Teacher's Sign/Remarks

classmate
Date
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Group - A

Multiple Choice Questions:

1. In the relation model, the relations are generally termed as.....
   a) Tuples b) Attributes c) Rows d) Tables
   Answer: Tables

2. Which one of the following commands is used to modify a column inside a table?
   a) Drop b) Update c) Alter d) Set
   Answer: Alter

3. Which media transmit data in the form of light?
   a) Twisted pair cable b) Light cable c) Sun cable d) Fiber optic cable
   Answer: Fiber optic cable

4. Which of the following communications modes support two-way traffic but in only one direction at a time?
   a) Simplex b) Half duplex c) Three-quarters duplex d) Full duplex
   Answer: Half duplex

5. A variable that stores the memory address of another variable is:
   a) Structure b) Union c) Function d) Pointer
   Answer: Pointer

6. <INPUT> is
a) Format tag b) Empty tag c) Both a and b d) None of these
Answer: Empty tag

7. URL stands for
a) Unique Reference Label
b) Uniform Reference Label
c) Uniform Resource Locator
d) Unique Resource Locator
Answer: Uniform Resource Locator

8. Which of the following is not a software development lifecycle model?
a) Agile Model b) RAD Model c) Prototype Model
d) Autonomous Model
Answer: Autonomous Model

9. Which among the following feature is not in the general definition of OOPs?
a) Modularity b) Efficient code c) code reusability
d) Duplicate or Redundant Data
Answer: Duplicate or Redundant Data

Group 'B'

Short Answer Questions.

10. Define DBMS. Write down the advantages of DBMS.

=> DBMS stands for Database Management System. It is a software that allows computer to perform database function of adding, storing, updating, deleting and retrieving data.

Advantages of DBMS

DBMS has numerous benefits. Some of the major benefits of DBMS are:

1) Improved data sharing: An advantage of the database management system is that it helps to create an environment in which end users have better access to more and better managed data. Such access makes it possible for end users to respond quickly to changes in their environment.

2) Data Security: Data security is a vital concept in a database. Only users authorized must be allowed to access the database and their identity must be authenticated using username and password. Unauthorized users shouldn't be allowed to access the database under any circumstances as it violets the integrity constraints. DBMS provides better platform for data privacy thus helping companies to offer an improved data security.

3) Better data integration: Due to the database management system, we have access to well managed and synchronized form of data making it easy to handle. It also gives an integrated view of how a particular organization is working and keeps track

of how one segment of the computer affects another segment.

4) Minimized Data Inconsistency: Data inconsistency occurs between files when various versions of the same data appear in different places. Data consistency is ensured in the database, there is no data redundancy. Besides, any database changes are immediately reflected by all users, and there is no data inconsistency.

5) Faster Data Access: The database management system helps the users to produce quick answers to queries making data accessing accurate and faster.

11. What is network topology? Describe any two network topologies with clear diagram.

⇒ Network topology is the physical arrangement of the computer system which is connected through communication medium. There are six types of network topology i.e. bus topology, star topology, ring topology, tree topology, hybrid topology and mesh topology.

Bus Topology

Bus topology is also known as linear topology. It is the arrangements of computer system connected to a common cable called a 'bus' or 'trunk', which is the backbone of the network.

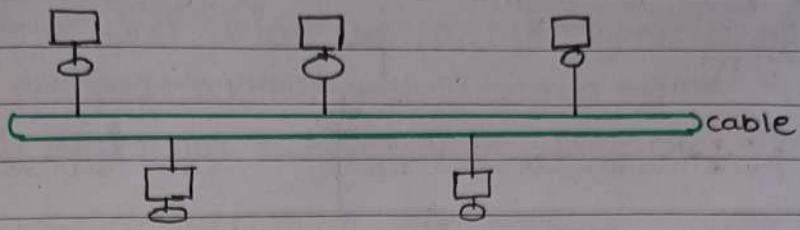


Fig: Bus Topology

Advantages

1) It is simple, reliable, easy to use and easy to understand.
2) It is easy to add and remove computer.
3) It is less expensive as compared to other topology as it uses less amount of coaxial cable.
4) If one computer fails, it doesn't affect other.
5) If there are few numbers of computers, it is best.

Disadvantages

1) If the length of trunk is short then it will be difficult to extend the network.
2) It is not suitable for large number of computer.
3) If the backbone fails, the whole network will go down.
4) Data traffic is high.
5) There are chances of data collision.

Star Topology

The arrangement of computer system in which all the computers are connected to a centrally located device called "HUB" or "SWITCH". The hub controls traffic on the network. It is the most popular and widely used topology such as office, home, college, school etc.

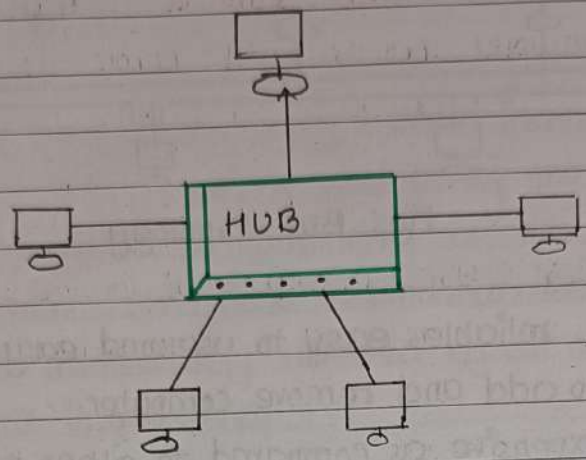


Fig: Star topology

Advantages

1) It is easy to add or remove computers.
2) If any computer in the ~~computer~~ network goes down then other computers can continue their functions.
3) It is easy to use and it is common network topology nowadays.
4) It is easier to troubleshoot in star topology.
5) It uses a centralized control system.
6) It is highly secure system.

Disadvantages

1) If there is any problem in central hub then the entire network will be down.
2) It is expensive technology because of cables and networking device hub or switch.
3) It requires large amount of cables.
4) The data traffic is high in central device hub so there may be chances of data collision.

12. Differentiate between structure and union.

Both structure and union are a heterogeneous collection of data types grouped together with a common name. However, there are several difference between them. They are listed below:

Structure	Union
1) The keyword struct is used to declare a structure.	1) The keyword union is used to declare a union.
2) Size of structure is equal to the sum of sizes of each member.	2) Size of union is equal to size of largest element.
3) Structure occupies more memory space than union.	3) Union occupies ~~more~~ less memory space than structure.
4) We can access all members at a time at structure.	4) We can access only one member at a time at union.
5) Structure allocates separate storage space for its every members.	5) Union allocated one common storage space for its all members.
6) Several members of a structure can initialize at once.	6) Only the first member of a union can be initialized.

In this way, structure and union ~~an~~ are different from each other.

13. Define OOP. Write down the features of OOP.

⇒ Object Oriented Programming (OOP) is a programming model that uses "object" to design application & computer programs.

Features of OOP

OOP focuses on binding attributes and behavior of real-world entity represented using an object and supports features like abstraction, encapsulation, inheritence, polymorphism etc.

1) Class: A class is a user-defined data type and the main building block of object-oriented programming. It is an identifiable entity that can have some descriptive properties. It is a user-defined data type that holds data members and member functions in a single unit. It is like a blueprint of an object.

2) Object: An object is anything that is identificable or a single material item. An object is any entity, things or organization that exists in real world. Object is the basic unit of OOP. It is an instance of class data type. It consists memory space. It consists of two fundamental characteristics:
a) it's attributes (or data) b) behaviours (or functions)

3) Inheritence: It is the process of creating new class (i.e. derived class) from base class. In OOP, the concept of inheritence provides the idea of reusability. Inheritence is a hierarchy of class in which same properties of base class is transferred into derived class. Inheritence is property that allows reuse of an existing class to build a new class. The different types of inheritence are: single inheritence, multiple inheritence.

multilevel inheritence, hierarchical inheritence and hybrid inheritence.

4) Abstraction: Abstraction is one of the most important features of OOP which only shows the essential information to the users and hiding the unnecessary details from the users. It helps in reducing programming complexity and efforts. Abstraction refers to the conceptual boundaries of an object. Example: In a switch board, we only press certain switches according to our requirement. what is happening inside, how it is happening, we don't know. This is an abstraction.

5) Encapsulation: The wrapping up of data and its functions into a single unit is called encapsulation. When using data encapsulation, data is not accessed directly, it is only accessible through the functions present inside the class. Encapsulation ensures that only authorized functions access the relevant data there by maintaining against unauthorized access to ensure data safety.

6) Polymorphism: The word polymorphism is derived from the latin word, "poly" means "many" and "morph" means "form". So, polymorphism means having many forms. Polymorphism is an important features of OOP, which refers to the ability of an object to take on different forms depending upon situation.

OR

Explain different data types used in JavaScript.

⇒ Data types in JavaScript describe the different kinds or types of data that you will be working with and storing in variables. It's important that we learn each of these data types because otherwise data can get stored in an improper format which results in issues in our code later on. JavaScript has 8 datatypes: String, Number, Bigint, Boolean, Undefined, Null, Symbol, object.

1) String

String is used to store text. In JavaScript, strings are surrounded by quotes:

- Single quotes: 'Hello'
- Double quotes: "Hello"
- Backticks: `Hello`

for example,

```
// strings example
const name = 'ram';
const name1 = "hari";
const result = `The names are ${name} and ${name1}`;
```

Single quotes and double quotes are practically the same and we can use either of them.

Backticks are generally used when we need to include variables or expressions into a string. This is done by wrapping variables or expressions with ${variable or expression} as shown above.

