification of information processing problems and development of the most economical and effective ways of solving them. Solutions must take into account the requirements of the client department and the capabilities and costs of alternative information processing systems. The work requires selection and modification of established analysis and programming techniques. Recommendations and cost estimates are subject to supervisory approval. Decisions affect the satisfaction of information requirements of clients, and errors in estimating the time required and the costs quoted to departments may result in operating losses to the department.

Contacts	2	46

The work requires frequent contacts with senior officials of client departments to discuss information processing objectives and requirements, to advise on computer methods and capabilities and to obtain the information needed to develop and implement computer systems.

Supervision	-	-

The work does not require the supervision of staff.

BENCH-MARK POSITION DESCRIPTION

Bench-mark Position Number: 17 Level: 3

Descriptive Title: Project Leader Point Rating: 551

Summary

Under the direction of the Chief, Systems Analysis Group, plans and directs the work of a team of four computer systems analysts engaged in the conduct of feasibility studies of proposed computer applications and the planning and development of computer systems for departmental mass data applications; advises departmental user officials on information processing matters; conducts feasibility studies and carries out computer systems analysis assignments; and performs other related duties.

Duties	% of Time
Supervises the work of a team of four computer systems analysts engaged in carrying out studies to determine the feasibility of proposed applications and planning computer systems for large mainframe computers and extensive peripheral equipment, to ensure the efficient completion of team assignments, the economical satisfaction of information requirements of users and the effective **use** and development of subordinate analysts - by defining objectives, priorities and deadlines, - by assigning project responsibilities in keeping with the abilities and experience requirements of subordinates, - by co-ordinating the work of team members to ensure continuity of systems components and avoid duplication of effort, - by co-ordinating the development of computer systems with concurrent projects of other teams and programming activities, and the adaptation of established techniques and methods by subordinate analysts, - by advising project team members on problems, and - by reviewing completed work assignments to ensure conformity to technical and procedural standards and to assess staff performance.	50
Conducts feasibility studies of proposed computer applications and carries out computer systems planning and development assignments, as the senior analyst on a project team or working independently on ad hoc assignments.	25

	% of Time
Advises departmental user officials on available information processing services, required input formats, and procedures for the integration and co-ordination of manual and automated information processing operations, on the basis of own experience and information obtained from colleagues, superiors and subordinate analysts, to assist users in obtaining the maximum benefits from departmental information processing services.	15
Performs other related duties, such as writing reports and memoranda on the terms of reference, scope, progress and results of project team assignments and on assessments of subordinate staff performance, and participating in the selection of programming and analysis staff.	10

Specifications	Degree	Points
Knowledge - Education and Experience	B3	189
The work requires a thorough knowledge of computer systems analysis practices and techniques, a good knowledge of the capabilities and capacities of departmental information processing facilities, and a general knowledge of the operations and information processing requirements of departmental user units. It also requires experience in the analysis of information processing systems, the planning and development of computer systems, the writing of reports and the supervision of staff. This knowledge is normally acquired through university graduation and six years of progressively responsible computer systems analysis and administration experience.		
Knowledge - Continuing Study	2	60
The work requires continuing study of departmental directives and manuals, texts, journals and periodicals and attendance at government and industry-sponsored training courses, to maintain an awareness of departmental information processing policies and procedures, and of trends and developments in computer systems programming and analysis.		
Decision Making	B3	210
The exercise of judgement, initiative and discretion is required in the conduct of feasibility studies of proposed computer applications, the development of computer systems, and the provision of advice to user officials. Decisions		

	Degree	Points

are made on the selection of alternative information processing methods and on the specification of machine configurations and processes to accomplish information processing requirements. Recommendations are made to undertake the development of computer systems to meet information requirements of users and to modify processes or requirements of users to improve the feasibility of applications. Errors in judgment can result in inefficient or uneconomical use of departmental information processing resources and can adversely affect the completion of computer applications. Recommendations are made to the Chief of the Systems Analysis Group and to user officials.

Contacts — 2 — 46

The work requires contacts with analysts, programmers, superiors and officials of departmental user units to obtain assistance in the planning and development of computer systems and the conduct of feasibility studies of proposed computer applications. It also requires occasional contacts with colleagues and officials in outside organizations to provide and obtain information relating to computer systems analysis and information processing techniques and practices.

Supervision — B2 — 46

The work requires supervision of four computer systems analysts, including the scheduling and allocation of work assignments to meet deadlines and provide for the development of staff, and the review and assessment of staff performance.

BENCH-MARK POSITION DESCRIPTION

Bench-mark Position Number: 18 Level: 3

Descriptive Title: Senior Analyst, Systems Software Point Rating: 534

Summary

Under the direction of the Chief, Systems Software, develops, implements and maintains software control programs and operating systems; carries out special projects on software and hardware systems; supervises the activities of a staff of subordinate software analysts; maintains an up-to-date knowledge of the computer field with emphasis on software development; and performs other duties.

