

INTRODUCTION TO COMPUTERS

Question 1

- (a) Describe briefly, the following terms: (1 Mark Each)
- (i) Touch Screen (PCC- May 2007 & Nov 2009)
 - (ii) Server (PCC-Nov 2007)
 - (iii) Data Bus (PCC-Nov 2007)
 - (iv) Dumb terminal (PCC-Nov 2007)
 - (v) WORM Disk (PCC-Nov 2007)
 - (vi) CMOS (PCC-May 2008)
 - (vii) Multiprocessing (PCC-May 2008)
 - (viii) Computer Output Microfilm (PCC-May 2008)
 - (ix) Multiprogramming (PCC-Nov 2008)
 - (x) SVGA (PCC Nov 2008)
 - (xi) Folder (PCC-June 2009)
 - (xii) Shareware (PCC-June 2009)
 - (xiii) Clock Speed (PCC-June 2009)
 - (xiv) LSI Circuit (PCC-Nov 2009)
 - (xv) USB Connector (PCC-Nov 2009)
- (b) Explain each of the following: (1 Mark Each)
- (i) Cache Memory (PCC-May 2007 & Nov 2008)
 - (ii) Boot Record (PCC-May 2007)
 - (iii) Spooling Software (PCC-May 2007)
 - (iv) Internet Browser (PCC-May 2007)
 - (v) Subroutine (PCC-Nov 2007)
 - (vi) PROM (PCC-Nov 2007)
 - (vii) Assembler (PCC-Nov 2007)

Information Technology

(viii) Flash Memory	(PCC-May 2008)
(ix) Interpreter	(PCC-May 2008)
(x) Smart Card System	(PCC-Nov 2008)
(xi) Compiler	(PCC-Nov 2008)
(xii) MMX	(PCC-June 2009)
(xiii) Operating System	(PCC-June 2009)
(xiv) BIOS	(PCC-Nov 2009)
(xv) FAT	(PCC-Nov 2009)

Answer

- (a) (i) Touch Screen: It is used in information providing systems. It consists of a screen which is lined with light emitting devices on its vertical sides and photo-detectors are placed on the horizontal sides. When the user's finger approaches the screen, the light beam is broken and is detected by the photo detectors. It is more effect than the mouse.

Or

Touch Screen: Touch Screens are mainly used in Information – providing systems like Railway Reservation counters, stock exchanges, hotels, restaurants etc. When an invisible infrared beam 'matrix' crisscrossing the screen is pressed by finger over a function or program displayed on the screen, the infrared beam is broken at that intersection and the system is activated. The beam emanates from holes along the bottom and sides of the display unit.

- (ii) Server: A server is a computer system that provides services to other computing systems – called clients – over a network. Server operates continuously on a network and waits for service request from other computers on the network. It provides better access control and can reduce costs by reducing duplication of hardware/software.
- (iii) Data Bus: The data bus is an electrical path that connects the CPU, memory, and the other hardware devices on the motherboard. In fact, the bus is a group of parallel wires. The number of wires in the bus affects the speed at which data can travel between hardware components.
- (iv) Dumb Terminal: It consists of I/O devices for data entry and obtaining result but has no processing capability. It cannot process the data at its own level, instead the data is processed by the central server. These terminals are used in central processing environment.
- (v) WORM Disk: It refers to Write Once, Read Many optical laser disks, or WORM disks. Once the data has been written to the medium, they only can be read, not updated or changed. Companies generally store their proprietary information in WORM disk. These are 3½ inch diskette of 200 MB capacity onwards.