2) Number

Number represents integer and floating numbers (decimals or exponentials). For example,

```
const number1 = 3;
const number2 = 3.433;
const number3 = 3e5 // 3*10^5
```

3) BigInt

In JavaScript, Number type can only represent numbers less than $(2^{53}-1)$ and more than $-(2^{53}-1)$. However, if we need to use a larger number than that, we can use the BigInt data type. A BigInt number is created by appending n to the end of an integer.

4) Boolean

This datatype represents logical entries. Boolean represents one of two values: true or false. It is easier to think of it as a yes/no switch. For example,

```
const datachecked = true;
const valuecounted = false;
```

5) Undefined

The undefined data type represents value that is not assigned. If a variable is declared but the value is not assigned, then the value of that variable will be undefined.

6) NULL

In Javascript, null is a special value that represents empty or unknown value. For example:

```
const number = null;
```

The code above suggests that the number variable is empty.

7) Symbol

This datatype was introduced in a newer version of JavaScript (from ES2015). A value having the data type symbol can be referred to as a symbol value. Symbol is an immutable primitive value that is unique. For example:

```
// two symbols with the same description
const value1 = Symbol('hello');
const value2 = Symbol('hello');
```

Though value1 and value2 both contain 'hello', they are different as they are of the symbol type.

8) Object

An object is a complex data type that allows us to store collections of data. For example,

```
const student = {
  firstName: 'ram',
  lastName : null,
  class : 10
};
```

14. Write short notes:

a) Cloud Computing: In cloud computing the word cloud means internet. So the phrase 'cloud computing means services like storage, servers etc. are delivered to any organization's ~~and~~ computer and devices through the internet. In other words, we can say cloud computing is a huge resource pool where any one having internet access can take resources and can upload his/her resources. On-demand services, Broad network access, Resource ~~planning~~ pooling and Easy sharing are the characteristics of cloud computing.

b) AI : Artificial Intelligence (AI) is a feature of computer that describes the behavior of computer to behave like human. The computer having AI will make decision itself and will have Artificial knowledge. It uses the voice recognition system. It also uses multiple processor and large collection of data to process very fast and make intelligent output. It will be based on IKBS (Integrated Knowledge Based System). It will be used in security systems, robots and games, etc.

Group-C

Long Answer Questions

15. Explain any three database models.

⇒ Database models are a set of rules and standards that define how the database organises / stores data. It also defines how users view the organization of data. There are 4 types of database models i.e. Hierarchical Database Model, Network Database Model, Relational Database Model, Entity Relationship Database Model.

1) Hierarchical Database Model

Hierarchical Database Model is represented in the form of tree structure. All records in Hierarchy are called nodes. Each node is related to the other in parent-child relationship. In this model top node is called root (or parent) node and other branches is called child node. Each node parent record may have one or more child node.

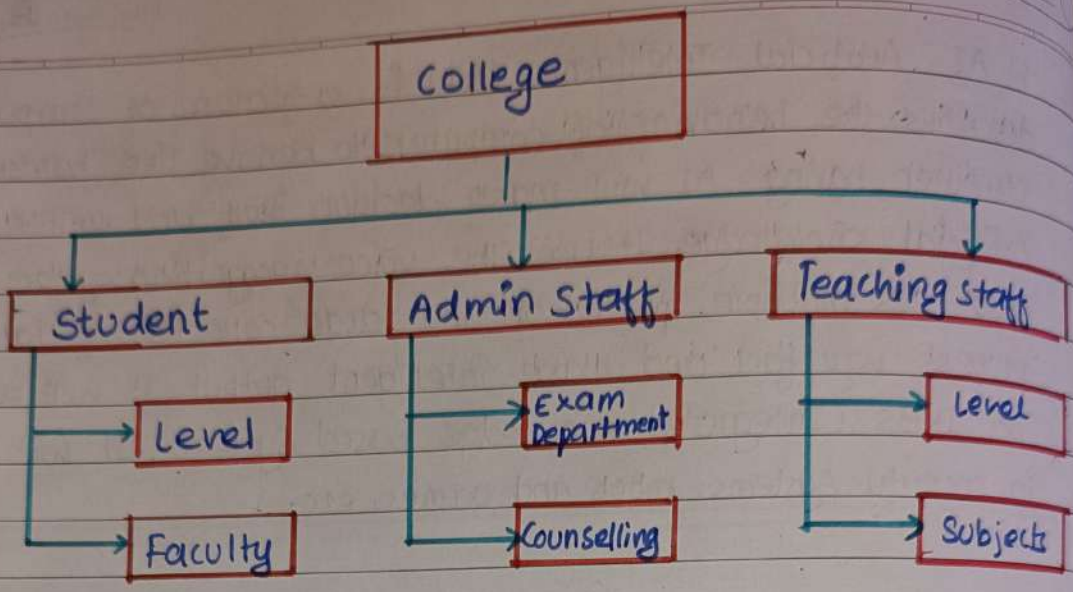


Fig: Hierarchical database model

Advantages

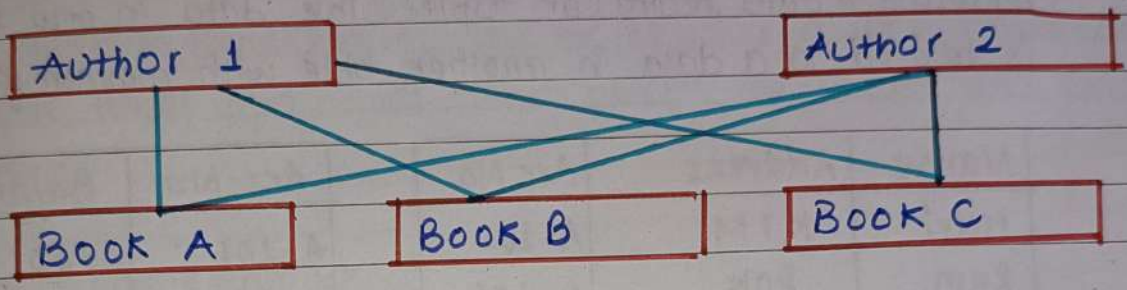
1) It is the easiest model of database.
2) It is secure model as nobody can modify the child node without consulting to its parent.
3) Searching is faster if parent is known.
4) It supports one to one and one to many relationships.

Disadvantages

1) It is old, outdated database model.
2) It increases data redundancy.
3) It doesnot support "many to many" relationship.
4) When parent node is deleted, all the child nodes are deleted automatically.
5) Modification and addition of child without consulting the parent is impossible.

2) Network Database Model

Network Database Model is an extension of the hierarchical database model. In this model, all types of relationship among the data elements must be determined when the database is first designed. In this model, a child data element can have more than one parent element.



Advantages

1) It is simple and easy to design.
2) It reduces data redundancy.
3) It is more flexible than hierarchical model because it accepts many to many relationship.
4) Searching is faster because of multiple pointers.

Disadvantages

1) It is less secure than hierarchical as it is open to all.
2) It increases the processing overhead due to the complex relationship.
3) It needs larger programs to handle the relationship.
4) It doesnot support small size ~~prod~~ project.

3) Relational Database Model

In this database, the data elements are organized in the form of tree tables with rows and columns. In this model, tables are known as relations. Each table of the database is stored as a seperate file. Each table column represents a data record field (or attributes) and each row represents a data record (or tuple). The data in one table is related to a data in another table with common fields.

Name	Address	Acc NO
Hari	KTM	A-101
Ram	POK	A-106
Gopal	BRT	A-108

Acc NO	Balance
A-101	3000
A-106	10000
A-108	1000

Advantages

1) It reduces data redundancy.
2) Normalization of database is possible.
3) Quick database processing is possible.
4) One table is linked with other using common field.
5) Easy to delete, update and query records.

Disadvantages

1) Too many rules makes database non-user friendly.
2) It is more complex than other models.
3) It needs more data storage devices for storing data i.e. data warehouse.
4) It needs more powerful computer to operate smoothly.

OR

Define function in C. WAP to input roll, name, address, marks of 100 students and display them using structure.

⇒ Function is a set of self contained block of statements to perform some specific task or job. It is a set of statements that takes input, does some specific computation and produce output.

```
#include <stdio.h>
#include <conio.h>
Struct student
{
  int roll;
  char name[30];
  char address[30];
  int marks;
}s[100];
void main()
{
   int i;
  for(i=0; i<100; i++)
{
  printf("Enter the roll number:");
  scanf("%d", &s[i].roll);
  printf("Enter the name:");
  scanf("%s", s[i].name);
  printf("Enter the address:");
  scanf("%s", s[i].address);
  printf("Enter the marks:");
  scanf("%d", &s[i].marks);
}
```

```
for (i=0; i<100; i++)
 {
   printf("Roll number is : %d \n", s[i].roll);
   printf("Name is : %s \n", s[i].name);
   printf("Address is : %s \n", s[i].address);
   printf("Marks is : %d \n", s[i].marks);
 }
 getch();
}
```

16. Explain the software development process.

⇒ The systematic way of developing any software is called SDLC or software development process. It is explained below:

1) System Study

System study is the first stage of system development process which involves the preparation of system proposal which list the problem definition, objective of the study, expected benefits of the new system etc. The system propasal is prepared by the system analyst.

2) System Analysis

The system analysis is an important activity that takes place when new information systems are being built or existing systems are being updated. It includes feasibility ~~analysis~~ study too.