Duties	% of Time
Develops, implements and maintains software control programs and operating systems to ensure maximum effective and efficient utilization of computer facilities and provision of service to meet user requirements - by establishing and maintaining contacts with software suppliers, - by analyzing software packages supplied by computer manufacturers or other suppliers and tailoring the package to meet departmental needs, - by identifying and assessing errors or inadequacies in control programs and designing modifications to overcome the problem, - by studying, developing and evaluating methods of improving the efficiency of operating systems, - by designing, testing and implementing new software or modifying existing software to meet particular requirements, such as interface programs to assess information produced by another computer, accounting routines, and the control of entry of programs to the system, - by identifying and resolving, or assigning staff to solve on-line problems in the operating system, - by recommending improvements in operating procedures to ensure optimum utilization of software and hardware, and - by establishing and maintaining a reporting system that will produce statistics on the efficiency of the operating system.	45

	% of Time
Carries out special projects on hardware and software systems - by conducting studies into new systems that may improve the operating system, determining feasibility and cost/benefit and making recommendations, - by designing, testing and installing control programs to facilitate operations such as communications, magnetic tape handling and direct access usage of the computer, and discussing installation problems with application programmers, - by conducting bench-mark tests of equipment that is being considered for procurement, - by carrying out research and analytical tests to establish which features of software control systems offered by manufacturers best meet the requirements of the department and which features must be avoided to prevent problems in the operating system, - by participating in meetings with manufacturers to resolve contractual problems, evaluate contractor's proposals and conducting tests on software delivered on contract, and - by studying, developing and recommending improvements in communications between remote terminals and the computer.	25
Supervises the activities of a small group of software analysts to ensure timely completion of projects and the effective development of staff - by assigning work projects and checking the resulting reports for technical content, - by providing advice and guidance on work assignments, - by establishing and maintaining standards of quality and quantity, and - by assessing training needs, evaluating performance and making recommendations to the Chief, Systems Software.	15
Maintains an up-to-date knowledge of the computer field, specifically languages, architecture, and software development by reading texts, periodicals, journals and manufacturer's literature, by visiting manufacturer's plants and attending industry sponsored courses, and by attending meetings, seminars, workshops and formal training courses.	10

	% of Time
Performs other duties such as giving lectures on computer software, maintaining liaison with application programmers, computer operations and various users, and providing technical advice to consultants.	5

Specifications	Degree	Points
Knowledge - Education and Experience	B3	189

The work requires a sound knowledge of computer hardware and a thorough knowledge of software systems. The work also requires a thorough knowledge of all the basic technical aspects of computer systems including machine languages, compilers, and input/output systems. Experience is required in analyzing software packages, in tailoring these packages to meet departmental requirements, in designing software control programs, modifying control programs and in maintaining the operating system at peak efficiency. Experience is also required in evaluating. both hardware and software, in establishing and maintaining professional working relations within the department and with outside industry. This education and experience is obtained either through secondary school or university completion, formal training courses and several years experience on various computers, involving various machine languages and operations requiring extensive tape and direct access manipulation.

Knowledge - Continuing Study	2	60

The work requires the continuing study of texts, journals, periodicals and manufacturer's literature and of the objectives, specifications and systems of various information processing installations to maintain an up-to-date knowledge of trends in software development and of the analysis and comparison of systems of both software and hardware. The work also requires attending seminars, workshops, training courses and visiting manufacturers.

Decision Making	B3	210

The work requires judgment and initiative in evaluating software packages provided by suppliers, in designing software control programs, in seeking the most effective and efficient methods of improving the operating system and in carrying out research and analysis of software systems. Initiative and judgment are also required in evaluating proposals made by suppliers in carrying out bench-mark

	Degree	Points

programs on new equipment and in identifying and solving critical on-line problems. Recommendations are made regarding additions to the system, changes in operating methods and procedures and the most suitable equipment and control programs to meet departmental requirements. Errors in judgment may result in modifications to the operating system that result in increased costs and reduced efficiency, the procurement of control programs that require extensive modifications to meet user's needs and the acquisition of equipment and software facilities that are unsatisfactory on a cost/benefit basis. Errors in judgment can also result in the introduction of procedures that result in delays in projects and ineffective and inefficient utilization of manpower resources.

Responsibility for Contacts — 2 — 46

The work requires contacts with senior staff of departmental organizations to obtain agreement with modifications to, or changes in, the operating system and to advise on computer capabilities and utilization. The work also requires contacts with manufacturers to obtain information, to outline departmental requirements and to resolve software problems.

Supervision — A2 — 29

The work requires the supervision of up to three systems software analysts, involves assigning work, giving advice and guidance, checking completed work and making recommendations on promotion and disciplinary action.

BENCH-MARK POSITION DESCRIPTION

Bench-mark Position Number: 19 Level: 4

Descriptive Title: Senior Planning Officer Point Rating: 605

Summary

Under the general direction of the Director of the Planning Division; develops short range objectives and plans related to the use of information processing resources; conducts feasibility studies involving major systems development; plans and directs the acquisition or modification of information processing equipment; advises senior departmental and other government officers on implications of planned information processing applications.

