CARIBBEAN EXAMINATIONS COUNCIL

Caribbean Secondary
Education Certificate

Information Technology Syllabus

Effective for Examinations from May/June 2010

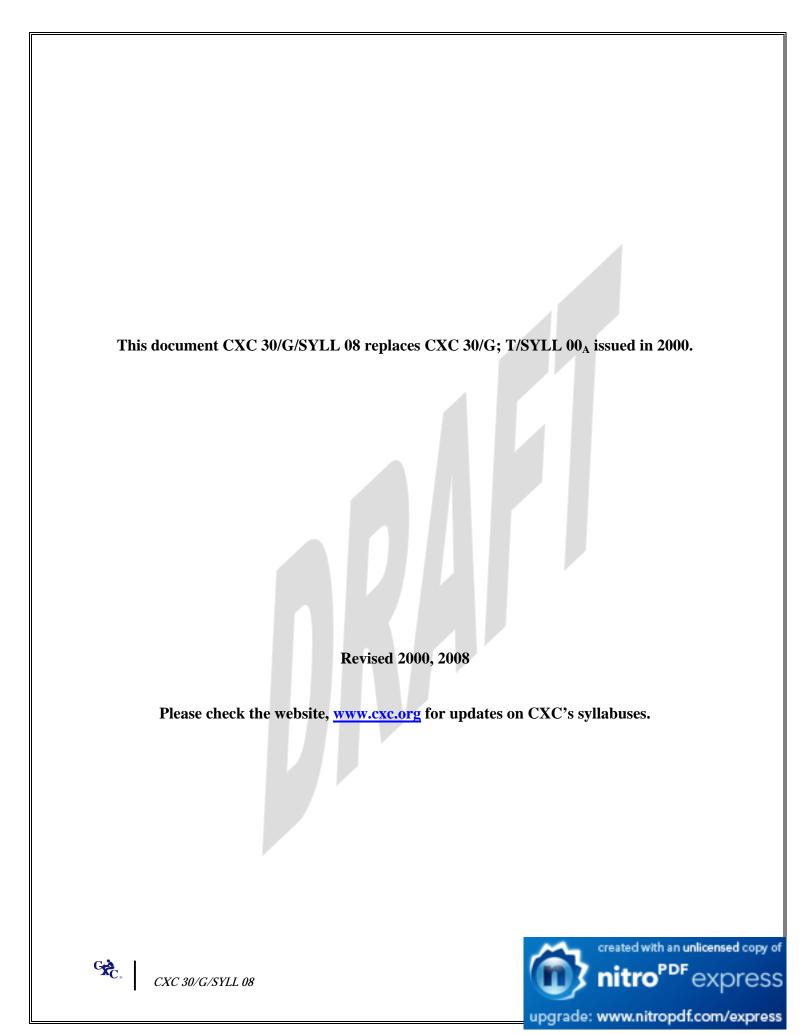Correspondence related to the syllabus should be addressed to:

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CXC 30/G/SYLL 08

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Revised 2000, 2008

Please check the website, www.cxc.org for updates on CXC's syllabuses.

Contents

Information Technology Syllabus

♦ **RATIONALE**

Information Technology has evolved over the past five decades in response to the need for more efficient techniques to manage the significantly increased volume and sophistication of the knowledge reservoir of mankind. It merges the study of Computer Science, Telecommunications and Office Automation; involves the collection, storage, accessing, processing and dissemination of information and impacts on both work and leisure activities.

In a world characterised by technological innovation and computerized responses to situations in the work place and in the wider society, all citizens will need to have practical exposure to the techniques of Information Technology in order to bridge the widening gap between Caribbean nations and the developed countries and provide our citizens with the best chances for survival and growth in this new age.

A structured programme in Information Technology develops computer-related skills and encourages the development of analytical and design skills which are applicable in all areas of the curriculum. This unique feature warrants the inclusion of Information Technology in the secondary school curriculum.

This syllabus is designed to provide a coherent view of the significance of information in a socio-economic context. Emphasis is placed on application of knowledge and the use of the computer. This approach has been adopted in recognition of the impact that changes in the availability of information can have on the educational process. The focus is on getting students to develop skills for life in an increasingly technological world, rather than on students absorbing a myriad of seemingly unrelated facts which may have only short term relevance.

The syllabus aims to provide the kind of practical experience which includes an element of discovery, and fosters self-confidence, together with the practical skills that will prepare students to meet the region's need for greatly increased productivity and cost effective procedures.

♦ AIMS

The syllabus aims to:

1. prepare students to function effectively in a dynamic technological era;

2. promote the development of computer-related skills for immediate application to other curricular areas;

3. provide a foundation for post-secondary education;

4. facilitate the development and application of problem-solving skills in students.

♦ ORGANIZATION OF THE SYLLABUS

The syllabus is organised under eight main sections.

1. Fundamentals of Hardware and Software

2. Problem-Solving and Program Design

3. Program Implementation

4. Applications and Implications of Information and Communications Technology

5. Information Processing

6. Wordprocessing, Presentation and Web Page Design

7. Spreadsheets

8. Database Management

♦ SUGGESTED TIME-TABLE ALLOCATION

It is estimated that the syllabus can be covered in approximately 160 hours or 4 periods per week during the fourth and fifth years in the secondary school. A suggested time allocation (in hours) is shown below for each section. The laboratory hours indicated are calculated on a per student basis.

Section		Class	Lab	Field	Total
1.	Fundamentals of Hardware and Software	18	4	2	23
2.	Problem-Solving and Program Design	7	15	-	22
3.	Program Implementation	15	20	-	35
4.	Applications and Implications of Information and Communications Technology	11	-	2	13
5.	Information Processing	12	-	-	12
6.	Wordprocessing, Presentation and Web Page Design	5	15	-	20
7.	Spreadsheets	5	10	-	15
8.	Database Management	5	13	-	18

<u>Allied Subjects</u>

Although no subjects are being specified as either prerequisites or co-requisites to Information Technology, it is expected that students would have pursued a course in Mathematics up to Grade 9 (Form 3).

♦ FORMAT OF THE EXAMINATIONS

Paper 01
(1 hour 30 minutes)
Sixty multiple choice items drawn from all areas of the syllabus.

Paper 02
(2 hours 15 minutes)
Twelve compulsory structured questions drawn from all areas of the syllabus, divided into three sections. Section 1 is worth 60 marks and consists of six short answer questions. Section 2 is worth 15 marks and consists of two structured questions. Section 3 is worth 45 marks and consists of four structured questions.

School Based Assessment

Paper 03
The SBA component will comprise a practical project testing: Section 2, Problem-Solving and Program Design; Section 3, Program Implementation; Section 6, Wordprocessing; Section 7, Spreadsheets and Section 8, Database Management.

The Project will carry 90 marks which will account for 30% of the final grade. This 90 marks will be distributed as follows: 20 for Wordprocessing; 20 for Spreadsheets; 20 for Database Management and 30 Problem-Solving and Pr

marked by the teacher in accordance with CXC guidelines and the marks should be submitted to CXC. The assignment should be administered as specified in the instructions contained in the Guidelines to the Conduct of the SBA, on pages 23 – 45.

♦ CERTIFICATION AND DEFINITION OF PROFILE DIMENSIONS

The subject will be examined for certification at the General Proficiency.

In addition to an overall grade, there will be a profile report that reflects the performance of each candidate under the following headings.

Profile Dimensions

Theory   The ability to apply fundamental concepts and skills to Information Technology.

Productivity Tools   The ability to apply standard features in the following areas:

      (i)   word processor in the preparation of documents, as well as the candidate's ability to use presentation and web page design applications;

      (ii)   spreadsheet programme in solving problems and presenting data; and

      (iii)   database management programme in storing and retrieving data.

Problem-Solving and Programming   The ability to use analytical skills in the development of algorithms, expressed as flowcharts or pseudocode, that can then be implemented as computer programs.

MARK AND WEIGHT ALLOCATION FOR PROFILE DIMENSIONS

Paper/Profiles	*Theory*	*Productivity Tools*	*Problem-Solving and Programming*	*Paper Total*	*% Weighting of Papers*
Paper 01	30	15	15	60	20
Paper 02	60	15	45	120	50
Paper 03	-	60	30	90	30
Profile Totals	90	90	90	270	
% Weighting Profiles	33.33	33.33	33.33		100

♦ HARDWARE AND SOFTWARE REQUIREMENTS

<u>For Schools:</u>

1. It is the responsibility of schools presenting candidates for the examinations to ensure that the required hardware and software are in place to achieve the syllabus objectives.

2. PASCAL is recommended for the programming units.

3. Students should have access to a PASCAL compiler and productivity software offering the advanced features required by the syllabus. From the list provided below, teachers may select appropriate software for the Wordprocessing, Spreadsheets, Database Management, Presentation and Web Page Design components of the syllabus.

Recommended Software

Wordprocessing	Spreadsheets	Database Management	*Presentation*	*Web Page Design*
1. Microsoft Word	1. Lotus 1-2-3	1. Microsoft Access	1. PowerPoint	1. Frontpage
2. WordPerfect	2. Microsoft Excel	2. Filemaker/Filemaker Pro	2. Freelance	2. MS Word
3. Microsoft Works	3. Microsoft Works	3. Paradox		
4. Claris Works	4. Claris Works			
5. Microsoft PowerPoint	5. Quattro Pro			

♦ NOTES TO TEACHERS

1. Students should be aware of the input/process/storage/output cycle as it pertains to hardware and software components in Section 1.

2. Section 2 should be taught before Section 3. Students should learn how to write algorithms, *before* they are introduced to coding in a programming language.

3. In Section 2, the focus should be on the development of problem solutions in the form of algorithms written in pseudocode/flowchart. The problem-solving skills acquired in this section serves as a foundation for programming in Section 3.

4. In Section 3, students are required to translate the algorithms developed in Section 2 into computer programs, using the recommended programming language (PASCAL). Use simple problems, for example, finding the average of a set of integers, or calculating tax payable, to illustrate how to develop simple programs.

5.   In Section 3, laboratory sessions should be used to:

    a.   familiarize the student with the features of the recommended compiler;
    b.   identify and correct syntax errors;
    c.   identify and correct logic errors;
    d.   execute program and display results; and
    e.   introduce students to and encourage them to use the debugging tool.

It is recommended that the students be required to write the programs on paper, before they get on the computer. That is, the act of program coding should take place before they actually get on the computer. This allows for more efficient utilization of computer time.

