Subjects:
Computer Technology
Structured Programming
Data Structure
Algorithm
OOP
Database
Networking
Operating System
Compiler Construction
Machine Learning

Structure Programming | Modular Programming | Procedural Programing

1. Identifier
2. Keyword
3. Operator (unary and binary.)
4. Data Type
5. Constants
6.
7. ASCII (American Standard Code for Information and Interchange)
8. Escape Sequence
9. Variables
10. Array
11. Relational & Logical Operator
12. Library Function
13. Function (Self defined)
14. Pass by value, Pass by reference.
15. Unsigned and signed number.
16. Pointer.
17. Recursion (Sum of N item, Factorial of N, Fibonacci using recursion).
18. Who is the inventor of C? (Dennis Ritchie, 1972).
19.
20. Prime number check and generate.
21. Type Casting.

Data Structure

Searching:

1. Linear search(com:O(N))
2. Binary search(com: O(LogN))

Sorting:

1. Bubble Sort.O(N^2)
2. Insertion Sort.O(N^2)
3. Quick Sort.O(N^2)
4. Selection Sort. O(N^2)
5. Merge Sort. O(NlogN)
6. Heap Sort. O(NlogN)

Stack (LIFO)
Queue (FIFO)
Prefix, Infix, Postfix
Linked

Trees:

Binary Tree
Complete Binary
Traversing Binary Tree (Pre-order, In-order, Post-order)
Binary Search Tree

Graphs:

BFS
DFS

Introduction to Computer

1. MSB, LSB
2. Number system
3. Decimal to binary with fraction.
4. Decimal to octal.
5. Decimal to hexa.
6. Binary to dec oct hex.
7. 1's complement
8. 2's complement
9. Logic gates
10. Universal and special gates.

Algorithm

1. BFS O (vertex+edge)
2. DFS O (V+E)
3. LCS O (2^(n+m))
4. Dijkstra O (E Log V)
5. Bellman Ford O (V Log V)
6. Prims O(E log V)
7. Kruskal O (E log V)
8. Coin Change O (mn)
9. Binary Search Tree O(Log N)

OOP

1. Object (Objects have states and behaviors)
2. Class (class is a blueprint from which individual objects are created.)
3. Constructor (A constructor initializes an object when it is created.)
4. Access Modifier (private, public, protected)
5. Non-Access Modifier(final, static, abstract)
6. Inheritance* (can be defined as the process where one class acquires the properties of another class, using extends keyword)
7. Polymorphism* (Overloading, Overriding)
8. Abstraction* (dealing with ideas rather than events, If a class is declared abstract, it cannot be instantiated.)
9. Encapsulation* (wrapping the data as a single unit, also known as data hiding)
10. Interface.
11. Multithreading (new thread->runnable->running->waiting->dead)

Operating System

1. Bootstrap at startup.
2. Hierarchical memory structure.
3. Cache
4. Multiprocessor, Multicore.
5. Multiprogramming.
6. Multitasking.
7. Deadlock.
8. Reason for deadlock(Mutual exclusion, hold and wait, no preemption, circular wait).
9. Resource allocation graph.
10. SJF, Priority scheduling, Round robin.

DBMS

1. CREATE DATABASE *databasename*;
2. DROP DATABASE *databasename*;
3. Table Creation: CREATE TABLE *table_name* (*column_name1 datatype*, *column_name2 datatype*);
4. Delete a Table from DB: DROP TABLE *table_name*;
5. *INSERT INTO table_name (column1, column2, column3, ...) VALUES (value1, value2, value3, ...);*
6. SELECT * FROM table_name;
   SELECT DISTINCT *column1*, *column2, ...* FROM *table_name*;
   SELECT *column1*, *column2, ...*
   FROM *table_name*
   WHERE *condition1* AND *condition2* AND *condition3* *OR* *condition3;*

   SELECT column1, column2, ...
   FROM table_name
   ORDER BY column1, column2, ... ASC|DESC;

   UPDATE table_name
   SET column1 = value1, column2 = value2, ...
   WHERE condition;

   DELETE FROM table_name WHERE condition;

Primary Key:

```
CREATE TABLE Persons (ID int NOT NULL,LastName varchar(255) NOT NULL, FirstName varchar(255), Age int, PRIMARY KEY (ID));
```

Foreign Key:

```
CREATE TABLE Orders (OrderID int NOT NULL,OrderNumber int NOT NULL,PersonID int, PRIMARY KEY (OrderID),FOREIGN KEY (PersonID) REFERENCES Persons(PersonID));
```

Types of SQL Join

1. Inner Join (SELECT *column_name(s)* FROM *table1* INNER JOIN *table2* ON *table1.column_name* = *table2.column_name*;)
2. Left Join (SELECT *column_name(s)* FROM *table1* LEFT JOIN *table2* ON *table1.column_name* = *table2.column_name*;)
3. Right Join (SELECT *column_name(s)* FROM *table1* RIGHT JOIN *table2* ON *table1.column_name* = *table2.column_name*;)
4. Full Join (SELECT *column_name(s)* FROM *table1* FULL OUTER JOIN *table2* ON *table1.column_name* = *table2.column_name*;)

Networking

1. **Local Area Network (LAN):** A network with a minimum of two computers to a maximum of thousands of computers within an office or a building is termed as LAN.Generally, it works for a single site where people can share resources like printers, data storage etc.
2. **Metropolitan Area Network (MAN):** It is larger than LAN and used to connect various LAN's across small regions, a city, campus of colleges or universities etc which in turn forms a bigger network.
3. **Wide Area Network (WAN):** Multiple LAN's and MAN's connected together form a WAN. It covers a wider area like a whole country or world.
4. Network topologies:
    a. Bus topology: It transmits data only in one direction.Every device is connected to a single cable
    b. Ring topology: A number of repeaters are used for Ring topology with large number of nodes, because if someone wants to send some data to the last node in the ring topology with 100 nodes, then the data will have to pass through 99 nodes to reach the 100th node. Hence to prevent data loss repeaters are used in the network.
    c. Star topology: Every node has its own dedicated connection to the hub.Hub acts as a repeater for data flow. Can be used with twisted pair, Optical Fibre or coaxial cable.
    d.