- (vi) CMOS: It is known as complementary metal oxide semiconductor. The PC uses the CMOS memory to store the date, time and system set up parameters, which are loaded every time the computer is started. It is powered by lithium ion battery.
 - (vii) Multiprocessing: It refers to the use of two or more central processing units, linked together, to perform coordinated work simultaneously. The jobs can be processed more rapidly. It is also known as parallel processing.
 - (viii) Computer Output Microfilm (Microfiche): It is an output technique that records output from a computer as microscopic images on roll or sheet film. These are the same images, which can be printed on paper. The COM recording process reduces characters by 24, 42 or 48 times smaller than the normal size produced by the printer. The information is then recorded on sheet film called 16 mm, 35 mm microfilm or 105 mm microfiche.
 - (ix) Multiprogramming: Multiprogramming is defined as execution of two or more programs that reside in primary storage. The CPU can execute only one instruction at a time, but can however, execute instructions from one program, then from second program then from first again, and so on. This type of processing is referred as "Concurrent Execution."
 - (x) SVGA: SVGA or Super Video Graphics adapter is an improvement on the VGA. Two combinations of resolutions and colors provided by SVGA are:
 - 640 x 480 pixels with 256 colors.
 - 1024 x 480 pixels with 16 colors
 - (xi) Folder: Folder, also called a Directory, is a tool for organizing files on a disk. Folders can contain files or other folders, so it is possible to set up a hierarchical system of folders on the computer.
 - (xii) Shareware: Shareware is a software developed by individual and small companies that cannot afford to market their software world wide or by a company that wants to release a demonstration version of its commercial product.
 - (xiii) Clock Speed: The clock speed is the speed at which the processor executes instructions. It is measured in megahertz (MHz) e.g. a 450 MHz processor performs 450 million instructions per second.
 - (xiv) LSI Circuit : LSI or Large Scale Integrated Circuits led to the development of the fourth generation computer. The LSI is a microchip containing thousands of small electronic components which function as a complete system.
 - (xv) USB Connectors : USB stands for Universal Serial Bus. USB connectors provide the user with higher data transfer speeds for different USB devices like keyboard, mouse, scanner or digital camera.
- (b) (i) Cache Memory: Processors incorporate a special type of internal memory (cache) to boost processing power significantly. Some of the information in the main memory is duplicated in the cache memory which is slightly slower but of much

Information Technology

greater capacity than the processor register and faster but much smaller than main memory. It comes in two types: L₁ and L₂ Cache.

Or

Cache Memory: Cache memory is a high speed memory capable of keeping up with the speed of CPU. It is similar to RAM from the access point of view and acts as a buffer between the CPU and the slower main memory.

- (ii) **Boot record:** Booting is a process that starts operating systems when the user turns on a computer system. Boot record is a small program that runs when the computer is started. The Boot record program checks the basic component and the files of the operating system which is used to run the system successfully.
- (iii) **Spooling Software:** The purpose of spooling software is to compensate for the speed difference between the computer and its peripheral devices such as input and output devices. It is used in large system and network computing environment.
- (iv) **Internet Browser:** It is a application software that enables a user to display and interact with text, images and other information typically located on a web page at a website on the world wide web or local area network. Microsoft Internet Explorer is the most popular internet browser.
- (v) **Subroutine:** A subroutine is a subset of instructions that appears over and again in the program or finds application in several programs. A great deal of coding effort can be saved through judicious use of subroutines to handle tasks which are encountered repetitively.
- (vi) **PROM:** Programmable read only memory is a non-volatile memory which allows the user to program the chip with a PROM writer. The chip can be programmed once, there after, it cannot be altered.
- (vii) **Assembler:** It refers to a computer program that translates programs written in symbolic coding to produce machine language programs.
- (viii) **Flash Memory:** Flash memory chips are a form of static RAM (SRAM) chips, which store data much like those used in the computer's primary storage. However, the data stays recorded even when the power is turned off. Flash memory is non-volatile. Flash memory devices have no moving parts, and are therefore very fast.
- (ix) **Interpreter:** It refers to a language translator that converts source program written in high level language to machine code. Interpreter translates programs a line at a time as it is being run. Each statement is translated into machine language just before it is executed.
- (x) **Smart Card System:** Smart cards resemble credit cards in size and shape and contain a microprocessor chip and memory, where as some include a keypad as well. These cards are used most frequently to make electronic purchases and to electronically transfer funds between accounts. These cards could contain digitized fingerprints of the cardholder, which could be compared at a security checkpoint to fingerprints of people who are authorized to enter a secure area.