6.   In Section 4, the aim is to familiarize the students with basic terms and concepts associated with computer networks and the Internet. A detailed treatment of the concepts is NOT required. Where possible, it would be helpful if teachers invite someone with expertise in Internet Technology to address the class and explain some of the concepts.

7.   While it is expected that students would gain skills in the use of productivity tools through practice on specific packages, teachers should ensure that students have an appreciation of the generic operations of each of the productivity tools so that skills are transferable to other packages.

8.   Teachers should organize field trips to allow students to see a variety of hardware used in diverse application areas.

9.   Although not a requirement of the course, it may be useful to apprise students of the history of computers.

10.   Teachers should encourage students to read computer magazines and, if possible, the school should subscribe to several of these.

11.   A glossary has been provided to facilitate a uniform interpretation of the terminology used in the syllabus. Teachers are advised to make use of this glossary and also the list of recommended texts. However, the reading list provided is not exhaustive and additional references should be consulted.

♦

♦ **REGULATIONS FOR RESIT CANDIDATES**

1. Resit candidates must complete all the components of the examination based on the proficiency for which they register.

2. Candidates who earned at least 50 percent of the MODERATED scores for the SBA component at the previous sitting may elect not to repeat this component provided they rewrite the examination in the subsequent year.

3. SBA scores can be transferred once only, that is to the examination immediately following that for which the SBA scores were obtained.

4. Resit candidates may be entered through the Local Registrar and should on registration indicate that they are resit candidates and give their registration number from the pervious year.

5. Candidates who obtained less than 50% of the Moderated marks for the SBA component must repeat the component at any subsequent year and must fulfil the requirements for that year. Candidates may choose to do a new project or improve on the project done in the previous year.

6. Candidates repeating the SBA component must be entered through a school or other approved educational institution.

♦ **REGULATIONS FOR *STUDENTS FROM PRIVATE INSTITUTIONS***

1. Candidates entered for the examination through private institutions recognized by the Council will be required to complete all the requirements of the syllabus.

2. Although the project is assessed in components in class, candidates are to be given the entire project. As candidates work on individual components in class they must be monitored by tutors in the institution and given feedback before the final assessment of that component. Tutors must also monitor candidates' project to determine the veracity of work submitted. Tutors should not accept projects which were not monitored during development. The marks recorded in the four components will be collated to form the final SBA mark for submission by April 30, in the year of the examination.

3. Candidates as well as tutors must retain a copy of the completed component as part of their portfolio.

♦ SECTION 1: FUNDAMENTALS OF HARDWARE AND SOFTWARE

GENERAL OBJECTIVES

On completion of this Section, students should:

1. appreciate the fundamental hardware and software terminologies and concepts;

2. develop expertise in the operation and use of microcomputer-based systems.

SPECIFIC OBJECTIVES	CONTENT
Students should be able to:	
1. describe a general-purpose computer system;	Major functions of systems: input, processing, output, storage.
2. explain the functions of the major hardware components of a computer system;	Central Processing Unit (CPU): control unit and ALU; main memory/immediate access storage, secondary storage, input/output devices.
3. outline the functions and uses of primary storage devices;	Bistable devices, PROM, EPROM, RAM, ROM.
4. manipulate units of storage;	Bit, byte, kilobyte, megabyte, gigabyte, terabyte, word, word size.
5. compare the types of secondary storage media with respect to portability, speed and capacity;	Magnetic tape, floppy disk, hard disk (fixed head, moving head, external), optical disks (CD, DVD), flash drive, flash memory cards.
6. use terms associated with storage devices;	Read/write head, sectors, tracks, buffers, cylinders, access time, sequential access, direct access; device interfaces such as: SCSI, IDE, SATA.
7. explain the uses of various input devices and media;	Optical mark reader (OMR), character readers (OCR, MICR), mouse, joystick, bar code reader, document scanner, light-pen, touch terminals, voice response unit, pads and tablets, point of sale (POS), keyboard, digital camera, biometric systems, sensors, remote control, sound capture, pointing devices, webcam.

SPECIFIC OBJECTIVES	CONTENT
Students should be able to:	
8. state the types and functions of output devices;	Visual display unit: resolution, types, sizes. Printers: impact and non-impact, types: (character, line, page, laser, inkjet, dot matrix). Characteristics: (speed, quality, storage capacity); plotters; audio output devices (for example, speakers, head-phones, earphones); microfilm. Also terms such as hard copy, soft copy, human readable and machine–readable.
9. describe how data are stored and manipulated within the computer;	Binary, octal and hexadecimal number systems; binary addition and subtraction. Integers (positive and negative): sign and magnitude, BCD, two's complement; representation of characters, ASCII.
10. interpret the hardware specifications of a computer system;	CPU type and speed; memory: capacity, type, word size, speed. Hard drive: capacity, speed; fire wire, expansion slots, ports.
11. distinguish between systems programs and application programs;	Systems software: operating systems, translators, utilities: Application software: general purpose, special purpose, custom written. Customization, integrated software.
12. explain the functions of an operating system;	File management, memory management, security, device management, input/output management, user interface, process management.
13. distinguish among multitasking, multiprocessing and multiprogramming;	Basic treatment of these terms. (See glossary).
14. explain the different types of processing modes;	Batch processing, real-time, on-line, time-sharing.
15. distinguish between types of user interface.	Software interface: Command driven, graphical user interface (GUI) (menu driven, pull-down and pop-up menus, icons). Hardware interface: touch screens, non-visual interface, sensors, and Braille keyboards.

♦ SECTION 2: *PROBLEM-SOLVING AND PROGRAM DESIGN*

GENERAL OBJECTIVE

On completion of this Section, students should have an understanding of the fundamental principles and practices of problem-solving on the computer.

SPECIFIC OBJECTIVES	CONTENT
Students should be able to:	
1. outline the steps in problem-solving;	Definition of the problem; propose and evaluate solutions; determination of the most efficient solution; develop and represent algorithm; test and validate the solution.
2. decompose a simple problem into its significant parts;	The components are: input; process; storage; output.
3. distinguish between variables and constants;	Variables as an area of storage whose value can change during processing; the value of a constant never changes.
4. use appropriate data types;	Integers, floating point (real), characters, literals.
5. explain the concept of algorithms;	Definition of algorithms; Characteristics: finite number of steps, precise, unambiguous, flow of control from one process to another, terminate.
6. identify ways of representing algorithms;	Representation of algorithms as Pseudocode or Flowcharts; Use of flowchart symbols: input/output, process, decision, directional arrows. Pseudocode - Use of: Read, Input, Store Write, Output, Display, If-then; If-then-else; For loop; while loop; (questions which require nested conditionals or nested loops will not be asked). Truth Tables Use of relational operators: <, >, =, <=, > =, < >. Logical operators: AND, OR, NOT. Arithmetic operators: +, −, *, /. Simple problems including: average, maximum.
7. develop algorithms to solve simple problems;	Use of problem-solving techniques outlined in Specific Objective 1 to the solution of simple problems.

SPECIFIC OBJECTIVES	CONTENT
Students should be able to:	
8. test algorithms for correctness;	Construction and use of trace tables to determine result. Trace table consists of variable names (identifiers) as column headings and values in the cells, one row for each pass.
9. use the top-down design approach to problem solving.	Application of stepwise refinement to problems with two or more tasks.

SECTION 3: *PROGRAM IMPLEMENTATION*

GENERAL OBJECTIVE

On completion of this Section, students should have an understanding of how to convert algorithms to programs using structured programming techniques.

SPECIFIC OBJECTIVES	CONTENT
Students should be able to:	
1. distinguish between low-level and high-level programming languages;	Low-level language (Machine or Assembly Language); High-level language (Pascal, C).
2. distinguish among the different generations of programming languages;	Characterization of first through to fifth generation languages.
3. list the sequence of steps associated with implementing a program;	Create source code, compile, linking, executing, maintain program.
4. explain commonly used terms and concepts in programming;	Testing, debugging, syntax errors, logic errors, run-time errors, dry run, test data.
5. declare elementary data types;	Integers, real numbers, characters.
6. declare variables and constants;	Use of meaningful variable names and constants; assign initial values.
7. manipulate data;	Reading from and writing to variables, arithmetic operations.
8. use control structures;	Conditional branching: if-then, if-then-else, Loops: while, repeat, for.
9. manipulate data in a list;	Declare 1-dimensional arrays; reading from and writing to arrays; traversing arrays; linear search.
10. perform checks and tests on programs to verify correctness;	Testing and debugging techniques.
11. write documented programs.	Importance of documentation; features of internal documentation (use of mnemonic names, use of comments, indentation, effective use of white spaces); external documentation (user manuals).

◆ SECTION 4: APPLICATIONS AND IMPLICATIONS *OF INFORMATION AND COMMUNICATIONS TECHNOLOGY*

GENERAL OBJECTIVES

On completion of this Section, students should develop an awareness of:

1. the use of the computer and the implications of that use;

2. trends in Internet and Communications Technology;

3. careers in the field of Information Technology.

A: INTERNET AND COMMUNICATIONS TECHNOLOGY

SPECIFIC OBJECTIVES	CONTENT
Students should be able to:	
1. use terms associated with data communications and networks;	Definitions of data communication and network; types of networks: (local area network, wide area network, metropolitan area network), types of transmission media: cable/wired media (coaxial, fibre-optic, twisted pair), wireless media (satellite, microwave, infra-red), wireless network technology: (Bluetooth, Wi-Fi), hotspot, modem, bandwidth (broadband, narrowband, voiceband), communication modes: (simplex, duplex, half duplex), point-to-point, and broadcast.
2. distinguish among Internet, intranet and extranet;	Refer to glossary.
3. explain concepts associated with the Internet;	Including Electronic mail (e-mail), newsgroups, Internet Relay Chat (IRC), Telnet, File Transfer Protocol (FTP), upload, download, World Wide Web (WWW), web browser, HTTP, Hypertext Markup Language (HTML/XHTML), web page, website, blogging, webserver, URL, e-commerce, e-learning, HTTP, pod-casting, bulletin board, VoIP.
4. describe measures to secure data and maintain data integrity;	Software Restrictions: passwords, encryption, virus protection, firewall; physical access restrictions: biometric systems, guards, locks; fire/water proof cabinets; archiving; backup and recovery procedures; propriety data and software.