Feasibility study

It is the study of whether the system is feasible or not to design. It includes the following:

i) Economic Feasibility: It determines whether the required software is capable of generating financial gains.

ii) Technical Feasibility: It is concerned with the availability of the hardware, software and the software equipments for the complete development of the system.

iii) Operational Feasibility: It concerns with smooth operation of the system and depends upon Human Resource for development and implementation of the ~~stu~~ system.

iv) Schedule Feasibility: It is to determine if a proposed system can be implemented within a estimated time frame or not.

v) Legal Feasibility: It concerns with the legal issue of the system. It concerns with trademark, copyrights, patent and etc.

vi) Behavioral Feasibility: It is concerned with the behavioral approach of the management staffs and workers within the system in the organization.

3) System Design

System Design is the creative phase of system development life cycle in which the designer must design all the aspects of the system from the input, process, output, database etc.

There are two types of system design.

i) Top Down Design: In this design, the team member starts with a large picture and moves to the details.

ii) Bottom-up Design: In this design, the team member starts with the details and then moves to the big pictures.

4) System Development

After designing a logical diagram of the system, the next step is to convert it into program using different programming language like C++, Java.net etc. This phase is called system development.

5) System Testing

System testing is the process of analyzing the program, finding errors and defects in the system. If the entire system is bug free and fulfill user's requirement, then it is ready to implement.

The system can be tested in two ways:

i) Black Box Testing: The internal code of the program is tested in black box testing.

ii) White Box Testing: The structure of the program is tested in white box testing.

6) System Implementation

Implementation involves testing the installed system, converting from the old system into the new one and training the users. The implementation process is divided into the four major categories:

i) Direct conversion: In this type, the software is directly installed at user's site by replacing the old system.

ii) Parallel conversion: In this type, both the old and new system are run in parallel for some time.

iii) Phased conversion: In this type, the system is installed module by module.

iv) Pilot conversion: In this type, new system is installed for a ~~new~~ few users, who evaluate it and help to decide whether it is suitable for the rest of the system to implement or not.

7) Maintenance and Review

Correcting and updating process of the system is called system maintenance. The maintenance involves correcting the errors which were not discovered in the early stage of the life cycle. There are three types of maintenance i.e.

i) Corrective maintenance: It corrects the run time errors during the operation.

ii) Adaptive maintenance: It modifies or adds new features in the system according to the environmental change.

iii) Perfective maintenance: It makes the system perfect, up-to-date and improve the life of the system.

Hence, the system development process involves these steps.

Set-II

Group-A

Multiple Choice Questions

1. In hierarchical database model records are organized as
a) Graph b) List c) Links d) Tree
Answer: Tree

2. An attribute of a table cannot hold multiple values is the property of
a) First normal form (1NF) b) Second normal form (2NF)
c) Third normal form (3NF) d) Fourth normal form (4NF)
Answer: First normal form (1NF)

3. The length of an IPv4 address is:
a) 32 bits b) 64 bits c) 128 bits d) 256 bits.
Answer: 32 bits

4. Which of the following address belongs class B?
a) 121.12.12.248 b) 280.12.12.248 c) 138.12.12.248 d) 192.12.82.248
Answer: 138.12.12.248

5. Which one of the following is correct syntax:
a) File*p; b) FILE*p; c) File=*p; d) FILE=*p
Answer: FILE*p;

6. Which of the following statement is not true regarding JavaScript?
a) JavaScript is a loosely typed language.
b) Javascript is an object-based language.

c) JavaScript is event driven
d) A Javascript embedded in an HTML document is compiled and executed by the client browser.
Answer: A Javascript embedded in an HTML document is compiled and executed by the client browser.

7. Which one of the following is not used to generate dynamic web pages?
a) PHP b) ASP.NET c) JSP d) None of the mentioned
Answer: None of the mentioned

8. Which of the following is not the phase of classical waterfall model?
a) Feasibility study b) Requirement Analysis c) Building Prototype
d) Maintenance
Answer: Building Prototype

9. What is cloud computing?
a) Cloud computing means providing services like storage, servers, database, networking etc.
b) Cloud computing means storing data in a database.
c) cloud computing is a tool used to create an application.
d) None of the mentioned.
Answer: Cloud computing means providing services like storage, servers, database, networking etc.

GROUP-B

Short Answer Questions

10. What is pointer? WAP to find sum of two numbers using pointer.

⇒ A pointer is a variable which holds the memory address of another variable rather than actual value. It is dynamic in nature.

```
#include <stdio.h>
#include <conio.h>
void main()
{
int a, b, sum, *p, *q;
clrscr();
printf("Enter the value of a and b:");
scanf("%d %d", &a, &b);
p = &a;
q = &b;
sum = *p + *q;
printf("The sum of two number is %d", sum);
getch();
}
```

11. What is system testing? Explain.

⇒ System testing is the process of analyzing the program, finding errors and defects in the system once the program modules are ready, each of program ~~modelue~~ modules is tested independently as per the specifications of the users and debugged. When the modules are bug free, they are integrated as a single system and this system is entirely tested.

If the entire system is bug free and fulfill the user's requirement, then it is ready to implement.

The system can be tested in two ways,

1) Black Box Testing: It is also called functional testing. The internal code of the program are tested. It is called black box testing because the testing process is totally hidden from the general users.

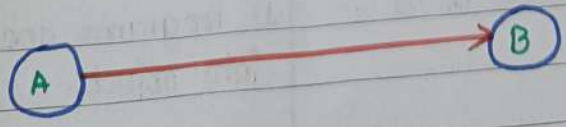
2) White Box Testing: It is also called glass box testing. ~~This~~ The structure of the program is tested. It is called white box testing. because the test process are totally visible to the general users.

Hence, system testing is the error detecting and debugging phase of system development life cycle.

12. Describe 'simplex', 'half duplex', and 'full duplex' with example.

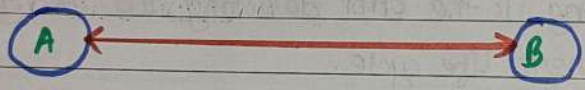
⇒ Data communication mode defines the direction of flow of information between two communication devices. 'Simplex', 'Half Duplex' and 'Full Duplex' are three types of data communication mode. They are explained below:

1) Simplex: In this model, flow of data is transmitted in only one direction similar to one way street. It provides less performance than half duplex and full duplex. The sender can only send but not receive the data and the receiver can only receive but not send the data. Example: radio & television broadcast.



2) Half Duplex: In this model, the flow of data is possible in both direction or mode of communication is bidirectional ~~or mode~~ but both devices cannot receive and transmit data at the same time. When one device is sending the data, other can only receive and vice versa. It provides better performance than simplex but less performance than full duplex. Example: walkie talkie

3) Full Duplex: In this model, flow of data is transmitted in bidirectional and both device can receive and transmit data at the same time. It provides better performance than simplex and half duplex mode.



Example: Telephone network, mobile communication, satellite communication.

Hence, simplex, half duplex and full duplex are simply the mode of data communication.

13. Differentiate between structured and object oriented programming.

⇒ Structured programming and object oriented programming are two programming paradigms. ~~They are explained below:~~ The differences between them are shown below:

Structured Programming	Object Oriented Programming
1) Programs are made as a single unit.	1) Programs are divided into objects.

Structured Programming	Object Oriented Programming
2) It is a collection of instructions which are executed by the computer sequentially.	2) It is a programming model using object and method to design application and computer program.
3) It uses top-down development process.	3) It uses bottom-up development process.
4) It uses local and global system of variable declaration.	4) It uses private and public system of variable declaration.
5) It doesnot include features like that of OOP.	5) It includes features such as data abstraction, encapsulation, inheritance and polymorphism.
6) It is more time consuming.	6) It is less time consuming.
7) It is less secure.	7) It is more secure.
8) It is difficult to add new data or function.	8) It is easy to add new data and function.
9) Maintaining and enhancing program code is difficult.	9) Maintaining and enhancing program code is easier.

14.

OR

Write down the features of PHP.

⇒ PHP is a script language that is freely available and used primarily on Linux, Web servers.

Features of PHP

The main feature of PHP is that it is an open-source scripting language, so we can free download and use it. PHP is a server scripting language. It is an open-source scripting language. It is widely used all over the world. Some important feasures of PHP are explained below:

1) Simple and faster: It is very simple and easy to use, compared to another scripting language. It is also faster than other scripting languages like. asp and JSP.

2) Loosely Typed Language: PHP supports variable usage without declaring its data type. It will be taken at the time of the execution based on the type of data it has on its value.

3) Open Source Language: Open source language means we should not pay for using PHP, we can free download and use.

4) Platform independent: PHP is available for WINDOWS, MAC, LINUX, UNIX operating system. A PHP application developed in one os can be easily executed in other os also.

5) Security: PHP is a secure language to develop the website. It consists of multiple layers of security to prevent threads and malicious attacks.

14. Write short notes on:

a) Big data: Big data refers to the large, diverse sets of information that grow at ever increasing rates. It encompasses the volume of information, the velocity or speed at which it is created and collected, and the variety or scope of the data points being covered. The types of big data are structured, unstructured and semi-structured.

b) E-commerce: E-commerce or Electronic commerce means buying and selling of goods, products or services over the internet. E-commerce is considered as transaction of money, funds and data. These business transactions can be done in four ways: Business to Business (B2B), Business to Customer (B2C), customer to Customer (C2C), Customer to Business (C2B). E-commerce is powered by the internet. Customers access an online store to browse through and place orders for products or services via their own devices.

Group C

Long Answer Questions

15. What is Jitter? Explain any four LAN Topologies.

⇒ Jitter is a change in the time it takes for a packet to travel across a network. The data packets get stuck on their way to the receiver, usually because the network is congested. They'll arrive at irregular intervals, sounding like choppy audio on a call or appearing as pixelated video on a video call when they arrive.

~~There o~~ The topologies are explained below.