Duties	% of Time
Develops short range objectives and plans to ensure efficient use of information processing resources - by defining in conjunction with other specialists standards of performance for hardware and personnel, - by projecting current equipment utilization and personnel resources against known or anticipated future requirements, - by preparing annual budgets of equipment expenditures, and - by collating estimates of information processing personnel requirements as prepared by other divisions and commenting of the appropriateness of these estimates.	20
Conducts feasibility studies for such major systems development as telecommunications network design, Public Service pay, Canada Pension Plan, Socio-Economic payments and the like - by conducting feasibility studies and cost benefit analysis of particular projects, - by developing general systems specifications, and - by preparing reports and making presentations and recommendations to clients.	20
Plans and directs the acquisition or modification of information processing equipment - by maintaining up-to-date knowledge of the state of development in the entire range of computing equipment and the software associated with the equipment, in	20

% of Time

data communication equipment and facilities in special conversions devices such as microfilm readers, optical character readers and magnetic tape converters,
- by preparing specifications for equipment acquisition, such as Treasury Board submissions, invitations to tender and benchmark programs, in accordance with the Treasury Board's guidelines,
- by evaluating the competing suppliers' performance against specifications, usually on the basis of benchmark tests, and recommending, in the form of a Treasury Board submission, a choice between alternatives, and
- by preparing plans, and subsequently monitoring these plans to ensure the successful installation of varied size computer systems.

Advises senior government officers on implications of planned information processing applications — 15

- by maintaining a knowledge of contemporary management techniques such as mathematical models, simulation, PERT/CPM, file organization and file management, etc., and counseling senior officers, both of this and other departments, as to its use, and
- by keeping abreast of the development in the ancillary equipment field, such as envelopers, microfilming equipment, bursters, etc., and making recommendations as to their use.

Advises senior management on the matters relating to information processing security — 10

- by being the Branch representative on the Sector Information Processing Security Committee
- by participating in the appraisal of the RCMP SEIT reports, and

- by being responsible for the implementation of the recommendations of the SEIT reports which affect the Branch.

Is the Branch representative on matters dealing with contingency Planning. Is responsible for the coordination of audit report replies. Is the Branch representative on the Services Official Languages Committee — 10

- by being responsible for the preparation of the annual O/L plan for the Branch, and

	% of Time
- by co-ordinating the implementation of the O/L plan within the Branch.	
Participates in other related duties such as	5
- the Public Service 'Commission's appraisal and selection boards for computer systems administrators up to the level of CSA-3, and - presenting papers, participating in panel discussion or otherwise contributing to national or international technical organizations including the Federal Institute of Management, the Canadian Information Processing Society, the Association of Computing Machinery, the Institute of Electrical Engineers, the Data Processing Management Association and others.	

Specifications	Degree	Points
Knowledge - Education and Experience	B4	216

The work requires a good knowledge of all aspects of information processing including systems analysis and programming practices and techniques, equipment capabilities, etc., and a thorough knowledge of at least one of the following subjects: computing equipment, programming and operating systems, data file organization for storage and retrieval, telecommunications, operations research disciplines. This technical knowledge must be combined with a good knowledge of management techniques, of departmental policies and plans and resulting information processing requirements, of branch objectives and of such subject matter areas as accounting, pay and personnel, inventory control and socio economic payments. The work requires the ability to develop short range plans and objectives, to plan and conduct studies for major systems development and to work effectively with client and departmental officials. This knowledge is normally acquired through university graduation, and eight years of closely related and progressively more responsible experience.

Knowledge - Continuing Study	2	60

The planning officer is required to continually study new developments in his particular field of specialization and relate his knowledge to the needs of the branch and the department and to contemporary management techniques. So rapid is the rate of change in some of these disciplines

Degree Points

that without continuous updating, and individual's value to the department diminishes rapidly. In developing plans and objectives to ensure efficient use of information processing resources, an up-to-date knowledge of all aspects of information processing, how they interrelate and how they relate to management practices is required. The planning officer's knowledge is kept current by reading technical publications (which are totally unintelligible to a non-specialist), by attending and participating in professional seminars and conferences and by attending university courses.

Decision Making C3 256

Judgment and discretion are required in developing short range plans and objectives to ensure effective use of information processing resources, in planning and conducting feasibility studies for major systems development such as telecommunications network design, in planning the acquisition or modification of information processing equipment and in advising senior government officers on the implications of planned information processing applications. Initial direction is very general and it is largely up to the planning officer to apply judgment and initiative to carry out his assignment in the most appropriate and effective manner. Two typical assignments are the design of a telecommunications network and the evaluation of competing supplier's bids to supply a large computer system. In both instances, the initial direction would be very general - "What is involved in setting up a telecommunications network to service the department?" or "Which of the competing bids is superior?" The planning officer is then required to plan and organize his work, in order to answer these rather fundamental questions. The work is often innovative and the planning officer has very little to guide him save his knowledge and initiative. As a result of feasibility studies, recommendations are made to develop comprehensive computer systems. Decisions and recommendations affect the department's overall plans for the provision of information processing services, particularly as these plans and services relate to the area of specialization of the planning officer. Errors in judgment could seriously impair the department's ability to meet its responsibilities. For example, a poorly designed telecommunications network or a computer system with serious faults which had not been detected would have serious repercussions on the department's operations. Because the work is so technical and the knowledge so specialized, recommendations by a recognized expert in a field are seldom questioned.