B: APPLICATIONS AND IMPLICATIONS

SPECIFIC OBJECTIVES	CONTENT
Students should be able to:	
5. outline ways by which information can be misused;	Violation of privacy, propaganda, software piracy, computer fraud, electronic eavesdropping, industrial espionage, surveillance, storage of inaccurate information, identity theft, credit card fraud.
6. describe appropriate hardware and software to meet the particular needs of a given application;	Projects to determine the relevant hardware and software (open source vs. proprietary) used in areas including business, industry, science and technology, education, law enforcement, recreation, music, gaming.
7. describe current and emerging technological trends;	Expert systems, robots, CADD, CAE, CAM, telemarketing, teleconferencing.
8. assess the impact of Information Technology on job skills and careers;	Computer skills used by office employees, teachers, engineers, medical personnel, musicians, mass media personnel, law enforcement personnel, movie industry; loss of jobs; retraining; telecommuting.
9. describe the roles of various personnel in computer-related professions.	The functions of individuals in computer-related fields: programmers, systems analysts and designers, IT managers, systems programmers, database administrators, network administrators, IT managers, file librarians, computer technicians, computer engineers, software engineers, software testers, webmaster, web-developer, software trainer, multi-media artists.

♦ SECTION 5: INFORMATION PROCESSING

GENERAL OBJECTIVE

On completion of this Section, students should develop an understanding of the principles, organization and operation of Information Processing Systems.

SPECIFIC OBJECTIVES	CONTENT
Students should be able to:	
1. distinguish between data and information;	Data as raw unprocessed facts; information as processed data.
2. explain the characteristics and functions of Information Processing;	Forms of Information Processing: automation, process control, commercial, industrial, and scientific data processing; information retrieval and management.
3. identify the sources of data in specified application areas;	Source document, turnaround document, machine and human readable document.
4. describe methods of validation and verification of data;	Difference between validation and verification. Methods: range check, reasonableness checks, data type checks, inconsistency checks.
5. identify appropriate verification and validation checks given a particular scenario;	Such as double entry to identify and correct typographical/transposition errors.
6. describe various methods of file organization and access;	Sequential field ordering; random, index-sequential; direct-access, sequential-access.
7. select appropriate file organization for particular application.	Associate an appropriate file structure and access method to a specific application. For example, a payroll file would be organized sequentially with sequential access.

◆ SECTION 6: WORDPROCESSING, PRESENTATION AND WEB PAGE DESIGN

GENERAL OBJECTIVE

On completion of this Section, students should have hands-on experience in the use of Wordprocessing, Presentation and Web Page Design packages in the development of computer-generated documents and be able to express their aptitude and creativity in design.

A: WORDPROCESSING

SPECIFIC OBJECTIVES	CONTENT
Students should be able to:	
1. select appropriate editing features in the preparation of a document;	Deleting and inserting characters, words, lines, sentences, paragraphs. Type-over mode. Selecting blocks of text. Copying and moving sections of text.
2. describe commonly available features;	Page numbers, page breaks, text alignment, wordwrap, margins, tabs, page length, default settings, font size.
3. select appropriate formatting features for the preparation of a document;	Margins, tab stops, line spacing, page breaks, page numbers, left and right justification, centre line, underline, highlight, uppercase, bold, and italic.
4. use headers, footers, footnotes and endnotes appropriately;	
5. combine documents;	
6. perform block operations;	
7. use columns and tables appropriately;	
8. apply appropriate character formatting features;	Underline, bold, italics, font types and sizes, superscript and subscript.
9. use search and replace functions appropriately;	
10. use mail-merge facilities;	Creation of primary documents and data files in mail merge application; Field names.
11. use spell-check;	
12. import documents;	Text files, graphics, tables including options such as automatic save and backup copy, password protection, track changes.

B: PRESENTATION

SPECIFIC OBJECTIVES   CONTENT

Students should be able to:

13.   explain the uses of presentation software;   For example, to enhance public speaking; to deliver lectures; to present project reports; to effectively present sales or marketing ideas.

14.   explain the concepts of wizards, templates and slides;

15.   choose appropriate slide layout;   Slide layout must relate to the type of information being presented.

16.   apply design templates to slides;   Choosing from a list of presentation designs.

17.   use formatting features effectively to enhance presentation;   Changing background colour, font size and other attributes, such as font colour and bullets.

18.   create slide headers and footers;   Use of the slide master to personalize the slides.

19.   create and use speaker notes;

20.   apply various types of animation effects to slides;   Flying, drive-in, camera effects; flash-once, typewriter; laser, reverse-texts, drop-in effects. Custom animation; timing and sound effects.

21.   insert graphics and moving pictures into a slide;

22.   manipulate multiple slides;   Insertion and deletion of slides; use of the slide sorter.

23.   present a slide show.   Use of slide show tools such as slide navigator, pointer options, screen attributes.

C: WEB PAGE DESIGN

This section provides students with hands-on experience in the use of web design software to create and maintain simple websites.

SPECIFIC OBJECTIVES	CONTENT
Students should be able to:	
24. plan the website;	Reasons for the website; the intended audience; number of web pages desired; content of each page; layout of the web pages.
25. create a simple web page;	Choosing an appropriate design for a page; inserting and deleting text and graphics; wrap text with image; create thumbnail image, index page, home page, hyperlink.
26. create hyperlinks;	Linking to another web page; link to a location within the web page; link to an email address; link to user-created files.
27. test the website;	Use of a web browser; verify that all the hyperlinks work correctly; use a test audience.
28. publish and maintain a website.	Registering domain names; locate hosting company; the use of the file transfer protocol (FTP) for uploading files.

♦ SECTION 7: SPREADSHEETS

GENERAL OBJECTIVE

On completion of this Section, students should develop expertise in the use of a spreadsheet package in the development of computer applications.

SPECIFIC OBJECTIVES	CONTENT
Students should be able to:	
1. explain the purpose of a spreadsheet;	Definition of spreadsheet: a spreadsheet is a table consisting of cells (rows, column locations) that hold accounting or financial data and simulates the traditional physical spreadsheet; it captures displays and manipulates data.
2. use appropriate terminology and notions commonly associated with spreadsheets;	Row, column, cell, cell address, label, value, formula, function, worksheet, template, range, title, window, record.
3. select basic pre-defined systems functions;	Including sum, average, date, maximum, minimum, count, if, vlookup, rank.
4. create advanced arithmetic formulae;	Formulae involving addition, subtraction; multiplication; division; powers; square roots, the use of brackets.
5. explain the use of common features of spreadsheet software;	Row/column title locking, relative addressing, absolute addressing.
6. invoke row and column title locking;	Horizontal, vertical, both.
7. replicate (copy) formulae into other cells;	Relative versus absolute addressing.
8. manipulate data on a spreadsheet;	Effects of move, copy, delete operations on formulae.
9. manipulate columns and rows;	Insert and delete columns and rows.
10. format a spreadsheet;	Numeric data formatting, text formatting, alignment, borders.
11. sort a spreadsheet;	Primary field, secondary field, ascending vs. descending order.

SPREADSHEETS (cont'd)

	SPECIFIC OBJECTIVES	CONTENT

Students should be able:

12.	find a record matching a given criterion;	Simple criterion, complex criterion, record - find command.
13.	perform charting operations;	Bar charts, line graphs, pie charts, graph titles, labels on axes.
14.	select appropriate graphical representation of data;	
15.	manipulate multiple worksheets;	Use of two or more worksheets to solve problems involving some or all of the functions and operations listed above.
16.	import files.	Graphics, tables.

◆ SECTION 8: DATABASE MANAGEMENT

GENERAL OBJECTIVE

On completion of this Section, students should develop expertise in the design of a database management system in the development of computer applications.

SPECIFIC OBJECTIVES	CONTENT
Students should be able to:	
1. explain the concept of a database;	Definition of database: repository of information; collection of tables that are related to each other.
2. use terminology commonly associated with a database;	Database terminology: table (relation), entity, tuple, attribute, primary key, secondary key, composite key, candidate key, alternate key, foreign key.
3. distinguish among terminology associated with files and databases;	Row (tuple, record), column (attribute, field), key. Data types: alphanumeric; numeric; data; logical.
4. outline the advantages and limitations of databases;	Comparison with files with regards to: Speed; Ad hoc queries; standardization; present multiple views of the same data.
5. create a database;	Table structure with at least three data types and populate with at least twenty-five records. Use of wizard is prohibited.
6. modify a table structure;	Adding new fields, deleting fields, changing field definitions.
7. sort a database;	Arranging data in numeric, alphabetic; or alphanumeric format. Report generating facilities of the database package, including use of sorting, grouping statistical and summary features, for example, count, sum and average.
8. establish relationships;	Use of joins, merge tables/files.
9. query a database using multiple search conditions;	Using more than one criterion; use of select, calculated fields.

DATABASE MANAGEMENT (cont'd)

SPECIFIC OBJECTIVES	CONTENT

Students should be able to:

10. determine the results of a search on a database given multiple conditions;

Two or more fields involving the use of relational and logical operators.

11. generate reports to the screen, printer and files.

Report generating facilities of the database package, including use of sorting, grouping, statistical and summary features, for example, count, sum and average.

♦ GUIDELINES FOR THE CONDUCT OF THE SCHOOL BASED ASSESSMENT

The guidelines for conducting the SBA which consists of a practical project set by the teacher are shown below.

1.   AIM

To provide students with the opportunity to demonstrate their problem solving and programming skills as well as their ability to use productivity tools effectively in:

(i)   entering, manipulating and presenting text data;

(ii)   simulating a worksheet;

(iii)   entering data, performing simple analysis on data and presenting data using a database management tool.

2.   ASSIGNMENT

The School Based Assessment consists of one practical project consisting of four related components, prepared and marked by the teacher in accordance with CXC guidelines.

The components will test Problem Solving and Programming as well as the application of processes involved in the use of Database Management, Spreadsheets and Wordprocessing. The four components will therefore cover the Specific Objectives in Sections 2, 3, 6, 7 and 8.

3.   ROLE OF THE TEACHER

The role of teacher is to:

(i)   assign the project for the School Based Assessment.

(ii)   provide guidance throughout the life of the projects. The teacher should work with candidates to develop a project management chart with definite time lines for achieving clearly identified objectives, from project inception to project completion.

(iii)   guide the candidate through the SBA by helping to clarify the problem or by discussing possible approaches to solving the problem. Teachers, while giving guidance, should guard against providing a complete solution to the problem for the candidate or prescribing a specific format that should be followed.

