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BCA/BSCIT SEM 1 – COMPUTER FUNDA.

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Ch – 4 (Part – 2)
Languages, Operating Systems and Software Packages

Q-1 What is Computer Language? Explain types of computer Language.

- ✓ Language is way of communication.
- ✓ Programming language consist of all the character and symbol to communication with the computer system.
- ✓ They are created for special purpose.
- ✓ Types of computer language.
- ✓ Computer Language
     1. Machine Language
     2. Assembly Language
     3. High-Level Language

1. Machine level language

- ✓ Machine language is made up of only two symbols "0" and "1" with all its different combinations. So all the instruction are coded in 0s and 1s.
- ✓ There is a specific binary code for each instruction. The binary code for certain operation differs from computer to computer.
- ✓ Each microprocessor has its own instruction and set and corresponding machine codes.
- ✓ An instruction prepared in any machine language has two-part format, as shown under :
- ✓ e.g. 1+2 (here 1 and 2 is operand and addition is operation, + is operator)
- ✓ Operation Code is the function that must be performed and Operand are the variables involved in this functions.
- ✓ Machine language is directly understood by the computer because it is made up of only two symbols "0" and "1". So, no translation is required.

Advantages
- ✓ Programs can be executed immediately open.
- ✓ end because it doesn't require any translation.
- ✓ No extra storage space is needed.
- ✓ Programmer has complete control over the performance of the hardware.

Disadvantage
- ✓ Tedious to program.
- ✓ Time consuming to code.
- ✓ Operation codes have to be memorized.

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✓ Assignment of memory is done by programmer.
✓ Time consuming for development.
✓ Programs development are machine dependent.
✓ Preparation of programs was slow and costly.

2. Assembly Language (Low Level Language)

✓ Machine language was tedious to code and error were expected to arise in bulk.
✓ To ease the programmer's burden, prompt codes and symbolic addresses were developed.
✓ Letter symbols were substituted for basic machine language commands codes.

✓ Symbolic addresses are used in place of actual machine address or location. Format of assembly language is similar to machine language :
✓ Examples of commands are MOV, ADD, SUB, INC, etc. Examples of Variable names are SUM, MARKS, AVERAGE, etc.

✓ The symbolic language made program writing so much easier for the programmers but it must be translated into machine code before being used for operation. The translation is actually done by a special translating program.

Advantage

1. Easier to code and understand programs as compared to machine language programs.
2. Task of memory management and allocation not done by programmer (taken care of by the assembler)
3. Can use Macros (Macro is a bunch of instruction referred as a single name)

Disadvantage

1. Programs have to be translated before execution.
2. Translation of programs take up time.
3. Programs are machine dependent. (Restricted for use on that machine)
4. Additional storage area needed for the source programs and object codes.
   ✓ Examples of Assembly Language
      Microsoft Assembly Language (MASM), Turbo Assembler.

3. High Level Languages (Higher Level Language)

✓ To write a program in any languages, a programmer has to remember all the operation codes of the computer and know in detail what each code does and how it affects the various registers of the computer.
✓ However, we have also seen that in order to write good computerized programs the programmer should mainly concentrate on the logic of the problem rather than the details of internal structure of the computer.
✓ The instruction here is even more English like, and as a result, the software industry began to explode with varying applications and systems software.

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Advantages

- ✓ The main advantage of high-level languages over low-level languages is that they are easier to read, write, and maintain. Ultimately, programs written in a high-level language must be translated into machine language by a compiler or interpreter.

- ✓ The first high-level programming languages were designed in the 1950s. Now there are different languages, BASIC, COBOL, C, C++, FORTRAN, Pascal, and Prolog.

3GL (Third Generation Language)

- ✓ Procedure Oriented language are identified in sequences of instructions. Instructions identify not only the kind of ('what') tasks to be performed but indicates the way ('how') each task can be achieved.

Advantages

1. Wide range of 3GL that support the development of software with varying nature (e.g. system software, business applications, etc.)
2. Allows programmers to have full control over the way tasks are performed.
3. Highly portable compared to Assembly Language.

Disadvantages

1. Programmers must be sufficiently trained.
2. Databases / File oriented applications are tedious to code.
3. Programmers must identify how tasks are to be achieved.

Examples of 3GL

- ✓ BASIC (Beginners All Purpose Symbolic Instruction Code), COBOL (Common Business Oriented Language), PASCAL, FORTRAN (Formula Translation), C, RPG (Report Program Generator), PL/1 (Programming Language 1), etc.