	Degree	Points
Contacts	3	73

A planning officer participates in all major systems development in the department, either as head of the task force, as in the cases of telecommunications network design and computer evaluation, or as a senior member, as in the development of the Old Age Security Automation team. The work brings him in contact with senior officers of the department to determine system requirements, to reach agreement on resources required and priorities, and to co-ordinate diverse work requirements. Often he is required to persuade user officials as to the proper or most effective use of hardware or personnel resources. The work also requires a constant liaison with equipment supplier personnel, especially at the technical level.

Supervision	-	-

The duties of a planning officer do not call for direct supervision. However, for particular projects, personnel are seconded from other divisions and assigned to the planning officer for the duration of that project.

BENCH-MARK POSITION DESCRIPTION

Bench-mark Position Number: 20 Level: 3

Descriptive Title: Senior Technical Consultant Point Rating: 458

Summary

Under the direction of the Chief, Technical Consulting Services, provides a consulting service to the engineers, scientists and technicians of client departments on all aspects of their use of computers. Provides leadership, advice, training and a problem solving service to the department and to other departments in the application of advanced mathematical, statistical and operational research methods which require the use of computers to a wide variety of complex scientific research, development and operational problems in any number of diverse fields such as; the geological sciences, metallurgy, mining and mineral economics, seismology, mineral processing, fuels technology, geodesy, photogrammetry, geography and energy resources. May be called upon to use any one of a number of different computers using FORTRAN and occasionally assembler programming languages.

Duties	% of Time
Analyzes requirements and designs and implements systems on request from the users of client departments or acts as a consultant giving advice and assistance to those scientists who wish to undertake their own system design and implementation	55

- by detailed discussions with the scientists, economists and engineers involved, determines system requirements,
- by conducting a feasibility study of the various possible solutions,
- by proposing both verbally and in writing to the clients the best way of solving their problem,
- by reviewing with the client details of the costs involved and recommending either implementation or rejection as a result of the cost benefit analysis,
- by doing a detailed analysis of each part of the system,
- by specifying the objectives of each program within the system,
- by determining which components of the applications software library (mathematical and statistical subroutines or major modeling and simulation packages) are appropriate to the problem and applying them,

% of Time

- by reviewing the program designs suggested by assigned staff,
- by designing system test data,
- by ensuring that all of the system objectives are accomplished,
- by ensuring that all parts of the system are documented,
- by ensuring that the client is fully aware of how to use system,
- by writing specifications for the tendering of systems design and programming for outside contract, evaluating responses and making recommendations with regard to the selection of a successful bidder, and
- by consulting with and advising and assisting the scientists who wish to implement their own solutions.

Manages the projects and staff under assigned control including Technical Consultants 20

- by estimating requirements for financial and manpower resources,
- by ensuring that work is carried out in a timely manner and in adherence with estimated manpower and financial costs,
- by ensuring that project staff designs, codes and documents according to the standards of the department,
- by performing regular appraisals of assigned staff, and
- by recommending to superior the training needs of the staff assigned.

Studies the research, development and operational activities of the client departments and keeps abreast of the latest developments, techniques and tools available in mathematics, statistics, operational research and computer methods, 10

- by visiting and discussing with scientists and engineers in the Department,
- by study of departmental publications,
- by study of the relevant technical and professional literature,
- by attendance at conferences and symposia,
- by reading the relevant technical literature,
- by attendance at seminars and conferences, and
- by personal contact with people active in the various fields.

% of Time

Performs research into the application of new techniques and knowledge that he has determined merit investigation, 13

- by obtaining the cooperation of scientists, engineers and their managers to support the investigation of new techniques,
- by implementing the new techniques on a limited scale,
- by comparing and reporting the advantages and disadvantages of new methods over old ones,
- by recommending the adoption or rejection of new techniques,
- by searching for and evaluating new mathematical and statistical subroutines,
- by developing new applications library routines and by modifying or converting existing routines, and
- by searching for, evaluating and participating in the selection and acceptance testing of large scale modeling or simulation software packages.

Performs other related duties, such as giving seminars on subjects in areas of expertise, and recommending to superior on the need for qualified staff. Attends selections boards organized by the Public Service Commission and other Departments for the promotion and recruitment of staff.

SPECIFICATIONS	Degree	Points
Knowledge - Education and Experience	B3	189

The work, requires an in-depth knowledge of computer systems analysis, programming techniques and practices and a thorough knowledge of the capabilities and capacities of a variety of computers and peripheral equipment. It also requires a good knowledge of information processing resources and procedures associated with the provision of information processing services to users.

A thorough knowledge of advanced mathematical techniques, such as those involved in the solution of simultaneous and differential equations, matrix algebra and statistics is necessary, together with the ability to learn new methods from research papers and texts. It is essential to communicate clearly both verbally and in writing. It is also desirable to have an in-depth knowledge of at least one of the specialized areas of client departments in addition to his computing knowledge. This knowledge and skill is usually only acquired through University graduation

	Degree	Points

in one of the physical or mathematical sciences and five years of various and progressively responsible experiences in computer systems programming. Finally, a general knowledge of research methods would be considered to be useful.