(iv)   assess each student's skills in problem solving and algorithm development using flowcharts or pseudocode, coding an algorithm in Pascal and the effective use of productivity tools to perform prescribed activities. The development of the project is a continuous exercise that occurs during scheduled class hours as well as outside class times. At a time to be determined by the teacher the relevant component will be assessed and the marks recorded. Hardcopies of the completed documents should be kept by both the teacher and student. The teacher should use the mark scheme provided by CXC and include any comments pertinent to the conduct of the assessment.

(v)   guide the candidate through the SBA by helping to clarify the problem or by discussing possible formats.

(vi)   ensure that students are allowed sufficient access to equipment to allow successful completion of their projects.

4.   ASSESSMENT CRITERIA

The following is the mark scheme for assessing SBA assignments. Teachers must clearly indicate the breakdown of the marks allocated for each question on the candidates' SBA paper.

(i)   Wordprocessing - 20 marks

Processes	Key Skills	Mark Allocation

The effectiveness with which the student uses formatting facilities to create and enhance the document.	• Formatting for presentation
	  - justification
	  - single and double line spacing
	  - paragraph styling (indent, hanging, block)
		2

	• Formatting for emphasis
	  - bold
	  - italics
	  - borders and shading to highlight and give emphasis
	  - font and point size
		2

	• Other features
	  - use of spell checker/search and replace/grammar check
	  - search and replace
		1

		(5)

Processes	Key Skills	Mark Allocation

The effectiveness with which students use formatting facilities to present information.	• Page Layout
	  - set margins
	  - change page orientations
	  - change paper size
	  - text orientation
	• Headers/footers/endnotes
	• Tables
		2
		
		1
		2

		(5)

The effectiveness with which students use facilities to create flyers or brochures.	• Multiple page/book fold/columns
	• Use of graphics
	• Clarity of itemization
	  - insert/delete (word, sentence, paragraph document)
	  - block operations - move/copy/cut and paste
		2
		1
		
		1
		
		1

		(5)
The effectiveness with which students use facilities to perform mail merge.	• Defining appropriate fields in the document • Creating primary document • Creating secondary document appropriately • Performing the mail merge	1 1 1 2
		(5)

(ii)   Spreadsheets – 20 marks

Processes	Key Skills	Mark Allocation
The effectiveness with which students use pre-defined systems functions to form arithmetic, logical and relation expressions.	• Demonstrating awareness of the existence of appropriate formulae • Use of appropriate formulae to solve numeric problems • Replicating formulae • Use of range names, relative and absolute addressing formats	1 2 1 2
		(6)
The effectiveness with which students manipulate the spreadsheet.	• Copying data • Moving data • Use of formatting features to allow clarity of display • Inserting page breaks appropriately • Deleting and inserting rows such that formulae remain unaffected	2
		(2)
The effectiveness with which students use the search and sorting facilities.	• Setting up primary and secondary key fields	1 **(1)**

Processes	Key Skills	Mark Allocation
The effectiveness with which students perform graphic operations to present information.	• Creating appropriate charts to represent data - bar, pie, line, from spreadsheet data • Labelling charts appropriately • Comparing different series of data on a single bar chart or line graph	3 1 1 (5)

The effectiveness with which students use spreadsheets to solve specific problems.	• Conceptualizing a solution using the spreadsheet
	   - select appropriate column and row labels
	   - layout spreadsheet to permit easy additions and deletions
	   - use constants in cells, instead of placing values directly in formula
	 • Organizing spreadsheet so that data can easily be interpreted
	 • Extracting data to allow summary information
		
		 1
		 1
		
		 1
		
		 1
		
		 2
		
		 (6)

(iii)   Database Management – 20 marks

Processes	Key Skills	Mark Allocation
The effectiveness with which students use facilities in creating and modifying database.	• Defining fields and selecting appropriate data types to create tables • Identifying appropriate primary keys • Adding/deleting/sorting/ modifying records or tuples • Deleting fields and changing field definitions	3 1 2 1 (7)

The effectiveness with which students use the query facility.	• Searching database
	   - use three tables, two tables one table in queries to generate new tables
	   - use multiple conditions
	 • Producing calculated fields
		
		 3
		
		 2
		 2
		
		 (7)

The effectiveness with which student use report generating facilities.	• Generating report on specified fields • Grouping on fields	2 1

Processes	Key Skills	Mark Allocation
	• Sorting on fields	1
	• Using summary features, for example, count and sum	2
		(6)

(iv) Problem Solving and Programming – 30 marks

Algorithm Development – 10 marks

Processes	Key Skills	Mark Allocation
Problem statement that defines the problem.	• Problem is clearly defined	1
		(1)
Representing the solution in flowchart or pseudocode.	• Start of solution	1
	• Definition of variables	
	- identify variables	1
	- initialize variables	1
	• Processing	
	- request for data	1
	- storing data	2
	- appropriate and logical use of control structures: selection statements; looping constructs	2
	- output results	1
	• End of solution	
		(9)

Trace Table Development – 5 marks

Processes	Key Skills	Mark Allocation
Constructing the trace table.	• ALL variables correctly identified and used	1
	• Appropriate test data	1
	• Data set complete	
	- data set test ALL areas for robustness	2
	- [data set test SOME areas]	[1]
	• Change in values correctly demonstrated	1
		(5)

Programme Working to Specification – 15 marks

Processes	Key Skills	Mark Allocation
The effectiveness with which the program achieved the objective.	• Program compiled (1)	1
	• Output (2)	
	- output is correct for ALL values in teacher's data set	2
	[Output is correct for SOME values in the teacher's data set]	[1]
		(3)
The effectiveness with which the language features are used to achieve a working solution.	• Appropriate use of features of the language (2)	
	- appropriate choice of data types for ALL variables	2
	[appropriate choice of data types for SOME variables]	[1]
	• Appropriate use of control structures (7)	
	- appropriate initialization of variables	1
	- appropriate use of sequence	1
	- appropriate use of if then else construct	2
	[inefficient use of if then construct]	[1]
The effectiveness with which the language features are used to achieve a working solution. (cont'd)	- appropriate use of looping construct to manipulate arrays and perform other tasks	3
	[inefficient or inappropriate	[1]

Processes	Key Skills	Mark Allocation
	use of loop construct]	(9)
The effectiveness with which the language features are used to achieve clarity.	• Clarity of program (3) - program documentation through variable names; author of program; date created; simple statement of task program solves	1
	- readability (correctly indented; logical flow of control; easy to follow;)	1
	- user-friendly.	1
		(3)

5.   REQUIREMENTS OF SBA PROJECT DOCUMENTATION

Problem-solving and Program Implementation Component

Requirements	Guidelines
Cover sheet	The information supplied here is essential since it is used to associate the submission with a particular candidate.
Table of contents	Provides easy reference when evaluating the project.
Problem definition	This section provides a clear statement of the problem. Students are also expected to draw flowcharts.
Program listing and output	This section is essential for assessing whether the component submitted is correct and complete. In addition, this section is used to evaluate the internal documentation. Candidates must demonstrate that they can select the appropriate features of the language to obtain the solution to the problem.
Test data (if applicable)	In situations where output is relevant, candidates are required to supply the test data that produced the output. This information would be necessary to determine whether the tasks have been performed correctly.

6. PROCEDURES FOR REPORTING AND SUBMITTING SCHOOL BASED ASSESSMENT

(i) Teachers are required to record the mark awarded to each candidate under the appropriate profile dimension on the mark sheet provided by CXC. The completed mark sheets should be submitted to CXC no later than April 30 of the year of the examination.

Note: The school is advised to keep a copy of the project for each candidate as well as copies of the mark sheets.

(ii) Teachers will be required to submit to CXC copies of the projects of a sample of candidates   as indicated by CXC. This sample will be re-marked by CXC for moderation purposes.

7. MODERATION OF SCHOOL BASED ASSESSMENT

The candidate's performance on the project will be moderated. The standard and range of marks awarded by the teacher will be adjusted where appropriate. However, the rank order assigned by the teacher will be adjusted only in special circumstances and then only after consideration of the data provided by the sample of marked projects submitted by the teacher and re-marked by CXC.

8. TYPES OF PROJECTS

Teachers should develop assignments that expose the candidates to realistic applications which involve, but are not limited to the following areas:

(i) business (for example, storing and managing employee, customer and sales records, marketing);

(ii) banking (for example, creation of different types of accounts, loans, interest, payments on loans, fixed deposits, investments);

(iii) education (for example, enrolment in schools, academic record keeping);

(iv) entertainment (for example, analysis of data on distribution and sales of movies, music, electronic games);

(v) environment (for example, records of storms and hurricanes over specific periods and in named territories, calculation of cost of damage to infrastructure, housing, livestock, farms);

(vi) law enforcement (collection and management of crime statistics collection and analysis of data on offenders, cost of maintaining prison populations);

(vii) medicine (for example, managing patient records collection and analysis of data on diseases over a period of time and in various locations);

(viii) monitoring (for example, analysis of data on accidents at intersections, counting and categorizing visitor arrivals in Caribbean territories);

(ix)   sports (for example, collection and processing of data on athletes sport meetings).

Wordprocessing

This assignment should consist of the formatting, importing and/or documentation of results to be included in <u>no more than</u> two word processed documents. One document must be a letter for mass mailing. The other may be chosen from but not limited to reports, faxes, simple brochures, flyers and newspaper articles. Note that Presentation and Web Page Design should not be included in the SBA project. Candidates' proficiency in these topics would be assessed in Paper 01 and Paper 02.

Spreadsheet

This assignment should be limited to:

(i)   a maximum of THREE major tasks consisting of no more than THREE requirements;

(ii)   the creation of no more than TWO charts.

Database Management

The tasks in this assignment should be limited to no more than:

(i)   THREE tables or files;

(ii)   FOUR queries;

(iii)   TWO calculations within queries;

(iv)   ONE report, with grouping and sorting involving TWO or THREE tables.

9.   SCOPE AND SIZE

The project should be the size and complexity for a candidate to satisfactorily complete during the second year of the two-year course.

The WP, SS and DB sections of the project should each have approximately the same number of tasks and degree of complexity such that each project requires the same amount of preparation. The project should encompass some advanced processes in Sections 6, 7 and 8. Problem-solving and Program Implementation should be based on the project and not attempted in isolation. It must, therefore, be an actual implementation of some aspect of the project.

Teachers are encouraged to design their School Based Assessment at the commencement of the academic year. This would allow for the completion of sections of the project as topics are addressed. It is suggested that the Problem-Solving component be attempted when the teacher has

completed Section 2 of the syllabus, and the Program Implementation component at the completion of Section 3.

