

Q.1. Explain the breadth first search graph traversal algorithm?

Ans. BFS graph data structure को traverse तथा search करने की algorithm.

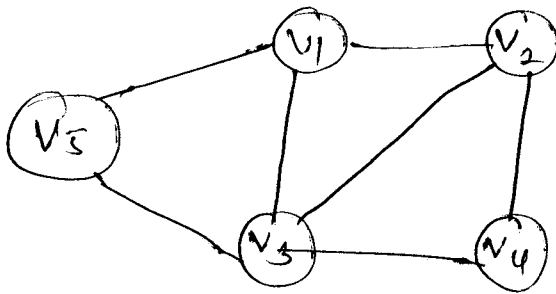
इसका प्रयोग graph में shortest path को ढूँढने तथा puzzle गेम्स को solve करने के लिए किया जाता है।

Data structure में BFS को implement करने के लिए Queue का प्रयोग किया जाता है।

BFS में पहले किसी भी एक node को visit किया जाता है तथा उसके बाद उसके adjacent के nodes को visit किया जाता है।

इसके बाद इन adjacent nodes के सभी adjacent nodes को visit किया जाता है और यह प्रक्रिया तब तक चलती है जब तक कि सभी nodes को visit नहीं कर लिया जाए।

eg.



Adjacent matrix. to solve BFS

Vertex	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>4</sub>	V <sub>5</sub>
V <sub>1</sub>	0	1	1	0	1
V <sub>2</sub>	1	0	1	1	0
V <sub>3</sub>	1	1	0	1	1
V <sub>4</sub>	0	1	1	0	0
V <sub>5</sub>	1	0	1	0	0

Q. 2... Explain Dijkstra's algorithm for finding the shortest path in a given graph?

Ans. Dijkstra's Algorithm :-

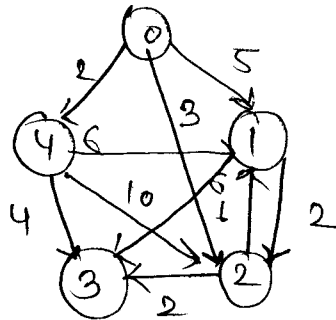
Dijkstra's algorithm का उपयोग data structure में shortest path को find करने के लिए किया जाता है। यह source to destination graph में सभी nodes को consider करता है। इसे single source shortest path problem भी कहते हैं।

```

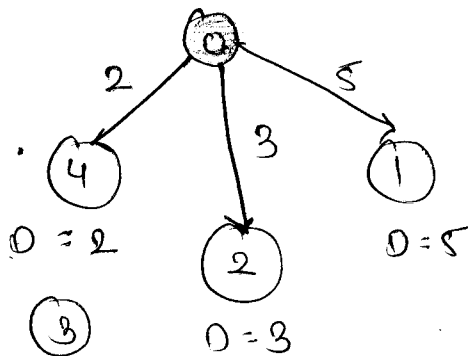
Declaration :- typedef struct t_graph {
    int n_nodes;
    int D[V];
    int visited[V];
    int path[V];
    int adj_matrix[V][V];
} graph;

```

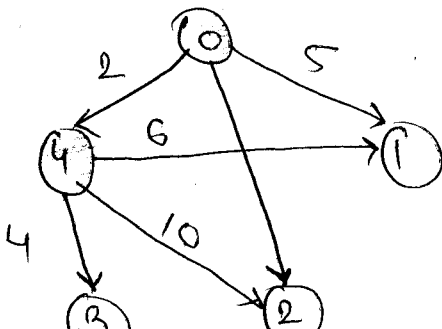
Given Graph :-



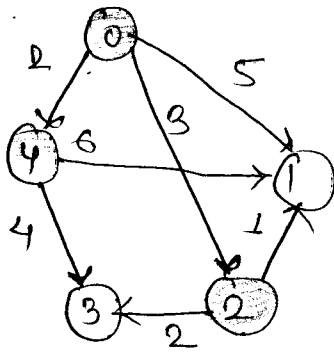
Step 1 Initial Start with source vertex 0



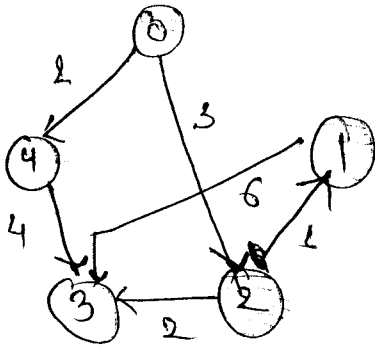
Step 2. choose closest node to 0.



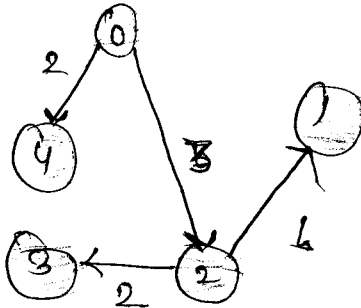
Step 3. Choose closest node to 4.



Step 4. Choose the closest node from 4 to 2.



Step 5. Choose the node from 2 to 1.



Shortest path  $2 + 3 + 2 + 1 = 8$

Q.3. What is hashing? Explain different types of hashing functions.

Ans. Hashing is a process of converting characters or a group of characters into a fixed length value or key. The process of generating a key from a value or key is called hashing.

Hashing is a process of generating a key from a value or key. For this purpose, various functions are used. Message or data is hashed using an algorithm to generate a hash value.

Hashing algorithm of Hash function of क्या जाता है।

There are three types of hashing functions.

- 1) The division method
- 2) Mid square method
- 3) Folding method.

1) The division method :- one of the most widely accepted hashing function is the division method, which is defined as follows.

Assume a table with 8 slots.

Hash key = key % table size

4 = 36 % 8  
 2 = 18 % 8  
 0 = 72 % 8  
 3 = 43 % 8  
 6 = 6 % 8

[0]	72
[1]	
[2]	18
[3]	43
[4]	36
[5]	
[6]	6
[7]	

2) Mid Square Method :- In this method, a key is multiplied by itself and the address is calculated by selecting an appropriate number of bits or digits from middle of the number.

K = 1234  
 K<sup>2</sup> = 1234 x 1234  
 = 1522756  
 H(K) = 227

3) Folding method :- In this method key k is partitioned into numbers of parts.

K = 356942781  
 Parts: K<sub>1</sub> = 356, K<sub>2</sub> = 942, K<sub>3</sub> = 781  
 Fold shifting: K<sub>1</sub> = 356, K<sub>2</sub> = 249, K<sub>3</sub> = 781  
 356 + 249 + 781 = 1386  
 Fold Boundary: K<sub>1</sub> = 653, K<sub>2</sub> = 942, K<sub>3</sub> = 187  
 653 + 942 + 187 = 1782

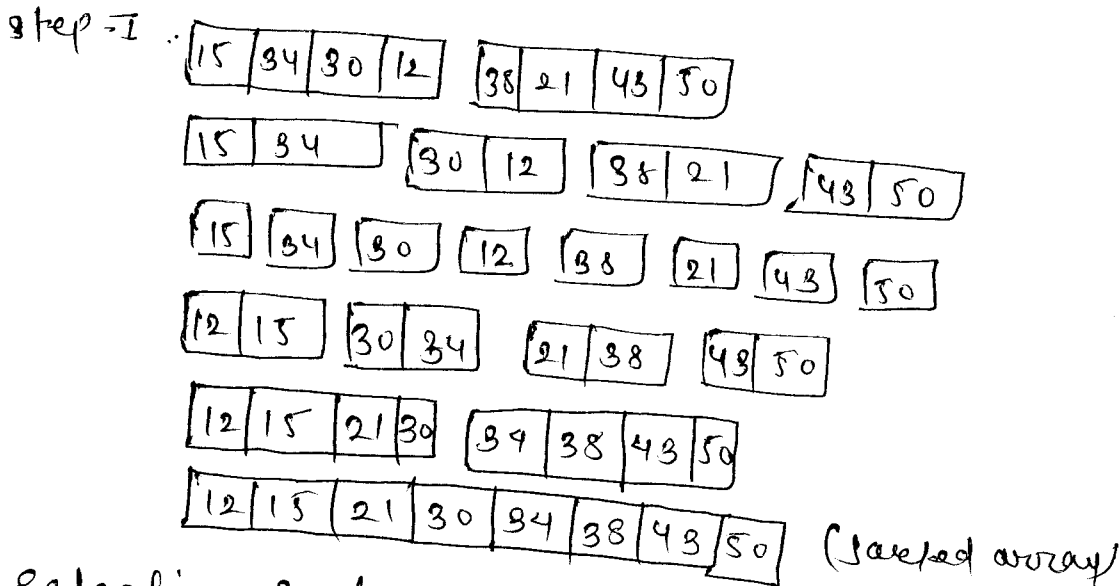
Q.4: Write short note on

- 1) Merge sort
- 2) Selection sort
- 3) Linear search or sequential search.

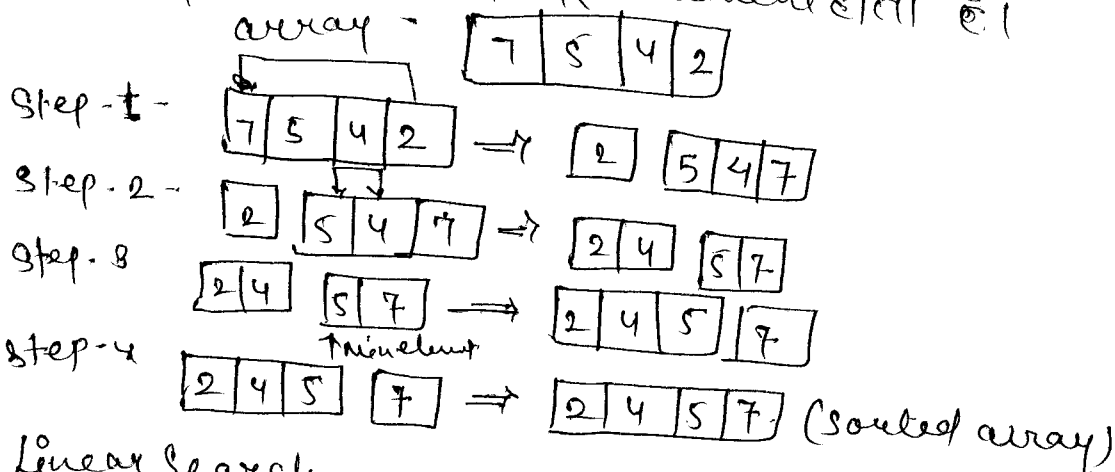
1) Merge sort :- Merge sort divide & conquer तकनीक में विभाजित किया जाता है जिसमें data की एक complex list को sublist combine कर दिया जाता है। इसके बाद इन sub-list को sort करते

eg. 