Knowledge - Continuing Study 60

The work requires knowledge of trends and developments in mathematical procedures, numerical analysis, systems analysis and programming techniques and changes to practices and capacities of available information processing equipment and to be aware of trends in research. This knowledge is normally gained by a continuing study of scientific journals, reports, directives, texts and equipment manuals, by attendance at Government and Industry sponsored training courses and seminars and by direct contact with research personnel.

Decision Making B2 163

The work requires the exercise of judgment, initiative and discretion in the analysis, design, development and implementation of scientific applications which are poorly defined. Suggestions are made to users on changes to their specifications which can result in better performance. Decisions are made on which of a number of alternate mathematical techniques is best suited to specific problems. Recommendations are made to user officials on the feasibility of new computer systems. Errors of judgment affect two different areas. Firstly, a poor choice can adversely affect the quality and efficiency of the services provided by the department thereby causing significant losses in revenue. Secondly, errors can cause undue delays and excessive costs to research projects and more important can lead to scientists and engineers publishing incorrect reports in scientific journals. Finally, with a number of problems, it is necessary for the incumbent to carry out research since there is no known solution to the problem.

Contacts 2 46

The work requires frequent contacts with research scientists of client departments to investigate their computing requirements. This usually requires a considerable amount of discussion to clarify the real objectives of the client or clients. The incumbent is required to obtain agreement on the objectives of a specific project and then to persuade

	Degree	Points
the clients to accept the results of his feasibility studies and analysis. Finally contacts occur with scientists and engineers throughout government and in Industry to obtain and provide information on new mathematical and numerical techniques.		
Supervision	-	-
The incumbent is responsible for assigning work to and maintaining performance of assigned staff in accordance with the requirements of projects.		

BENCH-MARK POSITION DESCRIPTION

Bench-mark Position Number: 21 Level: 3

Descriptive Title: Senior Training Officer, Information Processing Point Rating: 504

Summary

Under the general supervision of the Chief, Systems Training, participates in the development of new Information Processing and management courses and the modifications of existing courses to meet departmental requirements; supervises the activity of four subordinate training officers; carries out instructional duties for advanced Information Processing and management courses; maintains an up-to-date knowledge of the trends and developments in computer technology; and performs other duties.

Duties	% of Time
Participates in the planning and development of new Information Processing and management courses and in modifying existing courses to meet departmental requirements in the training of line management, analysts, programmers and operators	35

- by studying trends and developments in the Computer Systems field and identifying and assessing departmental training needs,
- by carrying out in-depth studies of courses offered outside the Public Service and of courses available from suppliers,
- by making recommendations on courses that should be conducted in the department and training needs that can best be achieved by using facilities offered by private industry,
- by designing course outlines, preparing syllabi, determining the manpower and financial requirements, determining and obtaining course material and training aids, and establishing course timetables,
- by designing practical exercises to test the student's ability to solve problems in the operating environment,
- by making modifications to programmed courses provided by suppliers and existing courses to meet departmental training needs and career path development,
- by arranging training facilities for the training of staff from other departments,
- by evaluating course results and making recommendations for improvements,

% of Time

- by providing advice to departmental management on all aspects of the training facilities, and
- by making suitable arrangements to meet varying requirements for accommodation of facilities and students.

Supervises the activities of a staff of four Instructors to ensure that courses are conducted in accordance with depart mental objectives and that training needs are being satisfied — 35

- by assigning specific segments of the training program to each instructor and providing the appropriate guidelines,
- by ensuring that each instructor has prepared adequate lesson plans and has arranged for hand-out material and training aids,
- by providing advice and guidance to instructors in instructional techniques, course content and the effective use of training aids,
- by monitoring training sessions to ensure that established standards are being met,
- by assessing student progress, evaluating course results and writing reports, and
- by appraising the performance of instructors and making recommendations for promotion or disciplinary action.

Carries out instructional duties for advanced Information Processing and management courses — 15

- by studying the relevant material and making up a course outline and lesson plans,
- by obtaining or preparing hand-out material and arranging for suitable training aids,
- by presenting course material through lectures, workshops, syndicates, and practical exercises, and
- by preparing, invigilating and marking examinations and case studies and assessing student performance.

Maintains an up-to-date knowledge of trends and developments in computer technology and instructional techniques and new training courses by studying texts, periodicals,. journals and other literature and by attending conferences, seminars and formal and informal courses. — 10

Performs other duties such as assisting in the selection of trainees, recommending placement of newly trained personnel and acting as the chief of the training group when required. — 5

Specifications	Degree	Points
Knowledge - Education and Experience	B3	189

The work requires a thorough knowledge of computer science particularly languages, utilities and computer operations together with a broad knowledge of at least one current generation operating system and hardware. The work also requires a sound knowledge of the training needs of the department, of training methodology of the effective use of training aids and the development of course outlines, syllabi and examinations. Experience is required in the computer operations, the application of computers, the use of various machine languages and in software applications. Experience is also required in supervising a staff, in evaluating the results of courses and in appraising student performance. This knowledge is normally acquired through university graduation and several years of experience in the design and implementation of complex computer projects utilizing a variety of languages, compilers and utilities or through secondary school graduation and extensive experience in systems analyses and application programming or software work.