10.   EQUIPMENT

The equipment should include an IBM-compatible computer with software that is capable of integration among Wordprocessing, spreadsheet and database management applications. Software must also include a Pascal compiler. CXC stipulates the use of the programming language Pascal for program implementation. CXC will not be responsible for partial assignments submitted due to software compatibility and/or integration problems.

11.   PROCEDURES FOR REPORTING AND SUBMITTING SCHOOL BASED ASSESSMENT

(i)   Teachers are required to record the mark awarded to each candidate under the appropriate profile dimension on the mark sheet provided by CXC. The completed mark sheets should be submitted to the CXC no later than April 30 of the year of the examination.

Note: The school is advised to keep a copy of the assignment for each candidate as well as copies of the mark sheets.

(ii)   Teachers will be required to submit to CXC a copy of the assignment/project set by the teacher as well as copies of the assignments of a sample of candidates as indicated by CXC. This sample will be re-marked by CXC for moderation purposes.

SAMPLE SCHOOL BASED ASSESSMENT

SAMPLE SBA 1

Carnival has long been a traditional cultural festival in several Caribbean territories. Every year, thousands of costumed masqueraders parade through the streets, dancing to the pulsating sounds of steelband, calypso and soca. Most of these revelers register to participate in the band of their choice months before the festivities begin. Organizers of these bands must utilize management and organizational skills in order to stage a successful event. As a bandleader of one these carnival bands, you are required to utilize suitable Wordprocessing, spreadsheet, database management as well as a programming application to design and implement computer-based solutions to the tasks involved in the management of your carnival band.

Spreadsheet

The financial records of the band are maintained using a spreadsheet application. The names of masqueraders are listed by section. Both men as well as women may register to play in each section. There are five sections in the band. The cost of costumes is quoted in US dollars. The cost by section is $160, $220, $280, $350 and $425 respectively. Masqueraders are given the option of paying for the costume in three installments, or paying the full cost in one payment. Many people utilize the installment option. Single full payment attracts a discount of 10%, while payment by installments attracts an interest of 15%. Installments should be spread over three equal payments.

Each masquerader pays an 'Inclusive' fee. A $150 Inclusive fee entitles the masquerader to food, drinks, access to portable bathroom facilities and bottled water during the carnival parade through the streets

However, a payment of $50.00 entitles the masquerader to portable bathroom facilities and bottled water only.

Expenditure is incurred in the provision of several amenities for masqueraders during the carnival. The bandleader must supply food, drinks, portable bathroom facilities, transportation, music, security personnel, and artiste fees. In addition, the costs of material for the manufacture of costumes as well as labour costs are incurred.

Because of the anticipated large number of masqueraders, the bandleader has decided to manage the income and expenditure of each section separately.

You are required to:

1.   Design a worksheet(s) which accepts income and expenditure costs for each section.

       Your worksheet must record all payments made by masqueraders, (a few persons have only made one or two of the required three installment payments on costumes), the total amount paid by each person as well as the grand total collected must be calculated. Costume payments must be made in US dollars. The total payments made by each person however, must be converted to the equivalent amount in local currency.

       In an appropriate row, count the number of masqueraders in the section; calculate the total payment on costume, Inclusive fees and the total overall payment.

       The expenditure incurred for each section must also be calculated. Food is $60.00 per person; drink is $40.00 per person; material is $150.00 and labour is $75.00. Other services are provided at a flat rate for the entire band. These are as follows: bathroom- $3000.00; transport $2500.00; music - $4000.00; security - $1800.00; artiste - $5000.00. The cost of each flat rate services for each section = Rate /No. of Sections.

       Food and drinks are increased by 15% of the starting per person cost for each successive section, material is increased by 12% of the starting cost for each successive section, while labour is increased by 8% of the starting cost for each successive section.

       The total cost of each service for each section = Cost of service X the number of masqueraders in the section.

       Save your spreadsheet as Masqueraders1.

2.   Modify your spreadsheet to effect the following changes:

   (a)   Insert a masquerader before the last person in each of the first three sections.

   (b)   Delete the third masquerader from each of the last two sections.

   (c)   Create a table that shows the total income and total expenditure by sections.

         Save your spreadsheet as Masqueraders2.

3.   Perform the following modifications to your worksheet.

   (a)   The cost of raw materials has decreased.   Change the initial cost of materials from $150.00 to 135.00.

   (b)   Labour costs however, have increased. The starting cost of sewing costumes for the first section is now $95.00.

   (c)   Due to inflation, it has become necessary to increase the cost of food and drink from 15% to 20%. However, the first section has been spared this price hike.

   (d)   Sort the first two sections in descending order by Total Payment.

   (e)   Sort the third and fourth sections in ascending order by Name, then by cost.

   (f)   Create an appropriate chart which compares the income and expenditure of each section. Give this chart a suitable name.

   (g)   Create an appropriate chart, with appropriate data labels, which shows the distribution of expenditure for any one named section.

         Save your spreadsheet as Masqueraders3.

Database Management

You should use a suitable application to manage data on persons who have registered to play in your band. Personal data on each applicant, such as name, sex, address, age, size and telephone contact. must be stored. Masqueraders' payment data must also be stored. The cost of costumes varies by section. Costume prices range from US$160 to US$425. In addition, the section of the band in which they choose to play must be recorded. The band has five named sections. Each section has a specific four-digit section code.   Your database should contain three tables. Using data from your spreadsheet, populate your database with data on at least twelve but not more than fifteen persons in each section.

You should test your database by performing queries to show:

1.   The name, age, size and address of all persons registered to play in a named section Name this query Section.

2.   The ID Number, name, sex, and age of all female masqueraders between twenty and thirty years old. Name this query TwentiesLadies.

3.   The ID Number, LastName, section and total payment of all persons who have paid in full for their costume in a given section. The data supplied should be sorted by Last name. Name this query Paidup.

4.   The bandleader has experienced difficulty in securing the advertised material for the costumes in the third section. He has therefore decided to give a 15% rebate on the total payment made to all persons in this section. Calculate this rebate and show it along with the name, address and total payment of all persons in one named section. Name this query Rebate.

5.   As an incentive to attract more female masqueraders to his band, the bandleader has decided to give a gift voucher to the value of 12% of the total payment to all females registered in the band. Show the name, sex, total payment and voucher value for all female revelers. Name this query GiftVoucher.

6.   Two revelers have asked to be refunded their payments, as they were forced to travel prior to the date of the carnival. Delete all records that pertain to these two named persons.

7.   Generate a report that shows the names, ID Number, section, age and total payments for all revelers who have paid in full for their costumes.   The report should be grouped by section and sorted in descending order by LastName, then by FirstName. The report should calculate and show the total amount of funds paid by the revelers of each section. The average payment of each section should also be generated as well as the grand total of payments made. This report should be given a suitable title utilizing two lines.

<u>Wordprocessing</u>

1.   Create a full page an advertisement for a local newspaper that informs the public about your carnival band. This must be designed on letter size paper.

2.   Using a suitable feature of your wordprocessing application, create a document which should be mailed to persons who have paid on full for their costumes.   The document should inform masqueraders of the parade route, the time of assembly and departure of the band onto the parade.

     The report from the database section should be inserted into your document.

     The final paragraph should express the bandleaders gratitude to masquerades for choosing to join his band for the carnival celebrations.

3.   Design a suitable letterhead for your document which should be placed in a header.

     A suitable footer must be inserted, with the words center aligned.

4.   The document should be justified. The left margin must be 1.5".

Problem-Solving

1. Develop an algorithm or write pseudocode that accepts as input the names of an unspecified number of masqueraders who each have paid the full cost of their costume and the amount each has paid. A masquerader may have paid for a costume in any of the five sections in the band. The algorithm should determine the section in which a masquerader plays based on the amount he/she has paid for the costume. The algorithm should also determine the number of masqueraders who have paid for costumes in each section. The names of persons and the section for which they have paid should be printed. A listing of section and the total number of persons registered to play in each section should also be printed, along with the total amount of money paid in each section.

2. Using data from your database, make a random listing of persons who have paid in full for their costumes. The listing should contain the IDNumber, and full amount paid by each masquerader for his/her costume and should be chosen randomly from each of the five sections. No more than twelve persons should be selected. Using this listing, design a trace table that traces the number of masqueraders in each section, the amount paid, and traces the total amount collected in each section.

Program Implementation

3. Using the programming language Pascal, write program code to implement the algorithm in (1).

SAMPLE SBA 2

Description of the Project

National general elections have been a recurring feature among the democratic territories of the Caribbean. Every year, in one territory or another, citizens exercise their right to elect a government of their choice. However, the exercise is not without its attendant challenges of data management. Thousands of votes are cast on the day of the elections and an anxious, waiting public demands speed, efficiency and accuracy in the determination of results.

In preparation for the actual exercise, the Trinbarjam Elections Commission has hired you to simulate the elections exercise as a test run, prior to the actual elections which are to take place shortly in your country. You are required to utilize suitable wordprocessing, spreadsheet, database management as well as a programming application to design and implement computer-based solutions to the tasks involved in the simulation of the election process.

Spreadsheet

The Elections Commission has mandated that you design a spreadsheet that will accept pertinent data on constituencies and candidates' votes and generate information that would enable the outcome of the elections to be divulged to the population in the shortest possible time. Four parties contest the elections: the Democratic Action Party (DAP), the Workers National Alliance (WNA), the United Progressive Movement (UPM), and the Peoples Democratic Revolution (PDR). Elections are contested to determine representatives in eleven constituencies. The representative being the candidate who gets the most votes in

his/her constituency. The parties field candidates in every constituency except for the PDR, which fields candidates in just six of the eight constituencies.

For each constituency, you are required to:

1. Create a table in your spreadsheet that records the number of Electors, Percentage voter turnout, Number of votes cast, the percentage of Spoilt ballots and the number of General votes.

    The number of electors registered in each constituency ranges from 6,250 to 10,795. The percentage voter turnout in each constituency is projected to be from a low of 45% to a high of 82%. Number of votes cast is determined by the Number of Electors * % Voter Turnout. The percentage of spoilt ballots varies from one constituency to another, but never exceeds 2.5% in any constituency. General votes are calculated as the votes cast – spoilt votes.

    For each constituency, design a spreadsheet that accepts the candidate's name, party acronym, rating, % of votes, and number of votes received. The rating is a value from 1 to 4 and is determined by the results of a recent poll conducted in each constituency by a noted pollster. Apart from the candidate's rating, the pollster also supplies the % of votes each candidate is likely to receive, based on the popularity rating. The actual number of votes received is that percentage of the General votes.

