



TEACHER'S CARE ACADEMY

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COMPUTER SYSTEMS ARCHITECTURE

PG TRB
2020-2021

UNIT-1

CONTENTS

PG TRB SYLLABUS.....	1
PREVIOUS YEAR QUESTIONS AND ANSWERS - I	2
PREVIOUS YEAR QUESTIONS AND ANSWERS – II	6
 1. THE COMPUTER SYSTEM	
ARCHITECTURE OF COMPUTER	10
1.1 SYSTEM BUSES.....	18
1.1.1 Computer Components	20
1.1.2 Computer function.....	22
1.1.3 Interconnection Structures	23
1.2 INTERNAL MEMORY.....	25
1.2.1 Computer Memory System Overview.....	30
1.2.2 Cache Memory.....	34
1.3 INPUT/ OUTPUT.....	40
1.3.1 External Devices.....	52
1.3.2 Direct Memory Access.....	58
1.3.3 The External Interface.....	66
OPERATING SYSTEM OVERVIEW.....	86

CONTENTS

2. THE CENTRAL PROCESSING UNIT

2.1 COMPUTER

ARITHMETIC.....	109
-----------------	-----

2.1.1 The Arithmetic and Logic Unit (ALU).....	109
--	-----

2.1.2 Floating-Point Arithmetic.....	117
--------------------------------------	-----

2.2 INSTRUCTION SETS.....	120
---------------------------	-----

2.2.1 Types of Operands.....	133
------------------------------	-----

2.2.2 Types of Operation.....	135
-------------------------------	-----

2.2.3 Register Organization.....	144
----------------------------------	-----

2.2.4 The Instruction Cycle.....	148
----------------------------------	-----

POSSIBLE PROBLEMS.....	154
------------------------	-----

COMPUTER ABBREVIATIONS	168
------------------------------	-----

SAMPLE SCHOOL BOOK QUESTIONS	198
------------------------------------	-----

PRACTICE QUESTIONS.....	200
-------------------------	-----

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UNIT I - COMPUTER SYSTEM ARCHITECTURE

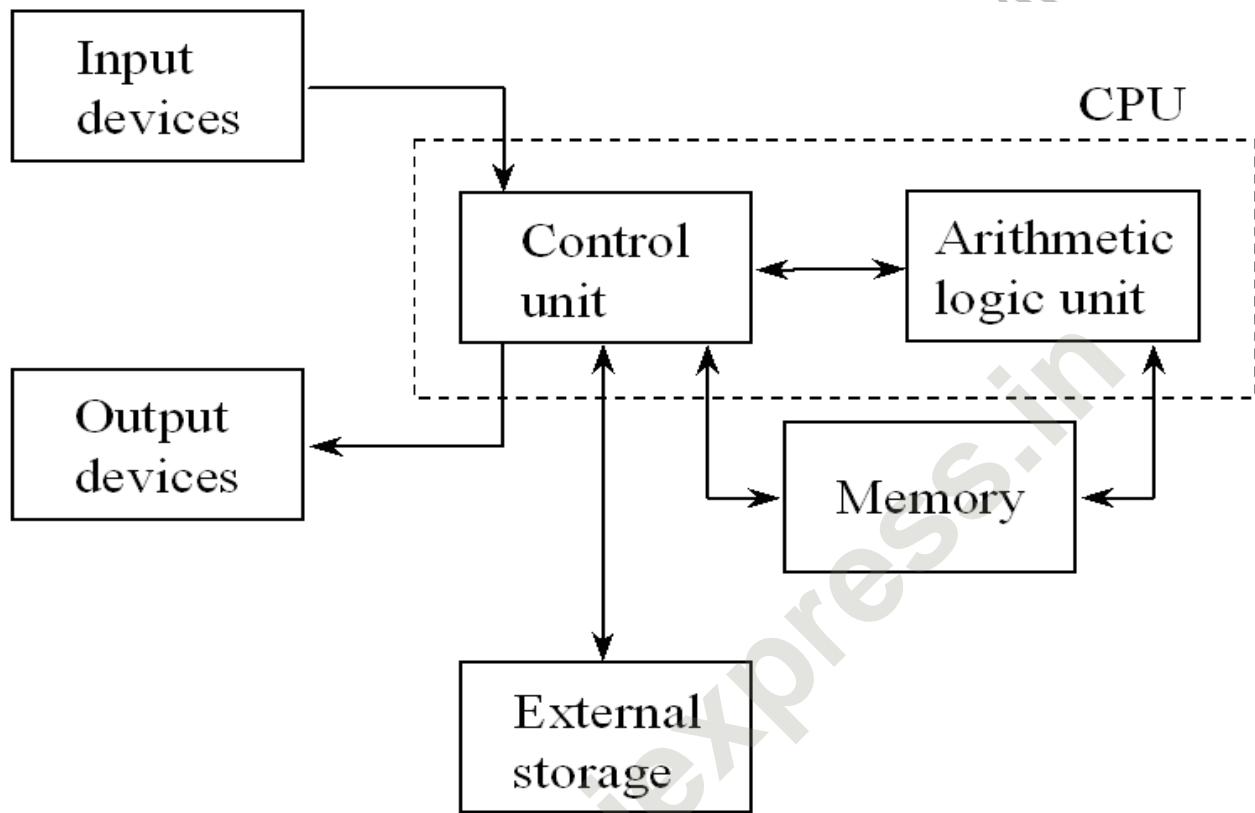
SYLLABUS

UNIT- I

THE COMPUTER SYSTEM- System buses - Computer components - Computer functions - Interconnection structures - Internal memory - Computer memory system overview- Cache memory - Input/ Output - External devices - Direct Memory Access-The external interface.

OPERATING SYSTEM OVERVIEW.

THE CENTRAL PROCESSING UNIT- Computer Arithmetic - The Arithmetic and Logic Unit (ALU) - Floating-point arithmetic – Instruction sets- Types of operands- Register organization- The instruction cycle.

THE COMPUTER SYSTEM**ARCHITECTURE OF COMPUTER****INTRODUCTION TO COMPUTER:**

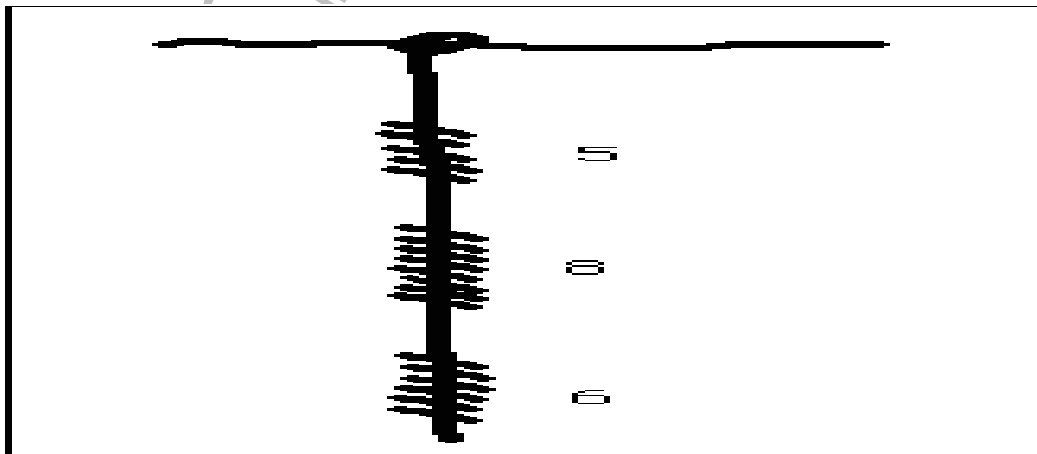
- ❖ Computer system = Hard ware+ software + user
- ❖ Computer is an electronic machine.
- ❖ *The term computer is derived from the Latin term -‘computare’,*
- ❖ Meaning - calculate or *programmable machine*.
- ❖ Charles Babbage is called the “Father” of the computer.
- ❖ It can process both numerical and non-numerical (arithmetic and logical) calculations.
- ❖ Computer is an advanced electronic device that takes raw data as input from the user and processes these data under the control of set of instructions (called program) and gives the result (output) and saves output
- ❖ It represents the decimal numbers through binary digits.(0,1)

UNITS OF MEMORY:

- ❖ The smallest unit is a bit. Which means either 0 or 1
- ❖ 1 bit 0 or 1
- ❖ 4 bit = 1 nibble
- ❖ 8 bit = 1 byte
- ❖ 1024 byte = 1 KILO byte = 2^{10} byte
- ❖ 1024 KB = 1 MEGA byte = 2^{10} KB
- ❖ 1024 MB = 1 GIGA byte = 2^{10} MB
- ❖ 1024 GB = 1 TERA byte = 2^{10} GB
- ❖ 1024 TB = 1 PETA byte = 2^{10} TB
- ❖ 1024 PB = 1 EXA byte = 2^{10} PB
- ❖ 1024 EB = 1 ZETTA byte = 2^{10} EB
- ❖ 1024 ZB = 1 YOTTA byte = 2^{10} ZB
- ❖ 1024 YB = 1 BRONTO (or) HELLA byte = 2^{10} YB

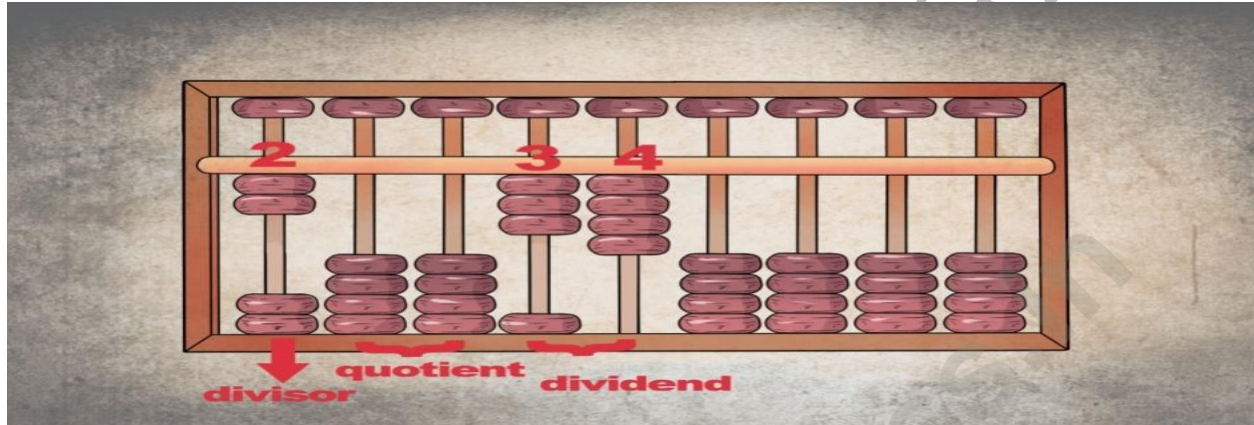
EVOLUTION OF COMPUTER**QUIPA (15TH & 16TH CENTURY)**

- ❖ A Tree Branches with a Thread knocked and made a additions and subtractions.

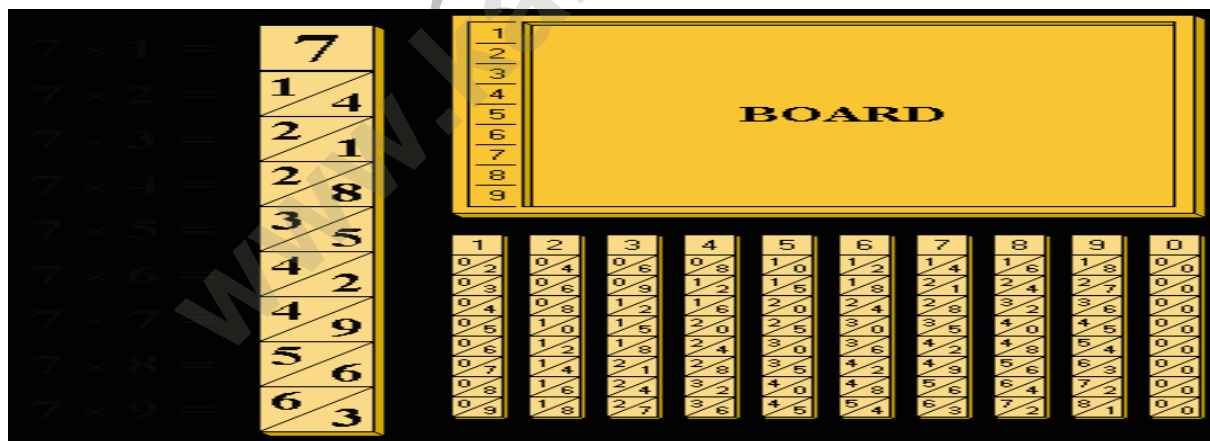


ABACUS (600 B.C)

- ❖ Invented by Babylonians at china
- ❖ Works By monitoring beads according the rules. The user can done addition, subtraction, multiplication, division.
- ❖ It was used by the Chinese and Egyptians

**JOHN NAPIER'S BONE CARDBOARD MULTIPLICATION CALCULATOR (17TH CENTURY)**

- ❖ A complete set of Napier bone's Consists of rods, one for each of the digit 0 to 9 Called bones, with number carried on them.
- ❖ It was first Appeared in print in 1614.

**BLAISE PASCAL (1642)**

- ❖ Blaise Pascal developed another mechanical adding machine Called *pascaline*, which could add and subtract numbers.
- ❖ first digital computer

PRACTICE QUESTIONS:

1. Floating point representation is used to store
 - A) Boolean values
 - B) Whole numbers
 - C) Real integers
 - D) Integers
2. Suppose that a bus has 16 data lines and requires 4 cycles of 250 nsecs each to transfer data. The bandwidth of this bus would be 2 Megabytes/sec. If the cycle time of the bus was reduced to 125 nsecs and the number of cycles required for transfer stayed the same, what would the bandwidth of the bus be?
 - A) 1 Megabyte/sec
 - B) 4 Megabytes/sec
 - C) 8 Megabytes/sec
 - D) 2 Megabytes/sec
3. Assembly language
 - A) Uses alphabetic codes in place of binary numbers used in machine language
 - B) is the easiest language to write programs
 - C) need not be translated into machine language
 - D) None of these
4. A three input NOR gate gives logic high output only when
 - A) One input is high
 - B) One input is low
 - C) Two inputs are low
 - D) All inputs are high
5. n bits in operation code imply that there are _____ possible distinct operators.
 - A) $2n$
 - B) 2^n
 - C) $n/2$
 - D) N^2
6. _____ register keeps track of the instructions stored in program stored in memory.
 - A) AR (Address Register)
 - B) XR (Index Register)
 - C) PC (Program Counter)
 - D) AC (Accumulator)
7. Memory unit accessed by content is called
 - A) Read only memory
 - B) Programmable Memory
 - C) Virtual Memory
 - D) Associative Memory



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Operating Systems

Ubuntu

Mac

Windows

Android

ios

Linux

Tizen

Debian

Chrome

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UNIT-2

INDEX:

<i>Syllabus</i>	1
<i>Previous Year Questions with explanation –I</i>	2
<i>Previous Year Questions with explanation –II</i>	4
1. Introduction:	8
1.1 System Software	8
<i>Questions</i>	9
1.2 OS Strategies	11
1.2.1 Batch Processing	11
1.2.2 Multi Tasking	11
1.2.3 Multiprogramming	12
1.3 History Of OS	13
<i>Questions</i>	16
2. Operating System Organization:	19
2.1 Basic OS Function	19
2.2 Computer Hardware Review	19
2.2.1 Processor	20
2.2.2 Memory	21
2.2.3 I/O devices	24
2.2.4 Device driver	25
2.2.5 Buses	25
2.3 Different Kinds Of OS	26
2.4 Operating System Concepts	28
2.4.1 Kernels	32