1) Bus Topology

A bus topology is also known as linear topology. It consists of several computers that are connected to a common cable called a 'bus' or 'trunk', which is a backbone for the network. Coaxial cable is used in bus topology for media and T-connector is used to terminate the data.

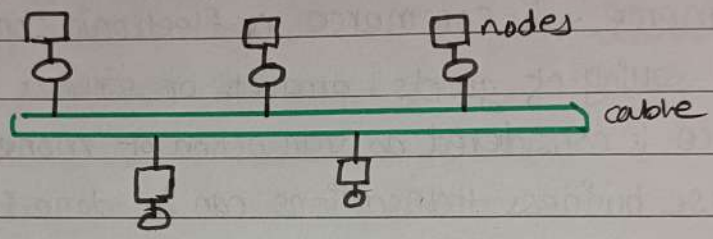


Fig: Bus Topology

Advantages

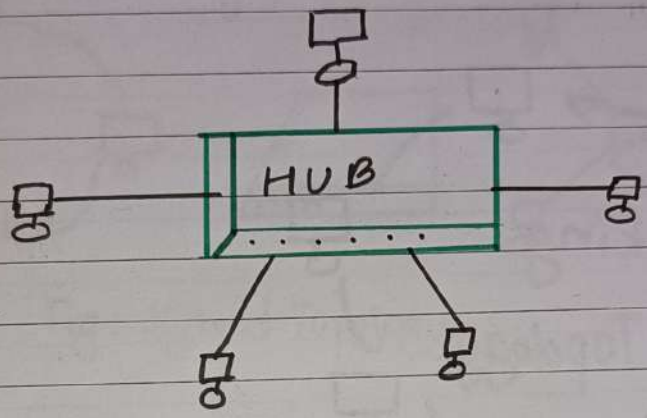
i) It is simple, reliable, easy to use and easy to understand.
ii) It is easy to add and remove of the computer.
iii) It is less expensive than other topology because it uses least amount of co-axial cable.
iv) Failure of one computer doesn't affect other.
v) It is best, if there is few numbers of computers.

Disadvantages

i) If the length of trunk is short then it will be difficult to extend the network.
ii) It is not suitable for large number of computer.
iii) Data traffic is high.
iv) There are chances of data collision.

2) Star Topology

In star topology all the computers are connected to a centrally located device called "HUB" or "SWITCH". This "hub" or "switch" are connected to a powerful central server computer. The "hub" controls traffic on the network. It is the most popular and widely used topology such as office, home, college, school etc.



Advantages

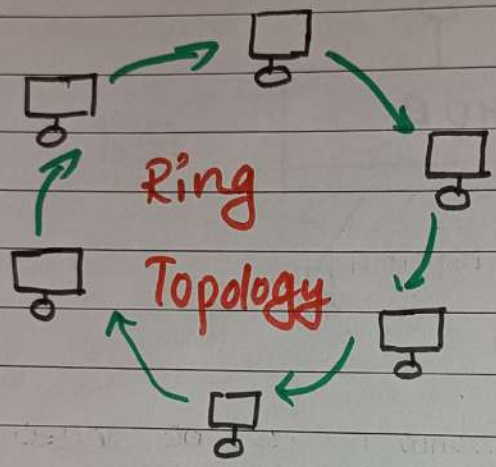
1) It is easy to add or remove computer.
2) If any computer in the network goes down then other computers can continue their functions.
3) It is easy to use and is common network topology nowadays.
4) It is highly secure system.

Disadvantages

1) If there is any problem in central hub then the entire network will be down.
2) It is expensive topology because of cables and networking device hub or switch.
3) It requires large amount of cables.

3) Ring Topology

In this topology, each node is attached with nearby computers on the point to point basis so that the entire system is in the form of ring. All the computers are connected in a closed ~~loop~~ loop. It is based on peer to peer network architecture. communication is done in single direction only.



Advantages

1) Cable length is shorter than of star topology.
2) It is simple and easy to use.
3) It has low cost for installation and expands.
4) Each computer has equal priority to communicate on network.

Disadvantages

1) failure of any one computer on the network disturbs the entire system.
2) Adding or deleting the computer disturbs the networking activity.
3) It is very difficult for troubleshooting.

4) Hybrid Topology

Hybrid Topology is the combination of two or more topologies. It is very difficult to design and implement. It is much expensive because it uses different devices in different network structure.

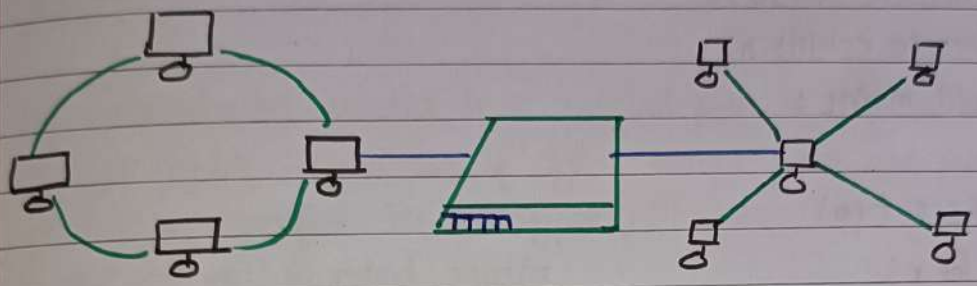


Fig: Hybrid Topology

Advantages

1) Computers in different topologies can be connected together.
2) The network size is very large.
3) Many topologies can be connected from a central point.

Disadvantages

1) There is a requirement of a technical person.
2) It is more complex than other topologies.
3) It is difficult to install and configure.
4) It requires a lot of cables.

OR

Roll, Name, Age, Marks of 100 students are ~~score~~ stored in record.txt file. WAP to display them.

```
#include<stdio.h>
#include<conio.h>
#include<stdlib.h>
void main()
{
 FILE *fp;
 int r;
 char n[20];
 int a;
 int m, i;
 fp=fopen("record.txt","r");
 if (fp==NULL)
 {
 printf("Unable to open file");
 exit(1);
 }
 else
 {
 for(i=1; i<=100; i++)
 {
 while(fscanf(fp,"%d%s%d%d",&r,n,&a,&m)!=EOF)
{
 printf("Roll no: %d",r);
 printf("Name is %s",n);
 printf("Age is %d",a);
 printf("Marks is %d",m);
 }
 }
}
```

```
fclose(fp);
getch();
}
```

16. Explain different types of guided media used in computer network.

⇒

The transmission media is a physical path or information highway through which information of signal travel from one place to another. It can be classified into two types:

1) Guided or Bounded Media
2) Un-guided or Unbounded Media.

The guided media is explained below:

Guided Media is that transmission media which uses external wires system that guides the signal to travel along the specific path guided by the cable. It is also called bounded media because the signals travelling in this media is guided form.

The transmission media can be classified into three types:

1) Twisted pair cable
2) Coaxial cable
3) fibre optic cable.

1) Twisted Pair Cable

It is the cable made up of copper wires twisted with each other. Each pair of twisted pair cable is covered with plastic insulator; the cables are coloured, so it identifies specific wire. One wire of the pair is used for transmitting data. The wires are twisted in order to reduce unwanted noise and interface from external sources. It is used for both analog

and digital transmission. The most common application of twisted pair is in the telephone system and in LAN. In LAN cables, it is available in different categories, such as CAT4, CAT5, CAT6, CAT7 depends on the bandwidth of the cable.

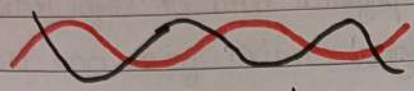


Fig: Twisted pair cable

The twisted pair cable can be further divided in UTP (Unshielded Twisted Pair) and STP (Shielded Twisted Pair)

i) UTP : UTP consists of number of twisted pairs of wires with simple plastic casing. It is easy to configure, cheap and can cover a distance of 100 meters. It has low bandwidth which is measured in Mbps.

ii) STP : STP is a wire with a copper shield. Cabling is more difficult to install and more expensive than UTP. Its bandwidth is 100 to 1000 Mbps. RJ connector is used in STP.

2) Coaxial Cable

Coaxial cable is a cable consisting of a solid copper wire as a central core then covered with PVC insulation materials. The insulation material is covered by a cylindrical mesh of wire. Finally, the braided mesh of wire is covered with plastic jacket. The coaxial cable is more expensive as compared to twisted pair cable and it is difficult to install. It has high bandwidth and transmits data from

few meters to kilometers. It is commonly used in cable television.

Coaxial cable can be further divided into thin net and thick net.

i) Thin-net: It is also known as 10 Base 2 which refers to the specifications of thin-net coaxial cable carrying 10 Mbps signal maximum upto 200 metres. It is flexible and easy to use. It is popularly used in Bus Topology.

ii) Thick-net: It is also known as 10 Base 5 which refers to the specifications for thick net coaxial cable carrying 100 mbps signal upto 500 metres. It is about half an inch thick. It is most popular in cable TV network.

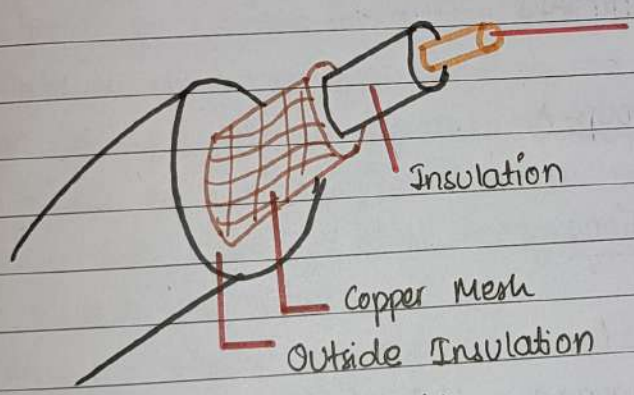


Fig: Coaxial Cable

3) Optical ~~Fibre~~ Fiber Cable

Optical Fiber cable is made of glass or plastic and transmits signals in the form of light. The plastic or glass cable is a light conducting material. So, it propagates light from one place to another. It is covered with low refractive index glass or plastic cladding. The cladding is covered with plastic insulation. Optical fiber is extremely fast because it can transmit the signal at the speed of light. It is suitable for long distance data transmission. It has very high

bandwidth, so we can transmit bulk amount of data. It is also more secure than other cables.