15	34	30	12	38	21	43	50
----	----	----	----	----	----	----	----



2) Selection sort :- इस sorting algorithm में सबसे पहले array में से सबसे छोटे element को select किया जाता है तथा इस element को array में पहले स्थान पर element होता है।



3) Linear search.

. CS-302. Programming in c++ attempt any three questions

①

Q. 1 (i) Explain static data members?

Ans:- static data members → when a data member is declared as static, only one copy of the data is maintained for all objects of the class. Static data members are not part of objects of a given class type. As a result, the declaration of a static data member is not considered a definition.

Q. 1 (ii) write a programme in c++ to check whether a number is prime or not?

Ans:-

```
#include <iostream>
using namespace std;
int main()
{
    int num;
    bool flag = true;
```

```
    cout << "Enter any number (should be positive integer): ";
    cin >> num;
    for (int i = 2; i <= num / 2; i++)
    {
        if (num % i == 0)
        {
            flag = false;
            break;
        }
    }
    if (flag == true)
        cout << num << " is a prime number";
    else
        cout << num << " is not a prime number";
    return 0;
}
```

at → Enter any number (should be positive integer) 175  
149 is a prime number

2

2 write short notes on the following:-

(i) C++ Streams → like the `cstdio` header inherited from C's `stdio.h`, `iostream` provides basic input and output services for C++ programs. `iostream` uses the objects `cin`, `cout`, `cerr` and `clog` for sending data to and from the standard streams input, output, error and log respectively.

(ii) Inline function → The inline functions are a C++ enhancement feature to increase the execution time of a programme. functions can be instructed to compiler to make them inline so that compiler can replace those function definition whenever those are being called. compiler replaces the definition of inline functions at compile time instead of referring function definition at runtime.

NOTE → This is just a suggestion to compiler to make the function inline, if function is big then, compiler can ignore the inline request and treat the function as normal function.

(iii). Generic Function → Generic Programming is a style of computer programming in which algorithms are written in terms of to be specified later types that are then instantiated when needed for specific types provided as parameters.

Q.3(i) what is Friend function? Explain with example?

Friend Function → A friend function of a class is defined outside that class scope but it has the right to access all private and protected members of the class. Even though the prototypes for friend functions appear in the class definition, friends are not member functions.

A friend can be a function, function template, or member function, or a class or class template in which case the entire class and all of its members are friends.

To declare a function as a friend of a class, precede the function prototype in the class definition with keyword friend as follows:-

```
Ex → class Box
    {
        double width;
        public:
        double length;
        friend void Printwidth(Box box);
        void Setwidth(double wid);
    };
```

Q.3 (ii) write a program to overload a binary operator using friend function?

```
Ans:- #include <iostream.h>
        #include <conio.h>
        class complex
        {
            int a, b;
```



Public:

void getvalue()

{

cout << "Enter the value of complex Numbers a, b"

cin >> a >> b;

}

Complex operator + (Complex ob)

Complex t;

t.a = a + ob.a;

t.b = b + ob.b;

return(t);

}

Complex operator - (Complex ob)

Complex t;

t.a = a - ob.a;

t.b = b - ob.b;

return(t);

}

void display()

{

cout << a << " + i" << b << " - i" << " | n";

}

};

void main()

{

clrscr();

Complex obj1, obj2, result, result1;

obj1.getvalue();

obj2.getvalue();

(5)

```

result = obj1 + obj2;
result1 = obj1 - obj2;
cout << "Input values : \n";
obj1.display();
obj2.display();
cout << "Result : ";
result.display();
result1.display();
getch();
}

```

Output → Enter the value of complex Numbers

4                      5

Enter the value of complex Numbers

2                                      2

Input values

4 + 5i

2 + 2i

Result

6 + 7i

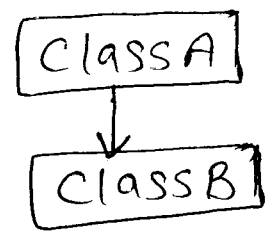
2 + 3i

Q.4 Explain different types of Inheritance with example?

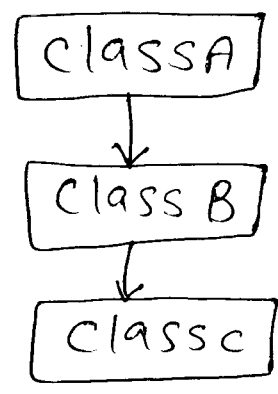
Ans:- Inheritance → Inheritance in object oriented programming can be described as a process of creating new classes from existing classes. New classes inherit some of the properties and behavior of the existing classes. An existing class that is parent of a new class is called a base class.

## Different types of Inheritance → (6)

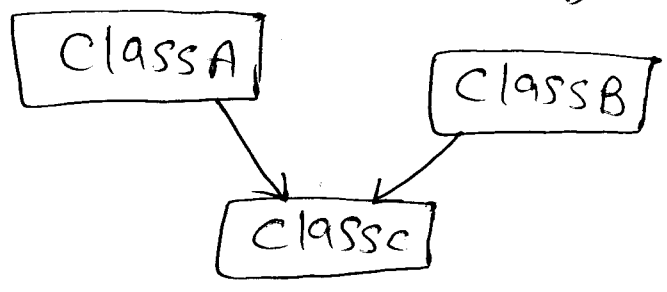
1. Single Inheritance → In this Inheritance, a derived class is created from a single base class.



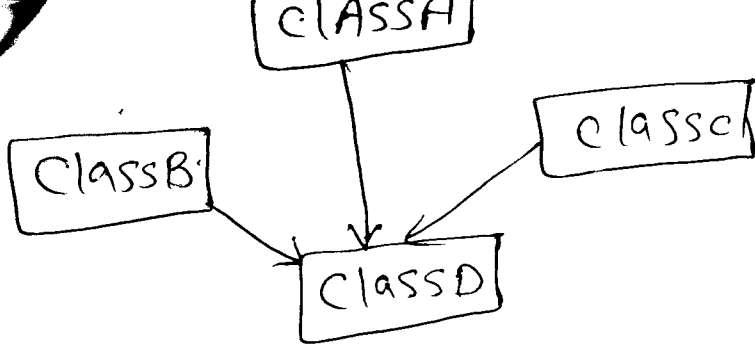
2. multilevel Inheritance → In this Inheritance, a derived class is created from another derived class.



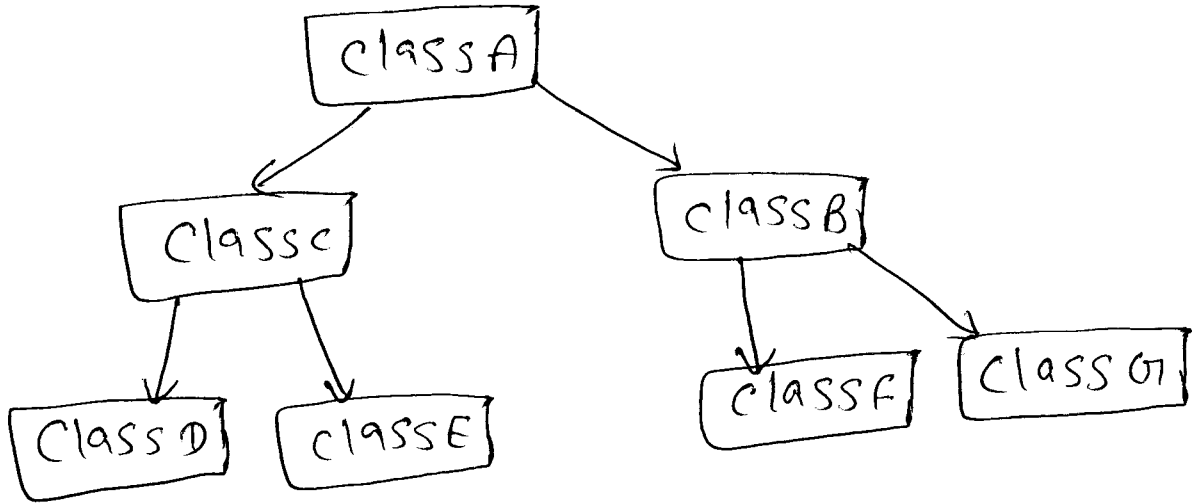
3. Multiple Inheritance → In this Inheritance, a derived class is created from more than one base class. This Inheritance is not supported by .NET language



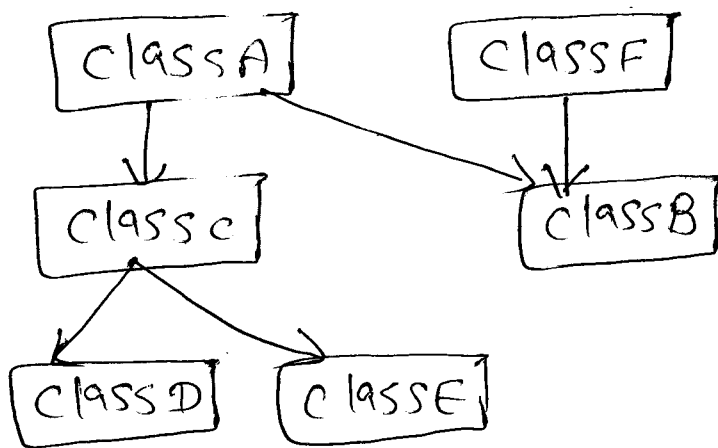
4. Multipath Inheritance → In this Inheritance, a derived class is created from another derived classes and the same base class of another derived classes.