Knowledge - Continuing Study	2	60

The work requires the continuing study of texts, periodicals, journals and a variety of instruction material, the operating system, and new departmental hardware and software acquisitions in order to plan, develop and update training programs for analysts, operators and programmers. Also required is continuing studying of advances in training methodology.

Decision Making	B2	163

The work requires the identification of training requirements in a variety of subject-matter areas, the evaluation of alternate methods of meeting the training needs, the assessment of the most efficient and economical solution and the planning and development of training programs that will fulfill all departmental requirements. Recommendations commit departmental manpower and financial resources. Errors in judgment in determining training requirements result in inadequately trained personnel, limitations in career development and affect the utilization and efficiency of the Information Processing system.

	Degree	Points
Responsibility for Contacts	2	46

The work requires frequent contacts with suppliers of training material, with commercial training organizations to arrange for courses outside the department and with management to explain and gain acceptance of proposed training programs. There are also frequent contacts with training organizations in other departments and officials in private industry to discuss common training problems.

Supervision	B2	46

The work requires the supervision of four instructors which requires assigning work, assessing performance, providing technical advice and guidance and making recommendations on promotion and disciplinary action.

BENCH-MARK POSITION DESCRIPTION

Bench-mark Position Number: 22 Level: 3

Descriptive Title: Supervisor, Information Processing Applications Section Point Rating: 578

Summary

Under direction of the Chief, Departmental Applications Division, plans and directs the work of staff providing a computer systems analysis and programming service for mass data applications in government departments and agencies; prepares preliminary systems proposals and cost estimates; advises on the installation and maintenance of information processing systems. .

Duties	% of Time
Plans and directs the work of a group of eight programmer-analysts providing a computer systems analysis and programming service for government departments and agencies contracting with the bureau for the development or modification of mass data applications to be processed on large mainframe computers - by interpreting the policy and directives of the bureau for user officials, - by discussing information requirements with client officials to determine the objectives and requirements of applications and to plan subordinate staff assignments, - by establishing objectives, priorities, deadlines and schedules for projects and co-ordinating subordinate staff activities, - by advising and instructing staff on technical problems encountered in analyzing and programming a variety of applications to ensure that the most efficient and economical methods and techniques are used, and - by reviewing assignments to ensure conformity to production standards and satisfaction of clients' information requirements.	50
Prepares preliminary systems proposals and cost estimates for major applications to establish objectives, requirements and terms of reference for the section's services - by consulting with senior officials or subject-matter specialists of client departments on information processing objectives and requirements,	40

% of Time

- by undertaking preliminary analyses of existing information processing methods and procedures to determine the most efficient and economical approach to the satisfaction of information requirements of clients,
- by recommending to client officials modifications of procedures associated with the proposed applications and assisting in their implementation,
- by preparing for the approval of the Chief, Departmental Applications Division, outlines of proposed systems and estimates of costs of analyzing, programming, key punching, and processing operations, and
- by negotiating terms of contracts with client departments and approving modifications within delegated authority.

Advises on and assists in the maintenance of automated systems under contract by reviewing clients' requests or reports, evaluating results, identifying problem areas and modifying the system. 10

Specifications	Degree	Points
Knowledge - Education and Experience	B3	189

The work requires a thorough knowledge of computer systems analysis and programming methods, procedures and techniques and a good knowledge of the characteristics and capabilities of a variety of computing devices. It also requires experience in the planning and development of information processing systems for a wide variety of applications and computing devices. Skill is required in establishing effective communications and good working relations with officials of client organizations. This knowledge is normally acquired through university graduation and six years of varied and progressively responsible experience in administration, computer systems analysis and programming.

Knowledge - Continuing Study	2	60

The work requires continuing study of the manuals and information bulletins for a variety of computer systems, reading of texts, journals and periodicals, and attendance at courses and seminars to keep abreast of trends and developments in systems analysis and programming techniques and machine capabilities.

	Degree	Points
Decision Making	B3	210

The work requires identification of information processing problems in a wide variety of subject-matter areas and bureau operations, the evaluation of alternative information processing systems and methods, the identification of the most efficient and economical solutions, and the development of systems that will meet the requirements of client departments and available facilities. Recommendations commit the information processing and manpower resources of the bureau. Errors in judgment may affect the economy and efficiency of computer applications developed for a variety of clients normally having little, if any, information processing resources or experience. Recommendations are made to the Chief, Departmental Applications Division, and to client officials.

Contacts	3	73

The work requires frequent contacts with senior officials of departments and agencies to discuss and define the objectives and requirements of proposed computer applications, and to obtain the information needed to recommend specific systems and estimate the cost of the services to be provided. Contacts may involve persuading clients to modify their requirements or input preparation procedures in order to meet the needs or reduce the costs of the computer application. Contacts involve negotiating, as a representative of the department, the terms of contracts for information processing services provided by the department.

Supervision	B2	46

The work requires the supervision of eight computer systems analysts and programmer-analysts; supervisory responsibilities include assignment of work, performance evaluation, training, and recommendation of advancement and disciplinary action.

