B.A. DEFENCE STUDIES

Year	Subject Title	Sem.	Sub Code
2018 -19 Onwards	SKILL BASED ELECTIVE II: INTRODUCTION TO COMPUTER APPLICATION IN DEFENCE	IV	18BDS46S

Objective:
To educate the students the basics of computers and its application in defence sector is the objective.

Credits: 2

UNIT I EVOLUTION OF COMPUTERS

1. Hardware Generations
2. Definition of Software
3. Operating system

UNIT II INTRODUCTION TO MS OFFICE

1. Creating, Opening, Editing and Saving a document, Copy, Cut, Paste operations
2. Page Setup, Headers and Footers, Formatting Texts, Paragraph, Page Borders, Document Printing
3. Introduction to MS Excel

UNIT-I

TOPIC-1

How Computers Evolved: A look at all the generations.

It's 1795 and you're the captain of a ship at sea. The sea in front of you is inky black. How do you know which direction your ship is going in? Simple! You estimate your location by the position of the stars above! You have a mathematical book that helps you with this, but there's only one problem. These calculations are made by human mathematicians and they're not always accurate.

That's exactly what the British scientist Charles Babbage, the father of computers, thought too. Babbage wanted to build a machine that could perform accurate calculations quickly to avoid errors in navigation and engineering. This is when he came up with the design for the first computer called the Difference Engine in 1822.But did you know that Babbage never actually built a computer? Babbage's design for the computer was built nearly 120 years after he designed it! Today, computers are indispensable and help us in almost every aspect of our lives. Using the mathematical language called binary (which only uses the digits 0 and 1), computers store huge amounts of information and help us make lightning-fast calculations which we could have not done ourselves. Let's look at the journey of the computer right from the start and see how it has evolved to help us practically do everything. First-generation computers were built using vacuum tubes as the main technology. These computers were very fragile and were as big as a room! They could roughly perform 5000 additions or subtractions per second! These computers consumed a lot of electricity and produced a lot of heat. The heat generated by the computer would also attract insects into the machine which would make the machine malfunction. This is why when computers have an error we still say "There's a bug in it!". These computers were used during the Second World War to calculate the aim of ballistic weapons and decode messages.Second-generation computers were built using transistors. Most of the development of transistors happened in Santa Clara Valley in the USA. And because transistors used silicon, this place was soon called Silicon Valley! Second-generation computers could perform roughly 5000 additions in a second but they were way more accurate! The only way to make transistor computers more powerful is to keep adding more transistors. This meant that a good transistor computer would need thousands of discrete parts to work well. Third-generation computers used integrated circuits that were made by fitting many transistors onto one chip. The development of ICs also gave rise to Moore's Law that believes that every two years, twice the number of transistors can be fitted into ICs while the cost of the ICs reduces by half. Since the circuits in the ICs are very close to each other, the electricity in the circuit needs to travel a very small distance. This led to faster calculations! The computer still needed an air-conditioned environment to function in. Fourth-generation computers run on microprocessors which are stamp-sized chips that contain all the important circuits needed for the computer to run. One of the earliest companies that made microprocessors was formed by combining the words integrated and electronics – Intel! These computers were also sometimes called microcomputers because they were so small compared to the computers in the past. The Apple II made by Apple is one of the earliest fourth-generation personal computers ever made and was hugely popular for personal use.

Fifth-generation computers may use neural networks and artificial intelligence and try to make decisions that mimic human beings. They can interpret information and make decisions. Since these computers can learn on their own, we are still figuring out the full extent of how to control them. These computers are used everywhere from entertainment, medicine, research and more. The world's smallest computer (that can measure the temperature of cell clusters) is smaller than a grain of rice.

With computers going from the size of a room to being smaller than a grain of rice, what do you think will come next in modern computing? Would you like to be a future computer scientist?

Deepthi is an ambivert who is on a steady diet of good food, filter coffee, and self-improvement. Being an ardent reader, storytelling has been her first love and she enjoys exploring how to convey stories compellingly. Having studied psychology and experienced the learning and development field, Deepthi is driven to understand human behavior and to know what makes each of us unique. You are most likely to find her tucked into a cozy corner at a local cafe with a Kindle or a book in hand. If you find her there, stop by and say hello, she'd be eager to learn your story too. Until then, you can ping her at storyweavers@byjus.com for anything you may like to share.

Computer Hardware & Software Questions & Answers - General Computer Awareness

The article aims to provide important Computer Software & Hardware questions that are commonly asked in the computer section of competitive exams.

Aspirants of various Government exams like RRB, Bank, Insurance, SSC etc must update themselves with basic knowledge of Computer hardware and software. At least this is what is expected of the candidates appearing for various exams. So, aspirants should go through the important Computer software and hardware questions given in this article carefully.