- (xi) **Compiler:** A compiler translates the entire program written in high-level languages such as COBOL, FORTRAN, and PASCAL into machine language before the program is executed. Compilers typically result in programs that can be executed much more swiftly than those handled by interpreters.
- (xii) **MMX:** MMX stands for Multimedia Extensions—a set of instructions built in to the CPU, specifically intended for improving the performance of multimedia or graphic applications—mainly games.
- (xiii) **Operating System:** Operating System is defined as an integrated system of programs which supervises the operation of the CPU, controls the input/output functions of the computer system, translates the programming languages into the machine languages and provides various support services.
- (xiv) **BIOS:** BIOS (stands for Basic Input Output System) is a small chip on the motherboard that loads the hardware settings required to load various devices like keyboards, monitors, or disk drives. It is a boot firmware program that controls the computer from the time we start it up until the operating system takes over. The BIOS also manages data flow between the computer's operating system and attached devices such as hard disk, video card, keyboard, mouse and printer.
- (xv) **FAT:** File Allocation table (FAT) is a log that records the location of each file and the status of each sector. When a file is written to a disk, the operating system checks the FAT for an open area, stores the file, and then identifies the file and its location in the FAT.

Question 2

Describe the various features of Third-Generation Languages (3GLs) and Fourth Generation Languages (4GLs).
(6 Marks)(PCC-May 2008)

Answer

These are the main features of the 3GLs and 4GLs:

Sl. No.	Third-Generation Languages 3 GLs	Fourth-Generation Languages 4 GLs
1.	It is intended for use by professional programmers.	It may be used by a non-programming end-programmers, end users as well as a professional programmer.
2.	It requires specification of how to perform the task.	It requires specification of what task to perform (system determines how to perform the task).
3.	It requires that all alternatives be specified.	It is having default alternatives built in; end user need not specify these alternatives.
4.	It requires large number of procedural instructions.	It requires far fewer instructions (less than one-tenth in most cases).

Information Technology

5.	The code may be difficult to read, understand and maintain.	The code is easy to understand and maintain because of English-like commands.
6.	The language developed originally for batch operation.	The language developed primarily for on-line use.
7.	It can be difficult to learn.	Many features can be learned quickly.
8.	It is difficult to debug the error.	Errors easier to locate because of short programs, more structured code, and use of defaults and English-like language.
9.	The approach is typically file-oriented.	The approach is typically data base oriented.

Question 3

Define an Image Processing. Describe the steps involved to document imaging. Also mention any five advantages of Image Processing. (5 Marks)(PCC-Nov 2009)

Answer

Image Processing : Image Processing captures an electronic image of data so that it can be stored and shared. Imaging systems can capture almost anything, including keystroked or handwritten documents (such as invoices or tax returns), flowcharts, drawings, and photographs.

There are five steps to document imaging:

1. Data Capture: The most common means of converting paper documents into electronic images is to scan them. By using scanner, the text and pictures can be converted into digitized electronic code.
2. Indexing: Document images must be stored in a manner that facilitates their retrieval. Normally they are stored in an index. Great care is needed in designing the indexing scheme.
3. Storage: As large amount of space is involved in storing, the images are usually stored on an optical disk. An appropriate size optical disk should be selected.
4. Retrieval: Keying in any information stored in an index can retrieve documents. The index tells the system which optical disk to search and the requested information can be quickly retrieved.
5. Output: An exact replica of the original document is easily produced on the computer's monitor or on paper, or is transmitted electronically to another computer.

Some of the advantages of Image Processing are as follows:

- (i) Accessibility: Documents can be accessed and reviewed simultaneously by many people, even from remote locations.

- (ii) Accuracy: Accuracy is much higher because costly and error-prone manual data-entry processes are eliminated.
- (iii) Capacity: Vast amounts of data can be stored in very little space, which significantly reduces storage and office space.
- (iv) Cost: When large volumes of data are stored and processed, the cost per document is quite inexpensive. As a result, the costs to input, file, retrieve, and re-file documents are reduced significantly.
- (v) Security: Various levels of passwords (network, data base, files, etc.) and clearances can be assigned to restrict document access.

