1. System

It is derived from Greek word **systema,** it means, it is collection of well organized functional unit which perform well define specific task.
Systems today are very helpful in **running business efficiently.**

Characteristics of System⇨

1. Organisation
2. Interaction
3. Interdepence
4. Integration
5. Central Objective

1. Organisation: - It implies **structure** and **order**. It is the arrangement of components that help to achieve objectives.

2. Interaction: - It **refers** to the procedure in which each component functions with other components of the system.

3. Interdepence: - It means that component of organization or computer system **d**epends on one another. They are coordinated and **l**inked together in **p**lanned way to achieve objective.

4. Integration: - It is concerned with how a system is **t**ied together. All parts of the system work together. Successful integration of components will be produce a better result.

5. Central Objective: - It is the last characteristics of the system that objectives may be **real** or stated.

Elements of System Analysis⇨

1. Outputs
2. Inputs
3. Files
4. Processes

1. Outputs: - This element of system must determine what is the objectives or goals of the system. Defining aim is very vital in system work.

2. Inputs: - Output of system depends upon inputs. There are **f**ollowing essential element of inputs.

a) **Accuracy**: - If the data is not accurate, the outputs are wrong.

b) **Timeliness**: - If data is not obtained in time, the entire system falls into arrears.

c) **Proper Format**: - The input must be available in proper format.

3. Files: - It is used to **store data**. File is collection of related records.

4. Processes: - This involves the programs and the way in which data is processed through the computer. Processing Involves is a set of logical steps. These steps are required to the computer and this is done by a series of instruction called "**Program**".

Types of System⇨ There are following **four** categories of system.

1. Physical or Abstract System
2. Open or Close System
3. Deterministic or Probabilistic System
4. **Man**-Made Information System

1. Physical or Abstract System: - Such categories of system are **t**angible entities that may be **s**tatic or **d**ynamic in operation. On the other hand abstract systems or conceptual or non physical entities.

2. Open or Close System: - Such categories of system are **continually** interact with its environments. It receives input from outside & delivers outputs to the outside.

3. Deterministic or Probabilistic System: - Such categories of system produce result either predictable form or deterministic form.

4. **Man-Made Information System**: - Such type of systems is associated with human developed system. There are following **three** categories of Man-Made System.

   a) **Formal Information System**: - It is based on the **o**rganization & represented by organization **c**hart.

   b) **Informal Information System: -** It is based on **e**mployee designed to meet personal & vocational needs to help in the solution of work related problem.