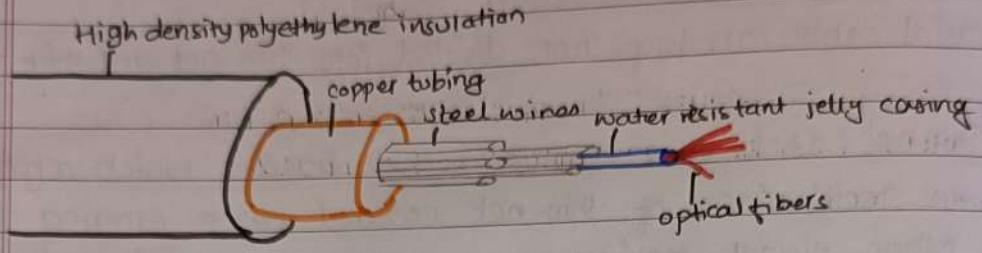


Fig: Optical Fiber Cable

In this way, twisted pair, coaxial cable and optical fiber cable are three types of guided transmission media.

Set - III

Group-A

Multiple Choice Questions

1. The full form of DML is
   a) Dynamix Mixing Language b) Detailed Markup Language
   c) Data Manipulation Language d) Digital Manipulation Language
   Answer: Data Manipulation Language

2. Which of the following command is a type of DDL command?
   a) Create b) Update c) Delete d) Grant
   Answer: Create

3. A device used to connect two networks having different protocols.
   a) Repeater b) Hub c) Bridge d) Gateway
   Answer: Gateway

4. A transmission media can have signal impairments because of:
a) Noise b) Attenuation c) Distortion d) All
Answer: All (Noise, Attenuation, Distortion)

5. Which function is used to read data from a file.
a) fputs() b) scanf() c) fscanf() d) fprintf()
Answer: fscanf()

6. www is based on which model?
a) Local-server b) client-server c) 3-tier d) None of these
Answer: Client-server

7. What are cookies?
a) Cookies are text files stored on the client computer and they are kept for various information tracking purpose.
b) Cookies are binary files stored on the server computer and they are kept for various information tracking purpose.
c) Cookies are binary files stored on the client computer and they are kept for data storage purpose.
d) None of the above.
Answer: Cookies are text files stored on the client computer and they are kept for various information tracking purpose.

8. Problem identification is a step in software development life cycle.
a) First b) Second c) Third d) Last
Answer: First

9. What is Artificial Intelligence?
a) A field that aims to make humans more intelligent
b) A field that aims to improve the security.
c) A field that aims to develop intelligent machines.
d) A field that aims to mine the data.
Answer: A field that aims to develop intelligent machines

Group B

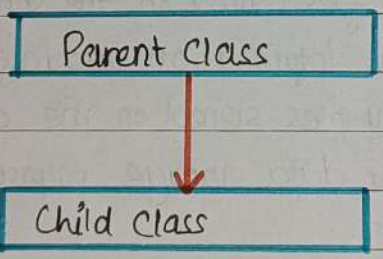
Short Answer Questions

10. What is inheritance in OOP? Explain its type.

⇒ Inheritance is the process of creating new class i.e. derived class from base class. In OOP, the concept of inheritance provides the idea for reusability. Inheritance in OOP is a hierarchy of class in which some properties of base class is transferred into derived class. It is property that allows the reuse of an existing class to build new class. There are five types of inheritance explained below:

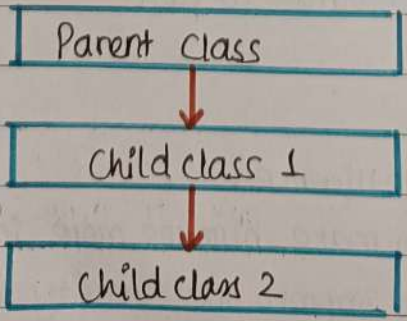
1) Single Inheritance

If a child is built from only one parent class then this type of inheritance is called single inheritance.



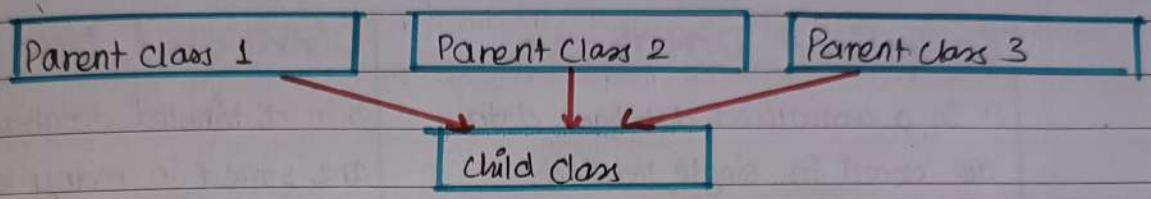
2) Multilevel Inheritance

The process of creating a new class from another child class are called multilevel inheritance.



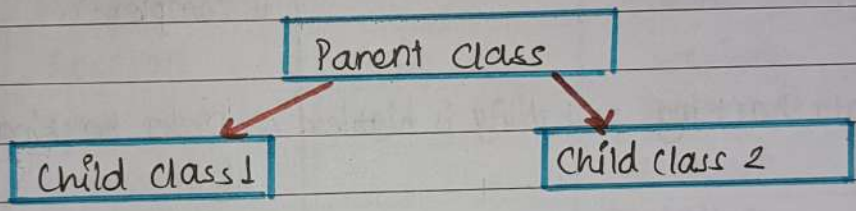
3) Multiple Inheritance

If a child class is built from two or more than two parent classes, then this type of inheritance is called multiple inheritance.



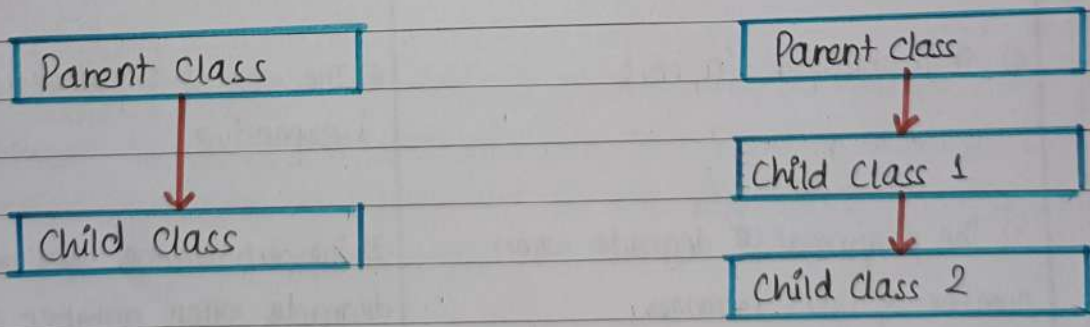
4) Hierarchical Inheritance

The process of creating several child classes from only one parent class is hierarchical inheritance.



5) Hybrid Inheritance

It is the combination of two or more types of inheritance.



In this way, single, multiple, multilevel, hierarchical and hybrid inheritance are the types of inheritance.

11. Differentiate between centralized and distributed database.

⇒ Centralized database architecture and distributed database architecture are two types of database architecture. Although both of them are arrangement of database, they are different from each other. They are differentiated below:

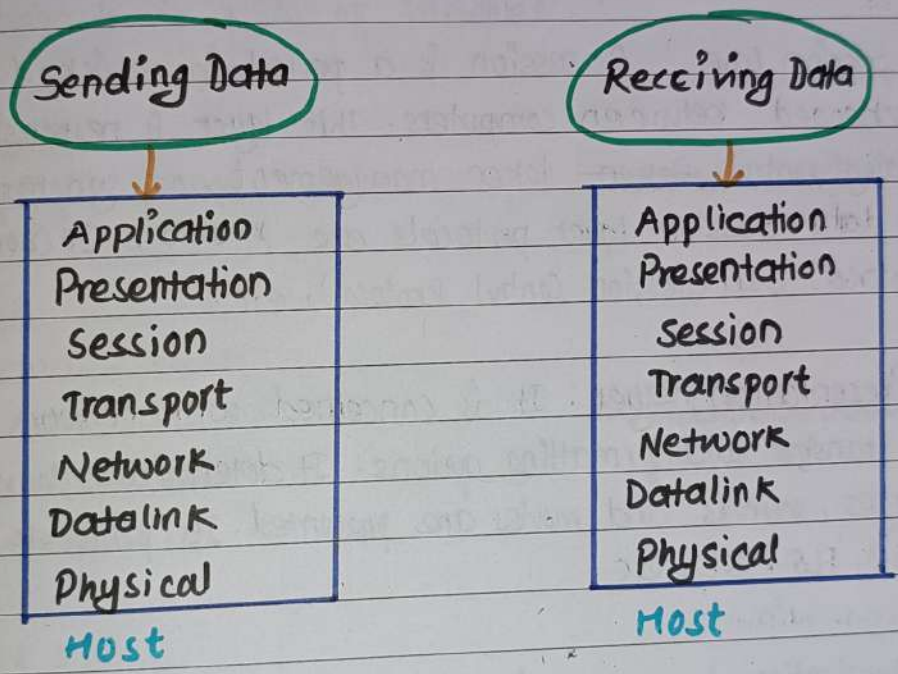
Centralized Database	Distributed Database
1) In a centralized database, data are stored in single location.	1) In distributed database, data are stored in many location.
2) Data traffic is high.	2) Data traffic is low.
3) Maintenance of database is easy.	3) Maintenance of database is complex.
4) Data hacking probability is ~~high~~less	4) Data hacking probability is high.
5) It is suitable for small organizations.	5) It is suitable for large organizations.
6) It is cheaper in cost.	6) The cost of implementation is expensive.
7) The performance degrades when number of users increases.	7) The performance does not degrade when number of user increases.
8) If any problem arises in one part of database, the whole system is affected.	8) If any problem arises in one part of database, other part remain unaffected.