Question 4

Explain the basic functions of an Operating System.

(6 Marks)(PCC-Nov 2008)

Answer

The operating system may be defined as an integrated system of programs which supervises the operation of the CPU, controls the input/output functions of the computer system, translates the programming languages into the machine languages and provides various support services.

There are six basic functions that an operating system can perform. These are:-

- (i) Schedule Jobs: Operating systems can determine the sequence in which jobs are executed, using priorities established by the organization.
- (ii) Manage Hardware and Software Resources: Operating systems cause the user's application program to be executed by loading it into primary storage and then cause the various hardware units to perform as specified by the application.
- (iii) Maintain System Security: They may require users to enter a password - a group of characters that identifies users as being authorized to have access to the system.
- (iv) Enable Multiple User Resource Sharing: They can handle the scheduling and execution of the application programs for many users at the same time, a feature called multiprogramming.
- (v) Handle Interrupts: An interrupt is a technique used by the operating system to temporarily suspend the processing of one program in order to allow another program to be executed. Interrupts are issued when a program requests an operation that does not require the CPU, such as input or output, or when the program exceeds some predetermined time limit.
- (vi) Maintain Usage Records: Operating systems can keep track of the amount of time used by each user for each system unit - the CPU, secondary storage, and input and output devices.

Information Technology

Question 5

What are Decision Support Systems? Describe various characteristics of a DSS.

(5 Marks) (PCC-Nov 2009)

Answer

Decision Support System: Decision Support System (DSS) is a specific class of computerized information system that supports business and organizational decision-making activities. A properly designed DSS is an interactive software-based system intended to help decision maker to compile useful information from raw data, documents, personal knowledge, and/or business models to identify and solve problems and make decisions. A DSS may present information graphically and may include an expert system or artificial intelligence. DSS have also achieved broad use in accounting and auditing today.

The common characteristics of Decision Support Systems are as mentioned below :

- (i) DSS support management decision making – These enhance decision quality. While the system might not point to a particular decision, it is the user who ultimately makes the final choice.
- (ii) DSS solve relatively unstructured problems – The unstructured problems with lesser well-defined questions do not have easy solution procedures and therefore need some managerial judgment. Such problems can be handled and addressed with the help of appropriate DSS.
- (iii) DSS are friendly computer interface – A friendly computer interface is also a characteristic of a DSS. As the managers and other decision makers using DSS are not necessarily good programmers, such systems must be easy to use. The communication between the user and the DSS is made easy through nonprocedural modeling languages.
- (iv) DSS should be able to respond quickly to the changing needs of the decision makers – As managers must plan for future activities, they rely heavily on assumptions. Any DSS should address the decision making for a variety of assumptions. A key characteristic of many systems is that these allow users to ask what-if questions and examine the results of these questions.

Question 6

Explain the various components of a Decision Support System. (4 Marks)(PCC-Nov 2007)

Answer

Components of a DSS: A decision support system has four basic components: (i) The users, (ii) Database, (iii) Planning language, and (iv) Model base.

- (i) **The users:** The user of a Decision Support System (DSS) is usually a manager with an unstructured or semi-structured problem to solve. In fact, user does not require a computer background to use a DSS for problem solving. He must have thorough understanding of the problem and the factors to be considered in finding a solution.

- (ii) Database: DSS includes one or more databases. These databases contain both routine and non-routine data from both internal and external sources. The data from external sources include data about economic condition, market demand for goods and services and industry competition, whereas internal data includes data from the financial and managerial accounting system, marketing, production and personnel department.
- (iii) Planning language: Two types of planning languages are commonly used in DSS.
 - (a) General Purpose: These languages allow user to perform many routine tasks viz., retrieving various data from a database or performing statistical analysis, budgeting, forecasting and worksheet oriented problem. The languages used in most of the spread sheets are the good examples.
 - (b) Special purpose: Special purpose planning languages are statistical languages viz., SAS, SPSS and Mini Tab. These languages perform statistical and mathematical operations.
- (iv) Model Base: The model base is the brain of the decision support system because it performs data manipulation and computations with the data provided to it by the user and database. Model base is custom developed model that does some types of mathematical functions viz., cross-tabulation, regression analysis, time series analysis, linear programming and financial computation. The analysis provided by the routines in the model base is the key to supporting the user's decision.