4GL (Fourth Generation Language)

- ✓ A programming language that uses high-level English like instructions to retrieve and form data for inquiries and reporting.

Advantage

1. Simplifies tasks for application development
2. Suitable for developing database oriented applications.
3. Easy to use
4. Programming can be done with little training.
5. Less time needed for development
6. End user can be involved during development process.

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Disadvantage

1. Not suitable for development of all software types (e.g. system software, scientific applications, etc.)
2. Does not allow intricate control of hardware when needed.
3. Graphic facilities not able to generate complex graphical displays.
4. Programmer loses control over how tasks are achieved.

Examples of 4GLs

FOCUS, SQL (Structured Query Language), FOXPRO

Fifth Generation Language

✓ A **fifth generation programming language** (abbreviated as **5GL**) is a programming language based on solving problems using constraints given to the program, rather than using an algorithm written by a programmer.

✓ Most constraint-based and logic programming languages and some declarative languages are fifth-generation languages.

✓ Fifth-generation languages are used mainly in artificial intelligence research.

✓ Prolog, OPS5, and Mercury are examples of fifth-generation languages.

✓ Fifth generation language is yet to come fully. But in today's computer world's fifth generation language has taken place widely. There some software's which are under fifth generation category.

✓ Example of Fifth Generation Language is ERP package.

❖ Artificial Intelligence (AI)

✓ The ability of a computer to think, to reason, to learn, to struggle for self-improvement is called as Artificial Intelligence in computers. Computer can get experience through trial and error method.

✓ In Artificial Intelligence computer have that human intelligence to solve unstructured problem.

✓ Machine "learns" what not to do through trial and error. Chess Game is an example of fifth generation language software.

❖ Expert Systems (ES)

✓ It is a special computer package which can perform the function of human expert by helping users to make complex decisions.

✓ An interactive knowledge based system that responds to questions, ask for clarification, make recommendations, and generally help users make complex decisions.

✓ The user of the Expert system sits at the terminal, PC or workstation and takes part in a question and answer session in which the problem and recommends action to be taken.

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1 word Question Answer

Sr No.	Question	Answer
1.	Language is ?	way of communication.
2.	Machine language is made up of	only two symbols "0" and "1"
3.	Each microprocessor has its own instruction and set and corresponding _____.	machine codes
4.	A programmer has to remember all the operation codes of the computer in _____.	High Level language
5.	In which language Procedure Oriented Computations are identified in sequences of instructions.	3GL
6.	In which language Tools developed by software vendors to increase the productivity of programming	4GL
7.	_____is a programming language based on solving problems using constraints given to the program.	5GL

What is Translator? Explain types of Translator.

❖ Compiler
- ✓ A compiler is a translator used to convert high-level programming language to low-level programming language.
- ✓ It converts the whole program in one session and reports errors detected after the conversion.
- ✓ The compiler takes time to do its work as it translates high-level code to lower-level code all at once and then saves it to memory.
- ✓ A compiler is processor-dependent and platform-dependent.
- ✓ It has been addressed by alternate names as the following: special compiler, cross-compiler and, source-to-source compiler.

❖ Interpreter
- ✓ The interpreter is similar to a compiler, it is a translator used to convert high-level programming language to low-level programming language.

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✓ The difference is that it converts the program one line of code at a time and reports errors when detected, while also doing the conversion.

✓ An interpreter is faster than a compiler as it immediately executes the code upon reading the code.

✓ It is often used as a debugging tool for software development as it can execute a single line of code at a time.

✓ An interpreter is also more portable than a compiler as it is processor-independent, you can work between different hardware architectures.

❖ Assembler

✓ An assembler is a translator used to translate assembly language into machine language.

✓ It has the same function as a compiler for the assembly language but works like an interpreter.

✓ Assembly language is difficult to understand as it is a low-level programming language.

✓ An assembler translates a low-level language, such as an assembly language to an even lower-level language, such as the machine code.

1 word Question Answer

Sr No.	Question	Answer
1.	A _____ is a translator used to converts the whole program in one session and reports errors detected after the conversion.	compiler
2.	_____converts the program one line of code at a time and reports errors when detected, while also doing the conversion.	interpreter
3.	An _____is a translator used to translate assembly language into machine language.	assembler

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Explain Word processing Packages.