12. ⇒

12. Explain OSI reference model for data communication.

Ans Open System Interconnection (OSI) model is the primary model of network communications developed by International standard Organization in 1984. It provides a logical framework for data communication process.

This model divides data communication process into seven groups and layers.



1) Physical Layer : It defines techniques to transfer bit stream to cable and transmits raw bit strecum over physical cable. Example of hardware in the physical layer are repeater, hub, modem etc.

2) Datalink layer : It is responsible for moving frames from one node to another node. Datalink protocols are point to point protocols (PPP), High-level Datalink control (HDLC).

3) Network Layer: It is responsible for delivery of packets from source host to destination host. Network layer protocols are IP (Internet Protocol), IPX (Internet Packet Exchange)

4) Transport Layer: It is responsible for delivery of message from one application to another application. Transport layer protocols are TCP (Transmission Control Protocol), UDP (User Datagram Protocol)

5) Session Layer: A session is a period in which data can be exchanged between computers. This layer is responsible for dialog control, ~~taken~~ token management and synchronization of data. Session layer protocols are X.225, IP (Zone Information Protocol), SCP (Session Control Protocol), etc.

6) Presentation Layer: It is concerned with network security, file transfer and formatting options. It determines how graphic, images, sounds and movies are presented. Its protocols are XDR, TLS, SSL, etc.

7) Application Layer: It is completely user oriented layer which is used by end user software such as web browser and email clients. Its protocols are HTTP, Telnet, FTP, SMTP, DNS etc.

Thus, OSI model represents the communication process in a network.

13. Explain fscanf() and fprintf() functions with syntax and example.

⇒ fscanf() and fprintf() are two important functions of file handling in C programming.
They are explained below.

fscanf()

It is used to read characters from the file and assigns the input to do a list of variables.

Syntax

```
fscanf (file_pointer, "format specifiers", variable_list);
```

Example

```
#include<stdio.h>
#include<conio.h>
#include<stdlib.h>
 void main()
{
 FILE *fp;
 char name[100];
 int age, i;
 float salary;
 fp = fopen("emp.txt", "r");
 if (fp == NULL)
{
 printf("Unable to open file");
 exit(1);
}
 while (fscanf(fp, "%s %d %f", name, &age, &salary) != EOF)
{
 printf("%s \t \t %d \t %f \n", name, age, salary);
```

```
}
fclose(fp);
}
```

fprintf()

It is used to write string to the file pointed to by file pointer. The string can include format specifier and a list of variables.

Syntax

```
fprintf (file_pointer, "format_specifier", variable);
```

Example

```
#include <stdio.h>
#include <conio.h>
 void main()
{
  FILE *fp;
 char name[100];
  int age, i;
 float salary;
fp = fopen ("emp.txt", "w");
printf ("Enter name :");
scanf ("%s", name);
printf ("Enter age :");
scanf ("%d", &age);
printf ("Enter the salary :");
scanf ("%d", & salary);
fprintf (fp, "%s\t %d\t %f\n", name, age, salary);
}
fclose(fp);
}
```

Thus, fscanf() is used to read data from file and fscanf() is used to write data to file.

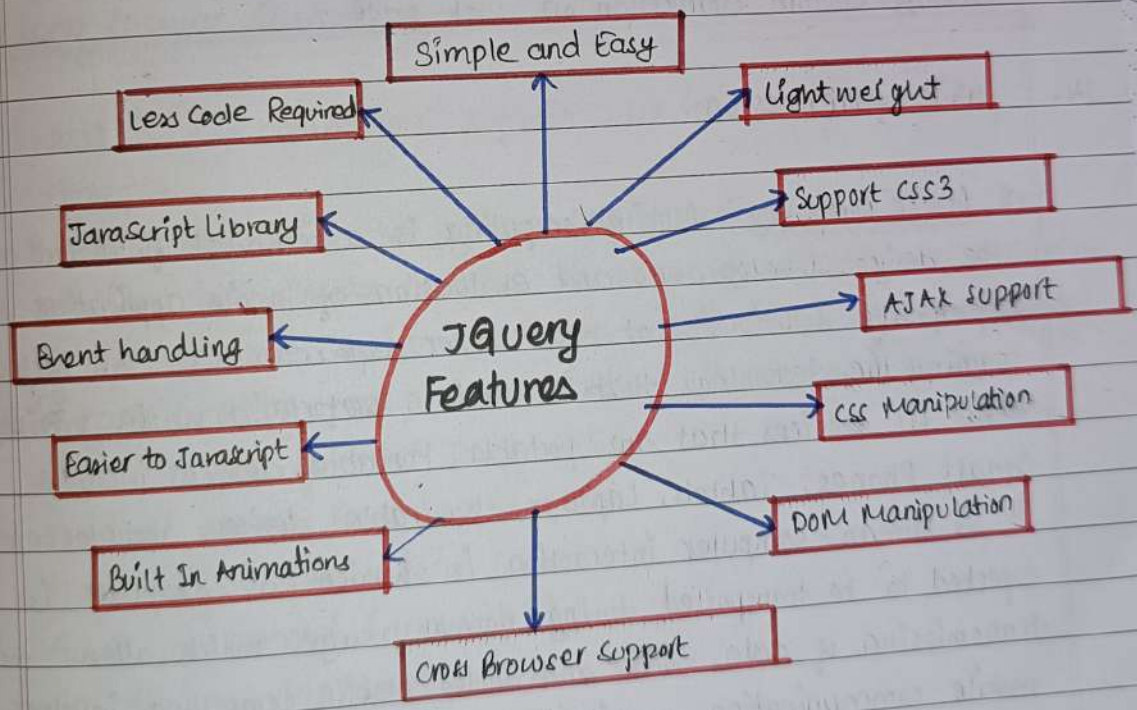
OR

What are the features of JQuery.

⇒ JQuery is an open-sourced Javascript library that simplies creation and navigation of web applications. Specially, JQuery simplifies HTML Document Object Model manipulation, Asynchronous JavaScript and XML and event handling.

Features of JQuery

JQuery is the Library of JavaScript. It is simple and easy to learn. For performing any task Jquery requires less code compare to Javascript.



1) Simple and Easy: It has predefined method using we can perform any task easily compare to Javascripland it is easy to learn.

2) Lightweight: It is very lightweight library i.e. about 19 KB in size.

3) Cross browser support: It support all modern web-browser webbrowser including IE-6.

4) Event handling: It support event handling like click mouse button.

5) Javascript library: It is javascript library.

6) Ajax Support: It supports ajax, we can develop a responsive and feature-rich site using AJAX technology.

7) Built in Animation: It have predefined method "animate()" for creating custom animation on web-page.

14. Write short notes on:

a) Mobile Computing: Mobile Computing is a technical field that covers the design, development and evaluation of mobile applications using appropriate solutions that meet user requirements. This includes learning the technology that is used to perform a wide variety of tasks on devices that are portable. Portable devices include Smart Phones, Tablets, Laptops, wearable devices, vehicles etc. It is human-computer interaction in which a computer is expected to be transported during normal usage, which allows for the transmission of data, voice, and video. Mobile computing involves mobile communication, mobile hardware and mobile software.

b) Robotics: Robotics is a branch of engineering that involves the conception, design, manufacture and operation of robotics. The objective of the robotics field is to create intelligent machines that can assist human in a variety of ways. Robotics can take on a number of forms. A robot may resemble a human, or it may be in the form of a robotic application, such as robotic process automation, which simulates how humans engage with software to perform repetitive, rules-based task.

Group C

Long Answer Questions

15. What is normalization? Explain 1NF, 2NF and 3NF with example.

⇒ Normalization is the process of breaking down complex relations into simple relation. It helps to simplify the structure of a table and avoid undesirable anomalies. Moreover, it helps in faster sorting and index creation. There are 6 types of normal ~~po~~ forms. They are:

1) First Normal Form (1NF)
2) Second Normal Form (2NF)
3) Third Normal Form (3NF)
4) Boyce Code Normal Form
5) Fourth Normal Form (4NF)
6) Fifth Normal Form (5NF)

1) First Normal Form (1NF)

A relation (R) is said to be in 1NF, if it's all attributes are atomic i.e. in every tuple of the relation (R), each attribute must have a value. It minimizes data redundancy in the database table.

Basic Rules

- The data fields should be atomic
- It eliminates duplicate rows and columns from the same table.
- It minimizes the data redundancy in the database table.

Example

Roll No	Name	Grade	Subjects	Marks
M101	Ram	XI	English	30
			Account	40
M102	Ashesh	XII	English	70
			Economics	67

Fig: Un-normalized table

Roll NO	Name	Grade	Subjects	Marks
M101	Ram	XI	English	30
M101	Ram	XI	Account	40
M102	Ashesh	XII	English	70
M102	Ashesh	XII	Economics	67

Fig: Using 1NF

2) Second Normal form (2NF)

A relation (R) is said to be in second normal form if it is in first normal form and each non key attribute is functionally dependent on the entire primary key.