5. Hierarchical Inheritance → In this Inheritance, more than one derived classes are created from a single base.



6. Hybrid Inheritance → This is combination of more than one Inheritance. Hence it may be a combination of multilevel and multiple inheritance or Hierarchical and multilevel Inheritance and multipath Inheritance Inheritance.



System Admin: Unix and Shell Programming  
III Test Model Paper (Solutions)

Q-1 Explain the various jobs of System Administrator.

Ans-1 The various jobs of System Administrator are-

- 1) System Startup and Shutdown
- 2) Opening and Closing user accounts: In Unix an administrator is both a user and super user. Usually, an administrator has to switch to the super-user mode with root privileges to open or close user accounts.
- 3) Helping users to set up their working environment.
- 4) Maintaining user services: User require service for printing, mail web access and chat.
- 5) Allocating disk space and re-allocating quotas when the needs grow.
- 6) Installing and Maintaining software.
- 7) Installing new devices and upgrading the configuration. The System Administrator have to edit configuration files to identify new installed devices.
- 8) Provisioning the Mail and Internet services.
- 9) Ensuring security of the system
- 10) Maintaining system logs and profiling the user.
- 11) Creation of new user accounts, group accounts and providing permissions to them.
- 12) Data Backup and Recovery
- 13) System Accounting
- 14) Reconfiguring the kernel whenever required.

Q-2 Explain the various User Management functions of the Administrator.

Ans. The following are the various User Management functions of system administrator.

- 1) `useradd` — Adds a new user account to the system
- 2) `usermod` — Modifying Account attributes
- 3) `userdel` — Deletes the user account from the system
- 4) `groupadd` — Adds group to the system.
- 5) `groupmod` — Modifies group attributes
- 6) `groupdel` — Removes group from the system.

Create an account — To create an account the syntax is

```
useradd accountname
```

The `useradd` command modifies the `/etc/passwd`, `/etc/shadow`, and `/etc/group` files and creates a home directory.

once an account is created we can set its password by using `passwd` command

```
$ passwd Raj
|
| changing password for user Raj
```

New UNIX Password:

Retype new UNIX Password:

Passed: All authentication tokens updated successfully.

Modify An account — The syntax is  
`$ usermod accountname`

Deleting an Account — The syntax is  
`$ userdel Accountname`

Create a new group -

The Command is

```
$ groupadd groupname
```

Modify a group. - The Command is

```
$ groupmod groupname
```

Delete a group - The Command is

```
$ groupdel groupname.
```

Q-3 Explain the following

(i) Mounting file system in Unix - Before we can access the files on a file system we need to mount the file system. The root (/) file system is always mounted. Any other file system can be connected or disconnected from the root (/) file system. For mounting a file system, first, you must create a directory to use as a mount point for the file system you want to ~~mount~~<sup>mount</sup>. We can mount the file system by using mount command, which makes all of the files and ~~a~~ directories available.

(ii) Finding files in Unix - There are two commands which can be used for finding files in Unix

grep - This command finds and prints lines in files that match a pattern.

The syntax is 

```
$ grep pattern to be searched file name
```

```
$ grep Rajesh Raj.Txt
```

This command will search pattern Rajesh in the file Raj.Txt

The `grep` command searches through the file, looking for matches to the pattern specified. To use it type `grep`, then the pattern we are searching for and finally the name of the file we are searching in.

Find - while `grep` command find files in lines, the `find` command finds file themselves

For e.g.

```
$ find *.j
```

This command searches for the file whose name is `.j`.

```
$ find *.txt
```

it will search for all `.txt` files in current directory.

Q-4 What is shell. Explain various types of Unix shell.

Ans-4 Shell - The shell provides you with an interface to the UNIX system. It gathers input from you and executes programs based on that input. When a program is finished executing, it displays that program's output.

A shell is an environment in which we can run our commands, programs and shell scripts. The prompt, `$`, which is called command prompt is issued by the shell.

Shell types:- In Unix there are two major types of shells

1) The Bourne shell - In this type of shell, the default prompt is the `$` character.

2) The C shell - In this type of shell the default prompt is `%` character.

Bourne shell is again divided into

1) Bourne shell (`sh`) 2) Korn shell (`ksh`) 3) Bourne Again shell (`bash`)

4) POSIX shell (`sh`)

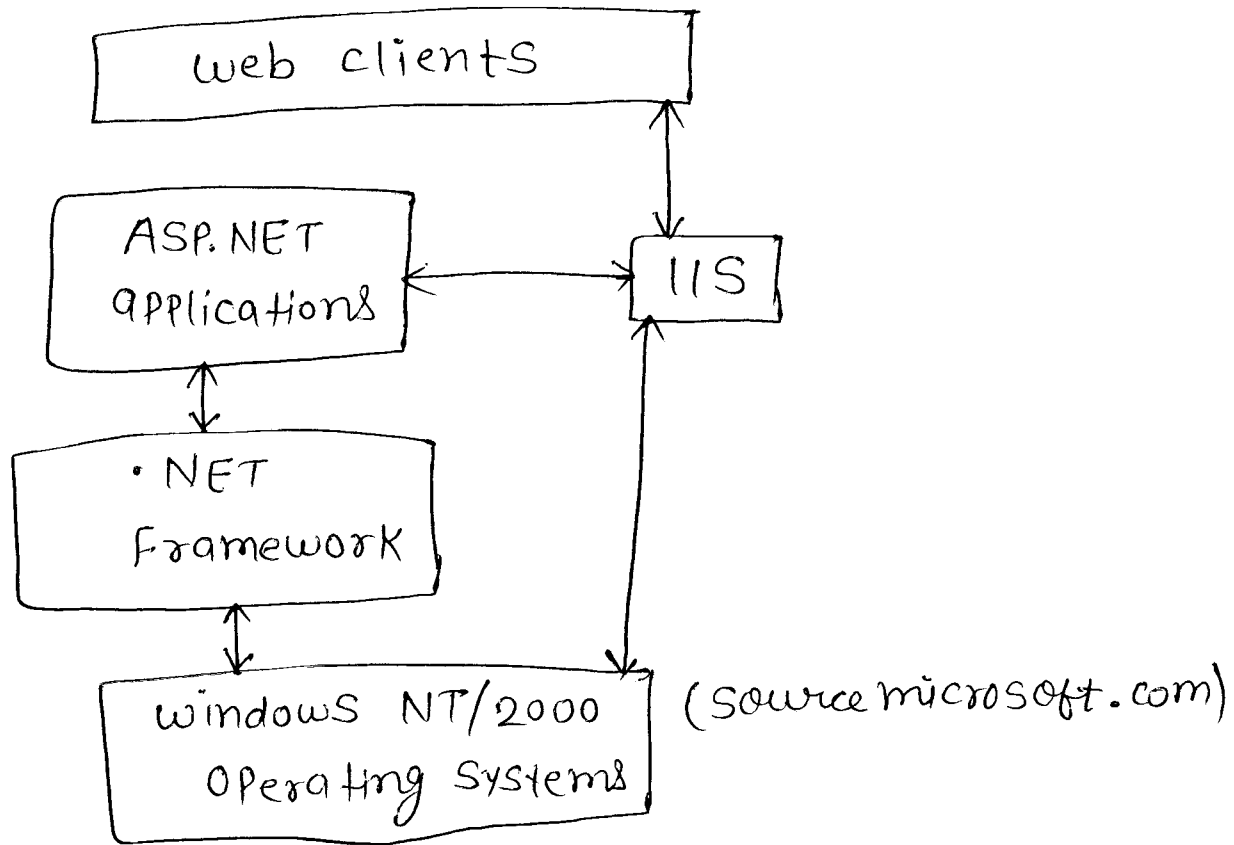
The different type of C shell are

1) C shell (`cs`) 2) TENEX/TOPS C shell (`tcsh`)



Q. 1 (i) Explain architecture of ASP.NET in detail?

Ans: - Architecture of ASP.NET → This section provides an overview of the ASP.NET infrastructure and subsystem relationships, as they are related to the subject of Security. The following illustration shows the relationships among the Security Systems in ASP.NET.



As the illustration shows, all web clients communicate with ASP.NET applications through IIS. IIS decipheres and optionally authenticates the request. if allow anonymous options is turned on, no authentication occurs. IIS also finds the requested resource and if the client is authorized, returns the appropriate resource.

In addition to the built-in ASP.NET Security features, an ASP.NET application can use the low-level Security features of the .NET Framework.

on the .NET framework using ASP.NET technology. enable you to create programmable web pages with interactive, dynamic or database-driven content that serve as the user interface for your web application.

A web form page implements application logic using server-side code. It can render the output in almost any HTTP capable language, including HTML, XML, WML, JavaScript, VB Script.

It can run on any browser or client device. It automatically renders the correct browser-compliant output for features such as styles, layout and so on. you can also design your web form page to target a specific browser, such as internet explore and take the advantage of the features of a specific browser or client service. web form pages comprise of two components:-

- (1) Dynamic user Interface
- (2) Application logic

This is similar to the way the visual interface of a VB form is separated from the code behind the form. The 2 building blocks of a web form page are contained in two separate files. The user interface is contained in file with the extension (.aspx) The application logic is contained in a file known as the code-behind file, which has the extension .aspx.vb or .aspx.cs (using C#).

Q.1 (ii) what is dataset? Explain various types of dataset

Ans:- Dataset → It uses the disconnected architecture

In memory presentation of data and can be considered local copy of the portions of the database. The application can access the data and manipulate the data directly from the local copy independent of the database. Thus it increase the scalability of systems and reduces the number of round trips to the databases. In addition, databases can be updated using this dataset. The data of this dataset can be from SQL Server, ORACLE or MSAACCESS. datasets are passed between the application tiers as XML documents and contains both the schema and data. Datasets acts as a passive container for the data. Dataset is a collection of tables and relationships between tables.