- ✓ A word processor provides more facilities for text storage, manipulation and retrieval of files. It provides several other facilities such as boldfacing text, text formatting, automatic paging, text alignment, margin setting, headers-footers, etc.
- ✓ It support Block operations that is used to define blocks of text, copy or move blocks and delete and print blocks. Facilities for printing text a specified format are also available in word processors.
- ✓ Printer control settings, character fonts, text sizes, highlighting and underlining are used to create special effects for presentation.
- ✓ A word processing package also provides file manipulation features, such as copying, deleting or renaming files automatic backup, searching, replacing and merging of documents.
- ✓ Word processors are used for Office automation and personal productivity. Examples of word processors are Word Pad, Word Star, Word Perfect, MS-Word, Page Maker, Lotus Word-Pro, etc.

Explain Spreadsheets Packages.

- ✓ Spreadsheets are program equivalent to a computerized ledger sheet with rows and columns. The display screen and computer store are divided into cells organized into rows and columns. Each cell is the intersection of a column and row which stores one data item.
- ✓ Most spreadsheets come in an "integrated" package which allows the business person to readily save data in files, enter data into the spreadsheet, perform calculations and create graphics from the results. It is a powerful analytical tool for preparing budgets, managing inventory, developing plans, accounting, etc.
- ✓ Formulas can be entered into the cell address. Formulas are mathematical expressions encompassing basic addition, subtraction, multiplication, divisions and other formulas built into a spreadsheet to perform calculations. E.g. sum, average, max, min, etc.
- ✓ Macros in spreadsheets can be used to activate several commands. They are defined by specifying the list of instructions to be executed and called by quoting their labels.
- ✓ Examples of spreadsheets are Lotus 1-2-3, MS-Excel, Q-Pro, etc.

Explain Graphical Packages.

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✓ A "graphical" package is an application package that allows user to draw graphs, charts, or images using a prescribed set of tools. Tools available include :
   o Graphical Tools : Which can automatically produce various type of graphs given a set of values.
   o Shape/Line Tools : Allows user to easily create shapes like circles and boxes.
   o Painting Tools : Allows painting and shading using different colors and patterns.
   o Text Drawing Tools : Allows text in various formats to be entered.

✓ A programmer usually use a mouse to draw figures on the screen and also to pick the graphics tools that he wishes to use to draw the diagrams, symbols, images, etc. Examples of graphical packages are Animator Pro, 3D Studio, Coral Draw, Photo Shop, etc.

Explain Database Packages.

✓ A database management package is used to create an environment where data can be stored in one place and need only a single input and update, delete operation and data sharing. The essential features of a database package include :
   o Creating, saving and printing simple database files.
   o Creating custom data entry forms, modifying databases file structures, creating data entry screens. Adding data to database files, editing entries and deleting entries.
   o Moving around a database, finding data and indexing data. Creating query files and using them to locate and print specified records only.
   o Creating and printing reports from database files, generating mailing labels, and summarizing data statistically.
   o Creating or writing program to suit user requirements.

✓ The DBMS let us specify data base structure and query (search condition) the database in a large number of ways. Examples of Database packages are Access, dBase, FoxBASE, FOXPRO, Oracle, MY SQL, SQL Server etc.

Explain Presentation Packages.
✓ A presentation program is a software package used to display information in the form of a slide show. It has three major functions: an editor that allows text to be inserted and formatted, a method for inserting and manipulating graphic images, and a slide-show system to display the content.
✓ Examples oSlideWiki, Audience (software), Ease, Emaze etc.
❖ Features of presentation package

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- ✓ **Creation of Slides**:
- ✓ A slide is a single screen of a presentation, and every presentation is composed of several slides.
- ✓ Slides contain any mixture of text, images, video, animations, links and sound
- ✓ **Animation**:
- ✓ Animation effects allow the various elements on each slide to appear after a certain amount of time or when a presenter presses a button.
- ✓ **Transitions**:
- ✓ This is how the presentation software "moves" the display of one slide to another.
- ✓ Transitions usually include dissolving from one slide to the next or the current slide being moved in some way to show the next slide as though it was underneath.

1 word Question Answer

Sr No.	Question	Answer
1.	A _____ provides more facilities for text storage, manipulation and retrieval of files.	word processor
2.	_____are program equivalent to a computerized ledger sheet with rows and columns.	Spreadsheets
3.	_____ in spreadsheets can be used to activate several commands.	Macros
4.	A _____ package is an application package that allows user to draw graphs, charts, or images using a prescribed set of tools.	Graphical
5.	A _____ package is used to create an environment where data can be stored in one place and need only a single input and updating to have data integrity, integration and data sharing.	database management
6.	A _____is a software package used to display information in the form of a slide show.	presentation program

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What is Operating System? Explain Types of Operating System.