2.5 System Calls	33
2.6 Operating System Structures	37
<i>Questions</i>	40
3. Device Management:	42
3.1 Device Management Functions	42
3.2 Device Characteristics	42
3.3 Direct Memory Access	45
3.4 Disk Space Management	46
3.4.1 Buffering	47
<i>Questions</i>	48
4. Process Management:	50
4.1 Resource Abstraction	50
4.2 The Process Model	50
4.3 Process Creation	50
4.4 Process Termination	51
4.5 Process Hierarchy	52
4.6 Process States	52
4.7 Implementation Of Process	53
4.8 Threads	54
<i>Questions</i>	58
5. Scheduling:	60
5.1 UniProcessor Scheduling	60
5.1.1 Types Of Processor Scheduling	60
5.1.2 Scheduling Algorithm	62
5.1.3 Short Term Scheduling Criteria	67

5.1.4 Alternative scheduling Policies	68
5.2 MultiProcessor Scheduling	70
<i>Questions</i>	74
6. Synchronization Principles:	76
6.1 Inter – Process Communication	76
6.1.1 Race Conditions	77
6.1.2 Critical Regions	78
6.1.3 Mutual Exclusion With Busy Waiting	79
6.1.4 Sleep and Wakeup	81
6.1.5 Semaphores	81
6.1.6 Mutexes	82
6.1.7 Monitors	82
6.1.8 Message Passing	84
6.1.9 Barriers	85
7. Dead Lock	86
7.1 Preemptable and Non Preemptable Resources	86
7.2 Resource Acquisition	88
7.3 Deadlock Detection and Recovery	90
7.4 Deadlock Avoidance	95
7.4.1 The Banker's Algorithm For Single Resource	97
7.4.2 The Banker's Algorithm For Multiple Resource	98
7.5 Deadlock Prevention	99
<i>Questions</i>	101
8. Memory Management:	107
8.1 Basic Memory Management	107

8.1.1 Memory Management Techniques	108
8.1.1.1 Fixed Partition	108
8.1.1.2 Variable Partition	110
8.1.2 Relocation and Protection	112
8.2 Virtual Memory	114
8.2.1 Translation Lookaside Buffer	117
8.2.2 Inverted Page Table	118
8.2.3 Page Replacement Algorithm	119
8.3 Input and Output:	125
8.3.1 Principles of I/O Hardware	125
8.3.2 Principles of I/O Software	129
8.4 File System	131
8.5 Multiprocessor Systems	144
8.5.1 Multiprocessor Hardware	144
8.5.2 Multiprocessor OS Types	147
8.5.3 Multiprocessor Synchronization	149
8.5.4 Multi Computers	150
<i>Questions</i>	162
9. Protection and Security:	164
9.1 Internal Access Authorization	165
9.2 Network Services and Protocols	166
<i>Questions</i>	168
<i>Practice Questions</i>	170

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UNIT II – OPERATING SYSTEM

SYLLABUS

(Mark – 10)

Introduction: System software, OS strategies; multiprogramming, batch.

Operating System Organization: basic OS function, kernels, device drivers.

Device management: buffering

Process Management: resource abstraction, process hierarchy.

Scheduling: Strategy selection.

Synchronization Principles: deadlock, semaphores, multiprocessors.

Deadlocks: hold and wait, Banker's Algorithm, consumable resources.

Memory Management: memory allocation strategies, variable partition.

Protection and Security: internal access authorization

OPERATING SYSTEMS

INTRODUCTION

SYSTEM SOFTWARE

- System software is a type of computer program that is designed to run a computer's hardware and application programs.
- It is the interface between the hardware and user applications. The operating system is the best-known example of system software. The OS manages all the other programs in a computer.
- System software is used to manage the computer itself.
- It runs in the background, maintaining the computer's basic functions so users can run higher-level application software to perform certain tasks.
- Essentially, system software provides a platform for application software to be run on top.

Important features of system software

- Computer manufacturers usually develop the system software as an integral part of the computer.
- The primary responsibility of this software is to create an interface between the computer hardware they manufacture and the end user.
- It generally includes the following features:
 1. **High speed:** To provide an effective platform for higher-level software in the computer system.
 2. **Hard to manipulate:** It often requires the use of a programming language, which is more difficult to use than a more intuitive user interface (UI).
 3. **Written in a low-level computer language:** Written in a computer language the central processing unit (CPU) and other computer hardware can read.
 4. **Close to the system:** It connects directly to the hardware that enables the computer to run.
 5. **Versatile:** Communicate with both the specialized hardware it runs on and the higher-level application software that is usually hardware-agnostic and often has no direct connection to the hardware it runs on. System software also must support other programs that depend on it as they evolve and change.

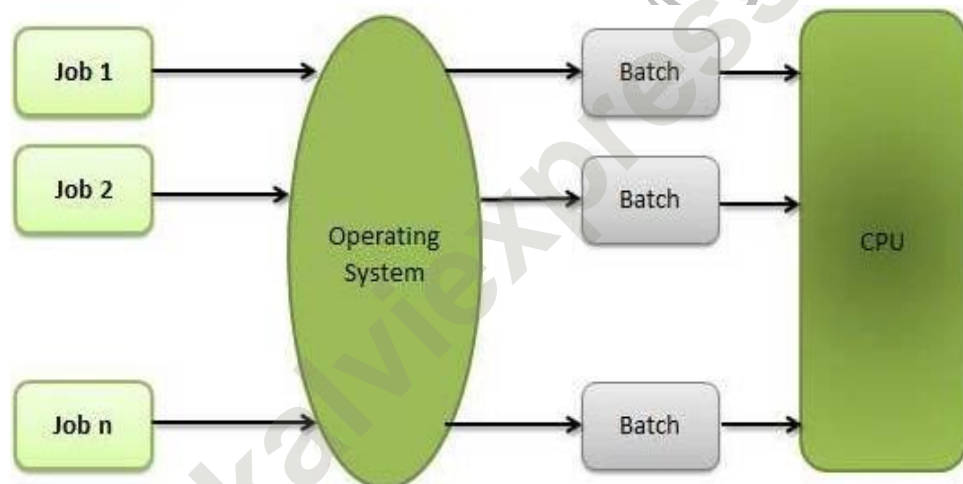
OS Definition:

- An operating system is an intermediary between users and computer hardware
- It acts as an interface and controls the execution of all kinds of programs.

OPERATING SYSTEM STRATEGIES

Batch processing

- Batch processing is a technique in which an Operating System collects the programs and data together in a batch before processing starts.
- An operating system does the following activities related to batch processing.
 - ✓ The OS defines a job which has predefined sequence of commands, programs and data as a single unit.
 - ✓ The OS keeps a number a jobs in memory and executes them without any manual information.
 - ✓ Jobs are processed in the order of submission, i.e., first come first served fashion.
 - ✓ When a job completes its execution, its memory is released and the output for the job gets copied into an output spool for later printing or processing.



Advantages

- Batch processing takes much of the work of the operator to the computer.
- Increased performance as a new job get started as soon as the previous job is finished, without any manual intervention.

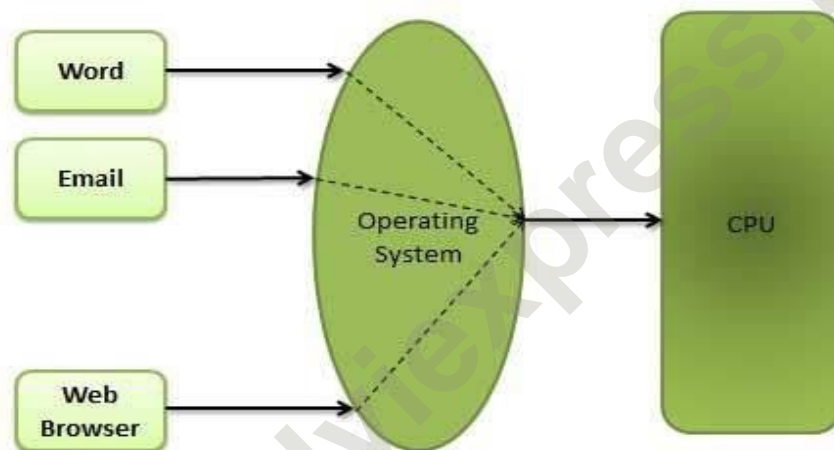
Disadvantages

- Difficult to debug program.
- A job could enter an infinite loop.
- Due to lack of protection scheme, one batch job can affect pending jobs.

Multitasking

- Multitasking is when multiple jobs are executed by the CPU simultaneously by switching between them.
- Switches occur so frequently that the users may interact with each program while it is running.

- An OS does the following activities in multitasking
 - ✓ The user gives instructions to the operating system or to a program directly, and receives an immediate response.
 - ✓ The OS handles multitasking in the way that it can handle multiple operations/executes multiple programs at a time.
 - ✓ Multitasking Operating Systems are also known as Time-sharing systems.
 - ✓ These Operating Systems were developed to provide interactive use of a computer system at a reasonable cost.
 - ✓ A time-shared operating system uses the concept of CPU scheduling and multiprogramming to provide each user with a small portion of a time-shared CPU.
 - ✓ Each user has at least one separate program in memory.



- ✓ A program that is loaded into memory and is executing is commonly referred to as a **process**.
- ✓ When a process executes, it typically executes for only a very short time before it either finishes or needs to perform I/O.
- ✓ Since interactive I/O typically runs at slower speeds, it may take a long time to complete. During this time, a CPU can be utilized by another process.
- ✓ The operating system allows the users to share the computer simultaneously. Since each action or command in a time-shared system tends to be short, only a little CPU time is needed for each user.
- ✓ As the system switches CPU rapidly from one user/program to the next, each user is given the impression that he/she has his/her own CPU, whereas actually one CPU is being shared among many users.

Multiprogramming

- Sharing the processor, when two or more programs reside in memory at the same time, is referred as **multiprogramming**.

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PRACTICE QUESTIONS:

1. Which one of the following is not a real time operating system?

- A) VxWorks
- B) Windows CE
- C) RTLinux
- D) Palm OS

2. What is the main function of the command interpreter?

- A) to get and execute the next user-specified command
- B) to provide the interface between the API and application program
- C) to handle the files in operating system
- D) none of the mentioned

3. Which of the following is NOT a valid deadlock prevention scheme?

- A) Release all resources before requesting a new resource
- B) Number the resources uniquely and never request a lower numbered resource than the last one requested.
- C) Never request a resource after releasing any resource
- D) Request and all required resources be allocated before execution.

4. Which of the following is major part of time taken when accessing data on the disk?

- A) Settle time
- B) Rotational latency
- C) Seek time
- D) Waiting time

5. A virtual memory system uses First in First out (FIFO) page replacement policy and allocates a fixed number of frames to a process. Consider the following statements:

P: Increasing the number of page frames allocated to a process sometimes increases the page fault rate.

Q: Some programs do not exhibit locality of reference.

Which one of the following is TRUE?

- A) Both P and Q are true, and Q is the reason for P
- B) Both P and Q are true, but Q is not the reason for P
- C) P is false, but Q is true
- D) Both P and Q are false



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Digital Electronics

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UNIT-3

INDEX

TOPICS	PAGE NUMBER
SYLLABUS	1
PREVIOUS YEAR QUESTIONS & ANSWERS	2
1. Introduction	16
2. Logic gates	21
2.1 NOT, AND, OR Gates	22
2.2 Universal Gates	24
3. Number systems	30
1.1 Decimal, Binary, Octal, Hexadecimal Number system	31
1.2 Conversions	36
4. Codes	46
4.1 BCD, ASCII, EBCDIC, Gray Code, Excess-3 code	
5. Signed and Unsigned Binary Number code	54
5.1 1's Complement, 2's Complement	56
5.2 9's complement, 10's complement	63
6. Boolean Algebra	68
6.1 Laws of Boolean Algebra	71
6.2 Reduction of Boolean Expression	78
6.3 Different forms of Boolean Algebra: SOP, POS	83
7. Karnaugh Map	92
7.1 2 variable Kmap, 3 Variable Map , 4 variable Kmap, 5 variable Kmap	94
7.2 Variable Entered Map	109
8. Multiplexer	116
8.1 2x1 Multiplexer, 4x1 Multiplexer, 8 x1 Multiplexer	117
9. Demultiplexer	123
8.1 1x4 DeMultiplexer, 1x8 DeMultiplexer	123

10. Encoder	126
11. Decoder	129
12. Combinational Circuit	134
12.1 Half adder	135
12.2 Full Adder	138
12.3 Half Subtractor	141
12.4 Full Subtractor	144
13. FLIP FLOPS	150
13.1 SR flip flop	151
13.2 D flip flop	158
13.3 JK Flip flop	160
13.4 T Flip flop	164
13.5 Master slave flip flop	167
13.6 Conversion of flip flop	173
14. Model Questions	181

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UNIT III – DIGITAL ELECTRONICS

SYLLABUS (Marks -10)

**Fundamental concepts: NAND, NOR, Exclusive OR operations,
Boolean Algebra: Number systems and codes: Primary, Octal,
Hexadecimal, Signed numbers codes.**

**Combinational Logic Design: K-Map representation of logical function
and simplification using K-map of 4 and 5 variables.**

Multiplexers, Decoders

Flip flop: Edge triggered Flip flop.

Text Books:

- 1. Digital Fundamentals by Floyd.**
- 2. Digital Design by Morris Mano.**

Reference Books:

- 1. Digital Circuits and Microprocessors by Herbart Taub.**
- 2. Digital Electronics by S.Salivahan**

INTRODUCTION:

- Electronic systems usually deal with information. Representation of information is called a **signal**. Signal in electronics is generally in form of voltage or current. Value of a signal is proportional to some physical quantity and it gives information about it. For example, temperature represented in terms of voltage signal.
- There are two types of signals which are different in terms of their characteristics with respect to time and value.
 1. Analog Signals
 2. Digital Signals
- A signal whose value is defined at all instances of time is called **continuous time signal**. On the other hand signal whose values are defined only at discrete instances of time is called **discrete time signal**. Most of the signals that occur in nature are analog in form. A discrete time signal can be obtained from continuous time signal by process called **sampling**. This has been illustrated in Fig. 1.1.

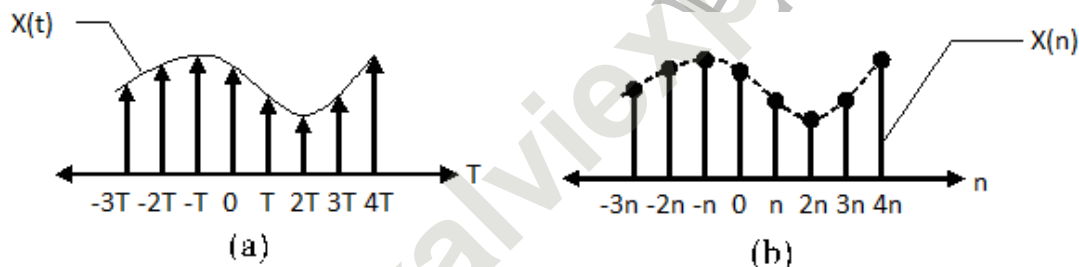


Fig. 1.1: (a) Continuous time signal $x(t)$ sampled at every T interval, (b) Resulting discrete time signal $x(n)$

- Similarly if a signal can take any value in a given range between some minimum and maximum value then the signal is called **continuous value signal**. On the other hand if a signal takes only certain fixed values in a given range then it is called **discrete value signal**. The process of converting a continuous value signal to a discrete value signal is called **quantization**. This is illustrated in Fig. 1.2.