Basic Rules

- It should be in First Normal Form (1NF)
- It identifies data dependencies.
- Non-key attributes are functionally dependent on primary key.

Example

Teacher ID	Subject	Teacher-Age
101	Physics	30
102	Biology	34
105	Math	31
108	English	52

Table 1 : tbl-teacher (1 NF)

Teacher ID	Subject
101	Physics
102	Biology
105	Math
108	English

Table 2 : tbl-subject

Teacher ID	~~Age~~ Teacher-Age
101	30
102	34
105	31
108	52

Table 3 : tbl-age

3) Third Normal Form (3NF)

A relation (R) is said to be in Third Normal Form, if and only if it is in 2NF and it removes transitive dependency in a table.

When an indirect relationship causes functional dependency it is called transitive dependency. If $X \rightarrow Y$ and $Y \rightarrow Z$ is true, then $X \rightarrow Z$ is a transitive dependency.

Basic Rules

- It should be in second Normal Form (2NF).
- It eliminates transitive dependency.

Example

Faculty-ID	Name	Dept.	Dept. Head
101	Rajesh	Account	Prakash
102	Roshan	Computer	Rabindra

Table 1: tbl-faculty info

Faculty-ID	Name	Dept.
101	Rajesh	Account
102	Roshan	Computer

Table 2: tbl-faculty

Dept	Dept-Head
Account	Prakash
Computer	Rabindra

Table 3: tbl-department

OR

Define structure. WAP to find the factorial of a number using recursion.

⇒ Structure is defined as a heterogeneous collection of data types grouped together with a common name. It is also called user-defined data type in C. It is a tool for handling a group or logically related data items.

```
#include <stdio.h>
#include<conio.h>
int fact(int);
void main()
int {
    int n, x;
printf("Enter the value of n:");
scanf("%d", &n);
x=fact(n);
printf("The factorial number is %d", x);
getch();
}
int fact(int n)
{
int r;
if (n==0)
r=1;
else
r = n * fact(n-1);
return r;
}
```

16. Explain prototype and Agile models of software development process.

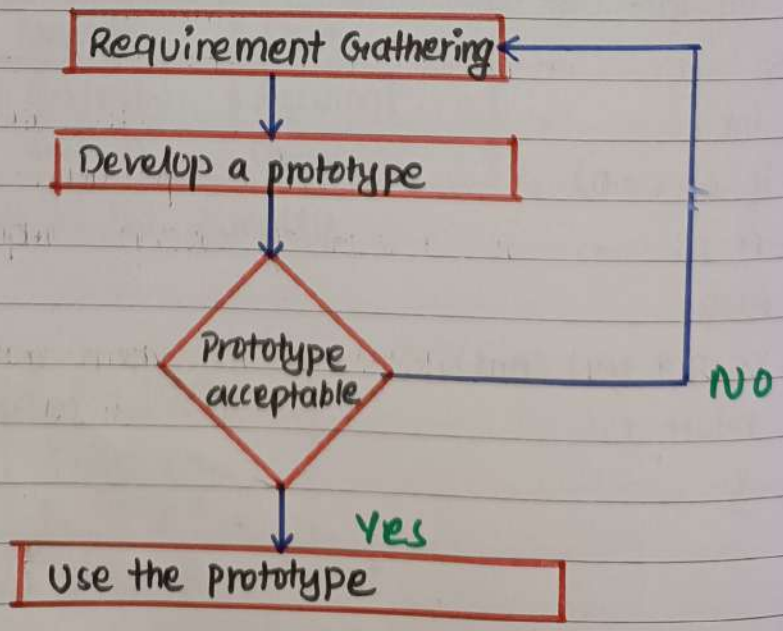
⇒ Software Development models are the models that define the process and flow in which the project needs to be carried out. Some of the software development models are:

1) Waterfall model
2) Prototype model
3) Agile model
4) Iterative Model
5) Spiral Model
6) V-Model

Prototype and Agile models are explained below:

Prototype Model

Prototype is the iterative model of software development which is more acceptable where there is no clear idea about requirements, inputs and outputs. The model is twice time more expensive than other models. These system are continuously modified until the user is satisfied.



Advantages

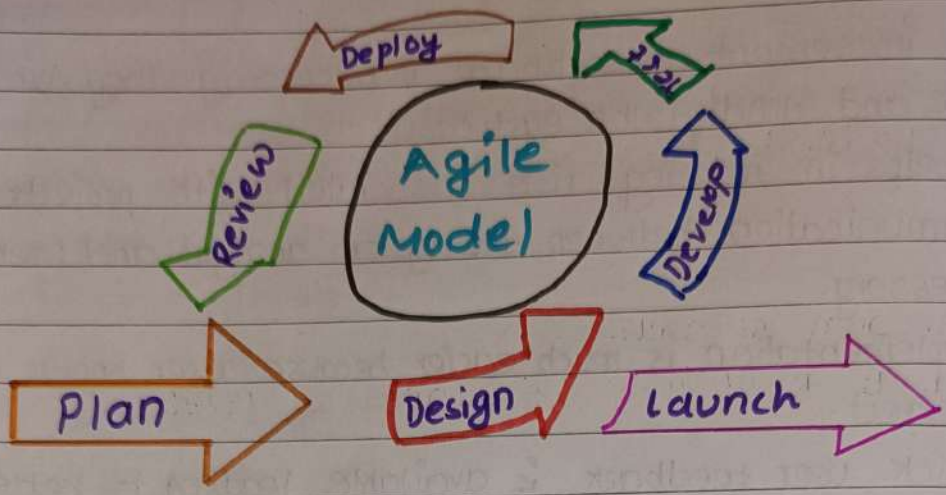
- User involvement for software is necessary. They can suggest, change and modify the system.
- It helps in reducing risk associated with projects.
- Communication between the system analyst and user is necessary.
- Implementation is much easier because user knows what to expect.
- Quick user feedback is available leading to better solution of the system.

Disadvantages

- It is time consuming and expensive. If the user is not satisfied by the prototype then a new prototype is developed.
- Too many changes can disturb the development team.
- Too much involvement of client is not always prefered by the developer.

Agile Model

The agile model is one of the simplest and effective process to turn a vision for a business need into software solutions. The agile model was primarily designed to help a project to adapt to change requests quickly. So, the main aim of the Agile model is to facilitate quick project completion. In the agile model, the requirements are decomposed into many small parts that can be incrementally developed. The Agile model adapts iterative development. Each iteration is intended to be small and easily manageable and that can be completed within a couple of weeks only.



Advantages

- New features can be added easily.
- It allows more flexibility to adopt the changes.
- Working software is delivered frequently.
- Face-to-face communication with clients.
- It reduces total development time of the whole projects.
- Anytime changes are acceptable.

Disadvantages

- It needs experience and highly skilled resources.
- It has lack of formal documentation.
- If a customer is not clear about the product they want, then the project will fail.
- Transfer of technology to new team members may be quite ~~changing~~ challenging due to lack of documentation.

Hence, prototype and agile model are two software development models.

Set-IV

Group A

Multiple Choice Questions

1. Which of the following SQL statement is used to DELETE rows from a database table?
a) DELETE b) REMOVE c) DROP d) CLEAR
Answer: DELETE

2. A field that is used to uniquely define a particular record in a table is called:
a) Primary key b) Entity c) Relationship d) Constraints
Answer: Primary key

3. What does "MAC" stands for in MAC address?
a) Mandatory Access Control b) Media Access Control
c) Micro Access Control d) Media Access certificate
Answer: Media Access Control

4. What is the correct syntax for referring to an external JavaScript script?
a) <script src = "myscript.js"></script> b) <script href = "myscript.js"></script>
c) <js href = "myscript.js"></ns> d) <js src = "myscript.js"></js>
Answer: <script src = "myscript.js"></script>

5. Which of the following is the correct way of defining a variable in PHP?
a) $ variable name = value; b) $ variable-name = value;
c) $ variable_name = value d) $ variable name as value;
Answer: $ variable_name = value;

6. What is the output of C program?
void main() { int b = 25;
//b memory location = 1234;
int *p; p = &b; printf("%d %d", &b, p); }
a) 25 25 b) 1234 1234 c) 25 1234 d) 1234 25
Answer: 1234 1234

7. Which feature of OOP is illustrated the code reusability?
a) Polymorphism b) Abstraction c) Encapsulation d) Inheritance
Answer: Inheritance

8. Which of the following is the discovering requirement from a user in the requirement collection process?
a) Feasibility study b) Requirement Elicitation
c) Requirement Specification d) Requirement validation
Answer: Requirement Elicitation.

9. What devices are detecting and responding to changes in an environment that are embedded in smart phones and an integral part of the Internet of Things (IOT)?
a) Wi-Fi b) Barcode c) RFID d) Sensors
Answer: Sensors

Group-B

Short Answer Questions

10. Differentiate the centralized and distributed database system.

⇒ Repeated Question from set - III. Solved in page number 42

OR

What are the purposes of normalization? Give an example of 2NF.

⇒ Normalization is the process of breaking down complex relation into simple relation. Following are the purposes of normalization:

1) to reduce data redundancy.
2) to improve faster sorting and index creation.
3) to simplify the structure of table.
4) to improve the performance of the data system.
5) to avoid undesirable insertion, update and deletion anomalies.
6) to not affect other relations in database when a row is added to a relation.

Second Normal Form

A relation (R) is said to be in Second Normal Form (2NF) if it is in First Normal Form and each non-key attribute is functionally dependent on the entire primary key.