# Type of datasets ->

Datasets are classified into 2 types:-

(1) Typed

(2) Untyped

(1) Typed Dataset -> It is derived from the dataset class and has an associated XML schema. The schema contains information about the tables, columns and rows. Structure will be known at the compile time itself. The structure of typed dataset is saved in Schema definition File (XSD). Tables and columns are accessible by their names while programming.

(2) Untyped data set -> It doesn't associate with any XML schema and at runtime, data can be loaded into the set without specifying the structure. Tables and columns are

Structure of an untyped dataset will be unknown to the  
i.

2 (\*) write short notes on following:-

(1) Method overriding → Subclass is not only inheriting but it can also give it's own implementation for those methods. all the methods cannot be overridden. To allow them, the parent class method must use overridable keyword.

(2) Cookies → cookies are introduced by NetScape with the first version of it's browser. They have been standardized by the www consortium and are supported by most browsers today. cookies are small amounts of information stored by the server on the browser. They can be stored either in a text file on the client's file system or in memory in the client browser session.

A cookie doesn't contain more than 4kb of data. cookies can be temporary or persistent. Temporary cookies known as session cookies exist only in the browser memory. They are removed from the browsers' memory when the browser is closed. Persistent cookies can exist for long periods of time. They are stored in special files known as cookies files on windows machine and magic cookies files on machintosh machines. These cookies files are maintained by the browser.

Q. 3 (i) Difference between XML and HTML ?

Ans →

or describing the data

1. Tags are not predefined
2. case sensitive, Lower case and upper case elements are treated differently.
3. It shows error if any error is there in the code.

1. For displaying the data.

2. Tags are predefined.

3. Not case sensitive.

4. It doesn't show error, if there is any error in the code

(ii) what is difference between XML and SGML?

Ans:-

XML

1. XML stands for Extensible markup language.
2. XML is the newer version of SGML and compatible with WML for mobile communication
3. underscore and colon are allowed in names.
4. The PIC (Processing instruction close) delimiter is `<?>`
5. Names are case sensitive.

SGML

1. SGML stands for Standard Generalized markup language.
2. SGML is older version and compatible with HTML for mobile communication.
3. underscore and colon are not allowed in names
4. The PIC is not required in SGML.
5. Names are not allowed in SGML.

closed start tags

unclosed end tags

3) Empty start tags

4) Empty end tags

5) Attribute Specifications that omit the attribute name.

(1) unclosed start tags

(2) unclosed end tags

(3) Empty start tags

(4) Empty end tags

(5) Attribute Specification that omit the attribute name.

Q.4 (1) what is difference between ADO.NET and ADO?

Ans:-

ADO.NET

1. Disconnection oriented model.

2. one dataset is a collection of one or more tables and their relations.

3. full support for XML.

4. ADO.NET use XML, XSD for interchange of data

5. Richer data types support for data exchange

ADO

1. Connection oriented model.

2. Recordset stores only one table from the database. Join query is used for multiple tables.

3. Limited support.

4. Data exchange between applications is provided through COM marshalling

5. Because of COM marshalling limited set of data types are supported.

Data Binding → Binding of these controls to the data from the database is called data Binding. There are 2 types of data binding - Simple and complex Binding.

① Simple Binding → It is the process of binding one data value from the dataset to the controls such as Textbox or Label. Using data Bindings property, these controls can be bound to the column.

② Complex Binding → It allows binding of more than one element to the control at the same time. It supports multiple value to be shown in a single control such as grid or List box.

(ii) User control → A user control is an ASP.NET Page that has been converted into a control. It enables you to reuse the same content and programming logic on multiple ASP.NET Pages. A user control extension is .ascx. It

can not be opened directly in a browser. It must be used in another ASP.NET Page. You could use a user control to display the same static content such as headers and footers on multiple page. This enables you to create common content just once and use it as many times as required. If the content changes, you just have to modify it in one file instead of an multiple pages.

Q-1 What is routing. What are principles of routing. 1+4.

Ans- Routing:- Routing is basically the process of moving a packet from one device to another on a different network, and this is done by a device called router.

Routing Principles → Each packet has two addresses, namely source address and destination address. The source address is the address from where the packet originates and the destination address is where the packet ~~is~~ packet is going.

For a router to be capable of routing packets, it must know the following information.

- \* The destination address
- \* Neighbouring routers
- \* Possible routes to remote networks
- \* The best possible route to each remote network and
- \* How to verify and maintain routing information.

A router can learn about remote networks from neighbouring networks or from an administrator. The router can then build a routing table that describes the path of how to find remote networks. If the network is directly connected it already knows the path, but if it is not directly connected, it must use one of the two ways to learn how to get to the remote network. one method is known as static routing and the other method is known as dynamic routing.



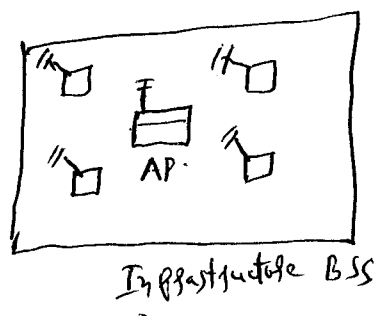
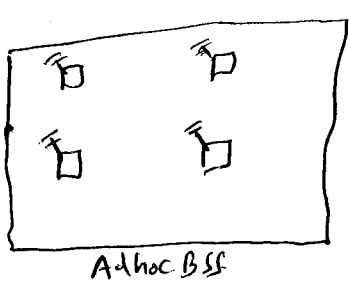
Q-2 Explain IEEE 802.11 Standard in detail.

Ans. IEEE <sup>has</sup> defined the specifications for a wireless LAN, called IEEE 802.11, which covers the physical and data link layer. This is also called as Wi-Fi.

Architecture - The standard defines two kinds of services:

- 1) The Basic Service Set (BSS)
- 2) The extended service set (ESS)

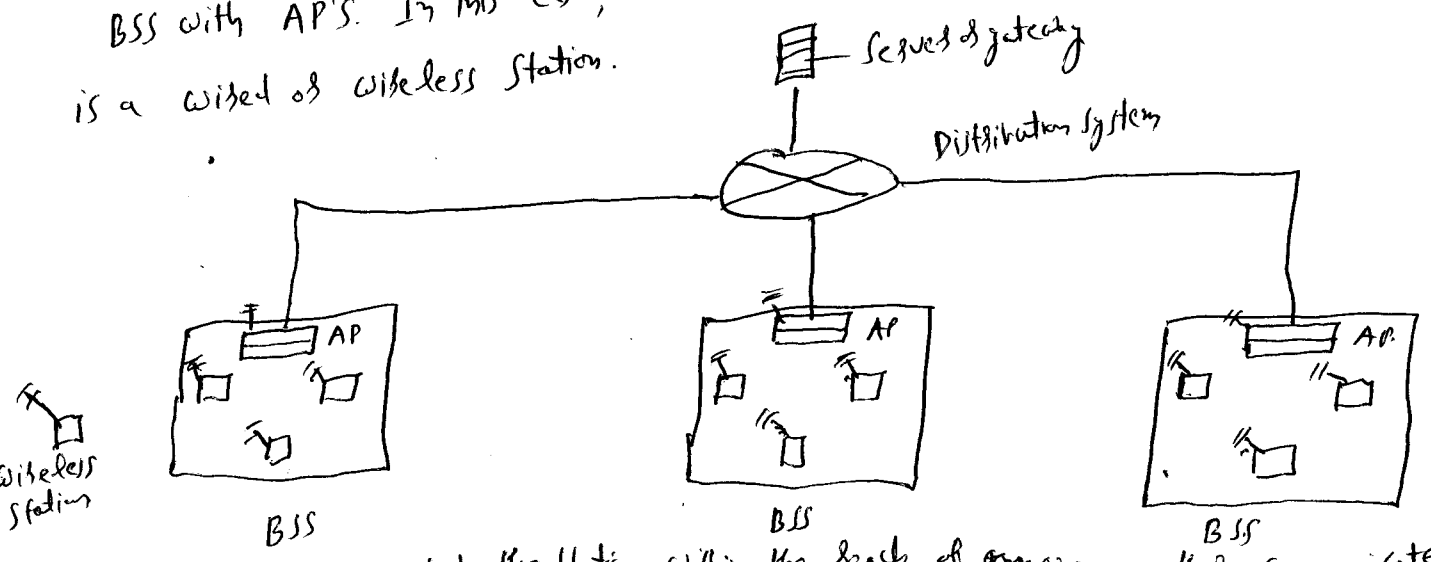
IEEE 802.11 defines the basic service set, as the building block of wireless LAN. A BSS is made up of stationary or mobile wireless stations and an optional base station, known as Access Point. Fig shows two sets in this standard.



(Basic service sets)

The BSS without an access point is a standalone network and cannot send data to other BSS. It is called Adhoc architecture. A BSS with an AP is called infrastructure BSS.

Extended Service Set (ESS) - An extended service set (ESS) is made up of two or more BSS with AP's. In this case, the BSS are connected through a distribution system, which is a wired or wireless station.



When BSS are connected, the station within the reach of one another communicate without the use of AP. However the communication between a station in BSS and the outside BSS occurs via the AP.

### Frame Structure and Addressing -

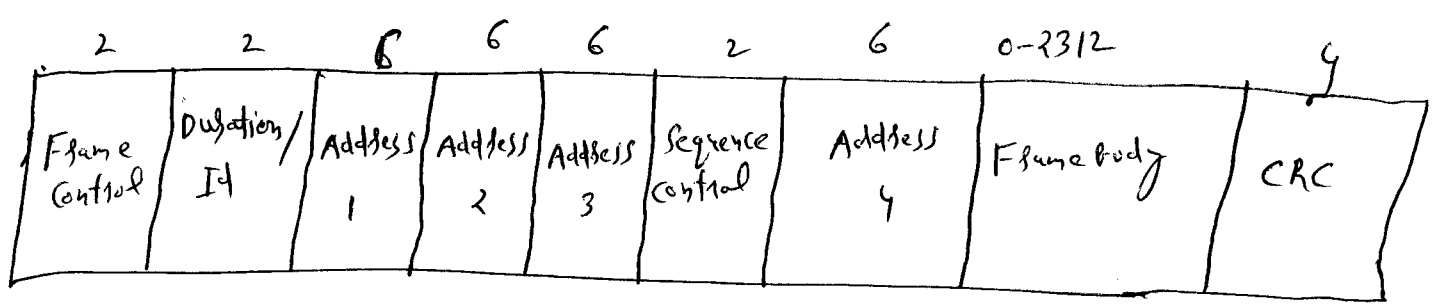
IEEE 802-11 support three types of frames. 1) Management frame 2) Control frame 3) data frames.