BENCH-MARK POSITION DESCRIPTION

Bench-mark Position Number: 23 Level: 2

Descriptive Title: Systems Analyst Point Rating: 383

Summary

Under the supervision of a project leader, Systems Analysis Section, participates in studies to establish the technical and economic feasibility of proposed computer applications; plans and develops information processing systems for mass data applications; and performs other related duties.

Duties	% of Time
Participates in the conduct of studies to establish the technical and economic feasibility of proposed computer applications, as a member of a team of computer systems analysts under the supervision of a project leader - by reviewing user policies and procedures relating to activities affected by the proposed applications, - by discussing requirements, resources, operations and objectives of users with their officials in headquarters and field locations, - by evaluating input forms, output requirements and operations of users to identify required changes in their procedures, - by consulting with colleagues and departmental special ists and reviewing previous departmental information processing applications, to identify alternative methods of meeting information requirements of users, and - by preparing reports, recommending the type and extent of information processing services appropriate, and estimating the development and processing requirements and associated costs of the recommended services.	25
Plans and develops information processing systems for mass data applications under supervision of a project leader, to ensure the co-ordination and integration of computer systems within applications, the economical satisfaction of information requirements of users, and the efficient use of depart mental equipment and programming facilities - by identifying and analyzing information processing requirements and objectives,	65

	% of Time
- by developing general solutions to computer systems requirements, - by evaluating alternative solutions in terms of costs, time and processing requirements, requirements of users, and available programming and processing resources, - by conferring with the project leader and project team colleagues to ensure the co-ordination of systems and avoid duplication of efforts, - by developing and recommending new user procedures to facilitate the provision of information processing services, - by developing program specifications and test procedures for approved systems, and - by directing programmers in the preparation of computer systems programs, operating instructions and program tests and in the correction or modification of completed programs.	
Performs other related duties, such as instructing user staffs in new procedures necessitated by information processing, evaluating utility routines for potential use in the development of computer systems, and assisting in the training of junior computer systems analysis and programming	10

Specifications	Degree	Points
Knowledge - Education and Experience	A3	114
The work requires a good knowledge of computer systems analysis and programming techniques and practices and the capabilities and capacities of information processing equipment. It also requires a general knowledge of legislative and administrative policy requirements affecting information processing operations of users. This knowledge is normally acquired through completion of secondary school education and five years of progressively responsible experience in computer systems analysis and programming.		
Knowledge - Continuing Study	2	60
The work requires knowledge of trends and developments in computer systems analysis and programming techniques and practices, gained by reading texts, journals and periodicals and attending government and industry-sponsored training courses. It also requires familiarity with departmental policies, procedures and practices, gained by reading departmental manuals and directives.		

	Degree	Points
Decision Making	B2	163

The work requires the exercise of judgment, initiative and discretion in evaluating the feasibility of proposed computer applications and in planning and developing information processing systems to meet information requirements of users within the limitations of costs, machine capacities, priorities and deadlines assigned to applications. Recommendations are made on the extent and type of information processing services appropriate to applications, the use of information processing facilities, and the revision of procedures in accordance with information processing requirements. Problems in identification of requirements of users are resolved by consultation with their officials; technical or procedural problems are referred to the project leader. Completed systems are submitted to the project leader for approval and are tested by trial runs before implementation. Decisions affect the quality, efficiency and economy of information processing systems used. Recommendations are made to the project leader.

Contacts	2	46

The work requires contacts with user officials and colleagues to obtain and provide information and assistance required for the evaluation of the feasibility of proposed applications, the planning and development of computer systems, and the implementation of new or revised procedures necessitated by information processing requirements. Contacts with user officials may require consultations in headquarters and field locations and may result in extensive revisions to operating procedures of users.

Supervision	-	-

Supervision of the work of others **is** not a continuing requirement. Work leadership and guidance are occasionally provided to programmers and junior analysts, and assessments of junior staff may be provided to the project leader on request.

BENCH-MARK POSITION DESCRIPTION

Bench-mark Position Number: 24 Level: 3

Descriptive Title: Telecommunications Advisor Point Rating: 458

Summary

Under the direction of the Chief, Technical Services, is responsible for the functional management and efficient operation of all departmental Telecommunication hardware related to systems which include online terminals and telecommunications equipment in Systems and Consulting Directorate, Head Office, remote research centres and regional offices. At the present time the configuration is comprised of 16 Mini-Computers with 4 located centrally and the remainder located at regional sites across the country. Approximately 300 terminals access the central configurations. This network is expected to continue to grow both in terms of terminals and computers. The incumbent will also advise user and departmental management officials on the use and development of departmental telecommunications resources, such as interactive information processing, electronic office automation, local area networking and digital switching; evaluate and plan the implementation of intelligent communication controllers; and perform other related duties.