    You must enter data for each candidate in each of the eight constituencies.

    Save your spreadsheet as Elections 01.

2. Modify your spreadsheet to reflect the following.

    (i)   Votes cast by Special voters must be considered and counted. Insert a row in an appropriate part of your spreadsheet table to record the number of special votes cast in each constituency.

    (ii)   Insert a column in an appropriate part of your spreadsheet to record the number of special votes received by each candidate. The special votes for each constituency are divided equally among the candidates in that constituency. Insert another column which records the total votes received by each candidate in each constituency. Total votes received are calculated as General votes + Special votes.

    (iii) Insert rows in appropriate part of your spreadsheet that calculate, for each constituency, the total number of special votes, and the total number of votes received by candidates.

    (iv)   Insert a column that indicates whether a refund is due to a candidate. This column should state "Refund Due" or "No Refund". A refund is due if the candidate's total votes received equals or exceeds 20% of Votes Cast in the constituency.

    Save your spreadsheet as Elections 02.

3.   Perform further modifications to your spreadsheet to reflect the following.

   (i)   In an appropriate part of your spreadsheet, create a table that lists the constituencies, and the total number of votes received by each party in each constituency.

   (ii)   Sort the candidates' data for each constituency. This should be sorted in descending order on total votes received.

   (iii)   Generate a column graph that compares the votes received by each party by constituency. Name this graph 'Votes by Constituency'.

   (iv)   Generate a graph that compares the parties by name (acronym) and the total number of votes each received in the election. Each slice of the chart must be labeled to show the number of votes received and the % of votes received overall. Name this chart 'Vote Distribution by Party'.

   Save your spreadsheet as Elections 03.

Database Management

You are asked to use a suitable application to manage data on candidates nominated to contest seats in the general elections. Three tables/files must be used to store the data. Relevant personal data on each candidate should be stored, including name, address, date of birth, sex, profession, constituency, party acronym and total votes received. Each candidate pays a deposit of $5000. (This deposit is refunded should the candidate garner 20% or more of the votes cast in his constituency).

Constituency data must also be maintained, including the constituency name, number of electors, number of votes cast, and number of special votes. The name and acronym of each party must also be stored. Data must be sourced from the spreadsheet section of your project.

You should test your database by generating queries to find the following.

1.   The candidate ID, name, sex, age and profession of all candidates from the Peoples Democratic Revolution (PDR).

2.   The candidate name, party acronym, number of electors and number of votes received for candidates in constituencies with more than 6500 voters and where the candidates received less than 500 of the votes cast.

3.   Special votes expressed as a percentage of the overall number of voters in each constituency. Your query should also show the constituency name field. The percentage should be expressed to two places of decimal.

4.   The candidates who received less than 20% of votes in their constituencies. Your query should show the candidate(s) name, party acronym, constituency, number of voters and votes received.

5.   All male candidates who are less than or equal to 40 years old and who received more than 40% of the votes cast in their respective constituencies. You must also show the dates of birth, name, number of votes received as well as the number of voters.

6.   Calculate the sum of the deposits to be refunded to each party (only candidates who received 20 percent or more of votes are eligible for refund).   Show the party name, acronym and sum refunded to each party.

Generate a report which lists the final results of the election. The report should list the constituency, party acronym, number of votes received, sex and name of candidates. The report   should   be   sorted   by constituency. Within each constituency the report should be sorted by number of votes received. It should also give the total and average number of votes cast in each constituency. The report should have a two-line title as follows:

<div align="center">

"Official Results
Trinbarjam National Elections"

</div>

Word-processing

1.   Each candidate must complete and submit a nomination form to the Trinbarjam Elections Commission. You are required to design the nomination form. It must allow for the entry of relevant data on the candidate, including the constituency which he intends to contest.

       The form must be designed on letter sized paper and must have a 0.7" margin on the left and right sides. The letterhead of the Trinbarjam Elections Commission must be placed at the top.

2.   The results of the national elections must be delivered to every candidate. Using a suitable feature of your Word-processing application, and data from the database section of your project, create a document which should be mailed to candidates. The letter should come from the Chairman of the Trinbarjam Elections Commission.

       The first paragraph should congratulate and thank the candidate (insert candidate's name in the letter) for the manner in which he/she conducted his/her campaign and invite him/her to view the complete listing of results.

       Insert the report "Official Elections Results" from your database into the document at this point. The final paragraph should congratulate the winners, and the winning party. The chairman should then invite who are qualify for a refund to visit the head office of the Commission to collect their deposit payment.

       You are required to print letters addressed to the first three and last candidate only from your database listing.

       The commission's letterhead should be placed at the head of your document and an   appropriate footer inserted. The text in the footer must be center aligned.

<u>Problem-Solving</u>

1. Develop an algorithm or write pseudocode to determine the winning candidate for a constituency in the national elections. The algorithm must accept as input the names of the four candidates and the number of votes each candidate receives. The successful candidate is the one who received the most votes.

   Print the name of the winner and the number of votes he/she received.

2. Design and execute a trace table that accepts vote data at a polling station in a constituency. Data should include special votes, general (valid) votes and spoilt votes. Votes should be cast for any one of four parties, DAP, WNA, UPM or PDR. The table should trace the increment of each vote category and determine which party secured the majority of votes. The table should have at least ten iterations and should end when a specific value is entered.

<u>Program Implementation</u>

3. Using the programming language Pascal, write program code to implement the algorithm in (1) above.

<u>SAMPLE SBA 3</u>

<u>Description of the Project</u>

The citizens of Trinbarjam, a country in the English-speaking Caribbean, are unable to purchase housing for their families, mainly due to the extremely high cost of real estate and building materials. Middle and low income earners are severely affected. The government, through its agency, the Housing Construction Corporation, has intervened however, and has embarked on an extensive house building exercise in three selected parts of the country.

Citizens were invited to apply for the chance to own one of these homes. You are asked to use word-processing, spreadsheet and database management applications to design and implement computer-based solutions to ensure that the public is well informed of the government's new housing initiative; that an efficient record of applicants' information is maintained; applicants' financial income and expense commitments are accurately calculated and assessed and that suitably qualified and approved applicants are duly informed.

<u>Spreadsheet</u>

Housing Construction Corporation is a state agency mandated to provide affordable housing for middle and low income earners. The Housing Construction Corporation invites applications from nationals who are employed and who can demonstrate that they would be able to meet their mortgage payments each month. Each application must be supported by documents giving details of the applicant's financial status. These include the applicant's salary and monthly salary deductions. The amount owed to banks and other financial institutions must also be disclosed with supporting verifying documents. In addition, details of applicants' monthly expenses on groceries, utilities, transportation, etc. must be submitted.

Homes are being built to accommodate approved applicants in three communities: Clarendon Court, Sangre Grande Villas and Providence Gardens. Applicants, who are middle and low income earners, must meet a net monthly income in order to qualify for consideration in each of these communities: $12,500, $9,500 and $7,500 respectively. This net income may be met by the applicant himself/herself or in conjunction with his/her spouse.

You are required to:

1.   Design a spreadsheet that accepts income data from applicants for each housing community. You may accept at least ten but no more than fifteen applications for each community:

Income

Applicant	Applicant Salary	Salary Deductions	Spouse Salary	Salary Deductions	Gross Income	Net Income	Status
Michael James	8,560.00	2,295.00	6,490.00	1,777.50	15,050.00	10,977.50	Qualified

Monthly deductions from salary include PAYE tax, health surcharge, union dues and payments to pension plan. No tax is deducted should the applicant's salary be $5,000 or less. A flat rate of 8% is deducted on the amount in excess of 5,000. Health surcharge is fixed at $155.00 per month while Union dues are 2% of salary. Pension deduction is 15% of salary. In a small number of instances, applicants' spouses are unemployed. If the net income meets the qualifying income for the housing community applied for as specified by the Housing Construction Corporation, the applicant's status would be "Qualified", else "Not qualified" should be recorded. All deduction rates are subject to change.

(a)   You must enter income data and use appropriate formulae to calculate deductions, gross income, and net income and determine whether the application qualifies for consideration.

In another section of your spreadsheet, information on applicants' loan indebtedness should be recorded and calculated. Total amounts owed with respect to bank loans, credit card loans and credit union loans must be revealed.

Loans

Applicant	Bank	Total Loan Amounts			Monthly Payments			
		Credit Card	Credit Union	Bank Payment	Credit Card Payment	Credit Union Payment	Total Loan Payments	
Michael James	$15,780.00	$1,100.00	$14,890.00	$ 439.65	$105.42	$ 414.11	$ 959.17	

(i)   Repayment on bank loans is calculated as equal monthly payments over three years at a simple interest of 8% of the starting loan amount.

(ii)   Repayment on credit card loans is calculated as equal monthly payments over 18 months at a simple interest of 10% of the starting loan amount.

(iii)   Repayment on Credit union loans is calculated as equal monthly payments over three years at a simple interest of 5%. An additional $300.00 is added to the loan repayment amount each month for the purchase of shares in the credit union.

Some applicants do not have credit cards, and just a few do not have loans with the credit union.

All interest rates are subject to change.

(b)   You must enter loan information for each applicant and use appropriate formulae to calculate monthly repayments. Insert a column to calculate each applicant's total monthly payments on loans.

In an appropriate section of your spreadsheet, information on each applicant's monthly expenses must be calculated. Each applicant must provide realistic estimates of monthly expenses on groceries, utilities (water, telephone and electricity), transportation, and miscellaneous expenses. A column stating the applicant's number of dependants must be included. Miscellaneous expense is calculated as number of dependants x $75.00

(c)   You must enter expense information for each applicant. Insert a column to calculate each applicant's total monthly expenses.

For each housing community, insert at table which lists each applicant's Net Income, Total Monthly Loan Repayments, and Total Monthly Expenses and Balance. Balance is calculated as Net Income – sum of Repayments and Expenses. Add a column that states whether the applicant has been approved or not approved for housing allocation. An application is approved if the Balance is equal to or exceeds one half of Net Income.

Create a suitable chart that compares each applicant's net income, total loan payment, and total monthly expenses (from the named housing community). Give an appropriate name to this chart. Print this chart.

Save your spreadsheet as LoanApplication 01. Print this spreadsheet.

2.   The economy has been further severely affected by international fiscal initiatives. To adjust to these realities and to offset any losses, banks have increased their interest on loans to 10% and credit cards companies now apply an interest of 15%. The qualifying income on homes however, has been reduced to $10,000, $7,500 and $5,500 respectively.