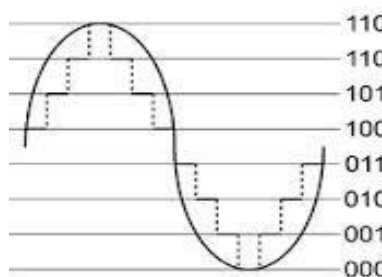


Fig. 1.2: Continuous value signal (solid line) and discrete value signal (dotted line)

Analog signal: Signals that are continuous in time and continuous in value are called analog signal.

Digital signal: Signals that are discrete in time and discrete in values are called digital signals. Digital signals are generally processed by digital systems like computers and hence their values are represented in terms of binary as shown in Fig. 1.2.

- Analog signal being continuous in time will have infinite values in any given period of time. Practically a digital system like computer cannot handle infinite values due to limited physical resources and processing power. This is the reason why a continuous time signal has to be sampled and converted to discrete time signal.
- Again Analog signals are continuous in value and hence can take any value in a given range. Now ideally number of values in any given range will be infinite which cannot be represented by finite number of bits on a computer. For example, as shown in Fig. 1.2, with three bits used for representing values only eight different values can be represented. Thus a continuous value signal has to be quantized and converted to discrete value signal.

1.1.1 Levels of Integration

- Digital electronic circuits have become increasingly popular and successful due to integrated circuit (IC) technology. Advancement in IC technology has made it possible to construct large number of devices (eg. transistor, diode, resistors, capacitors, etc) on a very small chip. Classification of IC technology based on number of components per chip is as follows.
 1. Small-scale integration (SSI), containing fewer than 100 components
 2. Medium-scale integration (MSI), containing 100 to 1000 components
 3. Large-scale integration (LSI), containing 1000 to 10,000 components
 4. Very large-scale integration (VLSI), containing more than 10,000 components

1.1.2 Comparison of Analog and Digital Systems

	Analog Systems	Digital Systems
1	Analog systems operate on continuous time and continuous value signals.	Digital systems operate on discrete time and discrete value signals generally represented in binary.
2	Analog systems are difficult to design.	Digital systems are easy to design as most of the components are in form of Integrated circuits (IC).
3	Analog systems are mostly custom made and lack flexibility.	Digital systems have high degree of flexibility.
4	Less efficient in storage of information.	More efficient in storage of information.
5	Analog signal processed by these systems are affected by noise very easily.	Digital signal are more noise-immune compared to analog signals.
6	Relatively costly compared to digital system	Low cost due to mass production of components.
7	Analog systems are more sensitive to parameter variation.	Digital systems are less sensitive to parameter variation
8	No conversion of input signals are required before processing	Input signals are converted from analog to digital form before it is processed
9	As no conversion of input signal is required there is no loss of information.	Due to process of sampling and of quantization there is loss of information.
10	Analog systems are more efficient for real time processing	Digital systems may offer limitations for real time processing

1.2 Introduction to Digital System:

- ☐ A digital system uses a building blocks approach. Many small operational units are interconnected to make up the overall system.
- ☐ The most basic logical unit system is gate circuit. There are several different types of gates with each perform differently from other logic gates.
- ☐ Digital signal consist of only two values, '0' and '1'. These two values have logical

PG TRB COMPUTER SCIENCE 2020 - 21**DIGITAL ELECTRONICS MODEL QUESTIONS:**

1. The voltages corresponding to LOW and HIGH levels respectively are given below.

Identify the voltages which correspond to the negative logic system.

A) 0 V and 5 V

B) -1.5 V and - 0.5 V

C) 5 V and 0 V

D) 1 V and 5 V

2. Which of the following is the most widely used alphanumeric code for computer input and output?

A) Gray

B) ASCII

C) PARITY

D) EBCDIC

3. The given hexadecimal number (1E.53)₁₆ is equivalent to _____ .

A) (35.684)₈

B) (36.246)₈

C) (34.340)₈

D) (35.599)₈

4. Convert 59.72₁₀ to BCD.

A) 111011

B) 01011001.01110010

C) 1110.11

D) 0101100101110010

5. The ASCII code is basically

A) 5 bit

B) 6 bit

C) 7 bit

D) 4 bit

6. Decode the following ASCII message.

10100111010100101010110001001011001

01000001001000100000110100101000100

A) STUDYHARD

B) STUDY HARD

C) stydyhard

D) stydy hard

7. Using 4-bit numbers ($n = 4$) if $k = (0011)_2$ how is k expressed in 2's complement.

A) (1011)₂

B) (1101)₂

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Data Structures

PG TRB
2020-2021



UNIT-4

CONTENTS

PG TRP SYLLABUS.....	1
PREVIOUS YEAR QUESTIONS AND ANSWERS - I	2
PREVIOUS YEAR QUESTIONS AND ANSWERS – II	9
1. DATA STRUCTURE	
1.1. INTRODUCTION.....	18
2. ARRAY	
2.1. ARRAYS TERMINOLOGY.....	19
2.2. OPERATIONS ON ARRAY.....	20
2.3. TYPES OF ARRAYS.....	26
3. STACK	
3.1. INTRODUCTION	29
3.2. OPERATIONS ON STACKS	30
3.3. APPLICATIONS OF STACK.....	31
4. QUEUE	
4.1. INTRODUCTION.....	36
4.2. BASIC FEATURES OF QUEUE.....	37
4.3. APPLICATIONS OF QUEUE.....	37
4.4. VARIOUS QUEUE STRUCTURE.....	39
5. LINKED LISTS	
5.1. INTRODUCTION.....	42
5.2. TYPES OF LINKED LISTS.....	42
5.2.1. SINGLY LINKED LIST.....	43
5.2.2. DOUBLY LINKED LIST.....	51
5.2.3. CIRCULAR LINKED LIST.....	52
5.2.4. DOUBLY CIRCULAR LINKED LIST.....	52

6. TREES

6.1. INTRODUCTION.....	54
6.2. BASIC TERMINOLOGY.....	55
6.3. TYPES OF BINARY TREE.....	56
6.4. TRAVERSAL OF A BINARY TREE.....	58
6.5. THREADED BINARY TREES.....	59

7. BALANCED BINARY TREE

7.1. AVL TREE.....	64
7.2. SPLAY TREE.....	69
7.3. RED-BLACK TREE.....	76
7.4. B TREE.....	80
7.5. HEAP TREES.....	84

8. GRAPH

8.1. INTRODUCTION.....	88
8.2. GRAPH TERMINOLOGY.....	89
8.3. GRAPH TRAVERSAL.....	93
8.3.1. BFS (Breadth First Search).....	93
8.3.2. DFS (Depth First Search).....	97
8.4. MINIMUM SPANNING TREE.....	104
8.4.1. KRUSKAL'S ALGORITHM.....	105
8.4.2. PRIM'S ALGORITHM.....	108
8.5. SHORTEST PATH ALGORITHMS.....	112
8.5.1. DIJKSTRA ALGORITHM.....	112
8.5.2. FLOYD WARSHALL ALGORITHM.....	113

9. ALGORITHMS FOR SEARCHING AND SORTING

9.1. SEARCHING.....	120
9.1.1. LINEAR OR SEQUENTIAL SEARCH.....	121
9.1.2. BINARY SEARCH.....	122
9.1.3. BINARY TREE SEARCH.....	123
9.2. SORTING.....	125
9.2.1. INTERNAL SORTING.....	125
9.2.1.1. BUBBLE SORT.....	126
9.2.1.2. SELECTION SORT.....	129
9.2.1.3. QUICK SORT.....	132

9.2.1.4. MERGE SORT.....	136
9.2.1.5. RADIX SORT.....	139
9.2.1.6. INSERTION SORT.....	141
9.2.1.7. HEAP SORT.....	143
9.2.1.8. SHELL SORT.....	148
9.2.2. EXTERNAL SORTING.....	125
9.3. COMPLEXITY.....	150
9.3.1. TIME COMPLEXITY.....	150
9.3.2. SPACE COMPLEXITY.....	151
10. ABSTRACT DATA TYPES & OBJECTS	
10.1. INTRODUCTION.....	153
10.2. DATA TYPE.....	153
11. LANGUAGE SUPPORT AND OOP.....	155
12. INHERITANCE.....	158
13. CLASSES & SUB CLASSES.....	165
14. HEADER FILES.....	168
15. OVERLOADING.....	171
16. GRAPHICAL USER INTERFACE (GUI).....	173
17. OPEN OFFICE.....	182
PRACTICE QUESTIONS.....	136

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UNIT IV: DATA STRUCTURES

SYLLABUS

**ABSTRACT DATA TYPES AND OBJECTS, GRAPHICAL USER
INTERFACE; LANGUAGE SUPPORT AND OOP: INHERITANCE,
CLASSES AND SUB CLASSES, HEADER FILES, OVERLOADING**

**PROGRAMMING WITH DATA STRUCTURES: STACKS, QUEUES,
LISTS, TREES AND BALANCED BINARY TREES, ALGORITHMS FOR
SEARCHING AND SORTING AND OPEN OFFICE**

BOOKS TO STUDY:

- 1. CLASSIC DATA STRUCTURES - D.SAMANTA**
- 2. DATA STRUCTURES MADE SIMPLE - SATHISH JAIN, SHASHI SINGH.**
- 3. DATA TYPES AND STRUCTURES - GOTLIEB, C.C. AND L.R.GOTLIEB.**
- 4. FUNDAMENTALS OF DATA STRUCTURES - HOROWITZ, ELLIS, AND SARTAJ SAHNI.**
- 5. AN INTRODUCTION TO DATA STRUCTURES WITH APPLICATIONS - TREMBLY, JEAN PAUL, AND PAUL G. SORENSON**

UNIT IV - DATA STRUCTURES

1.1 INTRODUCTION

WHAT IS MEANT BY A DATA?

- ❖ Data is a Single (or) a set of values. (Or) Facts and statistics collected together for reference or analysis

WHAT IS MEANT BY DATA STRUCTURE?

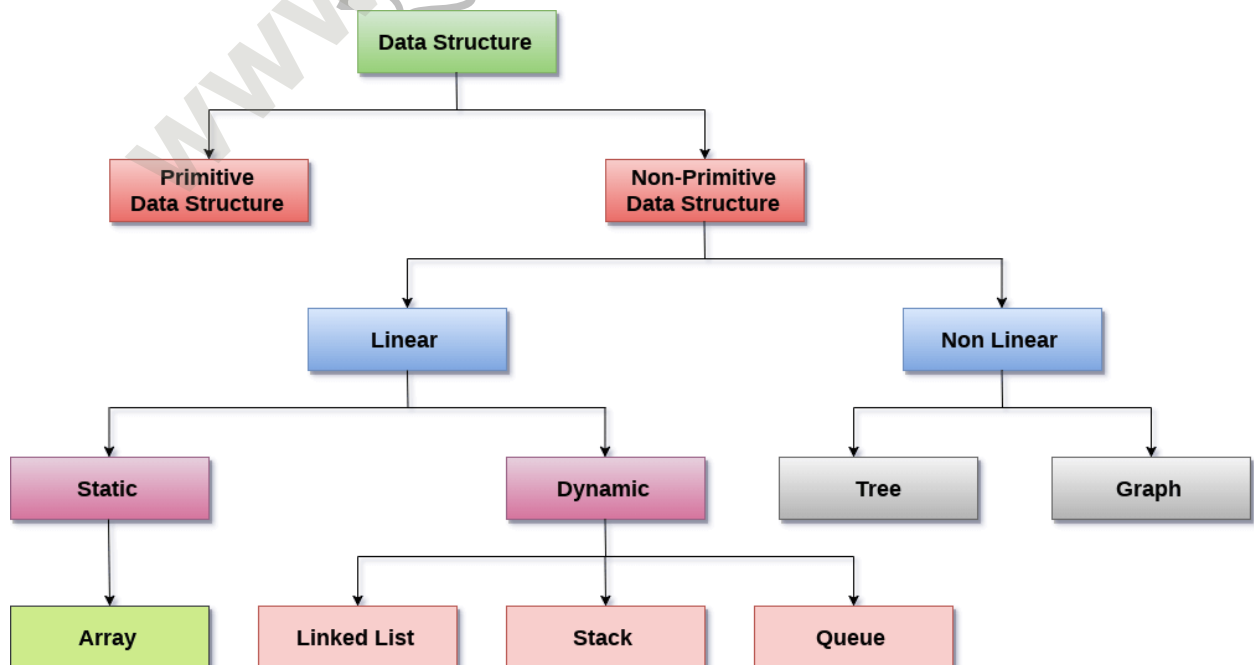
- It is a logical or mathematical model of a particular organization of data.
(Or)
- Data Structure is a specialized format for organizing and storing data so that it can be accessed and worked with in appropriate ways to make a program efficient.
 - **Data Structure = Organized Data + Allowed Operations.**

APPLICATIONS OF DATA STRUCTURE

Areas	Type of Data Structure
Operating System	Arrays and Tables
Data Base Management System	Array, Tables, B- Trees
Compiler Design	Hash Tables (look up an identifier)
Neural Network	Graph
Hierarchical Data Model	Trees

Categories of data structures:

- Two types:
 - 1) Linear data structure → Single generic type
 - 2) Non-linear data structure → Multiple Individual type



2. ARRAY

- An array is a collection of items stored at contiguous memory locations.
- The idea is to store multiple items of the same type together.

	<u>x[0]</u>	<u>x[1]</u>	<u>x[2]</u>	<u>x[3]</u>	<u>x[4]</u>
Int x[5]	12	10	7	20	6

Fig : An array of size 5 containing integers

- This makes it easier to calculate the position of each element by simply adding an offset to a base value, i.e., the memory location of the first element of the array (generally denoted by the name of the array).

2.1.ARRAYS TERMINOLOGY:

Size:

- Number of elements in an array is called the size of the array. Also called as length or dimension.

Type:

- Type of an array represents the kind of data type. Ex: int, string

Base:

- Base of an array is address of memory location where the first element in the array is located.

Range of index:

- Indices of array elements any change can be referenced by subscript like A_i or $A[i]$, this subscript is known as index. Index is always as integer value. Every element is identified by a subscripted or indexed variable
- Ex:
 - ✓ Int $A[100]$; The range of index is from 0 to 9
 - ✓ $A:\text{Array}[-5\dots 19]$ of integer: The Points of the range is -5,-4,-3,...18,19.
 - ✓ Here L is the Lower Bound.
 - ✓ If the range of index varies from $L\dots U$ then the size of the array can be calculated as $\text{Size}(A)=U-L+1$.

Word:

- It denotes the size of an element. In memory location computer can store an element of word size w . This word size varies from machine to machine such as 1 byte to 8 bytes.

2.2. OPERATIONS ON ARRAY

- ❖ The common operations can be performed on an array are
 - ✓ **Traversing**-processing each element in the array.
 - ✓ **Sorting** -Organizing the elements in some order.
 - ✓ **Searching** -Finding the location of an element with a given value.
 - ✓ **Insertion** - Adding a new element.
 - ✓ **Deletion** -Removing an element.
 - ✓ **Merging** -Combining two arrays into a single array.
- ❖ Although searching, and traversal of an array is an easy job, insertion and deletion is time consuming. The elements need to be shifted down before insertion and shifted up after deletion.

1. Traversing:

This operation is used visiting all elements in an array.

✚ Example: Array 'a' contains the following elements:

5	3	4	8	7			
---	---	---	---	---	--	--	--

The result of traversing is:

5
3
4
8
7

The algorithm for traversing is as follows:

- 1) Read the Array elements.
- 2) Display the elements of the array.