Duties	% of Time
Plans and supervises the operation and maintenance of the communications networks of the Department. Duties include those related to the functional responsibility exercised by the Information Processing Division over all central and remote equipment on-line to the department's Time-Sharing System and outside service bureau. Ensures the effective use of facilities and services to users - by developing administrative and operational procedures, - by reviewing production, progress and administrative reports to ensure that quality and production standards are maintained, - by initiating and conducting meetings with central site, communications and remote terminal suppliers to form and maintain integrated trouble isolation and support structure organizations, - by participating in the negotiation of contracts for terminal, communications and central site equipment, - by evaluating the effectiveness of support contracts and the manner in which they are carried out, - by participating in the testing of computer equipment to ensure its satisfactory performance prior to contract finalization,	50

% of Time

- by acting as a focal point for the receipt and dissemination of information related to the operational equipment related to real time computer systems,
- by standardizing problem determination procedures at central and remote sites,
- by carrying out on line terminal tests and other tests to ensure that continued effective security standards are maintained by all suppliers and users,
- by developing and supervising an effective method of monitoring the performance and degradation of system components,
- by supervising the preparation of both central and remote sites for the installation of computer communications-equipment,
- by supervising the installation of computer communications equipment at central and remote sites,
- by negotiating with suppliers schedules for the preventive maintenance of computer communications,
- by conducting on-site investigations of headquarters and field operations and discussions with departmental management officials and computer systems analysts, to identify possible problems related to information processing,
- by participating in the evaluation of new equipment either purchased or rental,
- by acting as consultant to the site manager on problems related to the interface of the central site computer and the telecommunications and remote site subsystems, and
- by ensuring and maintaining the integrity of the network.

Advises users, installation management, and departmental management officials on the use and development of depart mental telecommunication resources, such as interactive information processing, electronic office automation and local area networking supported by digital switching, to assist users in obtaining the maximum benefit from information technology and to ensure that the commitment to users is not degraded due to lack of understanding of departmental resources, capabilities and priorities 40

- by informing users at regional offices and Head Offices of the capabilities and requirements of departmental services as outlined above,

% of Time

- by assisting in the recommendation of alternative information processing arrangements or revisions to information requirements of users, to improve the technical or economic feasibility of approved applications or to accommodate changes in processing,
- by assessing administrative and technological innovations in information processing with a view to recommending the adoption of procedures, the acquisition of equipment, and the provision or development of departmental information systems services, and
- by advising and instructing staff on technical problems encountered in the various related activities and to ensure that the most efficient and economical methods and techniques are used.

Performs other related duties, such as participation in the selection and assessment of staff, represents the Chief at departmental meetings on information processing administration, prepares reports, memoranda and correspondence associated with the administration of the departmental Information Processing Service. 10

Specifications	Degree	Points
Knowledge - Education and Experience	B3	189

The work requires a thorough knowledge of data processing communications and networking techniques and practices and the capacities and capabilities of department and contractor information processing facilities. A thorough knowledge of the practices, capacities and performance of mini computers and telecommunications networks is a necessity. It also requires a thorough knowledge of the content, objectives and information processing requirements of research, administrative and operational programs and a good knowledge of departmental and government policies and regulations governing the administration of information processing and telecommunications services. Because users of the systems at the remote terminals are not information processing oriented, the work requires skill in dealing with users to ensure that they accept the system as a means of carrying out their responsibilities in an improved manner. An appreciation of the scientific and technological disciplines involved in the conduct of departmental research and operational programs is a further requirement. The work requires skill in the planning and coordinating of complex technical operations, the forecasting of staff, equipment and financial

	Degree	Points
requirements, and the development and presentation of advice. This knowledge is normally acquired through completion of university education and six years of progressively responsible administrative and information processing experience.		
Knowledge - Continuing Study	2	60
The work requires continuing study of trends and development in the administration and operation of information processing and telecommunications including the interrelationships of information processing, general management and research requirements of the Department, through reading of texts, journals and periodicals, consultations with manufacturers and attendance at various seminars, conferences and training courses.		
Decision Making	B2	163
The work requires the planning and coordinating of information processing activities of telecommunications systems supporting a large number of remote terminals located in Research Stations, the Department's Data Centre and Head-quarters and other regional sites. Systems equipment configurations are contracted to multiple computer, peripheral, and communications suppliers and determination of account ability necessitates the use of good judgment. The frequent resolution of conflicts between multiple computer suppliers, software and common carriers of telecommunications networks is an important function of the work. Decisions affect the effectiveness and efficiency of services provided to users and development personnel. Because the on line systems are meant to provide an improved information service to users at regional offices across Canada, the creditability of the Department will be measured to some extent by the efficiency of the system and decisions taken in coordinating the role of its different components plays an important part. Recommendations influence the acquisition and usage of computer and telecommunications equipment and facilities and the implementation of departmental information processing policies. Errors in judgment can adversely affect the efficiency and economy of departmental information processing services. Recommendations are made to the Chief, Technical Services Division.		

	Degree	Points
Contacts	2	46

The work requires contacts with senior departmental officials in headquarters and regional offices to plan and coordinate the provision of information processing services, to establish priorities and to advise on the development of departmental information processing policies. Contacts are also initiated during negotiation of contracts and when resolving problems encountered during the term of contracts. Contacts with other government and industry officials including common carriers are maintained to obtain information on technological and administrative development in information processing.

Supervision	-	-

The work requires supervision of programmer/analyst personnel on a project basis as required as well as occasional utilization of outside consulting resources.