Question 7

Define an Expert System. Describe the components of an Expert System.

(5 Marks & 7 Marks)(PCC-May 2007 & June 2009)

Answer

Expert System: An expert system (ES) is a computerized information system that allows non-experts to make decisions comparable to those of an expert. Expert systems are used for complex or ill-structured tasks that require experience and specialized knowledge in narrow, specific subject areas.

Components of an Expert system are: (shown in figure below)

- (i) Knowledge base: This includes the data, knowledge, relationships, rules of thumb (heuristics), and decision rules used by experts to solve a particular type of problem.
- (ii) Inference engine: This program contains the logic and reasoning mechanisms that simulate the expert logic process and deliver advice. It uses data obtained from both the knowledge base and the user to make associations and inferences, form its conclusions, and recommend a course of action.

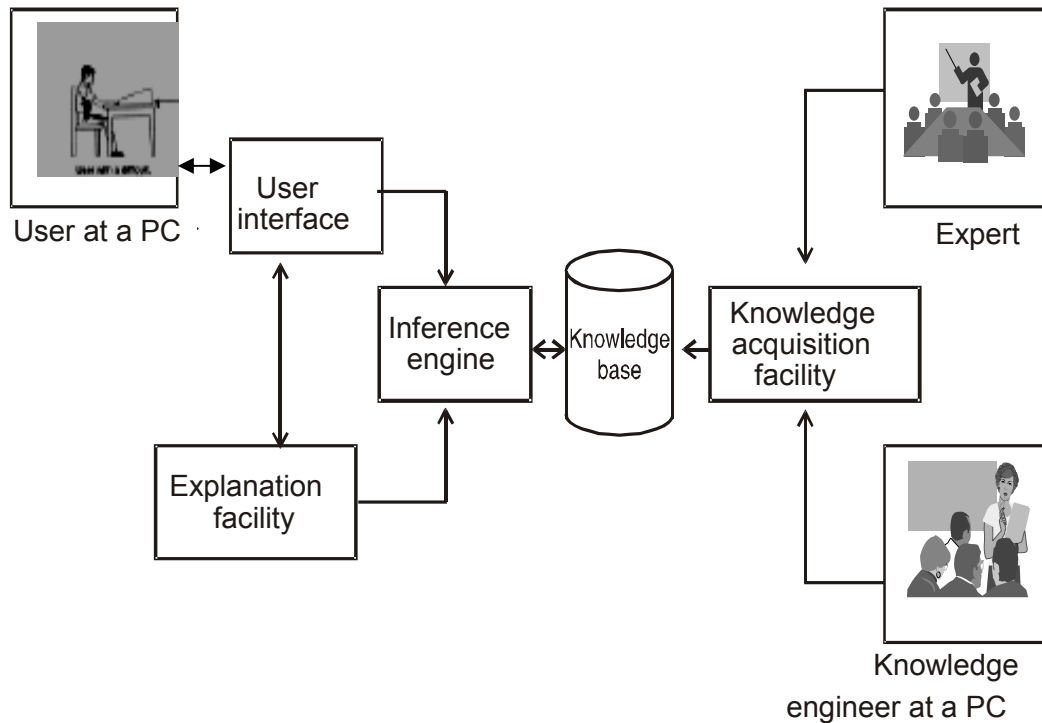


Fig.: Major components of an Expert System

- (iii) **User interface**: This program allows the user to design, create, update, use, and communicate with the expert system.
- (iv) **Explanation facility**: This facility provides the user with an explanation of the logic the ES used to arrive at its conclusion.
- (v) **Knowledge acquisition facility**: Building a knowledge base, referred to as knowledge engineering, involves both a human expert and a knowledge engineer. The knowledge engineer is responsible for extracting an individual's expertise and using the knowledge acquisition facility to enter it into the knowledge base.