The computer awareness section is mostly a part of various Insurance and Bank exams conducted in the country.

Computer Hardware & Software

What is Computer Hardware?

Computer hardware is the physical components of a computer that we can touch and feel. These are machinery or primary electronic devices that are used to build up the computer or data processing system. Computer hardware consists of interconnected electronic devices that we can use to control a computer’s operation, input and output.

Computer hardware examples:

Few examples of computer hardware are –

Motherboard – it is the circuit board that contains IC sockets and slots.

Central Processing Unit (CPU) – it is the heart of the computer

Peripheral of CPU such as Keyboard, Mouse, Monitor, Printer, Speaker, UPS etc.

Candidates can go through the Computer Fundamentals for detailed information and explanation of basic concepts of computer.

What is Computer Software?

Computer Software is a programming code executed on a computer processor. It is a set of programs that can do particular work of the user. The software simply is a collection of documentation, instructions, and procedures that are capable of performing different tasks on a computer system.

The computer software is divided into two major parts:

System Softwares – System software operates directly on hardware devices of the computer. It provides a platform to run an application and helps to run the hardware of the computer and the system itself. Operating systems, diagnostic tools, device drivers are some included in system software. These are mostly pre-installed on computers. Examples are Windows, Linux, Unix, etc.

Application Softwares – Designed for user-benefit to complete different tasks. These are either pre-installed in the computers or can be installed as per the need. It includes word processing, Language processors, web browsing, translators, editors and almost any other task for which we install the software. Examples are Word, Excel, PowerPoint, Oracle, etc.

Software is generally written or created in a high-level programming language. The language that is readable by people. These instructions in high-level languages are then converted into “machine language” instructions, represented in the form of binary code before the hardware can “run the code”. When we install any software, it is generally already in this machine language or binary form.

Candidates can refer to the Computer Shortcut keys in the given link to prepare for the Computer Awareness section.

Computer Hardware & Software Questions

Given below are 25 important Computer Hardware and Software Questions that have been asked frequently in competitive exams and have high chances to be asked again. Candidates can go through these questions to prepare and practice.

Introduction to Operating System

Abstract and Figures

It includes an introduction to Operating system (OS): Computer system structure and organization. OS definition, function, history. Categories, OS services, and operations. Note: If this data is useful for you , may you recommended it.

Introduction to operating system Computer System Operating system Objectives

[Dr. Qasim Mohammed Hussein] Page 3 Figure 1: computer system 1. Computer-System Operation A modern general-purpose computer system consists of one or more CPUs and a number of device controllers connected through a common bus that provides access to shared memory (Figure 1.2). Each device controller is in charge of a specific type of device (for example, disk drives, audio devices, and video displays). The CPU and the device controllers can execute concurrently, competing for memory cycles. To ensure orderly access to the shared memory, a memory controller is synchronizing access to the memory. For a computer to start running-for instance, when it is powered up or rebooted-it needs to have an initial program to run. This initial program, or bootstrap program, tends to be simple. Typically, it is stored in read-only memory (ROM) or electrically erasable programmable read-only memory (EEPROM),known by the general term firmware, within the computer hardware. It initializes all aspects of the system, from CPU registers to device controllers to memory contents. The bootstrap program must know how to load the operating system Computer System Organization

[Dr. Qasim Mohammed Hussein] Page 4 and to start executing that system. To accomplish this goal, the bootstrap program must locate and load into memory the operating system kernel. The operating system then starts executing the first process, such as "init," and waits for some event to occur. Figure 2 2. Storage Structure Computer programs must be in main memory (also called RAM) to be executed. Main memory is the only large storage area that the processor can access directly. It forms an array of memory words. Each word has its own address. Interaction is achieved through a sequence of load or store instructions to specific memory addresses. The load instruction moves a word from main memory to an internal register within the CPU, whereas the store instruction moves the content of a register to main memory. The instruction-execution cycle includes: 1) Fetches an instruction from memory and stores that instruction in the instruction register. And increment the PC register. 2) Decode the instruction and may cause operands to be fetched from memory and stored in some internal register. 3) Execute the instruction and store the result in memory.

The programs and data are not resided in main memory permanently for the following two reasons:

1) Main memory is usually too small to store all needed programs and. Data permanently.