Make the necessary changes such that your spreadsheet's values adjust to these changes.

Save this spreadsheet as LoanApplication 02.

Print the spreadsheet with adjusted information on applicants for *any ONE housing community*.

3.   (a)   For each housing community, sort the applicants' Income information in descending order on net income; Loans information in descending order on total loan payments, and Expenses first in descending order by total expenses, then

(b)   In an appropriate part of your spreadsheet, create a table that lists the Net Income, Total Monthly Loan Payments and Total Monthly Expenses for approved applicants from ALL three housing communities.

(c)   Create a suitable chart that compares the financial records of these approved applicants. Name this chart Approved Applicants.

Save your spreadsheet as LoanApplication 03.

Print the spreadsheet with data from any ONE housing community.

Database Management

1.   Information must be maintained on all applicants for housing units. Using information from your spreadsheet, you are required to design and populate a database with applicant data. You may accept at least thirty but no more than forty five applicants.

2.   Required personal information on applicants should include Applicant ID, title, name, sex, address, date of birth, marital status, number of dependants, and telephone number and housing community.

3.   Applicant ID is a five digit number in the format XXX07 where XXX is any number between 100 and 999. Applicants must be at least twenty years old but not older than forty-five.

4.   Financial data on each applicant is also required. These include net income, total monthly expenses, total monthly repayment, and whether application is approved or not.

5.   Dependant data is a third area of information required in respect of each applicant. The name of each applicant's dependant(s) must be submitted.

You are required to:

(i)   Design and create database tables (files) to meet the required criteria.

(ii)   Appropriate data types /field widths are to be used when designing the structure of each table.

(iii)   Print all tables (files) populated with appropriate records.

Your database should respond to the following queries.

(a)   List the last name, address (street and town), phone number, net income and number of dependants of all applicants who listed Clarendon Court as their choice for housing allocation. Name this query Clarendon Applicants.

(b)   List the name, applicantD and total monthly expenses of all applicants whose total monthly loan repayment exceed one thousand five hundred dollars. Name this query LoanPayment.

(c)   Count the number of persons who applied for homes in Sangre Grande Villas. Name this query SangreGrandeCount.

(d)   The age of the applicant may be a factor in determining housing allocation priority. List the name and date of birth of all applicants who are between the ages of twenty and thirty, inclusive. Name this query TwentytoThirty.

(e)   Perform a query to add a further ten percent to the salary of Providence Gardens' applicants.   Name this query ProvidenceGrace. Print the table showing Providence Gardens applicant's updated net income.

(f)   The HCC wants to know the disposable income of Clarendon Court's applicants. Perform a query which subtracts the sum of their total loan payments and total expenses from their net income. Print the names loan payment, expenses and disposable income of each Clarendon Court applicant. Name this query Balance.

(g)   Prepare a report which lists the names of all applicants whose application have been approved for housing unit allocation.   The report must show each applicant's title, name, applicantID, address, and housing community. The report should be sorted by community then by last name. For each grouping level the report must indicate the applicants' average net income.   A grand total of income and load payments and expenses should be indicated at the end of the report. The first line of the report title should be Approved Applicants.

Word-processing

1.   You are to design an application form on which nationals may apply to the Housing Construction Corporation for housing allocation. The application form must be designed on letter size paper (8 ½" x 11") using suitable features of a Wordprocessing application.   Relevant personal information as well as the applicant's financial information must be solicited. There should be a space for the applicant's signature. The left and right margins of the form must be 0.8" The top and bottom margins must be set to 1.0"

On the reverse side of the application form you are to design a flyer intended to inform the public about the homes being constructed and the qualifying requirements for each housing community.

2. Individuals whose applications have been approved must be duly informed by the Housing Construction Corporation. Write a letter which congratulates successful applicants and informs that their applications have been approved. The paragraph should contain the statement "Please find a listing of all applicants whose applications have been approved. Please check to ensure that your name is listed:"

Insert the report named 'Approved Applicants' from the database.

A final paragraph should give information about the proposed dates for the formal opening of the housing communities.

Using the mail merge feature of your Wordprocessing program, and data from your database, this letter must be sent from the office of the Chief Executive Officer of the HCC and addressed to the first four and to the last mentioned approved applicant.

Problem-Solving

1. Develop an algorithm or write pseudocode to determine whether an applicant is approved for allocation of a home in a named housing community. The algorithm/ pseudocode should accept the name of the applicant and his/her gross salary as well as salary deductions. The net salary should be calculated. An applicant qualifies if the net salary is above the qualifying salary for that housing community. The algorithm should then determine whether the applicant is approved. Approval is granted should the sum of applicant's expenses and repayments not exceed half of the balance.

2. Design and execute a trace table that accepts data for applicants of one housing community. The table should accept the net salary, total expense, and total repayment amount for each applicant. The balance should be determined. The approval status should be determined (applicant is approved if balance >= one half of net income). The number of applicants as well as the number of approved applicants should be counted. In addition the average net income and average balance of approved applicants should be determined.

Program Implementation

3. Using the programming language Pascal, write program code to implement the algorithm in (1) above.

♦ RECOMMENDED TEXTS

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Robertson, L.   Simple Program Design – A Step by Step Approach, Course Technology, Washington D.C., 2006.

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Website

http://www.learn-programming.za.net/learn_pascal_programming.html

♦ GLOSSARY

WORD	DEFINITION
Address	The identification of a particular location in memory where a data item or instruction is stored.
Algorithm	A sequence of instructions which rigorously defines a solution to a problem.
Antiglare screen	A polarized screen attached to the front of the monitor, which reduces eye strain.
Assembler	A program which converts ASSEMBLY LANGUAGE into MACHINE CODE to be used by a computer.
Automation	Computer control of machines and processes.
Backing storage	Memory external to the computer used for storage of large quantities of data or large programs. Backing store is also known as secondary store, auxiliary store or external store.
Bandwidth	A characteristic of a communication channel that determines the speed at which data can be transmitted over the channel.
Bar code	A series of thick and thin black bars separated by spaces of varying widths representing data.
Baud	A unit of speed in data transmission system which now represents one data signal per second.
BCD	BCD is an abbreviation for Binary-Coded-Decimal. In this number system, each digit of a number is written as a BINARY number, rather than converting the whole number. For example, 47 would be coded as 01000111, the binary codes for 4 and 7. Contrast this with 101111, which is the true binary code of 47.
Bistable device	A device which can exist in two discrete stable states.
Bit	An acronym for binary digit. It can have a value of 1 or 0.
Blog	Short for "Web log". A blog is an online journal or diary of an individual's opinions and latest news. It is updated regularly, in chronological order. Many blogs allow visitors to make comments, or "postings" in response to the blogger, or to ask questions.

WORD	DEFINITION
Broadband	A term used to describe a technology that provides bandwidth that is greater than that provided by ordinary telephone lines, that is, greater than 64 kilobits per second. The greater the bandwidth, the greater the data-carrying capacity.
Broadcast	The transmission of data to all connected stations simultaneously.
Bulletin board	An electronic equivalent of a conventional bulletin board. It is used as part of a communication network where users can post messages, read messages posted by other users, communicate with the system operator and upload or download programs.
Byte	A group of eight bits, usually representing a single character.
CADD	Acronym for computer-aided design and drafting. The use of computers and graphics in design and drafting process.
CAM	Acronym for computer-aided manufacturing. The use of computers to control machines in the manufacturing process.
Character	One of the set of symbols that may be represented in a computer. Characters may be letters, digits, symbols.
Character codes	Binary patters used to represent characters in a computer system.
Compiler	A program that translates the source program into executable machine code, and saves the code to a file (the object program) for later execution.
CPU	Central Processing Unit
Data corruption	The introduction of errors into data stored in a computer system.
Database	A collection of data files that may be used by a number of applications with storage and access to the data controlled by a set of programs known as Database Management System. (DBMS)
Database management system	Programs and database files that allow timely and easy controlled access to data by a number of users.
Data flow diagram	A pictorial representation of a network of processes linked by arrows illustrating the flow of data to and from processes in a system.
Decision table	A pictorial representation of program logic illustrating, in the form of a table, the appropriate actions to be taken for each combination of conditions.
Direct mode	The passing of COMMANDS to the OPER...

WORD	DEFINITION
	the use of a program. Certain commands such a RUN, SAVE, and LOAD are nearly always used in direct mode by typing the command words on the keyboard then pressing the return key. Interpreted language like BASIC permit a much wider range of direct mode commands.
Down-load	Process whereby programs or data are transferred via communications channels, from a computer and stored on media located at the user's computer.
Dry-run	A manual traversal of the logic of a program.
Duplex	A transmission system that allows data to be transmitted in both directions at the same time. This system is sometimes called Full Duplex.
DVD	Digital Video Disk or Digital Versatile Disk. A high-density compact disk for storing large amounts of data, especially high-resolution audio-visual material.
EBCDIC	An acronym for Extended Binary Coded Decimal Interchange Code. The code uses eight binary positions for each character thus allowing a character set of 256 characters.
Electronic mail	Mail or messages transmitted electronically by computers via communication channels. It is usual for such messages to be held in a central store for retrieval at the user's convenience.
EPROM	Erasable programmable read-only memory. A type of memory chip that can be erased by removing it from the circuit and exposing it to ultraviolet light. The chip can then be reprogrammed.
Expert system	A software package that acts as a consultant or expert to the user. It is "expert' in a specialized application or area and provides assistance to the user in solving problems in that area.
Feasibility study	In-depth study of an application area for the purpose of establishing whether automation would be cost effective. In general, the expected benefits should exceed the combined cost of installing the computer and developing the system.
Field	(1) A section of a record containing data relating to one attribute of an entity. (2) Part of a machine instruction containing an operation or address.
Floppy disk	A flexible magnetic coated disk, commonly used with microcomputers, on which data can be stored magnetically.
Font	A family or collection of characters (letters, pu...