The Management frames are used for station associated and disassociated with the access point, timing and synchronization, and authentication and deauthentication.

Control frames are used for handshaking and for positive acknowledgements during the data exchange.

Data frames are used for the transmission of data.

The MAC header provides the information on frame control, duration, addressing and sequence control. Fig shows the format of the MAC frame consist of a <sup>Mac</sup> ~~MAC~~ header, a frame body, and a CRC checksum.

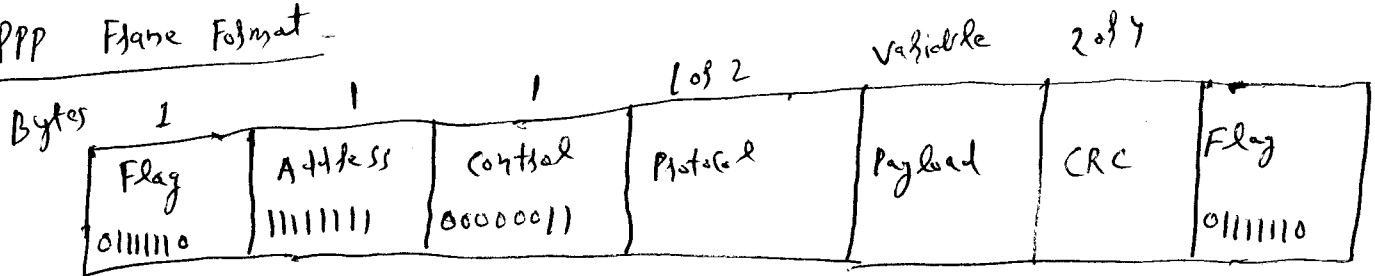


IEEE 802-11 general frame format

Q-3. What is Point to Point Protocol. Explain.

Ans. PPP (Point to Point Protocol) — PPP is a data link control over full-duplex Point to Point lines. PPP handles error detection, flow control, support multiple protocols. PPP used for dial-up lines and also for leased lines. PPP support a framing method that unambiguously delimits the end of the frame and the start of the next one. The frame format also handles error detection, PPP provides a LCP (Link Control Protocol) for initializing & testing line, maintaining connection and down line when they are no longer needed. PPP also provide a different NCP (Network Control Protocol) for each network layer supported.

PPP Frame Format -



(PPP Frame format)

All PPP frame begins and ends with the standard HDLC flag byte 01111110. PPP frames consists of an integer no. of bytes. For this reason PPP uses character stuffing not bit stuffing. Address field is always binary value 11111111 to indicate broadcasting. The control field default value is 00000011 to indicate unnumbered frame. Protocol field indicates what kind of protocol packet is in the payload field. The payload field consist of information of variable length. A default length of 1500 bytes is used. Checksum is field used for error detection.

Q.1. Write short note on [5]

- 1) Meta Data
- 2) Access tools.

Ans.

1) Meta Data :- Meta data, data के बारे में data होता है जो data warehouse को वर्णित करता है। इसे निर्माण के लिए देखरेख करने के लिए प्रबंध के लिए data warehouse का उपयोग करने के लिए प्रयुक्त किया जाता है। Meta data को पुनः लीन श्रेणियों में विभाजित किया जा सकता है।

a) Administrative Meta data :- यह administrative meta data tables, columns, schemas, dimensions, hierarchy data warehouse की नींव से संबंधित होता है।

b) Business Meta data :- यह Business meta data विभिन्न व्यापार संबंधित शब्दावली के साथ डील करता है। यह उस data से रखता है जिसकी महत्वपूर्ण निगरानी को देने हेतु Knowledge workers एवं Managers को आवश्यकता होती है।

c) Operational Meta data :- इस operational meta data के द्वारा data के आसपास के operational issue के साथ डील किया जाता है। यह उस data को रखता है जो data warehouse पर प्रक्रिया को प्रयुक्त एवं एक्सेस करता है।

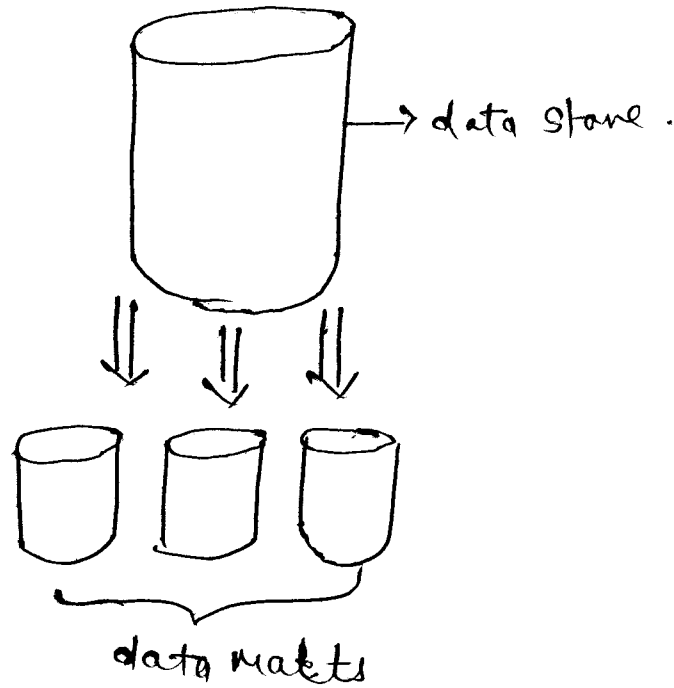
2) Access Tools :- Data warehousing का मुख्य उद्देश्य व्यापारियों के रणनीतिक निगरानी के लिए जानकारी प्रदान करना है। ये व्यापारियों को front end tool का उपयोग करते data warehouse के साथ इंटरैक्ट करता है।

Access tool मुख्य चार श्रेणियों में होते हैं। क्वेरी एवं रिपोर्टिंग टूल, application development tool, online analytics processing tool एवं data mining tool.

किसी भी व्यवसाय में information का प्रभावी रूप से उपयोग करने की योग्यता, सफलता प्राप्त करने का महत्वपूर्ण कारक होता है।

Q.2. Explain Data Marts in detail with diagram.

Ans. Data Mart:- एक ऐसा data store जो data warehouse के एकीकृत data के लिए सहायक होते हैं। डेटा मार्ट को data के विभाजन के अंतर्गत निर्देशित किया जाता है।



Data Mart data के प्राकृतिक रूप से अलग स्तर होता है एवं अलग database server पर रहता है। यह एक Local area network में समर्पित उपयोगकर्ता समूह के रूप में काम करता है। सभी data mart मात्र रिप्लेसिंग OLAP technology को शामिल करता है।

इस प्रकार के data marts को dependent data mart कहा जाता है क्योंकि इनका data warehouse से जोड़ा गया जाता है। क्योंकि इनका data, data warehouse से high value होता है। विभिन्न users इनके लिए technology प्रयुक्त की गई है और एकीकृत वर्जन से व्युत्पन्न सभी information view को access करते हैं।

## Q-3. Difference between OLAP and OLTP [5]

Ans.

### OLTP.

- 1) यह online Transaction Processing System है।
- 2) OLTP दिन-प्रतिदिन के operations के लिए प्रयुक्त किया जाता है।
- 3) Operational database OLTP के लिए data के मुख्य source होते हैं।
- 4) OLTP users मुख्य रूप से clerks अथवा निम्न स्तर के IT Professionals use करते हैं।
- 5) यह current and isolate data का उपयोग करते हैं।
- 6) यह E-R Model के design पर आधारित होते हैं।
- 7) यह limited record को accessed करता है।
- 8) इसकी processing speed fast होती है।

### OLAP.

- 1) यह online Analytical Processing System है।
- 2) OLAP में analysis operation के लिए प्रयुक्त किया जाता है।
- 3) Data Warehouse या data marts OLAP के लिए मुख्य data source होते हैं।
- 4) OLAP users, मुख्य रूप से knowledge workers or Managers होते हैं।
- 5) यह historical and aggregated data का उपयोग करते हैं।
- 6) यह star or snowflake Model के design पर आधारित हैं।
- 7) यह unlimited record को accessed करता है।
- 8) इसकी processing speed slow होती है।

Q.4. Explain MOLAP and ROLAP server in detail ?