- ✓ An Operating System performs all the basic tasks like managing file,process, and memory. Thus operating system becomes an interface between user and machine.
- ✓ Some of the widely used operating systems are as follows-

➢ Batch Operating System

- ✓ In Batch operating system, data is collected over a period of time and the processing of the data is deferred to a later time.
- ✓ This approach was used very commonly in the past when punch cards served as data storage media and is used as input into the computer system for processing.
- ✓ In batch processing, the data have first to be captured, normally as a form of source documents, like time cards, or alternatively, by RJE (Remote Job Entry) where data is gathered through remote terminals.
- ✓ The data will then be transmitted to the computer or the source document will be physically transported to the data center where transcription (conversion of source document data into machine readable form) is performed.
- ✓ The data is processed by the computer and the resulting output is given to the users. Batch processing is suitable in application where there are large amounts of data and when the turnaround times are not critical. As data are transcribed into machine readable form before submitting for processing, the speed of processing is therefore determined by the computer and not by the operator.
- ✓ Payroll processing is suitable for batch processing as it is only performed on a regular basis. (for example every month).
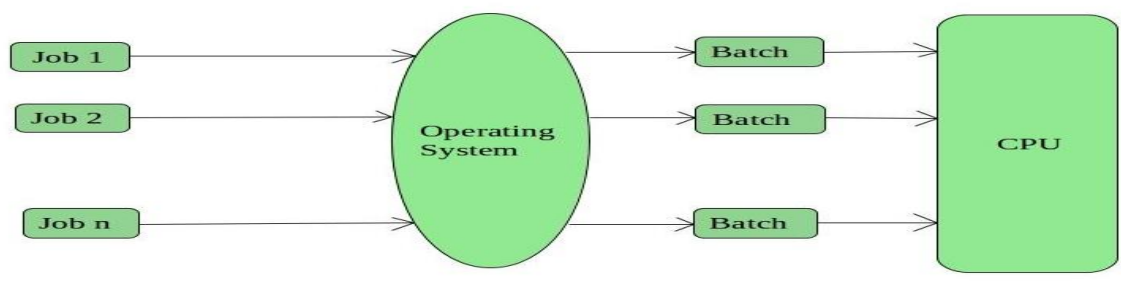
Advantages of Batch Operating System:

- ✓ It is very difficult to guess or know the time required by any job to complete.
- ✓ Processors of the batch systems know how long the job would be when it is in queue.
- ✓ Multiple users can share the batch systems
- ✓ The idle time for batch system is very less
- ✓ It is easy to manage large work repeatedly in batch systems

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Disadvantages of Batch Operating System:

- ✓ The computer operators should be well known with batch systems
- ✓ Batch systems are hard to debug
- ✓ It is sometime costly
- ✓ The other jobs will have to wait for an unknown time if any job fails

Examples of Batch based Operating System: Payroll System, Bank Statements etc.

➤ **Multiprogramming Operating System**
- ✓ Multiprogramming is the process of combining hardware and software to create a situation in which more than one program may be held in main store at one time.
- ✓ IT is thus possible to process several tasks simultaneously. The main objective is to minimize unused CPU time.
- ✓ In the time sharing mode the computer switches from one job to the other at a rapid rate. The jobs are entered into the computer through different terminals connected to the computer by cables.
- ✓ After processing the first user's job it proceeds to the second and then the third, and so on, for short bursts of time or "time slices" before returning to the first user's job from where it was earlier suspended.
- ✓ This cycle continues indefinitely; when one program is finished it is replaced by another one.
- ✓ The computer thus performs interleaved execution of two or more different and independent programs.
- ✓ The processor is kept busy while channels and buffers are occupied with job of bringing in data and writing out information.
- ✓ Multiprogramming is dependent on interrupts (an external event which causes running of current program, runs its defined procedure and comes back).
- ✓ Although commands are executed in sequence the system is sometimes required to respond to requests. This routine works according to a system of priorities, with each program having an associated priority number.