WORD	DEFINITION
	and special characters) of a particular size and style.
Fourth generation language (4GL)	A computer programming language which allows the program to specify "what" is to be achieved rather than "how" it is to be achieved. For example, database languages.
Gigabyte	The equivalent of approximately one billion bytes.
Half duplex	A transmission system that allows data to be transmitted in one direction at a time. That is the system can transmit and receive data but not at the same time.
Hard disk	A rigid disk used for storing data magnetically. Its rigid construction allows for higher storage densities. Access times for a hard disk are much faster than for floppy disks.
Hardware	The physical components of a computer system such as the Central Processing Unit (CPU), memory, input, output, and storage devices.
Home page	The file available for access at a web site intended chiefly to greet visitors, provide information about the site, and direct them to other sites with related information.
HTML	Hyper Text Markup Language. A markup language used to structure text and multimedia documents used extensively on the World Wide Web.
HTTP	Hyper Text Transfer Protocol. A protocol used to request and transmit files, especially Web pages and Web page components, over the Internet or other computer network.
IDE	Acronym for *I*ntelligent *D*rive *E*lectronics or *I*ntegrated *D*rive *E*lectronics. An IDE interface is an interface for mass storage devices, in which the controller is integrated into the disk or CD-ROM drive.
Immediate access storage	The memory within the central processor. Also referred to as internal use or main store.
Indexing	Creating a secondary file which contains pointers to items in an associated database file and allows rapid location of records in the file.
Information	Meaningful knowledge produced from raw data files.
Information retrieval	The process of retrieving specific information from data files.
Integrated package	This package combines several applications in a suite of programs. Most

WORD	DEFINITION
	of these packages combine a word processor; spreadsheet and database program. Data are shared easily between these integrated programs.
Internet	The Internet is the largest computer network system in the world. It consists of many smaller networks connected together by a global public network. The Internet is often called the information superhighway or cyberspace.
Intranet	An intranet is a private network that belongs to an organization, and is designed to be accessible only by the organization's members, employees, or others with authorization When part of an intranet is made accessible to customers, partners, suppliers, or others outside the company, that part is called an *extranet*.
Interpreter	A computer program which interactively translates and executes a source program without permanently storing any executable code.
Invoke	Process of starting up a program by using its name (or selecting its icon).
Joystick	An input device that uses a lever to control movement of the cursor or graphic images.
Justification	This is the adjustment of alignment of one or more lines of text with a particular margin, for example, alignment with the left margin, the right margin or both. The term justification often is used to refer to full justification of the alignment of text along both margins.
Keyboarding	The process of rapidly and accurately entering data into a computer via the keyboard as an input device.
Key-to-disk	Keyboard entry of data directly to magnetic disk without previous preparation on another medium.
Kilobyte	One thousand and Twenty-four bytes.
LAN	Acronym for Local Area Network. A type of computer network where two or more computers are directly linked within a small area such as a room or building site. A common characteristic of this system is that computers are linked by direct cables rather than by telecommunication lines.
Light pen	A light-sensitive input device which when it touches the screen detects the presence or absence of light. It is used to select an entry or indicate a position.
Magnetic disk	A mylar (floppy disk) or metallic (hard disk) circular plate on which

WORD	DEFINITION
	electronic data can be stored magnetically. Suitable for direct or random access data storage and retrieval.
Mail-merge	A facility found in full fledged Wordprocessing programs that draws information from a database, usually a mailing list, to print multiple copies of a document. Each copy contains some common text but each bearing different addresses.
Main-memory	See immediate access storage.
Mainframe	A large-scale computer with a variety of peripheral devices, a large amount of backing store and a fast CPU. The term is often used in comparison with a smaller or subordinate computer. It should be noted that there is no clear dividing line between mainframes and minicomputers.
Margins	Space provided to the left, right, top and/or bottom of a page of text or data.
Menu	A screen listing commands of action or alternatives to lead the user through an interactive program.
Menu-driven Interface	A Program interface where the user is provided with a list of operations.
Merge	The combination of two or more files on the basis of common field (key field).
MICR	Magnetic Ink Character Recognition.
MIDI	Musical Instrument Digital Interface. A standard for representing musical information in a digital format.
Microcomputer	A computer based on a microprocessor. See definition of microprocessor below.
Microfiche	An output medium consisting of microfilm sheets. Very high density storage can be attained using this method of storage.
Microfloppy disk	Refers to 3.5 inch floppy floppy disks. They are housed in rigid plastic casting having a sliding shutter which automatically closes when the disk is removed from the disk drive.
Microprocessor	A single chip which contains the arithmetic/logic unit (ALU) and the control unit (CU).
Minicomputer	A computer whose size, speed and capabilities lie between those of a mainframe and a microcomputer.

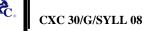| WORD	DEFINITION
Modem	Acronym for modulator-demodulator. A device that converts signals from analogue to digital and vice versa. A modem allows computers to exchange information through telephones lines.
Monitor	A television-like device used to display data.
Mouse	An input device that controls the movement of the cursor. The cursor moves in response to the movement of the mouse on a flat surface.
Multiprogramming	The ability of a computer to execute two or more programs at the same time, using <u>one</u> CPU (or processor).
Multiprocessing	The ability of a computer to execute programs on two more processors simultaneously. The program is distributed over several processors.
Multitasking	The concurrent execution (at the same time) of two or more *related* tasks. A group of cooperating tasks is executed simultaneously to achieve a common goal.
Narrowband	A term used to describe a technology that provides bandwidth that is less than or equal to that provided by ordinary telephone lines. That is, 64 kilobits per second or less.
Natural language processing	The use of the computer to understand and translate a natural language, like English, into commands to perform a given operation.
Network	A network is a group of connected computers that exchange information and share equipment.
Numeric	Data comprising digits on which mathematical operations can be performed by a computer system.
Object code	Machine language program produced by a compiler.
On-line	The term is used to describe peripheral devices under the control of the processor.
Off-line	Describes peripheral devices that operate independently and are not under the control of the processor.
Operating system	A set of programs that control and supervise the resources of a computer system. It also acts as an interface between the user and the computer.
Peripheral	Any hardware device connected to and controlled by the central processing unit.
Plotter	An output device specially designed to produce hardcopy of graphical...

WORD	DEFINITION
	data.
Point of sale terminal	A device that reads data at the source of a transaction (for example. a supermarket checkout) and stores it for subsequent transmission directly to the computer system for processing.
Podcasting	A form of audio broadcasting using the Internet; podcasting takes its name from a combination of "iPod" and broadcasting. It is a method of releasing files to the Internet, allowing users to subscribe and receive new files automatically.
Printer	A device specially designed to produce a hard copy of computer output.
Protocol	A set of rules and procedures controlling the transmitting and receiving of data so that different devices can communicate with each other.
Pseudocode	A language consisting of English-like statements used to define algorithm.
Real-time	A processing mode in which the passage of real-time is critical to the application.
Register	A permanent location in the internal memory of a processor used for the temporary storage of data during processing operations.
Record	A collection of fields on data related to one entity.
Resolution	A characteristic of a monitor's screen, determined by the number of pixels that can be displayed by it.
SATA	Acronym for Serial Advanced Technology Attachment. It is a computer bus primarily designed for transfer of data between a computer and mass storage devices such as hard disk drives and optical drives.
SCSI	Acronym for Small Computer System Interface. It is a set of standards for physically connecting and transferring data between computers and peripheral devices. SCSI is most commonly used for hard disks and tape drives, but it can connect a wide range of other devices, including scanners and CD drives.
Sector	A pie-shaped division of each disk track.
Simplex	A transmission system that allows data transfer in one direction only.
Software	A collection of programs, procedures and routines which direct the operations of a computer.
Software package	A fully documented program or set of programs generalised and designed to be used with little or no modification.
Sort	Redistribution of data into an order on the ba

WORD	DEFINITION
	item (sort-key).
Source code	Program written in high level language or assembly level language.
Source document	A document used for the initial recording of data relating to business transactions. Very often source data needs to be converted into machine-readable form for example, punched cards or paper tape, before it can be processed by a computer.
Spell-check	A dictionary feature associated with a word processor which allows the user to easily detect and correct errors in spelling. One can add new words to the dictionary so that the latter may grow with usage e.g. in WordPerfect, WordStar and Microsoft Word.
Syntax	A set of rules defining the structure of statements in a programming language.
Telecommunication	The process of transmitting data between devices using transmission facilities such as telephone lines or microwave links.
TCP/IP	TCP/IP stands for Transmission Control Protocol/Internet Protocol. These are a set of rules and regulations followed by computers on the Internet to communicate.
Telecommuting	A method of working where an off-site employee uses computer and a communication channel to communicate with the office computer.
Telemarketing	The employment of telephone lines and computers to market products and manage accounts.
Terminal	The combination of a monitor and keyboard to input and check data and to view output. A terminal does not necessarily include a processor.
Template	A specification of the number of fields and the kinds of data which fields in a database record are allowed to hold.
Touch terminal	Also called a touch screen. A device that allows data to be input by touching a screen with the finger or other object. The surface of the screen consists of a number of programmed touch points each of which may trigger a different action when selected by the user.
Track	The path on a tape, disk or drum on which data are stored. On a disk these paths are concentric circles; on a tape there are several tracks parallel to the edge of the tape; on a drum there are bands of equal size along the circumference of the drum.
Turnaround document	A document which, after being output by the computer, can be used to record data.

WORD	DEFINITION
Two's complement document	A method of representing numbers in which the computer does not perform subtraction in the normal way but inverts digits to be subtracted and adds to them.
Up-load	Process of reading data from a user's computer storage and sending it to another computer via communication channels.
URL	Each page on the World Wide Web has a unique address called the Uniform Resource Locator (URL).
Usenet	Short for Users Network is the largest discussion forum in the world. Usenet allows people with common interest to communicate with one another.
VoIP	Acronym for *Voice over Internet Protocol*. It is a protocol which governs the transmission of voice over the Internet. VoIP is often used abstractly to refer to the actual transmission of voice (rather than the protocol implementing it). VoIP is also known as *IP Telephony*.
Validation	A checking process in a program which is aimed at finding out if data is genuine. Validation should be carried out on any data that is entered from the keyboard, even when this is simply a Y or N response.
World Wide Web (WWW)	The World Wide Web commonly referred to as the 'Web', is a graphical easy-to-use system of inter-linked files on the Internet. Vast amounts of information can be obtained through the use of the WWW.
Web page	A document on the World Wide Web, consisting of an HTML file and any related files for scripts and graphics and often hyperlinked to other Web pages.
Web site	Set of interconnected Web pages, usually including a home page, generally located on the same server, and prepared and maintained as a collection of information by a person, group, or organization.
Web browser	A web browser is a programme that allows users to view and explore information on the World Wide Web. Examples of popular browsers are: Microsoft Internet Explorer and Mozilla Firefox.
Web Server	A computer that delivers (serves up) Web pages. When a request is made to access a web site, the request is sent to the web server. The server then fetches the page and sends it to your browser.

Western Zone Office
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