Ans. MOLAP :- MOLAP सबसे अधिक प्रयुक्त किया जाने वाला OLAP आर्किटेक्चर होता है जिसमें data को multidimensional cube में store किया जाता है। Storage relational database में नहीं होते हैं। यह user को data के subset को slice and dice हेतु अनेक विभिन्न पथनुओं से देखने के लिए अनुमति प्रदान करता है। MOLAP local cubes प्रोग्राम्स की ब्राना करने के लिए सभी आवश्यक data को निहित रखते हैं तथा offline प्रयुक्त किए जा सकते हैं। MOLAP क्यूअरस की query response time एक performance प्रदान करते हैं। यह पर्याप्त performance को केवल तभी प्रदान करता है जब input data set छोटा होता है।

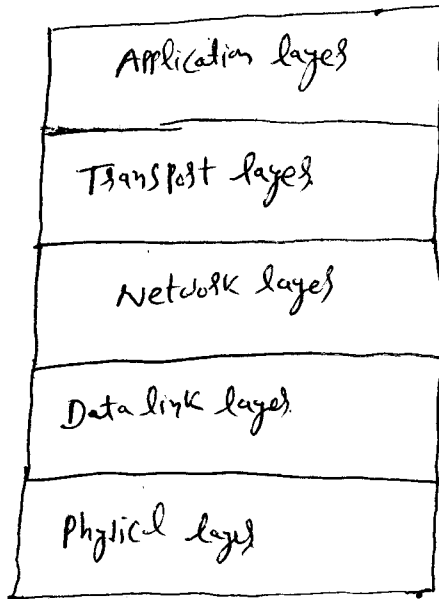
ROLAP :-

OLAP आर्किटेक्चर का ROLAP वह अन्य वर्जन होता है। जिसमें data को relational database में store किया जाता है। इस आर्किटेक्चर में, फैंक्ट लेवल से data की कॉपी को relational database के अन्तर्गत tables में store किया जाता है। यह सम्पूर्ण relational database में सभी dimension के मध्य तथा सारांश से लेकर एग्जेशनल - केवल विवरण तक लोगों को कहीं भी दिए करने के लिए अनुमति प्रदान करता है।

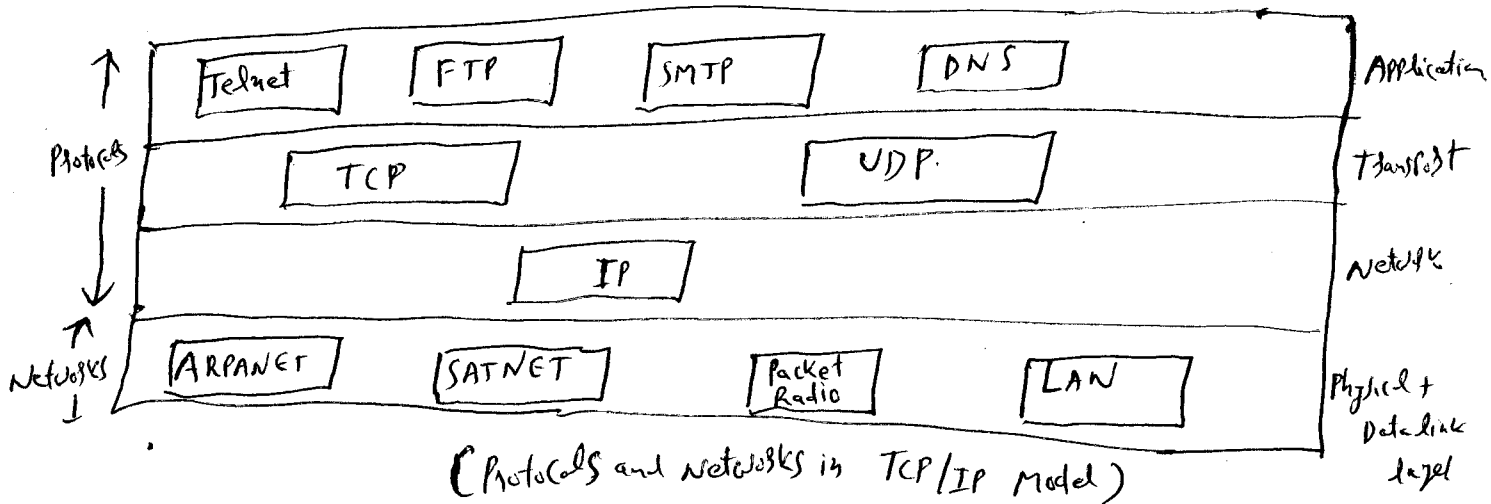
ROLAP local cubes के द्वारा आयमेशन एवं cube definition को निहित रखा जाता है लेकिन प्रोग्राम्स की उस समय ब्राना की जाती है जब उनकी आवश्यकता होती है।

Q-1 Draw the TCP/IP Model and Explain it

Ans.



(TCP/IP Model)



(Protocols and networks in TCP/IP Model)

TCP/IP is Transmission Control Protocol and Internet Protocol Model. It provides

- 1) Support to a flexible Architecture. Adding
- 2) The network was robust and connections remain intact until the source and destination machines are working

Layer 1 - Host-to-network layer - 1) Lowest layer of all

2) Protocol is used to connect to the host, so that the packet can be sent over it.

3) Varies from host to host and network to network.



- 2
- Network layer -
- 1) It helps the packet to travel independently to destination
  - 2) IP (Internet Protocol) is used in this layer.
  - 3) The various functions are
    - \* Delivering IP packets
    - \* Performing routing
    - \* Avoiding congestion

- Transport layer -
- 1) Functioning such as Multiplexing, Segmenting and Splitting on the data is done by transport layer.
  - 2) The applications can read and write to the transport layer.
  - 3) Transport layer add header information to the data.
  - 4) Transport layer breaks the message into small units
  - 5) Transport layer also arranges the packets to be sent in sequence.
- It supports two protocols TCP and UDP.

- Application layer - The application layer supports the following applications
- 1) SMTP (Simple Mail Transfer Protocol)
  - 2) FTP (File Transfer Protocol)
  - 3) TELNET (For Remote login)
  - 4) DNS (Domain Name System)

Q-2. What is SET. What are its steps. Explain in brief.

Ans. SET - SET is an encryption and security specification designed to protect credit card transactions on the Internet.

The main participants of SET are: clients, vendors and vendors bank. The certification of all of the three parts is required. The certificates of the client and vendors are provided by their banks.

SET Steps:- 1) The Customer communicates to the vendor that he is interested to buy some items with a credit card.

2) The vendor sends to customer a transaction identified.

3) The ~~customer~~ vendor sends to ~~customer~~ its digital certificate and the certificate of its bank. The certificate contains the public key. They are encrypted with the private key of the certification authority.

4) ~~customer~~ Customer uses the public key of the certification authority and obtains both the public keys of the customer and its bank.

5) ~~customer~~ Vendor sends customer two information blocks. order information and purchase information (OI).  
(PI).

OI contains the transaction identified and the type of the credit card used. It is encrypted with ~~customer~~ vendor's public key. PI contains the purchase total price and the credit card number.

6) ~~customer~~ Vendor sends to its bank a message encrypted with the bank public key. The message contains PI, received from customer and the ~~customer~~ vendor's certificate.

7) The ~~customer~~ bank controls that the transaction identified is the same that contained in vendor's PI block.

8) The ~~customer~~ bank sends a request to the bank that released the customer's credit card looking for payment authorization.

9) If the customer's bank authorizes the payment, the vendor's bank sends to vendor a message with the vendor's public key containing the transaction identified.

10) If the transaction has been approved vendor sends the response message to customer with the indication that the payment has been accepted and that the required items will be delivered.

Q-3 Explain Secure Multipurpose Mail Extension Protocol.

4

Ans. - The traditional email system using the SMTP protocol are text based, but in modern era, people want to exchange multimedia files, documents in various formats. To cater these needs, the Multipurpose Internet Mail Extension (MIME) permits the users to send binary files using the Basic E-mail system. When we enhance the basic MIME system to provide for security features, it is called Secure Multipurpose Internet Mail Extension (S/MIME).

S/MIME is a specification for secure electronic mail providing authentication and confidentiality. S/MIME specifies additional MIME content types to be used for encryption and digital signature. A MIME entity is being wrapped into an encrypted or signed CMS (Cryptographic Message Syntax) object.

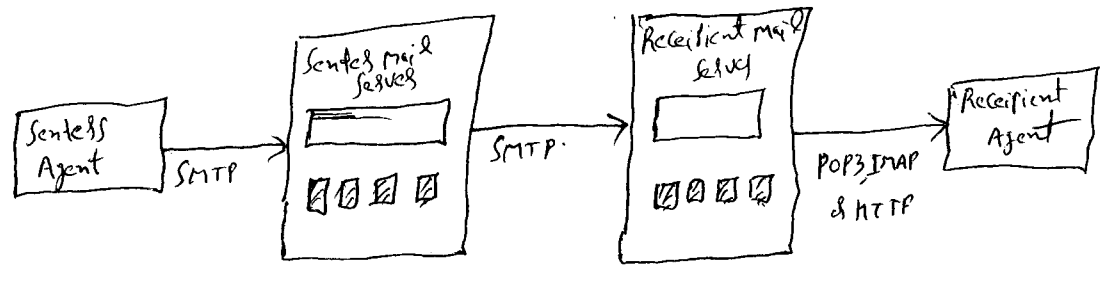
The basic S/MIME functions are

- 1) enveloped data - encrypted content and associated keys
- 2) signed data - encoded messages + signed digest
- 3) clear-signed data - clear text message + encoded signed digest
- 4) signed and enveloped data - nesting of signed and encrypted entities.



4 write short notes on  
i) SMTP ii) SSL

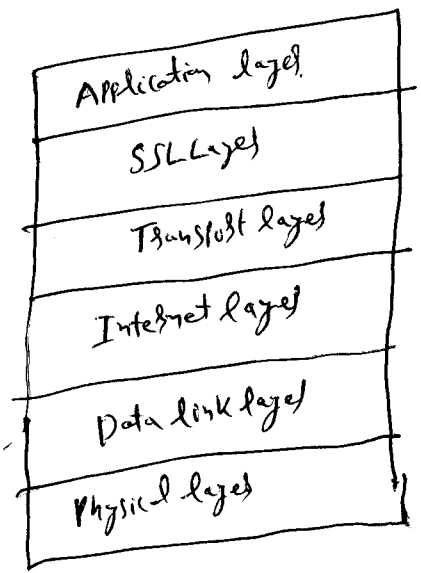
SMTP :- Simple mail Transfer Protocol - SMTP transfers messages from sender mail server to recipient mail server. It restricts the body of the all email messages to be in 7 bit ASCII format.



(Email Protocols)

SSL - Secure socket layer - The SSL Protocol is an Internet Protocol for the secure exchange of information between a web browser and web server. It provides two basic security services: authentication and confidentiality. It provides a secure pipe between the web browser and the web server. All the major web browsers support SSL.

SSL can be considered as an additional layer in the TCP/IP protocol suite. The SSL layer is located between the application layer and the transport layer.