Algorithms: Traverse-array ()

Input: An array A with elements

Output: According to process ()

Steps:

1. $i=L$ // start from first location L
2. while $i \leq U$ do // U upper bound
 1. Process (A[i])
 2. $i=i+1$ // move to next position
3. End while
4. Stop

Here process () is an procedure which when called for an element can perform an action

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Date:

Time: 3 Hours

Total Marks: 150

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UNIT IV – DATA STRUCTURES

MODEL EXAMINATIONS

- 1) A tool for specifying logical properties of data types is_____
 - a) Abstract Data Type
 - b) Logical Data Type
 - c) Non Abstract Data Type
 - d) Linear Data Type
- 2) What data structure can be used to check if syntax has balanced parenthesis?
 - a) Queue
 - b) Tree
 - c) List
 - d) Stack
- 3) In an array range specifies_____
 - a) Scope of the Array
 - b) Number of the Elements in the Array
 - c) The Group of the Array
 - d) Size-1 of the array
- 4) Which of the following data structures are indexed structures
 - a) Linear arrays
 - b) Linked lists
 - c) Both (A) & (B)
 - d) None of above
- 5) The '*' is known as
 - a) Referencing Operator
 - b) Dereferencing Operator
 - c) Memory Allocation Operator
 - d) Memory freeing Operator



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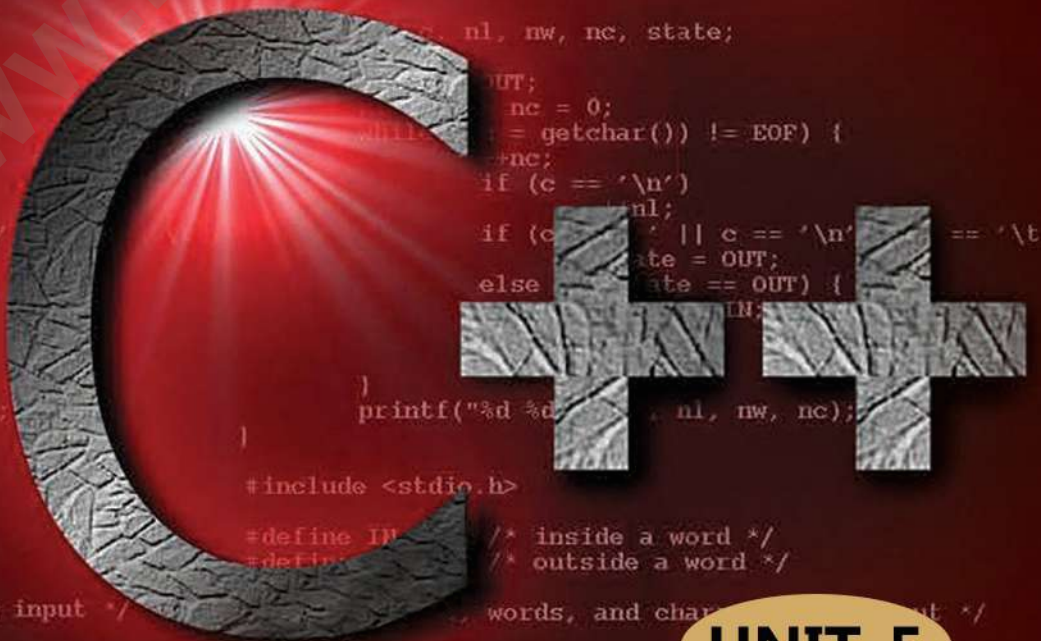
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Programming in C++



UNIT-5

Programming in C++

S.No	Contents	Page No
	Syllabus	1
	Solved Question and Answer	2
1.	Object Oriented Programming	12
	1.1 Introduction	12
	1.2 Procedure Oriented Programming	12
	1.3 Object Oriented Programming Paradigm	13
	1.4 Basic Concepts Of Object-Oriented Programming	15
	1.4.1 Object	15
	1.4.2 Class	15
	1.4.3 Data Hiding and Encapsulation	17
	1.4.4 Encapsulation	18
	1.4.5 Abstraction	19
	1.4.6 Abstract and Concrete Class	21
	1.4.7 Polymorphism	22
	1.4.8 Implementation of Polymorphism using Function Overloading	22
	1.4.9 Inheritance	23
	1.4.10 Message Passing	24
	1.4.11 Advantages of Object Oriented Programming over earlier Programming methodologies	24
	1.4.12 Exercise	25
2.	Implementation of Object Oriented Programming Concept in C++	29
	2.1 Member of a class: Data Members and Member functions(methods)	29
	2.2 Data Members	29
	2.3 Member functions	30
	2.4 Inside class definition and outside the class definition using scope resolution operator(::)	30
	Nesting of Member functions	32
	2.5 Exercise	34

3.	Control structure	37
	3.1 Introduction	37
	3.2 Condition	38
	3.2.1 The if statement	38
	3.2.2 Simple if statement	39
	3.2.3 If else statement	39
	3.2.4 Nested if	40
	3.2.5 The else if Ladder	41
	3.2.6 The switch statement	41
	3.2.7 Goto statement	42
	3.3 Exercise	43
4.	Looping Structure	46
	4.1 Introduction	46
	4.2 While loop	46
	4.3 For statement	47
	4.4 The do-while statement	48
	4.5 Jumps is Loop	49
	4.6 Exercise	49
5.	Functions	50
	5.1 Introduction	50
	5.2 The main function	50
	5.3 Function prototyping	51
	5.4 Call by reference	51
	5.5 Return by reference	52
	5.6 Objects As Function Arguments pass by value/pass by reference	52
	5.7 Difference between call by value and call by reference	54
	5.8 Exercise	54
6.	Constructors and Destructors	56
	6.1 Introduction to Constructors	56
	6.2 Types of Constructors	57
	6.3 Default Constructor	57
	6.4 Parameterized Constructors	58
	6.5 Multiple Constructors in a class	59
	6.6 Constructor with Default Arguments	59
	6.7 Dynamic Initialization of Objects	59

	6.8 Copy constructors	60
	6.9 Destructors	62
	6.10 Exercise	63
7.	Inheritance: Extending Classes	66
	7.1 Introduction	66
	7.2 Derived classes	66
	7.3 Single Inheritance	68
	7.4 Multilevel Inheritance	70
	7.5 Multiple Inheritance	71
	7.6 Exercise	73
8.	Data File Handling	77
	8.1 Introduction	77
	8.2 Input and Output Operation	78
	8.3 Error Handling Function	78
	8.4 File Pointers and Their Manipulation	79
	8.5 Reading and Manipulation of Text from an existing text file	79
	8.5.1 Program to write in a text file	80
	8.5.2 Program to read from text file and display it	80
	8.5.3 Program to count number of characters	80
	8.5.4 Program to count number of lines	81
	8.5.5 Program to copy contents of file to another file	82
	8.6 Exercise	82
9.	Pointer	84
	9.1 Introduction	84
	9.2 Declaration and Initialization of Pointers	85
	9.3 Dynamic Memory Allocation	87
	9.4 new and delete Operators	87
	9.5 Dynamic Memory Allocation for Arrays	89
	9.6 Pointers and Arrays	90
	9.7 Arrays of Pointers	93
	9.8 Function Returning the pointer	94
	9.9 Dereference operator(*)	95
	9.10 Self Referential Structures	97
	9.11 Types of self referential structures	97
	9.12 Exercise	98

10.	Python	102
	10.1 How to get started with python?	102
	10.2 Your first Python Program	105
	10.3 Python Keywords and Identifiers	105
	10.4 Python Statement, Indentation and Comments	106
	10.5 Docstrings in Python	108
	10.6 Python Variables, Constants and Literals	109
	10.7 Python Data types	115
	10.8 Python Operators	126
	10.9 PythonNamespace and Scope	132
	10.10 Python flow Control	136
	10.11 Python for Loop	140
	10.12 Python functions	148
	10.13 Python Package	154
	10.15 File Handling in Python	156
	10.16 Python Object Oriented Programming	159
	10.17 Python objects and classes	165
	Python Operator Overloading	166
	10.18 Exercise	169
11.	PHP	171
	11.1 What is PHP	171
	11.2 How to Download & Install XAMP on Windows	175
	11.3PHP Data Types, Variables, Constant, Operators	177
	11.4PHP Operators	180
	11.5 PHP Control Structures: If else, Switch Case	182
	11.6 PHP Loop: For, ForEach, While, Do While	185
	11.7 PHP Form using GET, POST Methods with Example	191
	11.8 Exercise	195
12.	Sample Questions (more than 100 Questions)	196

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UNIT V – PROGRAMMING in C++

SYLLABUS

(Mark – 20)

1. OBJECT ORIENTED PROGRAMMING: Data hiding, data encapsulation, Class and Object, Abstract Class and Concrete class, Polymorphism (Implementation of polymorphism using Function overloading as an example in C++); Inheritance, Advantages of Object oriented Programming over earlier programming methodologies.

2. IMPLEMENTATION OF OBJECT ORIENT PROGRAMMING CONCEPTS IN C++:

Members Functions (methods), inside class definition and outside class definition using scope resolution operator (::) Objects as function arguments pass by value and pass by reference ;

✚ CONSTRUCTOR AND DESTRUCTOR:

✚ CONSTRUCTOR: Declaration and Definition of a constructor;

✚ DESTRUCTOR: (Extending Class): Concepts of inheritance, Base Class, Derived Class, Defining Derived Class, Multillevel Inheritance and Multiple Inheritance

Data File Handling: Reading and Manipulation of text from an already existing text file (Accessing Sequentially);

3. POINTERS: Declaration and Initialization of Pointers: Dynamic memory allocation/deallocation Operators: New, delete; Pointers and Arrays: Array od Pointers, Function Returning a Pointer. Deference Operator: Self referential Structures, Python, PHP.

1. OBJECT-ORIENTED PROGRAMMING

OOPS: Object Oriented Programming. It is a programming paradigm in its own right and it is a set of software engineering tools which can be used to build more reliable and reusable system.

1.1 Introduction

Definition: OOP is a method of implementation in which programs are organized as cooperative collection of objects each of which represents an instance of some class and whose classes are all members of a hierarchy of classes united through the property called inheritance.

Software Crisis

The major issues in software are

1. How to represent real life entities of problem in system design?
2. How to design systems with open interfaces?
3. How to ensure reusability?
4. How to develop modules?
5. How to improve quality and productivity of software?

Software Evolution

Some of the programming approaches: Layers of computer software.

- **Modular programming**
- **Top-down programming**
- **Bottom-up programming**
- **Structured programming**

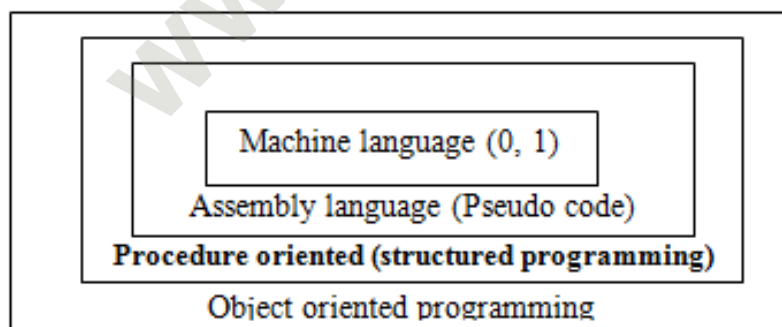


Fig: Layers of computer software

1.2 Procedure Oriented Programming

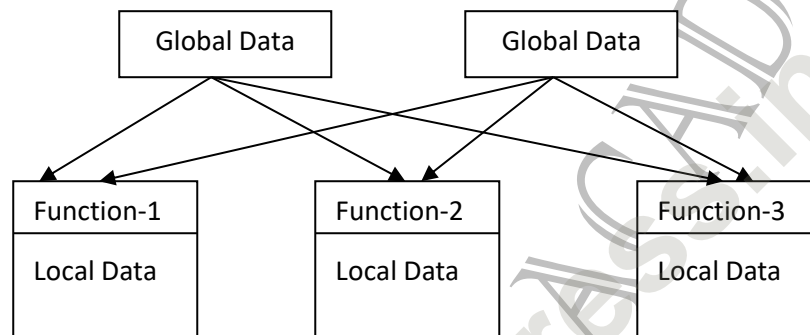
Important features:

1. Programs are organized in the form of subroutines and all data items are global.

2. Program controls are through jumps and call to subroutine.
3. Subroutines are abstracted to avoid repetitions.
4. Suitable for medium sized software applications.
5. Difficult to maintain and enhance the program code.

Structure of procedure oriented program

COBOL, FORTRAN and C are commonly known as Procedure oriented programming (POP).



Disadvantages:

1. No security of data.
2. No better memory management.
3. No code reusability
4. Slow performance as length of the program increase.
5. Code maintenance and enhancement are difficult.

Characteristics of procedure oriented programming

1. Emphasis is on doing things (algorithms)
2. Large program are divided into smaller programs known as functions.
3. Most of the functions share global data.
4. Data move openly around the system from function to function.
5. Functions transform data from one form to another.
6. Employs top-down approach in program design.

1.3 Object Oriented Programming Paradigm

Development of a software system is through the use of data abstraction. It is classified into two categories.

1. Object based programming language.
2. Object oriented programming language.

Object Based Programming Language:

It supports encapsulation and object identity without supporting important features like polymorphism, inheritance and message based communication.

Object Oriented Programming Language:

Incorporate all the features of object based along with inheritance and polymorphism.

OOP=Object based Language +inheritance+ polymorphism.

Module

The modules represent the physical building blocks. It is a collection of classes and objects. OOP is a methodology that allows the association of data structure with operations.

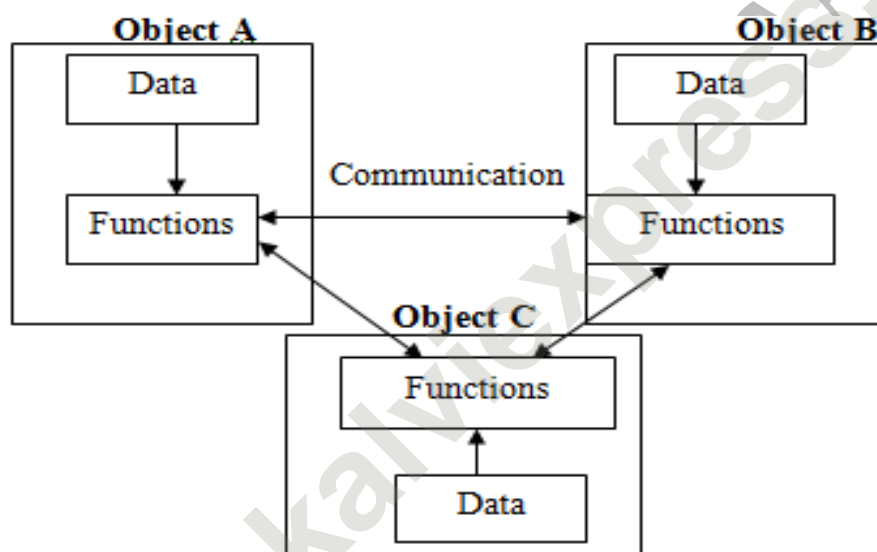


Fig: Organization of data and functions in OOP

Features of OOP as follows,

1. Improvement over the structure programming
2. Emphasis is on data rather than procedure.
3. Data abstraction is introduced in addition to procedural abstraction.
4. Data and associated operations are unified into a single unit, thus the objects are grouped with common attributes, operations and semantics.
5. Programs are designed around the data being operation rather than operations themselves.
6. Relationships can be created between similar yet distinct data types. EX: C++, Small talk, Eiffel, Java, etc.
7. Follow bottom-up approach in program design.