2) Main memory is a volatile storage device that loses its contents when power is turned off or otherwise lost. Thus, most computer systems provide secondary storage as an extension of main memory to hold large quantities of data permanently. The wide variety of storage systems in a computer system can be organized in a hierarchy . The main differences among the various storage systems lie in speed, cost, size, and volatility. The higher levels are expensive, but they are fast. Figure 3: Storage device hierarchy 3. I/O Structure A computer system consists of CPUs and multiple device controllers that are connected through a common bus. The device controller is responsible for moving the data between the peripheral devices that it controls and its local 3. I/O Structure

Typically, operating systems have a device driver for each device controller. To start an I/O operation, the device driver loads the appropriate registers within the device controller. The device controller examines the contents of these registers to determine what action to take. The controller starts the transfer of data from the device to its local buffer. Once the transfer of data is

complete, the device controller informs the device driver via an interrupt that it has finished its operation. The device driver then returns control to the operating system . For other operations, the device driver returns status information. For moving bulk data, direct memory access (DMA) is used. After setting up buffers, pointers, and counters for the I/O device, the device controller transfers an entire block of data directly to or from its own buffer storage to memory, with no intervention by the CPU. Only one interrupt is generated per block, to tell the device driver that the operation has completed, rather than the one interrupt per byte generated for low-speed devices. There are different categories for designing a computer system according to the number processors used.

1. Single-processor system: there is one CPU for executing instructions.

2. Multiprocessor system: It contains two or more processors that share bus, clock, physical memory and peripheral devices. The advantages of multiprocessors are: a) Increase throughput. b) Economy scale (less cost). c) Increase reliability.

3. Clustered system: it consists of multiple computer systems connected by a local area network. Computer system structure

Operating systems have been evolving through the years. Following table shows the history of OS. OS performs many functions such as:

1. Implementing user interface.
2. Sharing HW among users.
3. Allowing users to share data among themselves.
4. Preventing users from interfering with one another.
5. Scheduling resource among users.
   Facilitating I/O operations.
6. Recovering from errors.

8. Accounting for resource storage.

9. Facilitating parallel operations.

10. Organizing data for secure and rapid access. . Handling network communications.

Operating system Functions Operating system History

The main categories of modern OS may be classified into three groups which are distinguished by the nature of interaction that takes place between the computer and the user: 1. Batch system In this type of OS, users submit jobs on regular schedule (e.g. daily, weekly, monthly) to a central place where the user of such system did not interact directly with computer system. To speed up the processing, jobs with similar needs were batched together and were run through the computer as a group. Thus, the programmer would leave the programs with the operator. The output from each job would send to the appropriate programmer. The major task of this type was to transfer control automatically from one job to the next. Disadvantages of Batch System

1. Turnaround time can be large from user standpoint.

2. Difficult to debug program.

2. Time-Sharing System This type of OS provides on-line communication between the user and the system, the user gives his instructions directly and receives intermediate response, and therefore it called interactive system. The time sharing system allows many user simultaneously share the computer system. The CPU is multiplexed rapidly among several programs, which are kept in memory and on disk. A program swapped in and out of memory to the disk. Time sharing system reduces the CPU ideal time. The disadvantage is more complex. Operating system Categories

3. Real time operating system Real Time System is characterized by supplying immediate response. It guarantees that critical tasks complete on time. This type must have a pre-known maximum time limit for each of the functions to be performed on the computer. Real-time systems are used when there are rigid time requirements on the operation of a processor or the flow of data and real-time systems can be used as a control device in a dedicated application. The airline reservation system is an example of this type.

1. On-line and off-line operation A special subroutine was written for each I/O device called a device controller. Some I/O devices has been equipped for either on-line operation (they are connected to the processor), or off-line operations (they are run by control unit).

2. Buffering A buffer is an area of primary storage for holding data during I/O transfer. On input, the data are placed in the buffer by an I/O channel, when the transfer is complete the data may be accessed the processor. The buffing may be single or double.

3. Spooling (Simultaneously Peripheral Operation On-Line) Spooling uses the disk as a very large buffer. Spooling is useful because device access data that different rates. The buffer provides a waiting station where data can rest while the slower device catches up. Spooling allows overlapping between the computation of one job and I/O of another job. Performance development of OS .

4. Multiprogramming In multiprogramming several programs are kept in main memory at the same time, and the CPU is switching between them , thus the CPU always has a program to be execute. The OS begins to execute one program from memory, if this program need wait such as an I/O operation, the OS switches to another program. Multiprogramming increases CPU utilization. Multiprogramming system provide an environment in which the various system resources are utilized effectively, but they do not provide for user interaction with the computer system. Advantages a) High CPU utilization. b) It appears that many programs are allotted CPU almost simultaneously. Disadvantages a) CPU scheduling is requires. b) To accommodate many jobs in memory, memory management is required.

5. Parallel system There are more than on processor in the system. These processors share the computer bus, clock, memory and I/O devices. The advantage is to increase throughput (the number of programs completed in time unit).