Q.4. What do you mean by data definition and data manipulation statements? [5]

Ans. Data Definition Language :- DDL जो कि conceptual schema को define करने के लिए use किया जाता है तथा यह इस बात की जानकारी भी देता है कि physical devices में इस schema को कैसे implement किया जाता है।

- 1) CREATE :- Database में objects को create करने के लिए
- 2) ALTER - Database के structure में बदलाव करने के लिए
- 3) DROP - Database में से objects को delete करना
- 4) COMMENT :- data dictionary में comments को add करना
- 5) RENAME - object का rename करने के लिए।

Data Manipulation Language :- DML वह language है। और वह language जो database में data को manipulate करने के काम आता है (DML data manipulation language कहलाती है।

Statements

- 1) Select :- एक database में से data को retrieve करना
- 2) Insert :- table में data को insert करना
- 3) Update :- table में मौजूदा data को update करना
- 4) Delete :- table में सभी records को delete करना
- 5) CALL :- Java subprograms को call करना।

Q.2. what do you mean by stored procedures and function in my SQL?

Ans. Stored Routines :- कई बार कुछ ऐसे statements होते हैं जिन्हें आपको बार - बार execute करने की आवश्यकता होती है।  
MySQL में दो प्रकार के stored routines provide करती हैं।

- 1) stored procedures
- 2) stored functions.

Stored procedures :-

- 1) stored procedures द्वारा कोई value return नहीं की जाती है।
- 2) stored procedures में select statement के साथ दूसरे DML statements भी जुन कर सकते हैं।
- 3) stored procedures में transactions use कर सकते हैं।
- 4) stored procedures को CALL command के द्वारा call किया जाता है।

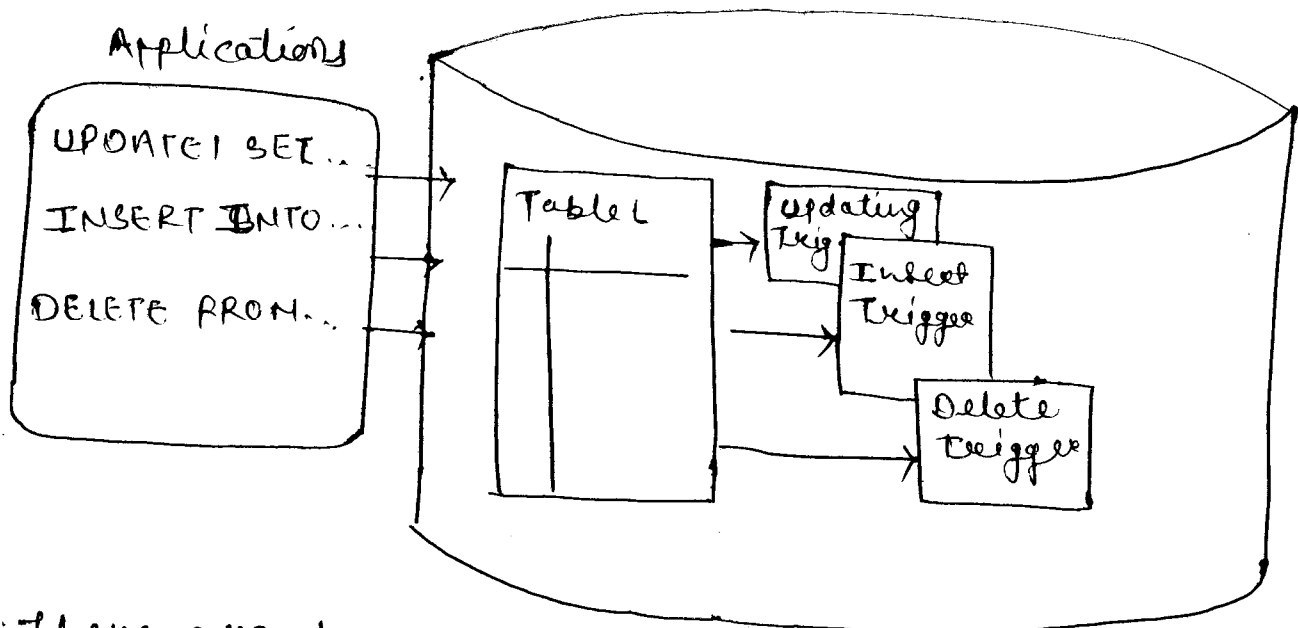
Stored Functions :-

- 1) stored function द्वारा values return की जाती है।
- 2) stored functions में केवल select statements ही use कर सकते हैं।
- 3) stored functions में आप ऐसे SQL statements नहीं use कर सकते हैं जो transaction commits और rollbacks perform करते हैं।
- 4) stored functions को select command के द्वारा call किया जाता है।

Q.3. What is Trigger & explain in detail? [5]

Ans. Trigger संग्रहित (Stored) programs होते हैं जब कभी tables में कोई action जैसे insertion, deletion, update किया जाता है तो trigger अपने आप स्वयं execute हो जाता है।

Trigger को call या invoke नहीं किया जा सकता क्योंकि जब भी DML statements को perform किया जाता है तो trigger अपने आप execute हो जाता है।



There are two types of triggers

- 1) Row level Triggers :- जब प्रत्येक Row में update, delete, insert, deletion होता है तो तब row level trigger execute होता है।
- 2) Statements level Triggers :- जब प्रत्येक SQL statements execute होता है तो तब statement level trigger execute होता है।

Q. Write short note on [5]

- 1) SQL functions
- 2) SQL operators

1) SQL functions :- SQL में built-in functions और भी बहुत powerful बनते हैं। निम्न functions हैं SQL में

1) SUM :- Sum function का प्रयोग न्यूमेरिक columns के total sum को select करने के लिए होता है।  
Select SUM (col<sup>n</sup>) from table.

2) AVG :- AVG function column की avg. value को return करता है।  
- select avg (column) from table.

3) MAX :- MAX function column में highest value को return करता है।  
- select max (column) from table

4) MIN :- MIN function column में lowest value को return करता है।  
- select MIN (col<sup>n</sup>) from table.

2) SQL operators :- An operator is a reserved word or a character used primarily in SQL statements where clause to perform operations such as comparisons and arithmetic operations. These operators are used to specify conditions in SQL statements.

there are three types of operators

- 1) Arithmetic operator - +, -, \*, /, %.
- 2) Comparison operator - =, !=, <, >, <=, >=, !<, >!
- 3) Logical operator - AND, ANY, BETWEEN, EXISTS, IN, LIKE, NOT, OR, ISNULL, UNIQUE.



III<sup>rd</sup> year  
3<sup>rd</sup> test

(कृपया यहाँ से लिखना आरम्भ कीजिए)

3/4/18

ME = 30  
Solved Paper

Q.1 निम्नांकित को परिभाषित कीजिए

(A) Dry bulb temp. (B) Wet bulb temp (C) Dew Point temp.

Ans → (A) Dry bulb temperature → temp. recorded by thermometer here dry bulb temp. of air recorded by a thermometer when it is not affected by the moisture present in the air. denoted by  $t_d$  or  $t_{db}$ .

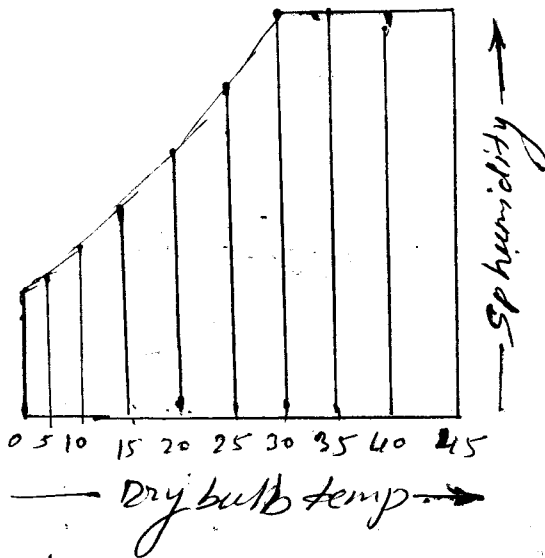
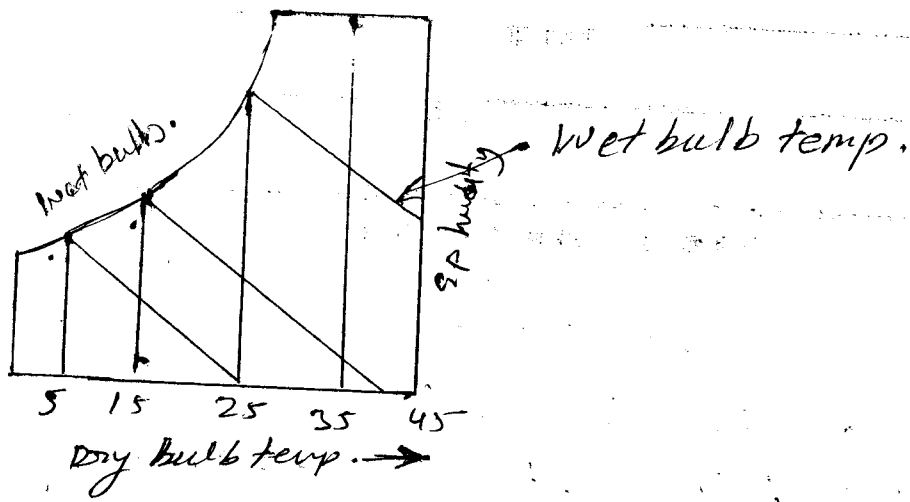
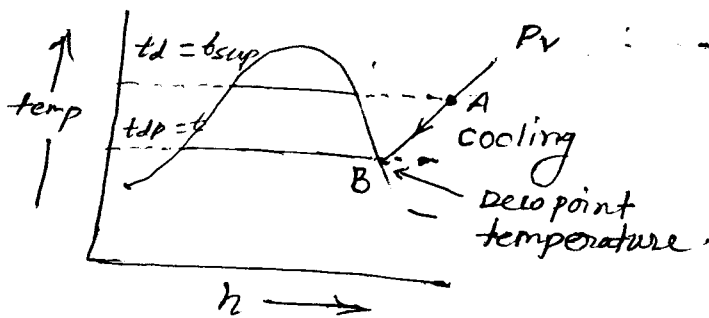


Fig: Dry bulb temp line

[B] Wet bulb temp → temp recorded by thermometer which is affected by moisture present in air & lines are inclined. denoted by  $t_{wb}$ .