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Programming in C++

1. Classes and object

1) Correct way of creating an object of a class called Car is

- A. Car obj;
- B. Car *obj = new Car();
- C. Only B
- D. A & B both

2) In C++, Class object created statically(e.g. Car obj; and dynamically (Car *obj = new Car() ;) are stored in memory

- A. Stack, heap
- B. Heap, heap
- C. Heap, stack
- D. Stack, stack

3) True statement about Class and structure in C++ is

- A. Default access specifier is private in class and public in structure
- B. Way of creating objects of class and structure are different
- C. Way of inheriting class and structure are different
- D. None

4) In C++ programming, cout is a/an

- A. Function
- B. Operator
- C. Object
- D. macro

5) Which is Abstract Data Type in C++

- A. Class
- B. Int
- C. Float
- D. array



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Relational Database Management Systems



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UNIT-6

Table of Content

Chapter No	Chapter Name	Page No
	Syllabus	1
	Previous Year Question Paper – SET 1	3
	Previous Year Question Paper – SET 2	6
1	Database Management System	9
	1.1.Introduction to Database Concepts	9
	1.1.1.Basic Terminologies of DBMS	9
	1.1.2.Purpose of Database System	10
	1.2. DBMS	13
	1.3. Characteristics of the Database Approach	17
	1.4. Data Model	20
	1.5. The Three Schema Architecture (Data Abstraction)	21
	1.6. Database Languages and Interfaces	23
	1.7. Database Users	24
2	Keys in Database System	27
	2.1. Introduction	27
	2.2.Super Key	28
	2.3. Candidate Key	28
	2.4. Primary Key	29
	2.5. Alternate Key	30
	2.6. Foreign Key	30
	2.7.Compound Key	31
	2.8. Composite Key	32
	2.9. Surrogate Key	32
	2.10. Differences between Primary Key & Foreign Key	33
	2.11. Entity Relationship (ER) Model	34
	2.12. Main Phases of Database Design	34
	2.13. Entity Types, Entity Sets, Attributes and Keys	36
	2.14.Relationship Types, Relationship Sets, Roles and Structural Constraints	40

3	Data Normalization	45
	3.1. Introduction	45
	3.2. First Normal Form	46
	3.3. Second Normal Form	46
	3.4. Third Normal Form	48
	3.5. Boyce-Codd Normal Form	49
4	Back-End and Front-End Tools	53
	4.1.Examples of Commercially available Database Management System's (Back-End)- MYSQL	53
	4.2. Examples of Front End Software's Visual C++	59
5	RDBMS Tools	62
	5.1. Classification of SQL Statements	62
	5.1.1.Data Manipulation Language	63
	5.1.1.1. SELECT Statement	63
	5.1.1.2. INSERT Statement	63
	5.1.1.3. UPDATE Statement	64
	5.1.1.4. DELETE Statement	64
	5.2. SQL SELECT Statements	65
	5.2.1. Selecting ALL Columns	65
	5.2.2. Selecting Specific Columns	65
	5.3. Column Heading Default	65
	5.4. Limiting Rows during Selection (using WHERE Clause)	67
	5.5. Pattern Matching	67
	5.6. TOP, LIMIT Clause	68
6	SQL Operators	73
	6.1. Arithmetic Operators	73
	6.2. Comparison (Relational) Operators	73
	6.2.1. Use of Comparison Operators	73
	6.3. Logical Operators	74
	6.3.1. Use of Logical Operators	74
	6.3.2. Logical Operator Precedence	75

	6.4. Order By Clause	75
	6.4.1. Sorting Records in Ascending Order	76
	6.4.2. Sorting Records in Descending Order	76
7	Functions	79
	7.1. Introduction	79
	7.2. Types of Functions	80
	7.3. Single Row Functions	80
	7.3.1. Numerical Functions	80
	7.3.2. Character Functions	81
	7.3.3. Date Functions	81
	7.3.4. Implicit and Explicit Conversion	82
8	Grouping Records	89
	8.1. Types of Group Functions	89
	8.1.1. MAX()	91
	8.1.2. MIN()	91
	8.1.3. COUNT()	91
	8.1.4. SUM()	91
	8.1.5. AVG()	92
	8.1.6. Using AVG() and SUM() Functions	92
	8.2. Group By Clause	92
	8.3. Grouping By More than One Columns	93
	8.4. Having Clause	94
9	Sub Queries	100
	9.1. Guidelines for using Sub-Queries	100
	9.2. Types of Sub-Queries	103
	9.2.1. Single Row Sub-Queries	103
	9.2.2. Multiple Row Sub-Queries	104
	9.2.2.1. ANY, ALL, IN, NOT IN Operators and Examples	105
10	Database Objects	109
	10.1. Data Types	109
	10.2. Data Definition Language (DDL)	110
	10.2.1. Create Table Command	110
	10.2.2. Describe Table Command	110
	10.2.3. Alter Table Command	110
	10.2.4. Drop Table Command	111

	10.3. Synonyms	111
	10.4. View	113
11	Integrity Constraints	116
	11.1. Introduction	116
	11.2. Types of Integrity Constraints	116
	11.2.1. Domain Integrity Constraints	116
	11.2.2. Entity Integrity Constraints	116
	11.2.3. Referential Integrity Constraints	117
	11.3. Index	119
12	Creation of Table/Relation and Managing Existing Tables	122
	12.1. CREATE TABLE Command	122
	12.2. Creating a Table by using a Sub-Query	122
	Managing Existing Tables and Other Database Objects	122
	12.3. The ALTER TABLE Statement	122
	12.3.1. Adding a New Column in a Table	122
	12.3.2. Modifying a Column in a Table	122
	12.3.3. Renaming a New Column in a Table	122
	12.3.4. Dropping a Column in a Table	122
	12.4. Dropping Tables	122
13	Relational Algebra and Relational Calculus	124
	13.1. Introduction	124
	13.2. Relational Algebra	124
	13.3. Relational Calculus	139
	13.3.1. Tuple Relational Calculus	139
	13.3.2. Domain Relational Calculus	141
	PG-TRB 2020-21 Question Bank	144

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Unit – VI -RELATIONAL DATABASE MANAGEMENT SYSTEM

SYLLABUS

Chapter 1: Database Management System

Introduction to database concepts: Relation/Table, Data, Concept of String Candidate Key, Alternate Key, Primary Key, Foreign Key, Data Normalization – First, Second, Third, BCNF Normal Forms

Examples of Commercially available Database Management System's (Back-End) – MySQL

Examples of Front End Software's Visual C++

Chapter 2: RDBMS Tools: Oracle

Classification of SQL Statements: DML (SELECT, INSERT, UPDATE, DELETE)

SQL SELECT Statement: SQL SELECT statement, selecting all the columns, selecting specific column, column heading default

SELECT statement continued: Limiting Rows during selection (using WHERE clause), Logical operators, use of Logical operators (AND/OR/NOT Operators), Logical Operator Precedence, ORDER BY Clause, Sorting in Ascending/Descending order

Functions:

SQL Functions, Types of SQL Function (Single Row/ Multiple Row),
Character Functions: UPPER(), TRIM(), SUBSTR(), ROUND(),
TRUNC(), MOD(), Working with Dates : LAST_DAY(),
MONTHS_BETWEEN(), ROUND(), Implicit and Explicit conversion

Grouping Records:

Types of Group Functions: MAX(), MIN(), COUNT(), SUM(), AVG(),
Using AVG() and SUM() functions, Group By clause, Grouping By more
than one columns, Having clause

Sub Queries:

Guidelines for using sub queries, types of sub queries (Single row and
Multiple row)

Database Objects: DDL (Data Definition Language), Creating
Synonyms, querying a view, modifying a view,

Including constraints: UNIQUE KEY, PRIMARY KEY, FOREIGN
KEY

Creation of Table/Relation: CREATE TABLE Statement, creating a
table by using a sub-query

Managing Existing Tables and other Database objects: The ALTER
TABLE Statement, adding a new column in a table, Dropping tables

Chapter 1 :Database Management System

1.1.Introduction to Database Concepts

1.1.1.Basic Terminologies of DBMS

- Data : collection of raw facts or materials
- Information : Processed data or meaningful data. After data getting processed, it will have some meaning.
- Data item : Field Name or Column Name or Attribute Name or Domain Name. Ex: Name, DoB, Address
- Record : Collection of data items. Example : Bio-Data
- File : Collection of records. Example : Bio-Data File, Payroll File
- Database: Collection of inter-related data items with less redundancy to server multiple applications. Example: Student database, Employee Database
- Redundancy : Repeated data or Unwanted data or Duplicate Data
- DBMS : Applications programs or software used to provide interface between users and databases.
- Table : It is a interaction of rows and columns. It is also called as Relation
- Row : It is a record which contains a entire information about an entity. It is also known as Tuple
- Entity : It may be a thing or a place or a person.
- Column : Field Name where a single piece information has been pasted. It is also known as Domain
- Degree : The number of attributes in a relation determines the degree of relation.
- Cardinality: The number of tuples or rows in a relation is termed as Cardinality
- Simple Attribute : It can not be further sub-divided. Example : Rollno
- Composite Attribute: It can be further sub-divided. Example: Date. It has Day, Month and Year
- Single Valued Attribute : It can take only one value for each entity. Example: Account_Number
- Multivalued Attribute: It can take more one value. Example: Color
- Derived Attribute: It can be derived from another attribute. Example: Age which can be derived from DoB
- Key Attribute : It is unique identification of a record. Ex: Primary key – Rollno, Exam-No, Account-No

1.1.2. Purpose of Database Systems

Database systems came to existence in response to early methods of computerized management of commercial data. As an example of such methods, during 1960s, consider part of a university organization that, among other data, keeps information about all instructors, students, departments, and course offerings. Information was stored in operating system files. The users were able to manipulate the information through number of application programs which include the following programs.

- Add new students, instructors, and courses
- Register students for courses and generate class rosters
- Assign grades to students, compute grade point averages (GPA), and generate transcripts

System programmers wrote these application programs to meet the needs of the university. New application programs are added to the system as the need arises. For example, suppose that a university decides to create a new major (say, computer science). As a result, the university creates a new department and creates new permanent files (or adds information to existing files) to record information about all the instructors in the department, students in that major, course offerings, degree requirements, etc. The university may have to write new application programs to deal with rules specific to the new major. New application programs may also have to be written to handle new rules in the university. Thus, as time goes by, the system acquires more files and more application programs.

This typical **file-processing system** is supported by a conventional operating system. The system stores permanent records in various files, and it needs different application programs to fetch records from, and add records to, the appropriate files. Before database management systems (DBMSs) came to existence, organizations usually stored information in such systems. Keeping organizational information in a file-processing system has a number of major disadvantages:

- **Data redundancy and Inconsistency**

Since different programmers create the files and application programs over a long period, the various files are likely to have different structures and the programs may be written in several programming languages. Moreover, the same information may be duplicated in several places (files). For example, if a student has a double major (say, music and mathematics) the address and

telephone number of that student may appear in a file that consists of student records of students in the Music department and in a file that consists of student records of students in the Mathematics department. This redundancy leads to higher storage and access cost. In addition, it may lead to **data inconsistency**; that is, the various copies of the same data may no longer agree.

For example, a changed student address may be reflected in the Music department records but not elsewhere in the system.

• **Difficulty in Accessing Data**

Suppose that one of the university clerks needs to find out the names of all students who live within a particular postal-code area. The clerk asks the data-processing department to generate such a list. Because the designers of the original system did not anticipate this request, there is no application program on hand to meet it. There is, however, an application program to generate the list of *all* students. The university clerk has now two choices: either obtain the list of all students and extract the needed information manually or ask a programmer to write the necessary application program. Both alternatives are obviously unsatisfactory.

Suppose that such a program is written, and that, several days later, the same clerk needs to trim that list to include only those students who have taken at least 60 credit hours. As expected, a program to generate such a list does not exist. Again, the clerk has the preceding two options, neither of which is satisfactory.

The point here is that conventional file-processing environments do not allow needed data to be retrieved in a convenient and efficient manner. More responsive data-retrieval systems are required for general use.

• **Data Isolation**

Because data are scattered in various files, and files may be in different formats, writing new application programs to retrieve the appropriate data is difficult.

• **Integrity Problems**

The data values stored in the database must satisfy certain types of **consistency constraints**. Suppose the university maintains an account for each department, and records the balance amount in each account. Suppose also that the university requires that the account balance of a department may never fall below zero. Developers enforce these constraints in the system by adding



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Business Computing

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UNIT-7

S.No	Contents	Page No
	Previous Year Questions & answers with Explanation	i - xiv
1.	Integration of User Interface and Database	2
	1.1 User Interface	2
	1.2 Types of User Interface	2
	1.3 DBMS: Basic Concepts	3
	1.3.1 Introduction	3
	1.3.2 What is data?	4
	1.3.3 Information	4
	1.3.4 File	4
	1.3.5 Database	5
	1.3.6 Why Database	5
	1.3.7 Database Management System(DBMS)	6
	1.3.8 Function of DBMS	6
	1.3.9 Advantages of DBMS and disadvantage of DBMS	6
	1.3.10 Database Basics	7
	1.3.11 Three level architecture of DBMS	8
	1.3.12 Database users	9
	1.3.13 Database language	9
	1.3.14 Data Dictionary	10
	1.3.15 Database structure	10
	1.3.16 What are Keys in DBMS?	11
	1.4 Normalization	16
	1.5 User Interface and Database	24
	1.6 Exercise	25
2.	More Application Areas of Databases	32
	2.1 Inventory Control	32
	2.2 Financial Accounting	34
	2.3 Fees Management System	36
	2.4 Result Analysis System	38
	2.5 Admission Management System	39
	2.6 Income Tax Management System	41
	2.7 Exercise	42
3.	Advanced Program Development Methodology	43
	3.1 System Development	43
	3.1.1 What is Software Development Life Cycle?	43
	3.1.2 Why is it important in SDLC?	43

3.2 Life Cycle	44
3.2.1 The 7 stages of the SDLC	44
3.2.1.1 Requirement collection and Analysis	44
3.2.1.2 Feasibility Study	44
3.2.1.3 Design	44
3.2.1.4 Coding	44
3.2.1.5 Testing	44
3.2.1.6 Installation/Deployment	46
3.2.1.7 Maintenance	46
3.3 The 5 best Software Development Processes (and how to pick the right one for you)	46
3.3.1 Waterfall	46
3.3.2 Agile and Scrum	47
3.3.3 Incremental and Iterative	48
3.3.4 V-Shaped	49
3.3.5 Spiral	50
3.4 Testing	51
3.4.1 Introduction	51
3.4.2 Principles of Testing	51
3.4.3 Types of Testing	51
3.4.3.1 Unit Testing	51
3.4.3.2 Integration Testing	52
3.4.3.2.1 Verification	52
3.4.3.2.2 Validation	52
3.4.3.2.3 Black Box Testing	53
3.4.3.2.4 While Box Testing	53
3.4.3.3 Regression Testing	53
3.4.3.4 Smoke Testing	53
3.4.3.5 Alpha Testing	54
3.4.3.6 Beta Testing	54
3.4.3.7 System Testing	54
3.4.3.8 Stress Testing	54
3.4.3.9 Performance Testing	54
3.4.3.10 Object Oriented Testing	55
3.5 Exercise	

4.	Data Model	60
	4.1 ER Model	60
	4.1.1 Types of data model	60
	4.1.2 What is ER Diagram	61
	4.1.3 What is ER Model	61
	4.1.4 History of ER models	61
	4.1.5 Why use ER Diagrams?	62
	4.1.6 ER Diagrams Symbols & Notations	62
	4.1.7 Components of the ER Diagram	63
	4.1.8 What Is Entity?	65
	4.2 Attributes	66
	4.2.1 Types of Attributes	66
	4.3 Relationship	67
	4.3.1 One to One	67
	4.3.2 One to Many	68
	4.3.3 Many to One	68
	4.3.4 Many to Many	70
	4.4 Summary	71
	4.5 Exercise	
5.	SQL Statement	74
	5.1 What is SQL	74
	5.2 Why Use SQL?	74
	5.3 Types of SQL	74
	5.4 What is DDL?	74
	5.5 What is DML?	76
	5.6 What is DCL?	77
	5.7 What is TCL?	78
	5.8 What is DQL?	78
	5.9 MySQL Aggregate Functions Tutorial: SUM, AVG, MAX, MIN, COUNT, DISTINCT	79
	SQL Join	82
	5.10 Summary	88
	5.11 Exercise	89

6.	Data Dictionary	93
	6.1 Definition	93
	6.2 Active and passive data dictionary	93
	6.3 Elements of Data Dictionary	94
	6.4 Extended data dictionary	95
	6.5 Functions of Data Dictionary	95
	6.6 Forms of Data Dictionary	96
	6.7 Summary	98
	6.8 Exercise	98
7.	Data Warehouse	99
	7.1 Introduction	99
	7.2 Data Warehouse Models	101
	7.3 OLAP Analytical Operations	101
	7.4 Types of OLAP	104
	7.5 Exercise	105
8.	Data Mining	106
	8.1 Fundamentals of data mining	106
	8.2 The Data Mining Process	107
	8.3 Data Mining Applications	108
	8.4 Data Mining Techniques	108
	8.5 Data pre-processing	109
	8.6 Support and confidence	111
	8.7 Task and A Naïve Algorithm	112
	8.8 Association Rules Mining: Apriori Algorithm	115
	8.9 Classification	118
	8.10 Decision Tree	120
	8.11 Naïve Bayes Method	121
	8.12 Cluster Analysis	125
	8.13 Types of Data	127
	8.14 Computing Distance	127
	8.15 Types of Cluster Analysis	128
	8.16 K means Method	133
	8.17 Exercise	137
9.	Practice Questions	139

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UNIT – VII

BUSINESS COMPUTING

SYLLABUS

Integration of User Interface and Database;

More application areas of Databases;

Inventory control, Financial Accounting, Fees Management System, Result Analysis System, Admission Management System, Income Tax Management System;

Advance Program Development Methodology: System Development

Life cycle, Data Models (Entity Relationship Model), Attributes (single, Composite and Multi – valued), Relationship (One-to-One, One-to-Many and Many-to-Many SQL Statements

Data Dictionary, Data Warehousing, Data Mining.