Example of 2NF

Teacher-ID	Subject	Teacher Age
101	Accounts	52
105	Economics	48
108	Computer	25
109	Maths	32

Fig: Unnormalized Form

Teacher-ID	Subject
101	Accounts
105	Economics
108	Computer
109	Maths

Fig: 2NF-1

Teacher-ID	Teacher Age
101	52
105	48
108	25
109	32

Fig: 2NF-2

11. Write a program to find the factorial of any given number using JavaScript.

⇒

```
<html>
<head>
<script>
function show()
{
  var i, no, fact;
 fact = 1;
 no = Number(document.getElementById("num").value);
 for (i=1; i<=no; i++)
 {
  fact = fact*i;
 }
 document.getElementById("answer").value=fact;
 }
```

```
</script>
</head>
<body>
Enter Num: <input id = "num">
<button onclick = "show()"> Factorial </button>
<input id = "answer">
</body>
</html>
```

OR

How do you fetch data from database in PHP and display it in form? Describe.

Data is one of the important assets for any business. It is a significant resource in any organization, and for certain organizations, it is one of the main resources. The manner in which we store our information assumes a significant function in its simply entry, use and security.

To add, access, and perform operations on data, we need a database management system. MySQL is the most popular and widely used Open Source Relational DBMS.

~~To fetch~~ As we know, Database is a collection of tables that stores data in it. To fetch data from MySQL database it is simple to do, using "MySQL "select" query in PHP.

MySQL select Query

```
SELECT column-name(s)
FROM table-name
```

PHP

$query = mysql_query("select * from tablename", $connection);

for this, we must have a database in MySQL. Here, we have a database named "company" which consists of a table named "employee" with 5 fields in it.

Next, we have created a PHP ~~form~~ page named "updatephp.php" where following steps will be going to perform:

- **We first establish connection with server**

```
$connection = mysql_connect("localhost", "root", "");
```

- **Select database**

```
$db = mysql_select_db("company", $connection);
```

- **Executes MySQL select query**

```
$query = mysql_query("select * from employee", $connection);
```

- **Display fetched data**

```
<span> Name: </span> <? php echo $ row1 ['employee_name']; ?>
<span> E-mail: </span> <? php echo $ row1 ['employee_email']; ?>
<span> Contact No: </span> <? php echo $ row1 ['employee_contact']; ?>
<span> Address: </span> <? php echo $ row1 ['employee_address']; ?>
```

- **Closing connection with server**

```
mysql_close ($connection);
```

12. Compare the OOPs and procedural programming language.

OOP and POP are two types of programming language. They are compared below:

OOP	POP
1) Programs are divided into objects.	1) Programs are divided into functional modules.
2) OOP is programming model using object and methods to design application and computer program.	2) POP is collection of instruction which are executed by the computer sequentially.
3) It uses bottom up development process.	3) It uses top down development process.
4) It uses private and public system of variable declaration.	4) It uses local and global system of variable declaration.
5) Maintaining and enhancing program code is easier.	5) Maintaining and enhancing program code is difficult.
6) It is less time consuming.	6) It is more time consuming.
7) It is more secure.	7) It is less secure.
8) It is easy to add new data and function.	8) It is difficult to add new data and function.
9) It is easy to reuse program code.	9) It doesn't contain a proper mechanism for reusing Program code.

13. What are the major activities performed to design the software? Describe.

⇒ Inorder to design a software, there are some steps that must be followed. They are explained below:

1) System Study: It involves the preparation of system proposal which list the problem definition, objectives of the study, expected benefits of the new system etc. The system proposal is prepared by the system analyst.

2) System Analysis: It is concerned with identifying problems, examine strengths and weaknesses of the old system and to overcome these drawbacks in the new system.

3) System Design: It is the architectural phase of software designing in which the aspects like input, process, output, data etc. should be designed by using different system design tools.

4) System Development: The phase is all about converting the logical diagram of system into program using different programming language like C, C#, C++, Java, .net etc.

5) System Testing: It is the process of analyzing the program, finding errors and defects in the system. If the entire system is bug free and fulfill the user's requirement, it is ready to implement.

6) System Implementation: It involves testing the installed system, converting from the old system into the new one and training the users.

14. ⇒

7) Maintenance and review: It involves correcting the errors which were not disclosed in earlier stage of the life cycle. It is necessary because the requirements of organization change with time.

Thus, these are seven major activities performed to design the software.

14. Explain the popular five-application areas of AI.

⇒ Artificial Intelligence (AI) is the machine-displayed intelligence that simulates human behaviour or thinking and can be trained to solve specific problems.

Application Areas of AI

AI is being used in different fields like Education, E-commerce, Robotics, Healthcare, Agriculture, Graming, Automobiles, Social media, Marketing, Chatbots, Finance etc. Some of them are explained below:

1) Education: Although the education sector is the one most influenced by humans, Artificial Intelligence has slowly begun to seep its roots in the education sector as well. Even in the education sector, this slow transition of AI has helped increase productivity among faculties and helped them concentrate more on students than office or administration work.

2) Robotics: Robotics is another field where AI applications are commonly used. Robots powered by AI use real-time updates to sense obstacles in its path and pre-plan its journey instantly. It can be used for: carrying goods in hospitals, factories and warehouse, cleaning offices and large equipment, Inventory management etc.

3) Agriculture: AI is used to identify defects and nutrient deficiencies in the soil. This is done using computer vision, robotics and machine learning applications. AI bots can help to harvest crops at a higher volume and faster pace than the human laborers.

4) Automobiles: AI is used to build self-driving vehicles. AI can be used along with the vehicle's camera, radar, cloud services, GPS, and control signals to operate the vehicle. AI can improve the in-vehicle experience and provide additional systems like emergency braking, blind spot monitoring and driver assist steering.

5) Gaming: Another sector where AI applications have found prominence is the gaming sector. AI can be used to create smart, human-like NPCs to interact with the players. It can be used to ~~create smart~~ Predict, human behavior using which game design and testing can be improved.

Group 'C'

Long Answer Questions

15. Compare the star and ring topology with pros and cons. Which of data communication cable is more ~~applicable to~~ appropriate to design the local area network?

⇒ Topology is the physical arrangement of the computer system which is connected to each other through communication medium.

The star and ring topology are compared below:

Star Topology	Ring Topology
1) The computers are connected to a centrally ~~connected~~ located device called "Hub" and "switch".	1) The computers are connected with nearby computers on point to point basis.
2) It is easy to add or remove computers.	2) Adding or deleting the computer disturbs the network activity.
3) The hub or switch are connected to a powerful central server.	3) There is no use of a central server.
4) Communication process is bidirectional.	4) Communication process is unidirectional.
5) It is based on client-server architecture.	5) It is based on peer to peer network.
6) It is easier to troubleshoot.	6) It is difficult to troubleshoot
7) It uses more cable than ring topology.	7) It uses less cable than star topology.
8) The data traffic is high in central device.	8) The data traffic is reduced due to unidirectional flow of data.

Twisted Pair cable is the most appropriate data communication cable to design the local area network. In LAN, twisted pair cables are available in different categories such as CAT4, CAT5, CAT6, CAT7 depends on the bandwidth of cable.

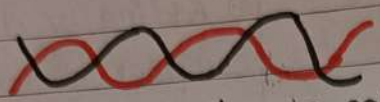


Fig: Twisted pair cable

Twisted Pair cable is made up of copper wires twisted with each other. Each pair of twisted pair cable is covered with plastic insulator, the cables are coloured, so it identifies specific wire. It is used for both analog and digital transmission.
There are two types of twisted pair cable:
1) Unshielded Twisted Pair (UTP)
2) Shielded Twisted Pair (STP)

In LANs, STP are mostly used. It is a wire with a copper shield. Cabling is difficult to install and more expensive than UTP. Its bandwidth is 100 to 1000 Mbps. RJ45 connector is used in STP. It provides better protection against EMI (Electromagnetic Interference).

16. What is structure? Write a program to input roll, name and age of 5 students and display them properly using structure.

Structure is defined as a heterogeneous collection of different data types grouped together with a common name. It is a tool for handling a group or logically related data.

```
#include<stdio.h>
#include<conio.h>
 struct student
{
 int r;
 Char n[20];
 int a;
 }s[5];
 void main()
{
 int i;
for(i=0; i<5; i++)
{
 printf("Enter the roll no:");
 scanf("%d", &s[i].r);
 printf("Enter the name:");
 scanf("%s", s[i].n);
 printf("Enter age:");
 scanf("%d", s[i].a);
 }
printf("The output is:\n");
for(i=0; i<5; i++)
{
printf("Roll no: %d\n", s[i].r);
```

```
printf("Name : %s \n", s[i].n);
printf(" Age: %d \n", s[i].a);
}
getch();
}
```

OR

Write a C program to enter ID, employee name, and post of the employee and store them in a data file named "emp.txt". Display each record on the screen in an appropriate format.

```
#include <stdio.h>
#include <conio.h>
    void main()
{
    FILE *fp;
    int emp-id;
     char name[30];
     char post[30];
    fp = fopen("emp.txt", "w");
    scanf("%d", &emp-id);
    printf("Enter the Employee ID : ");
    scanf("%d", &emp-id);
    printf(" Enter the employee name:");
    scanf("%s", name);
    printf(" Enter the post : ");
    scanf(" %s", post);
    printf(" Employee ID : %d
    fprintf(fp, " %d %s %s", emp-id, name, post);
     fclose(fp);
```

```
fp = fopen("emp.txt", "r");
printf ("Employee ID is : %d", emp.id);
printf (" Employee Name is : %s", name);
printf (" Post is : %s", post);
 fclose (fp);
  getch ();
  }
```

THE END

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