(c) Dew point temp.  $\rightarrow$  temp. recorded by thermometer, when the moisture present in it begins to condense.



Q.2 साइकोमीटरी से आप क्या समझते हैं। इसके उपयोग बताये ?

साइकोमीटरी  $\rightarrow$  यह विज्ञान की वह शाखा है जिसमें वायु में उपस्थित आर्द्रता का मान ज्ञात किया जाता है। साइकोमीटरी चार्ट को वायु के महत्वपूर्ण गुणधर्मों को दर्शाया जाता है। इस चार्ट को एक वायुमण्डलीय ताप (1.012 bar) पर इन गुणों का अध्ययन किया जाता है। या इसे मापा जाता है।

इस चार्ट से वायु के विशिष्ट गुणधर्मों को एक साथ देखा जाता है। इसमें इन गुणधर्मों को किसी एक बिन्दु पर ज्ञात किया जाता है। इसके द्वारा वायु के शुष्क बलव तापमान पर specific humidity ज्ञात की जाती है। तथा एन्थैल्पी का मान भी ज्ञात करते हैं।

Dry bulb temp or Wet bulb temp का मान प्राप्त करने के लिए Psychrometer उपकरण का उपयोग करते हैं। जिसमें दो thermometer लगे होते हैं। एक thermometer बिना air के सम्पर्क में होता है तथा दूसरा thermometer moisture से affect होता है, उपरोक्त बिन्दु पर बिन्दु पर बिन्दु का उपयोग करते हैं। अच्छी reading के लिए इसे स्कूल से 5min तक झुमाना पड़ता है। व इस reading से हम psychrometric chart से सहायता से विभिन्न मान प्राप्त कर सकते हैं।

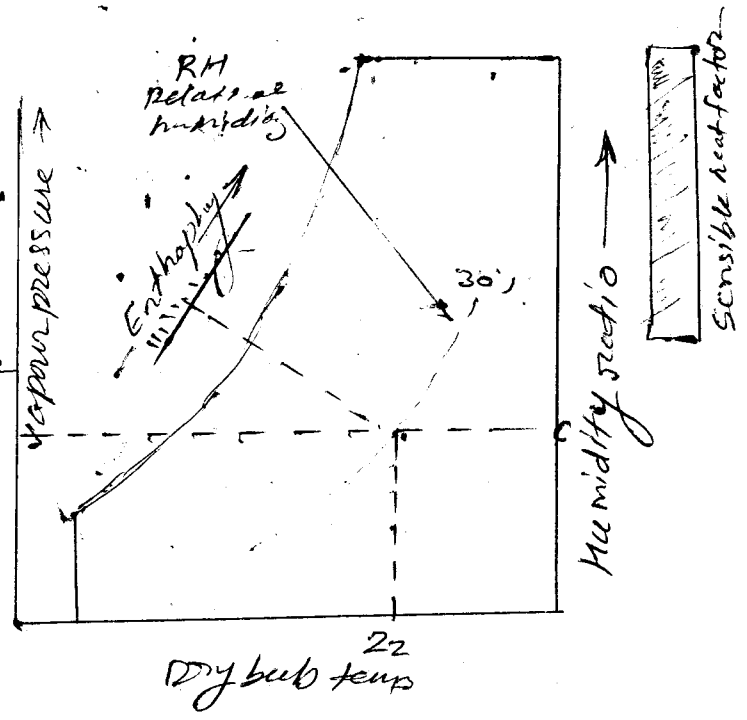
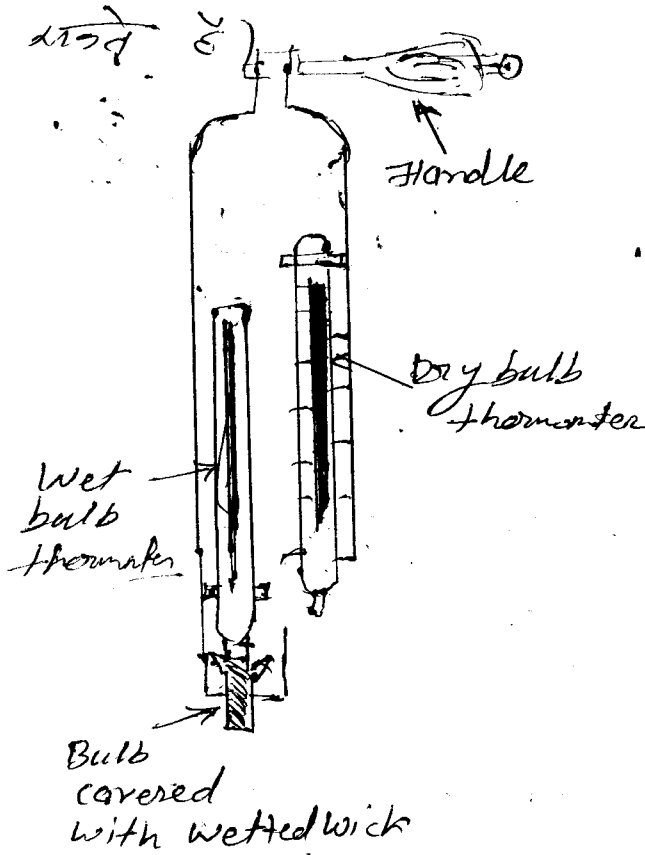


Fig: psychrometric chart.

Fig - Sling psychrometer.

- \* उपकरण व chart से सहायता से humidity को control करने के लिए temp प्राप्त कर सकते हैं।
- \* इससे विभिन्न प्रकार के temp प्राप्त कर सकते हैं।
- \* आर्गन, नाइट्रोजन, शर्करा व अन्य गैसों के अध्ययन प्राप्त कर सकते हैं।
- \* comfort area के द्वारा product की quality को मैनेज कर सकते हैं।

Q.3 Summer air conditioning प्रणाली को स्पष्ट करे?

Ans → इसका उपयोग गर्मियों की सीजन में बहुत अधिक रूप में किया जाता है। यह वातावरण से गर्म गर्म हवा को ठंडी करने का कार्य करती है। जिससे से human comfort fill कर सके, व यह बेल्ट व उद्योगों में भी इसका उपयोग किया जाता है।

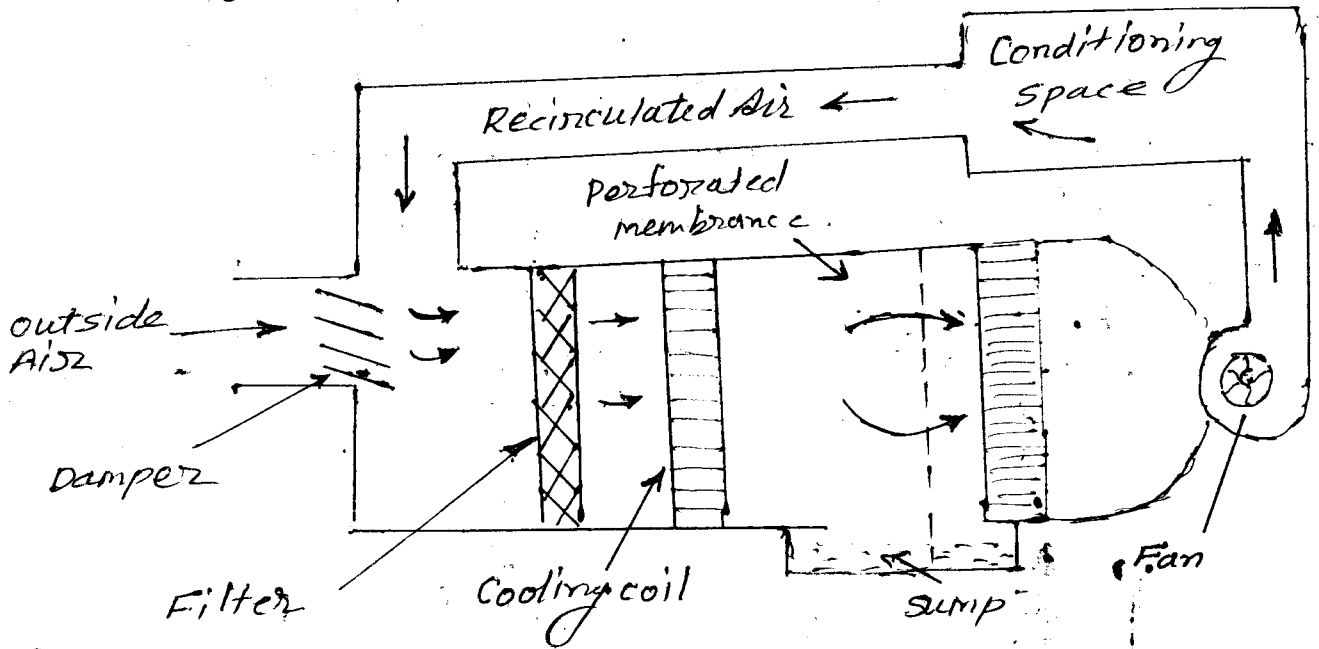


Fig: Summer air conditioning system

चित्र में दिखाए अनुसार outside जो कि left side की तरफ है वहाँ से air अन्दर chamber में आने के बाद वह filter Rod से filter होती है। व असुधिया इंसान से जाती है। अब इस air को चार्ज से सहायता से temp को control करने की आवश्यकता पड़ती है, वह cooling coil पर cool करती है। बाद में वह air sump में cool हो के fan के द्वारा conditioning space में फैली जाती है। वह स्थान cooling effect में आ जाता है। उस cooling air को पुनः cooling chamber में पुनर्स्थापित कर उपयोग में ले लिया जाता है।