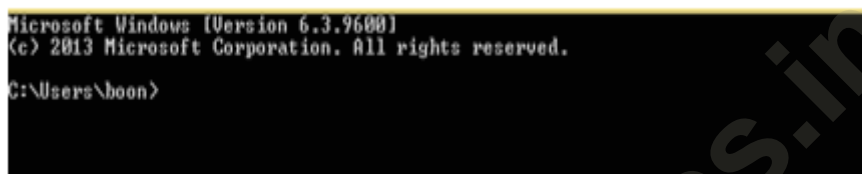
1.Integration of User Interface and Database

1.1 User Interface

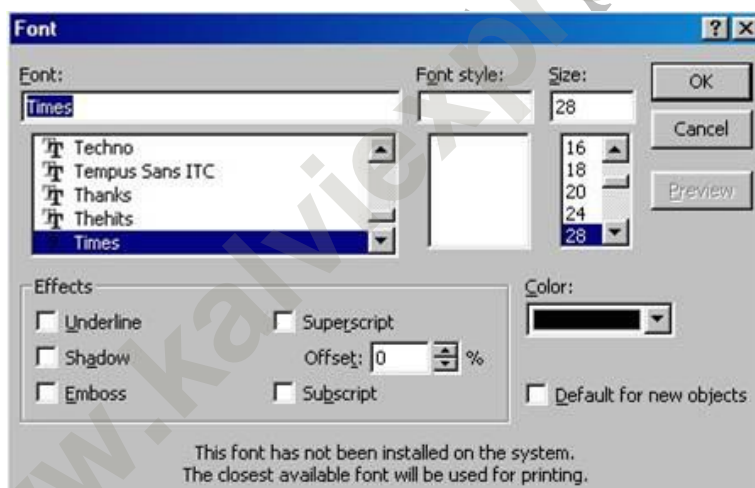
The user interface (UI) is the point of human-computer interaction and communication in a device. This can include display screens, keyboards, a mouse and the appearance of a desktop. It is also the way through which a user interacts with an application or a website.

1.2 Types of User Interface:

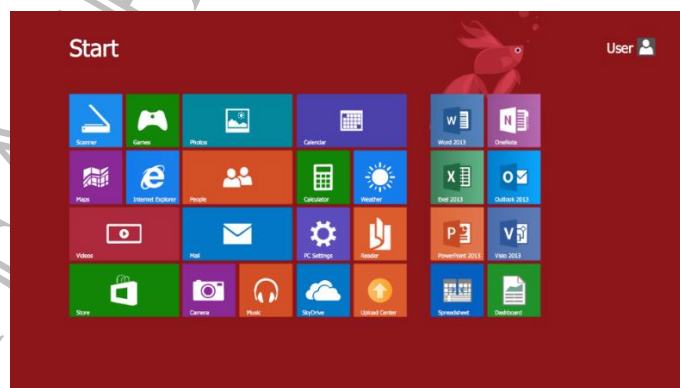
- **Command Line Interface:** Allows the user to interact with the computer by typing in commands. The computer displays a prompt, the user keys in the command and presses enter or return.



- **Form-based user interface:** Used to enter data into a program or application by offering a limited selection of choices. For example, a settings menu on a device is form-based.



- **Graphical user interface:** A GUI (graphical user interface) is a system of interactive visual components for computer software. A GUI displays objects that convey information, and represent actions that can be taken by the user. The objects change color, size, or visibility when the user interacts with them.



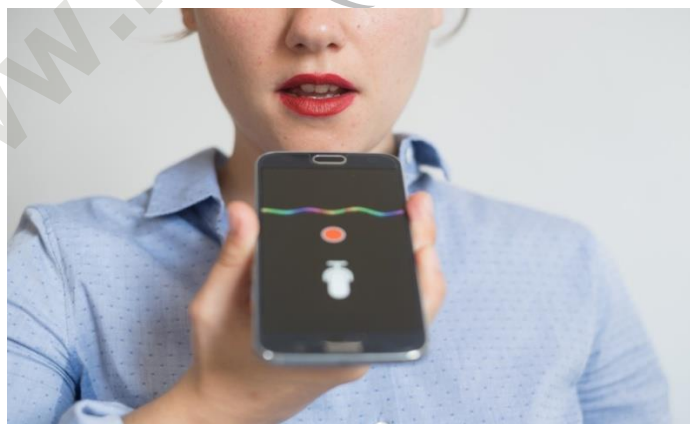
- **Menu-driven user interface:** A UI that uses a list of choices to navigate within a program or website. For example, ATMs use menu-driven UIs and are easy for anyone to use.



- **Touch user interface:** User interface through haptics or touch. Most smart phones, tablets and any device that operates using a touch screen use haptic input.



- **Voice user interface:** Interactions between humans and machines using auditory commands. Examples include virtual assistant devices, talk-to-text, GPS and much more.



1.3 DBMS: Basic Concepts

1.3.1 Introduction:

In computerized information system data is the basic resource of the organization. So, proper organization and management for data is required for organization to run smoothly.

Database management system deals the knowledge of how data stored and managed on a computerized information system.

In any organization, it requires accurate and reliable data for better decision making, ensuring privacy of data and controlling data efficiently.

Examples:

1. Deposit and/or Withdrawal from a bank
2. Hotel, Airline or Railway reservation
3. Purchase items from supermarkets in all cases, a database is accessed.

1.3.2 What is data?

- Data is the known facts or figures that have implicit meaning.
- Unprocessed value or raw fact is known as Data.

Data can be represented:

1. Alphabets: (A-Z,a-z)
2. Digits (0-9) and
3. Special characters(+,-.#,\$,etc)

e.g: 25, "raj"etc.

1.3.3 Information:

Information is the processed data on which decisions and actions are based. Information can be defined as the organized and classified data to provide meaningful values.

Eg: "The age of Ravi is 25"

1.3.4File:

File is a collection of related data stored in secondary memory.

File Oriented approach:

The traditional file oriented approach to information processing has for each application a separate master file and its own set of personal file. In file oriented approach the program dependent on the files and files become dependent on the files and files become dependents upon the programs

Disadvantages of file oriented approach:

1. **Data redundancy and inconsistency:** The same information may be written in several files.
2. **Difficulty in accessing data:** The conventional file processing system do not allow data to retrieved in a convenient and efficient manner according to user choice.

BUSINESS COMPUTING**Data Mining and warehousing**

1: Which of the following applied on warehouse?

- A) write only
- B) read only
- C) both A & B
- D) none of these

2: Data can be store , retrive and updated in ...

- A) SMTOP
- B) OLTP
- C) FTP
- D) OLAP

3: Which of the following is a good alternative to the star schema?

- A) snow flake schema
- B) star schema
- C) star snow flake schema
- D) fact constellation

4: Patterns that can be discovered from a given database are which type...

- A) More than one type
- B) Multiple type always
- C) One type only
- D) No specific type

5: Background knowledge is...

- A) It is a form of automatic learning.
- B) A neural network that makes use of a hidden layer
- C) The additional acquaintance used by a learning algorithm to facilitate the learning process
- D) None of these

6: Which of the following is true for Classification?

- A) A subdivision of a set
- B) A measure of the accuracy
- C) The task of assigning a classification
- D) All of these

7: Data mining is?

- A) time variant non-volatile collection of data
- B) The actual discovery phase of a knowledge
- C) The stage of selecting the right data
- D) None of these

8: ——— is not a data mining functionality?

- A) Clustering and Analysis
- B) Selection and interpretation
- C) Classification and regression
- D) Characterization and Discrimination



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Web Development

UNIT-8

www

HTML5

js

Cloud

XML

flat

CSS3

PHP

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header

.com

footer

.net

.org

database

CONTENTS

SYLLABUS	1
PREVIOUS QUESTIONS – SET-I	2
PREVIOUS QUESTIONS – SET-II	4
CHAPTER-I HTML/DHTML	
1.1 Introduction	6
1.2 Objectives	7
1.3 Introduction to Universal Resource Identifier (URI)	8
1.4 Basic Tags of HTML	10
1.4.1 HTML	11
1.4.2 HEAD	11
1.4.3 TITLE	11
1.4.4 BODY	12
1.4.5 Commonly Used Tags	13
1.4.6 Header Section	17
1.4.7 Colorful Webpage	18
1.4.8 Comment Lines	18
1.4.9 Text Formatting	19
1.4.10 Emphasizing material in a Webpage	22
1.4.11 Text Styles	22
Possible Questions	25
CHAPTER – II LISTS	
2.1 Ordered List OL (L1, Type-1, I, A, a: START, VALUE)	28
2.2 Unordered List-UL (Bullet Type-Disc, Circle, Square)	30
2.5 Description List or Definition List(DL, DT, DD)	31
2.4 Nested List	32
2.5 Web Page Authorizing Using HTML	33
Possible Questions	36

CHAPTER – III TABLES AND FRAMES	
3.1 Creating Tables	39
3.1.1 Border	40
3.1.2 WIDTH	40
3.1.3 CAPTION	42
3.1.4 ALIGN	43
3.1.5 Cell Spanning	44
3.1.6 Coloring cells	46
3.1.7 Column specification	47
3.2 Frames	50
3.2.1 Frameset	50
3.2.2 Frame tag	51
3.2.3 Height and Width	51
3.2.4 Frameborder	52
3.2.5 Frames inside other Frame	54
3.2.6 Noframes tag	55
Possible Questions	57
CHAPTER- IV FORMS	
4.1 Definition	61
4.2 MS-Access	62
4.3 ORACLE	64
4.3.1 Oracle Database Features	66
4.3.2 Oracle Database Editions	67
4.4 Form Tags	67
4.4.1 METHOD Attribute	68
4.5 Document Object Model	79
Possible Questions	83

CHAPTER – V ACTIVE SERVER PAGES (ASP)	
5.1 Concept of ASP	86
5.1.1 How does it work?	87
5.1.2 ASP Objects	88
5.2 Features of ASP	88
5.3 Your first ASP page	89
5.4 Variables	92
5.4.1 Declaring Variables	93
5.4.2 Naming Variables	93
5.4.3 Assigning values to variables	94
5.4.4 Declaring variables using Option Explicit	95
Possible Questions	96
CHAPTER – VI FUNCTIONS	
6.1 String Manipulation Functions	98
6.1.1 InStr()	98
6.1.2 Left()	98
6.1.3 Right()	99
6.1.4 Mid()	99
6.1.5 Trim, LTrim() and RTrim()	99
6.1.6 LCase() and UCase()	100
6.1.7 Len()	100
6.1.8 String()	101
6.2 Time & Date Functions	101
Possible Questions	103
CHAPTER – VII ARRAYS AND POCEDURES	
7.1 Arrays	104
7.2 Array declaration – Static array	105

7.2.1 Dynamic arrays	106
7.3 1-Dimensional array	106
7.4 2-Dimensional arrays	109
7.5 Procedures and Functions	110
7.6 Functions	111
7.6.1 Parameters	112
Possible Questions	123
CHAPTER – VIII DATABASE CONNECTION	
8.1 Connecting with Database	124
8.2 Creation of DSN	126
8.3 OLEDB Connection	134
Possible Questions	135
Glossaries for HTML	137
Glossaries for ASP	142
PRACTICE QUESTIONS	168

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UNIT VIII – WEB DEVELOPMENT

SYLLABUS (Marks -10)

WEB DEVELOPMENT

HTML/DHTML

Introduction, Objectives, Introduction to Universal Resource Identifier (URI)

Basic Tags of HTML; HTML, HEAD, TITLE, BODY, Ordered List- OL (L1, Type-1, I, A, a: START VALUE), Unordered List-UL (Bullet Type – Disc, Circle, Square, DL, DT, DD), Web Page Authoring Using HTML

Tables: Creating Tables, Border, WIDTH, CAPTION, ALIGN

Frames: Frameborder, height and width

Forms: Definition, MS-Access or Oracle

Form Tags: FORM, METHOD, Document Object Model

Active Server Pages (ASP)

Active Server Pages (ASP): Concept of ASP, features of ASP,

Variables: Explicit and Implicit Declaration:

Functions:

String Manipulation Functions: Ucase (), Lcase (), Len (), Left (), Right (), Mid (), Ltrim (), InStr ()

Time & Date Functions: Date (), Day (), Hour (), Left (), Len (), Minute (), Month (), Monthname (), Now (),

Arrays: Declaration and use of 1 dimensional and 2 dimensional arrays;

Procedures and Functions, Passing parameters/ arguments;

Connecting with Databases: Creation of DSN, using OLEDB

CHAPTER - 1

INTRODUCTION AND BASIC TAGS OF HTML

1.1 INTRODUCTION

- ✚ HTML stands for HyperText Markup Language. HTML provides a way of displaying Web pages with text and images or multimedia content.
- ✚ HTML is not a programming language, but a markup language. An HTML file is a text file containing small markup tags. The markup tags tell the Web browser, such as Internet Explorer or Netscape Navigator, how to display the page.
- ✚ An HTML file must have an .htm or .html file extension. These files are stored on the web server. So if you want to see the web page of a company, you should enter the URL (Uniform Resource Locator), which is the web site address of the company in the address bar of the browser. This sends a request to the web server, which in turn responds by returning the desired web page. The browser then renders the web page and you see it on your computer.
- ✚ HTML allows Web page publishers to create complex pages of text and images that can be viewed by anyone on the Web, regardless of what kind of computer or browser is being used. Despite what you might have heard, you don't need any special software to create an HTML page; all you need is a word processor (such as Microsoft Word) and a working knowledge of HTML.
- ✚ Fortunately, the basics of HTML are easy to master. However, you can greatly relieve tedium and improve your productivity by using a good tool. A simple tool is Microsoft FrontPage that reduces the need to remember and type in HTML tags. Still, there can always be situations where you are forced to handcode certain parts of the web page.
- ✚ HTML is just a series of tags that are integrated into a document that can have text, images or multimedia content.
- ✚ HTML tags are usually English words (such as blockquote) or abbreviations (such as p for paragraph), but they are distinguished from the regular text because they are placed in small angle brackets.
- ✚ So the paragraph tag is <p>, and the blockquote tag is <blockquote>. Some tags dictate how the page will be formatted (for instance, <p> begins a new paragraph), and others dictate how the words appear (makes text bold).
- ✚ Still others provide information - such as the title - that doesn't appear on the page itself. The first thing to remember about tags is that they travel in pairs. Most of the time that you use a tag - say <blockquote> - you must also close it with another tag - in this case, </blockquote>. Note the slash - / - before the word "blockquote"; that is what distinguishes a closing tag from an opening tag.