➤ **Time Sharing Operating System**
- ✓ As the name "Time Sharing" implies it has the ability to process several tasks simultaneously. In the time sharing mode the computer switches from one job to the other at a rapid rate.
- ✓ The jobs are entered into the computer through different terminals connected to the computer by cables.
- ✓ After processing the first user's job it proceeds to the second and then the third, and as on, for short bursts of time or "time slices" before returning to the first users job from where it was earlier suspended.
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✓ The exchange of programs from the secondary storage unit and the CPU takes some amount of time called over head time. Thus it is not efficient in processing long programs. Main advantage is that a number of users can use the computer simultaneously.
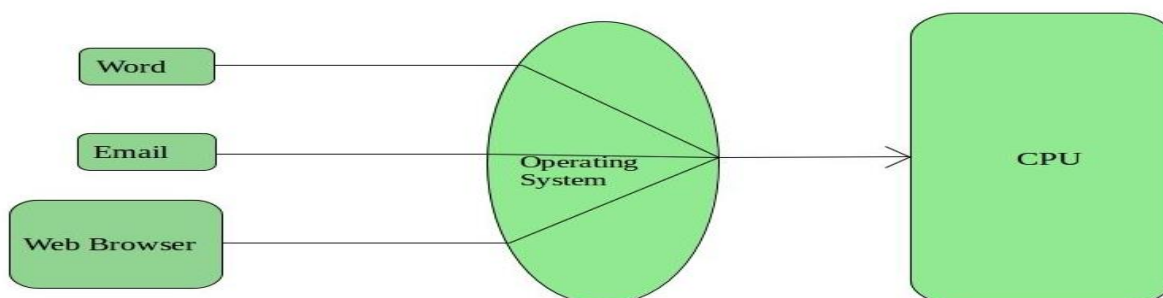
Advantages of Time-Sharing OS:

✓ Each task gets an equal opportunity
✓ Less chances of duplication of software
✓ CPU idle time can be reduced

Disadvantages of Time-Sharing OS:

✓ Reliability problem
✓ One must have to take care of security and integrity of user programs and data
✓ Data communication problem
✓ Examples of Time-Sharing OSs are: Multics, Unix etc.

➢ On-Line Operating System
✓ In an On-Line system, the terminal used by the operator is connected to the main computer so that the operator can interact with the computer in a conversational mode. It is used in applications requiring fast response from the computer.
✓ There are some benefits by allowing users to communicate with the computer on-line. Error checking can be performed by the computer when data entry is carried out. The operator can be informed of the error so that immediate correction can be made. On-Line queries can be performed to allow immediate retrieval of information.
✓ The nature of on-line systems allow centralization of information, fast data retrieval immediate file updates and improved customer services. Limited validation checks at the terminal increases the accuracy of input.
✓ However, the cost of implementation such a system is much more than the batch system.
✓ Furthermore, as the terminals may be located remotely from the main computer site, security aspects of implementation must receive special considerations.

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➢ Real-Time Operating System

✓ A Real-Time systems are always on-line but on-line systems need not be real-time systems. However, further constraints are placed in terms of response time and availability of the system.

✓ A real time system receive data and process it quickly enough to produce output which can be used to control or affect the outcome of an ongoing activity of process.

✓ In general, real-time systems handles small volumes of data at any one time and the turnaround time is critical. Feedback is essential in real-time systems.

✓ Most real-time systems are used in mission critical application like process control and therefore, reliability and availability is of paramount importance.

✓ Missile guidance systems are examples of real-time systems. Control signals are sent to the fins of the missile to correct any deviations.

Advantages

✓ Error messages are immediate
✓ Source documents are available at the time the error occurs.
✓ Faster than on-line systems.

Disadvantages

✓ Direct access devices have to be used.
✓ Elaborate controls and backup procedures to guard against unwarranted access to the system.
✓ Control checks are difficult since updating occurs at the time of processing.

Sr No.	Question	Answer
1.	An _____ performs all the basic tasks like managing file,process, and memory.	Operating System
2.	In _____, data is collected over a period of time and the processing of the data is deferred to a later time.	Batch operating system
3.	_____ is the process of combining hardware and software to create a situation in which more than one program may be held in main store at one time.	Multiprogramming
4.	In the _____ mode the computer switches from one job to the other at a rapid rate.	time sharing
5.	In an _____, the terminal used by the operator is connected to the main computer so that the operator can interact with the computer in a conversational mode.	On-Line system
6.	A Real-Time systems are always on-line but on-line systems need not be_____.	real-time systems