6. Distributed system Distribute the computation among several physical processors. It involves connecting 2 or more independent computer systems via communication link. So, each processor has its own O.S. and local memory; processors communicate with one another through various communications lines, such as high-speed buses or telephone lines. Advantages of distributed systems: a) Resources Sharing You can share files and printers. b) Computation speed up A job can be partitioned so that each processor can do a portion concurrently (load sharing). c)

Reliability – If one processor failed the rest still can function with no problem. d) Communications Such as electronic mail, ftp

7. Personal computer Personal computers computer system dedicated to a single user. PC operating systems were neither multi-user nor multi-tasking. The goal of PC operating systems were to maximize user convenience and responsiveness instead of maximizing CPU and I/O utilization.

•Examples: Microsoft Windows and Apple Macintosh An operating system provides services to programs and to the users of those programs. The common services provided by the operating system are: 1. Program execution: Operating system loads a program into memory and executes the program. The program must be able to end its execution, either normally or abnormally.

2. I/O Operation: I/O means any file or any specific I/O device. Program may require any I/O device while running. So operating system must provide the required I/O.

3. File system manipulation: Program needs to read a file or write a file. The operating system gives the permission to the program for operation on file.

4. Communication: Data transfer between two processes is required for some time. The both processes are on the one computer or on different computer but connected through computer network. Communication may be implemented by two methods: a. Shared memory b. Message passing.

5. Error detection: error may occur in CPU, in I/O devices or in the memory hardware. The operating system constantly needs to be aware of possible errors. It should take the appropriate action to ensure correct and consistent computing. Operating system with multiple users provides efficient system operations: 1. Resource allocation: For simultaneously executing job. Operating system Service.

Accounting: For account billing and usage statistics. 3. Protection: Ensure access to system resource is controlled. Modern operating systems are interrupt driven. If there are no processes to execute, no I/O devices to service, and no users to whom to respond, an operating system will sit quietly, waiting for something to happen. Events are almost always signaled by the occurrence of an interrupt or a trap. A trap is a software-generated interrupt caused either by an error (for example, division by zero or invalid memory access) or by a specific request from a user program that an operating-system service be performed. For each type of interrupt, separate segments of code in the operating system determine what action should be taken. An interrupt service routine is provided that is responsible for dealing with the interrupt. Since the operating system and the users share the hardware and software resources of the computer system, we need to make sure that an error in a user program could cause problems only for the one program that was running. With sharing, many processes could be adversely affected by a bug in one program. A properly designed operating system must ensure that an incorrect (or malicious) program cannot cause other programs to execute incorrectly. A) Dual-Mode Operation We must be able to distinguish between the execution of operating-system code and user defined code. The approach is to separate the two modes of operation: user mode and kernel mode (also called supervisor mode, system mode, or privileged mode). A bit, called the mode bit is added to the hardware of the

computer to indicate the current mode: kernel (0) or user (1). The dual mode of operation provides us with the means for protecting the operating system from errant users-and errant users from one another. Operating system operations

calls provide the means for a user program to ask the operating system to perform tasks reserved for the operating system on the user program's behalf. B) Protection CPU To ensure that the operating system maintains must control over the CPU. We must prevent a user program from getting stuck in an infinite loop or not calling system services and never returning control to the operating system. To accomplish this goal, we can use a timer. A timer can be set to interrupt the computer after a specified fixed or variable period. The operating system components are : In multiprogramming environment, OS decides which process gets the processor when and how much time. The operating system is responsible for the following activities in regard to process management:

1) Creating and deleting both user and system processes.

2) Suspending and resuming processes.

3) Providing mechanisms for process synchronization .

4) Providing mechanisms for process communication .

5) Providing mechanisms for deadlock handling Management Main memory is a large array of words or bytes where each word or byte has its own address. The operating system is responsible for the following activities in regard to memory management:

1) Keeping track of which parts of memory are currently being used and by whom

2) Deciding which processes (or parts thereof) and data to move into and out of memory

1. Process Management Memory Management Operating System Components. Allocating and deallocating memory space as needed. The operating system is responsible for the following activities in regard to file management:

1) Creating and deleting files

2) Creating and deleting directories to organize files

3) Supporting primitives for manipulating files and directories

4) Mapping files onto secondary storage

5) Backing up files on stable (nonvolatile) storage media OS provides the following activities in connection with disk management:

1. Free-space management.

2. Storage allocation

3. Disk scheduling.

System calls provide an interface between the running program and the operating system. User cannot execute privileged instructions; the user must ask OS to execute them- system calls. System calls are implemented using traps. OS gains control through trap, switches to kernel mode, performs service, switches back to user mode, and gives control back to user. Example about how system calls are used from the OS to read data from one files and copy them to another file, shown in figure . the programmer never see this level of detail.