- ✚ The basic HTML page begins with the tag `<html>` and ends with `</html>`. In between, the file has two sections - the header and the body.
- ✚ The header - enclosed by the `<head>` and `</head>` tags - contains information about a page that will not appear on the page itself, such as the title. The body - enclosed by `<body>` and `</body>` - is where the action is. Everything that appears on the page is contained within these tags.
- ✚ HTML pages are of two types:
 1. Static
 2. Dynamic

Static Pages

- ✚ Static pages, as the name indicates, comprise static content (text or images). So you can only see the contents of a web page without being able to have any interaction with it.

Dynamic Pages

- ✚ Dynamic pages are those where the content of the web page depend on user input. So interaction with the user is required in order to display the web page.
- ✚ For example, consider a web page which requires a number to be entered from the user in order to find out if it is even or odd. When the user enters the number and clicks on the appropriate button, the number is sent to the web server, which in turn returns the result to the user in an HTML page.

1.2 OBJECTIVES OF HTML

- ✚ Recognize the components of an HTML file and create such a file
- ✚ Link to local files and Web pages from their Web pages.
- ✚ Add graphics and sound to their Web pages using HTML.
- ✚ Create different kinds of lists to their Web page using HTML.
- ✚ Create a multi-column and multi-row tables using HTML.
- ✚ Set background colors and graphics for Web pages.
- ✚ Evaluate Web page design and consider design issues that affect web pages.
- ✚ Add links to sites from their Web pages.
- ✚ Tailor web design and development to Interlink Environment.
- ✚ HTML is the *lingua franca* of the Internet. Publishing HTML-formatted documents on the Internet via the World Wide Web proved to be the answer to these needs.
- ✚ HTML is a subset of the Standard Generalized Markup Language (SGML). SGML is an international standard (ISO 8879) published in 1986 as a format for structuring and marking up documents.

- ✚ HTML adopts a simplified set of SGML's structural, semantic, and formatting tags, keeping the emphasis on the content rather than on the document itself. An important addition to HTML was the inclusion of support for hypertext, which enabled authors to define a semantic network of linked information.

FEATURES OF HTML

- 1) It is a very **easy and simple language**. It can be easily understood and modified.
- 2) It is very easy to make an **effective presentation** with HTML because it has a lot of formatting tags.
- 3) It is a **markup language**, so it provides a flexible way to design web pages along with the text.
- 4) It facilitates programmers to add a **link** on the web pages (by html anchor tag), so it enhances the interest of browsing of the user.
- 5) It is **platform-independent** because it can be displayed on any platform like Windows, Linux, and Macintosh, etc.
- 6) It facilitates the programmer to add **Graphics, Videos, and Sound** to the web pages which makes it more attractive and interactive.
- 7) HTML is a case-insensitive language, which means we can use tags either in lower-case or upper-case.

1.3 INTRODUCTION TO UNIVERSAL RESOURCE IDENTIFIER (URI)

- ✚ A URI (Uniform Resource Identifier) is a sequence of characters that identifies a logical or physical resource. Universal Resource Identifiers are specified in the Internet Engineering Task Force (IETF) Request for Comments (RFC) 3986 and are summarized and extended in documentation for the W3C's Web Architecture, Architecture of the World Wide Web, Volume 1. According to the specifications, resources do not have to be accessible on the Internet.
 - ✚ Examples of resources include electronic documents, elevator door sensors, XML namespaces, web pages and ID microchips for pets.
 - ✚ There are two types of URIs, Uniform Resource Locators (URLs) and Uniform Resource Names (URNs).
1. **Uniform Resource Locator (URL)** – this type of URI begins by stating which protocol should be used to locate and access the physical or logical resource on a network. If the resource is a web page, for example, the URI will begin with the protocol HTTP. If the resource is a file, the URI will begin with the protocol FTP or if the resource is an email address, the URI will begin with the protocol mailto. It is important to remember that

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PRACTICE QUESTIONS

1. Which tag tells the browser where the page starts and stops?
A) <html> B) <body>
C) <head> D) <title>
2. All HTML documents will be basically
A) Graphs B) Text
C) Pictures D) None of the above
3. Which one of the following is always used to enclosed HTML tags?
A) {} B) []
C) < > D) ()
4. Which one of the following is used to represent a closing tag or end tag?
A) / B) \
C) & D) #
5. Which one of the following is ignored by the browses?
A) Tags B) Attributes
C) Comments D) Head section
6. Which o the following tag is used to provide a name to a web document?
A) <html> B) <body>
C) <head> D) <title>
7. Which one of the following tag is not visible in the browser?
A) <html> B) <body>
C) <meta> D) <title>
8. Which section is used for text and tags that are shown directly on your web page?
A) Head B) Meta
C) Body D) title



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Web Scripting



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UNIT-9

Index

CONTENTS	Page No.
Syllabus	1
Previous Year Questions with Explanation	2
1. Java Script	7
1.1 Introduction	7
1.2 What is JavaScript	7
1.3 Features of JavaScript	7
1.4 History of JavaScript	8
1.5 Application of JavaScript	8
1.6 JavaScript Comment	8
1.7 JavaScript Variable	10
1.8 Javascript Data Types	12
1.9 JavaScript Operators	15
1.9.1JavaScript Arithmetic Operators	15
1.9.2 JavaScript Comparison Operators	15
1.9.3 JavaScript Bitwise Operators	16
1.9.4 JavaScript Logical Operators	16
1.9.5 JavaScript Assignment Operators	16
1.9.6 JavaScript Special Operators	16
1.10 JavaScript If-else	19
1.10.1 JavaScript If statement	19
1.10.2 JavaScript If...else Statement	20
1.10.3 JavaScript If...else if statement	20
1.11 JavaScript Switch	21
1.12 JavaScript Loops	25
1.12.1 JavaScript For loop	25
1.12.2 JavaScript while loop	25
1.12.3 JavaScript do while loop	26
1.13 JavaScript Functions	27
1.14 JavaScript Events	30
1.15 JavaScript addEventListener()	33
1.16 JavaScript onclick event	35
1.17 JavaScript dblclick event	36
1.18 JavaScript onload	37
1.19 JavaScript onresize event	39
1.20 External JavaScript file	40

CONTENTS	Page No.
2. MULTIMEDIA AND AUTHORING TOOLS	44
2.1 Definition of Multimedia	44
2.2 Components of Multimedia	45
2.3 Applications of Multimedia	46
2.4 Features of Authoring Tools	49
2.5 Authoring Tools Classification	50
2.5.1 Card or Page based authoring tools	50
2.5.2 Icon based or Event driven authoring tools	51
2.5.3 Time based authoring tools	2
2.5.4 Object-Oriented authoring tools:	53
3. Image formats	55
4. Image scanning with the help of scanner	59
5. Animation, Morphing and Applications	68
6. Graphic Tools: Image Editing Software (Photoshop / CorelDraw)	68
6.1 Image Handling	68
6.2 To resize an image in Photoshop	70
7. Concepts of Multimedia:	83
7.1 Types of Multimedia	84
7.2 Multimedia Software Development Tools	84
8. RECORDING SOUND USING SOUND RECORDER (CAPTURE)	85
8.1 Voice Recognition Software Philips/Dragon	86
8.2 MIDI (Musical Instrument Digital Interface)	88
9. Movie File Formats: AVI, MPEG	89
9.1 Movie Frames: Concepts of Frame, Frame Buffer	92
10. Multimedia Authoring using Macromedia Flash	96
10.1 Making of simple Flash movie	100
Practice Test Questions	108

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UNIT – IX - WEB SCRIPTING

SYLLABUS

Java script

Event handling, adding java script in an HTML page

Multimedia and authoring tools

Image Formats

TIFF, BMP, JPG/JPEG, GIF, IC, PDF, PSG:

Image scanning with the help of scanner: Setting up resolution, size, file Formats of images; Image preview

Significance of PDF-creation, modification; Animation, Morphing and Applications

Graphic Tools: Image Editing Software (Photoshop / CorelDraw)

Image Handling: Cropping an image, adjusting image size, saving an image;

Layers: Adding layers, dragging and pasting selections on to layers, moving and copying layers, duplicating layers, deleting layers, merging layers. Opacity.

Concept of multimedia: Picture/ Graphics, Audio, Video;

Sound: Recording sound using sound recorder (capture), Sound editing, Effect enhancement;

Voice Recognition software Philips / Dragon, MIDI player, sound recorder.

Sound Quality: Radio Quality,

1. Movie File Formats: AVI, MPEG.

Movie Frames: Concept of Frame, Frame Buffer;

2. Multimedia authoring using macromedia flash

Making of simple flash movie.

WEB SCRIPTING

1. Java Script

1.1 Introduction

JavaScript is *an object-based scripting language* which is lightweight and cross-platform.

JavaScript is not a compiled language, but it is a translated language. The JavaScript Translator (embedded in the browser) is responsible for translating the JavaScript code for the web browser.

1.2 What is JavaScript

JavaScript (js) is a light-weight object-oriented programming language which is used by several websites for scripting the webpages. It is an interpreted, full-fledged programming language that enables dynamic interactivity on websites when applied to an HTML document. It was introduced in the year 1995 for adding programs to the webpages in the Netscape Navigator browser. Since then, it has been adopted by all other graphical web browsers. With JavaScript, users can build modern web applications to interact directly without reloading the page every time. The traditional website uses js to provide several forms of interactivity and simplicity.

Although, JavaScript has no connectivity with Java programming language. The name was suggested and provided in the times when Java was gaining popularity in the market. In addition to web browsers, databases such as CouchDB and MongoDB uses JavaScript as their scripting and query language.

1.3 Features of JavaScript

There are following features of JavaScript:

1. All popular web browsers support JavaScript as they provide built-in execution environments.
2. JavaScript follows the syntax and structure of the C programming language. Thus, it is a structured programming language.
3. JavaScript is a weakly typed language, where certain types are implicitly cast (depending on the operation).
4. JavaScript is an object-oriented programming language that uses prototypes rather than using classes for inheritance.
5. It is a light-weighted and interpreted language.

6. It is a case-sensitive language.
7. JavaScript is supportable in several operating systems including, Windows, macOS, etc.
8. It provides good control to the users over the web browsers.

1.4 History of JavaScript

In 1993, **Mosaic**, the first popular web browser, came into existence. In the year **1994**, **Netscape** was founded by **Marc Andreessen**. He realized that the web needed to become more dynamic. Thus, a 'glue language' was believed to be provided to HTML to make web designing easy for designers and part-time programmers. Consequently, in 1995, the company recruited **Brendan Eich** intending to implement and embed Scheme programming language to the browser. But, before Brendan could start, the company merged with **Sun Microsystems** for adding Java into its Navigator so that it could compete with Microsoft over the web technologies and platforms. Now, two languages were there: Java and the scripting language. Further, Netscape decided to give a similar name to the scripting language as Java's. It led to 'Javascript'. Finally, in May 1995, Marc Andreessen coined the first code of Javascript named '**Mocha**'. Later, the marketing team replaced the name with '**LiveScript**'. But, due to trademark reasons and certain other reasons, in December 1995, the language was finally renamed to 'JavaScript'. From then, JavaScript came into existence.

1.5 Application of JavaScript

JavaScript is used to create interactive websites. It is mainly used for:

- Client-side validation,
- Dynamic drop-down menus,
- Displaying date and time,
- Displaying pop-up windows and dialog boxes (like an alert dialog box, confirm dialog box and prompt dialog box),
- Displaying clocks etc.

1.6 JavaScript Comment

The JavaScript comments are meaningful way to deliver message. It is used to add information about the code, warnings or suggestions so that end user can easily interpret the code.

The JavaScript comment is ignored by the JavaScript engine i.e. embedded in the browser.

Advantages of JavaScript comments:

There are mainly two advantages of JavaScript comments.

- To make code easy to understand It can be used to elaborate the code so that end user can easily understand the code.
- To avoid the unnecessary code It can also be used to avoid the code being executed. Sometimes, we add the code to perform some action. But after sometime, there may be need to disable the code. In such case, it is better to use comments.

Types of JavaScript Comments:

There are two types of comments in JavaScript.

1. Single-line Comment
2. Multi-line Comment

JavaScript Single line Comment

It is represented by double forward slashes (//). It can be used before and after the statement.

Let's see the example of single-line comment i.e. added before the statement.

```
<script>
```

```
// It is single line comment
```

```
document.write("hello javascript");
```

```
</script>
```

Let's see the example of single-line comment i.e. added after the statement.

```
<script>
```

```
var a=10;
```

```
var b=20;
```

```
var c=a+b;//It adds values of a and b variable
```

```
document.write(c);//prints sum of 10 and 20
```

```
</script>
```

JavaScript Multi line Comment

It can be used to add single as well as multi line comments. So, it is more convenient.

It is represented by forward slash with asterisk then asterisk with forward slash. For example:

```
/* your code here */
```

It can be used before, after and middle of the statement.

```
<script>
```

```
/* It is multi line comment.
```

```
It will not be displayed */
```

```
document.write("example of javascript multiline comment");
```

```
</script>
```

PG TRB COMPUTER SCIENCE 2020 - 21 PRACTICE QUESTIONS

1. Which of the following is not considered as an error in JavaScript?

- A) Syntax error
- B) Missing of semicolons
- C) Division by zero
- D) Missing of Bracket

2. What will be the output of the following JavaScript code?

```
function compare()  
{  
    int a=1;  
    char b=1;  
    if(A).toString()===B)  
        return true;  
    else  
        return false;  
}
```

- A) true
- B) false
- C) runtime error
- D) logical error

3. The expression of calling (or executing) a function or method in JavaScript is called _____

- A) Primary expression
- B) Functional expression
- C) Invocation expression
- D) Property Access Expression

4. What will be the output of the following JavaScript code?

```
<p id="demo"></p>  
<script>  
function myFunction()  
{  
    document.getElementById("demo").innerHTML=Math.cbrt(125);  
}  
</script>
```

- A) 125
- B) 25
- C) 5
- D) Error

5. What will be the output of the following JavaScript code?

```
var o = new F();
```

```
o.constructor === F
```

- A) false
- B) true
- C) 0
- D) 1

6. The meaning for Augmenting classes is that _____

- A) objects inherit prototype properties even in a dynamic state
- B) objects inherit prototype properties only in a dynamic state
- C) objects inherit prototype properties in the static state
- D) object doesn't inherit prototype properties in the static state

7. Which of the following function of Boolean object returns a string containing the source of the Boolean object?

- A - toSource()
- B - valueOf()
- C - toString()
- D - None of the above.

8. What will be the output of the following JavaScript code?

```
document.writeln("<br/>navigator.language: "+navigator.language);
```

- A) Browser name
- B) Browser language
- C) Browser version
- D) Error



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COMMUNICATION & NETWORK CONCEPTS

UNIT-10

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TABLE OF CONTENT

Chapter No.	Chapter Name	Page No.
	Sullabus	1
	Previous year questions (set-1)	2
	Previous year questions (set-2)	9
1.	Introduction	16
1.1	Communication System	16
1.1.1	Signal	16
1.1.2	Bit Rate and Baud Rate	21
1.1.3	Communication Mode	22
1.1.4	Way of Communication	22
1.1.5	Delays in Computer Network	24
1.1.6	Communication Channel	27
1.1.7	Bandwidth, and Data Transfer Rate	28
1.1.8	Frequency	33
1.1.9	Circuit Switching, Packet Switching	35
1.2	Network Definition	37
1.2.1	Uses Of Computer Network	37
1.2.2	Peer-to-Peer Network and Client Server Network	38
1.3	Evolution of Computer Network	40
1.4	Internet, Intranet & Extranet	41
1.4.1	Comparison Between Internet, Intranet and Extranet	42
2.	Types of Networks	45
2.1	Local Area Network (LAN)	45
2.2	Metropolitan Area Networks (MAN)	46
2.3	Wide Area Networks (WAN)	46
2.4	Personal Area Network (PAN)	47
2.5	Campus Area Network (CAN)	47
2.6	Storage Area Network (SAN)	47
2.7	Types of LAN Technologies	48
2.7.1	Ethernet	48
2.7.2	Fast Ethernet	50
2.7.3	Gigabit Ethernet	51
2.7.4	10 Gigabit Ethernet	51

3. LAN Topology	55
3.1 Bus Topologies	55
3.2 Star Topologies	56
3.3 Tree Topologies	57
3.4 Ring Topologies	58
3.5 Mesh Topologies	58
3.6 Hybrid Topologies	59
4. Transmission Medium (Communication Channel)	61
4.1 Types Of Transmission Medium	61
4.2 Guided Transmission Medium	63
4.2.1 Twisted pair cable (ethernet cable)	63
4.2.2 Coaxial cable	64
4.2.3 Fiber optics	65
4.3 Wireless transmission	66
4.3.1 The electromagnetic spectrum	66
4.3.2 Radio wave	68
4.3.3 Microwave transmission	68
4.3.4 Infrared and millimeter waves	69
4.4 Communication satellites	70
4.4.1 Geo - geostationary satellites	70
4.4.2 Meo - medium-earth orbit satellites	71
4.4.3 Leo - low-earth orbit satellites	71
5. Network Devices	74
5.1 Ethernet Card (NIC)	74
5.2 Hub	75
5.3 Switch	76
5.4 Repeater	76
5.5 Bridge	77
5.6 Router	78
5.6.1 Physical vs Logical Addresses	78
5.7 Gateway	79
5.8 Modem	80
5.9 Wi-Fi Card	80
6. ISO/OSI Stack	82
6.1 Protocol Hierarchies	82
6.2 OSI Reference Model	86
6.2.1 Seven Layers of OSI Reference Model	87

7. Network Protocols (TCP/IP Protocol Suit)	93
7.1 Transmission Control Protocol / Internet protocol(TCP/IP)	93
7.2 List of Layers and its Protocols	97
7.3 Application Layer Protocols	99
7.3.1 File Transfer Protocol	99
7.3.2 Hyper Text Transfer Protocol	100
7.3.3 Simple Mail transfer protocol (SMTP) : E-Mail Protocol	101
7.3.4 Post Office Protocol Version 3 (POP3) : E-Mail Protocol	103
7.3.5 Telnet : Remote Access Protocol	103
7.3.6 Simple Network Management Protocol (SNMP)	104
7.3.7 Dynamic Host Configuration Protocol (DHCP)	104
7.3.8 Chat Protocol	105
7.3.9 VOIP	106
7.4 Transport Layer Protocols	106
7.5 Network Layer Protocols	107
7.5.1 Address Resolution Protocol (ARP)	107
7.5.2 Reverse Address Resolution Protocol (RARP)	107
7.5.3 Internet Control Message Protocol (ICMP)	107
7.6 Physical Layer Protocols	107
7.6.1 Fiber Distributed Data Interface	107
7.7 ALOHA Net	108
8. Flow Control	111
8.1 For Noiseless Channel:	111
8.1.1 Simplex Protocol	111
8.1.2 Stop And Wait Protocol	112
8.2 For Noisy Channel	113
8.2.1 Sliding Window Protocols	114
8.2.2 Protocol Using Go Back N:	115
8.2.3 Protocol Using Selective Repeat	116
9. Error Control	119
9.1 Framing	119
9.2 Error Detection Techniques	122
9.2.1 VRC(Vertical Redundancy Check)or Simple Parity check	123
9.2.2 LRC (Longitudinal (or horizontal) redundancy checking)	123
Two-dimensional Parity check	
9.2.3 Checksum	124
9.2.4 Cyclic redundancy check (CRC)	124

9.3	Error Correction Techniques	125
9.3.1	Hamming Code	126
10.	Routing	131
11.	Congestion Control	135
11.1	General principles of congestion control	135
11.2	Traffic shaping	135
11.3	Flow specification	136
11.4	Congestion control in virtual circuit subnets	136
11.5	Congestion control in datagram subnets	136
12.	Media Access Control (MAC) Address	138
12.1	Format of MAC Address	138
12.2	Types of MAC Address	139
13.	IP Address (IPv4 Overview)	143
13.1	What is Network?	143
13.2	IPv4 - OSI Model	144
13.3	Network Layer	145
13.4	IPv4 - TCP/IP Model	145
13.5	IPv4 - Packet Structure	146
13.6	IPv4 - Addressing	147
13.7	IPv4 - Address Classes	150
13.8	IPv4 - Subnetting	152
14	Electronic Mail	163
14.1	Architecture and Services	163
14.2	The User Agent	164
14.3	Message Formats (rfc 822)	165
14.4	Message Transfer	167
14.5	Final Delivery	167
15.	Video Conferencing	170
16.	HTML (Hyper Text Markup Language)	172
16.1	History of HTML	172
16.2	HTML Generations	172
16.3	HTML(Hypertext Markup Language) Tags	173
16.4	XML (Extensible Markup Language)	180
16.5	WWW(World Wide Web)	180
16.6	Web Page	180
16.7	Web Site	181
16.8	Web Browser	181

16.9	Home Page	182
16.10	URL (Uniform Resource Locator)	183
16.11	Web Server	184
16.12	Web Hosting	184
16.13	WEB 2.0	184
17.	Wireless Ad-hoc Network	186
17.1	Desirable properties of Ad-Hoc Routing protocols	187
17.2	There are currently two variations of mobile wireless networks	188
17.3	Characters and Fundamental Challenges of Wireless Ad-hoc	189
17.4	Proactive and Reactive Routing	190
18.	GSM (Global System for Mobile Communication)	192
18.1	Introduction	192
18.2	1G,2G,3G,4G	193
18.3	GSM Architecture	195
19.	Network Security	199
19.1	Security Attacks	202
19.2	Encryption and Decryption	203
19.3	Cryptography	203
19.4	Private key Cryptography	204
19.5	Public key Cryptography	205
19.6	Encryption Methods	211
19.7	Digital Signature	216
19.8	Firewall	217
20.	Cyber Law	223
PG TRB (2020-2021) QUESTION BANK		225

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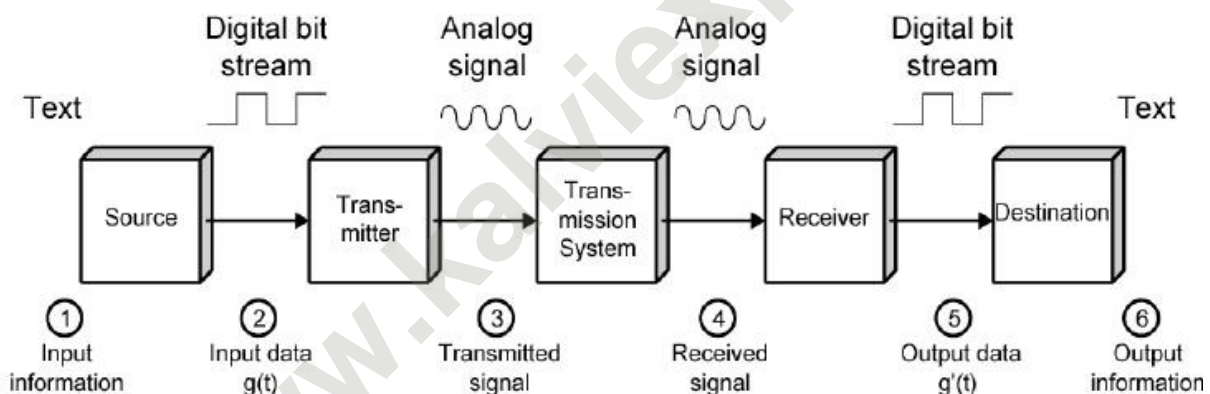
COMMUNICATION AND NETWORK CONCEPTS

SYLLABUS

- Evolution of Networking : Internet
- Data Communication Terminologies: Bandwidth (Hz, KHz, MHz) and Data transfer rate (bps,kbps,Mbps,Gbps,Tbps)
- Network Devices : Modem, Ethernet Card, Hub, Switch, Router.
- Different Topologies – Bus, Tree
- Concepts of LAN, WAN, MAN.
- Protocol : TCP/IP, Internet
- Wireless/Mobile Communication , GSM
- Electronic Mail, Chat, Video Conferencing
- Network Security Concepts : Cyber Law, Hackers and Crackers.
- Web Pages : Hyper Text Markup Language (HTML), Hyper Text Transfer Protocol (HTTP), Website, Web Browser, Web Server.

CHAPTER 1**INTRODUCTION****1.1 COMMUNICATION SYSTEM**

- Sending or Receiving information, such as speaking, writing, telephone lines, computers or using some other medium is communication.
- The **communication system** basically deals with the transmission of information from one point to another using the well-defined steps which are carried out in sequential manner. The system for data transmission makes use of the sender and destination address. In this other so many elements are also there that allows it to transfer data from one set of point to another set of point after dividing the **elements of communication system** in groups and these interface elements acts as the main **component for data communication**.
- Data communication system made up of five basic components, they are
 - Message
 - Sender
 - Receiver
 - Transmission Medium
 - Protocol

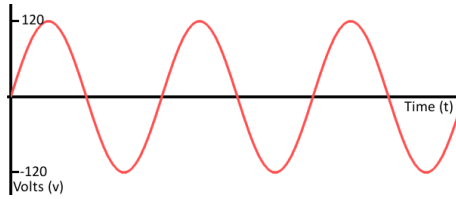
**1.1.1. SIGNAL**

- A signal is an electromagnetic or electrical current that carries data from one system or network to another.
- In electronics, a signal is often a time-varying voltage that is also an electromagnetic wave carrying information, though it can take on other forms, such as current.
- There are two main types of signals used in electronics: analog and digital signals.

a.) Analog Signal

- Because a signal varies over time, it's helpful to plot it on a graph where time is plotted on the horizontal, x -axis, and voltage on the vertical, y -axis.

- Looking at a graph of a signal is usually the easiest way to identify if it's analog or digital; a time-versus-voltage graph of an analog signal should be **smooth** and **continuous**.



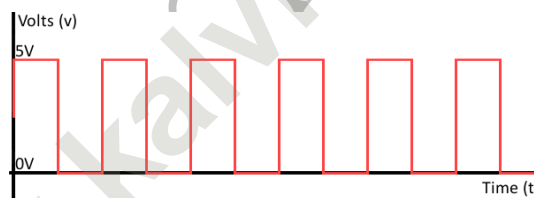
- While these signals may be limited to a **range** of maximum and minimum values, there are still an infinite number of possible values within that range.

For example:

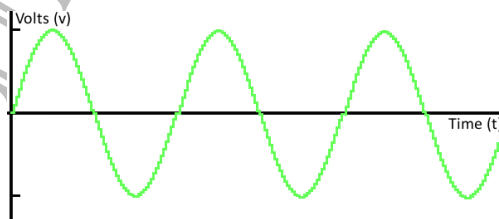
- The analog voltage coming out of your wall socket might be clamped between -120V and +120V, but, as you increase the resolution more and more, you discover an infinite number of values that the signal can actually be (like 64.4V, 64.42V, 64.424V, and infinite, increasingly precise values).

b.) Digital Signals

- Digital signals must have a finite set of possible values.
- The number of values in the set can be anywhere between two and a-very-large-number-that's-not-infinity.
- Most commonly digital signals will be one of **two values** -- like either 0V or 5V.
- Timing graphs of these signals look like **square waves**.



- Or a digital signal might be a discrete representation of an analog waveform. Viewed from afar, the wave function below may seem smooth and analog, but when you look closely there are tiny discrete **steps** as the signal tries to approximate values:



- That's the big difference between analog and digital waves. Analog waves are smooth and continuous, digital waves are stepping, square, and discrete.

c.) Key Differences:

- An analog signal is a continuous signal whereas Digital signals are time separated signals.

- Analog signal is denoted by sine waves while It is denoted by square waves
- Analog signal uses a continuous range of values that help you to represent information on the other hand digital signal uses discrete 0 and 1 to represent information.
- The analog signal bandwidth is low while the bandwidth of the digital signal is high.
- Analog instruments give considerable observational errors whereas Digital instruments never cause any kind of observational errors.
- Analog hardware never offers flexible implementation, but Digital hardware offers flexibility in implementation.
- Analog signals are suited for audio and video transmission while Digital signals are suited for Computing and digital electronics.

d.) Characteristics Of Analog Signal

Here, are essential characteristics of Analog Signal

- These type of electronic signals are time-varying
- Minimum and maximum values which is either positive or negative.
- It can be either periodic or non-periodic.
- Analog Signal works on continuous data.
- The accuracy of the analog signal is not high when compared to the digital signal.
- It helps you to measure natural or physical values.
- Analog signal output form is like Curve, Line, or Graph, so it may not be meaningful.

e.) Characteristics of Digital Signals

Here, are essential characteristics of Digital signals

- Digital signal are continuous signals
- This type of electronic l signals can be processed and transmitted better compared to analog signal.
- Digital signals are versatile, so it is widely used.
- The accuracy of the digital signal is better than that of the analog signal.

f.) Difference Between Analog and Digital Signal

Here are important differences between Analog and Digital Signal:

Analog	Digital
An analog signal is a continuous signal that represents physical measurements.	Digital signals are time separated signals which are generated using digital modulation.
It is denoted by sine waves	It is denoted by square waves

PG TRB (2020-2021) QUESTION BANK

- 1.) The number of bits used for addressing in Gigabit Ethernet is _____.
(A) 32 bit (B) 48 bit
(C) 64 bit (D) 128 bit
- 2.) Which of the following devices takes data sent from one network device and forwards it to the destination node based on MAC address?
(A) Hub (B) Modem
(C) Switch (D) Gateway
- 3.) _____ do not take their decisions on measurements or estimates of the current traffic and topology.
(A) Static algorithms (B) Adaptive algorithms
(C) Non – adaptive algorithms (D) Recursive algorithms
- 4.) Which of the following layer of OSI Reference model is also called end-to-end layer ?
(A) Network layer (B) Data layer
(C) Session layer (D) transport layer
- 5.) The IP address _____ is used by hosts when they are being booted.
(A) 0.0.0.0 (B) 1.0.0.0
(C) 1.1.1.1 (D) 255.255.255.255
- 6.) Suppose we want to download text documents at the rate of 100 pages per second. Assume that a page consists of an average of 24 lines with 80 characters in each line. What is the required bit rate of the channel?
(A) 192 kbps (B) 512 kbps
(C) 1.248 Mbps (D) 1.536 Mbps
- 7.) If a file consisting of 50,000 characters takes 40 seconds to send, then the data rate is _____.
(A) 1 kbps (B) 1.25 kbps
(C) 2 kbps (D) 10 kbps



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