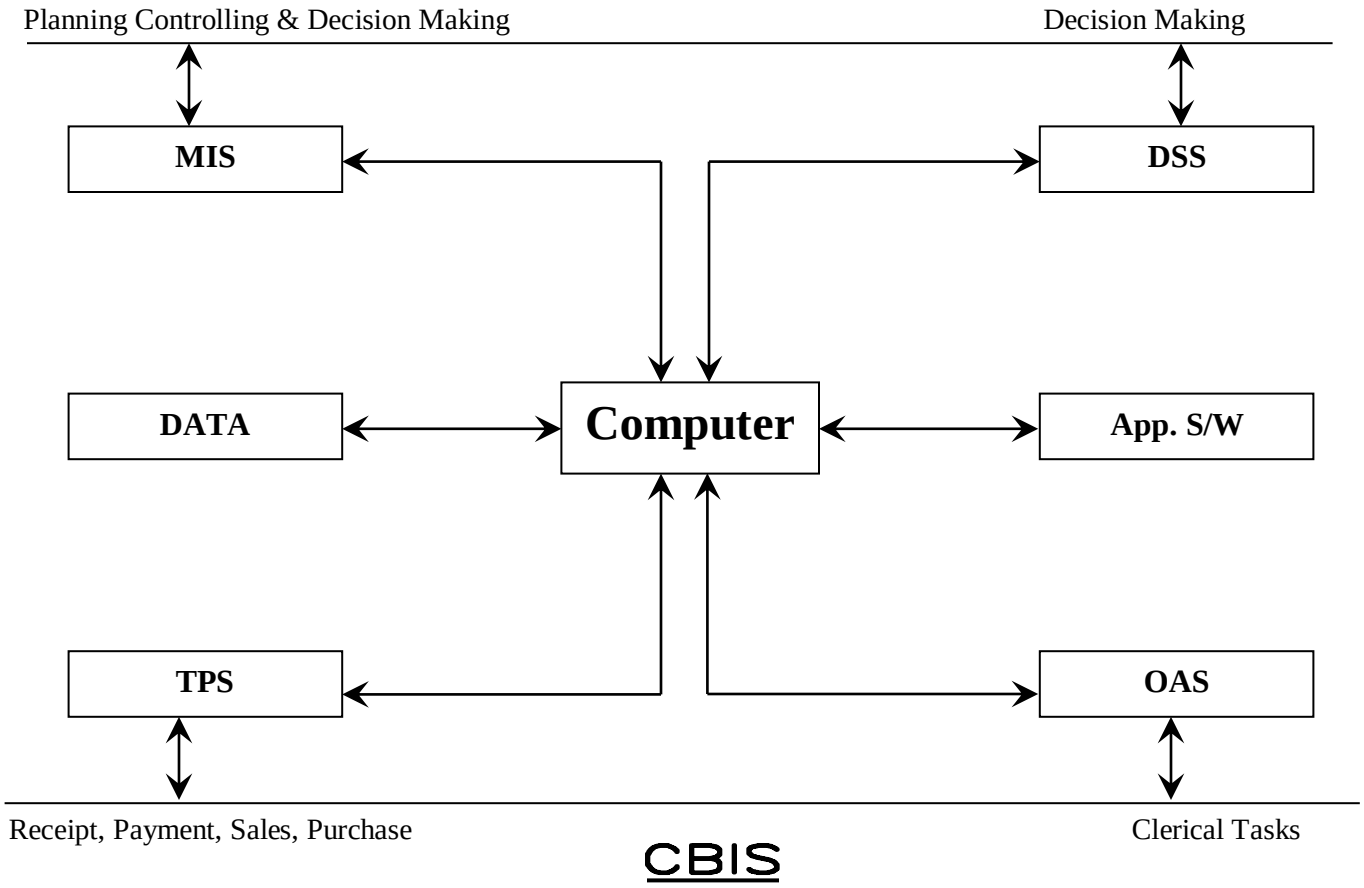
   c) **Computer Based Information System (CBIS)**:- Such types of system are categorized into **four** types.

      i. **MIS** (Management Information System)

      ii. **DSS** (Decision Support System)

      iii. **TPS** (Transaction Processing System)

      iv. **OAS** (Office Automation System)



CBIS

Hierarchical Views of CBIS⇨

Top Management	for **DSS**
Middle Level Management	for **MIS**
First Line Management	for **TPS**
Clercial Personal	for **OAS**

2. SDLC

SDLC (System Development Life Cycle) ⇨ There are **following** steps involves in SDLC.

1. Preliminary Investigation
2. Determination System requirements
3. Design of system
4. Development of S/W
5. System testing
6. Implementation
7. Evaluation
8. Maintenance

Modify/Detail Phases of System Development Life Cycle (SDLC)

1. Preliminary Investigation
   - System Feasibility Study
     i. Technical feasibility
     ii. Economical feasibility
     iii. Operational feasibility
2. Requirement Analysis
3. Design
4. Coding (C, C++, Java, C# etc.)/**development of s/w**
5. Testing
   a) Unit testing
   b) Integration testing
   c) White box testing
   d) Black box testing
   e) **V** & **V** testing (**Verification** & **Validation**)
   f) Alpha testing
   g) Beta testing
6. Implementation
7. Evaluation
8. Maintenance

Technical feasibility: - Study of **f**unction, **p**erformance & **c**onstraints that may affect the ability to achieve an **a**cceptable system. Technical feasibility centers on the **r**equired/existing computer system (**Hardware/Software**) & to what extent it can support the proposed application.

Economical feasibility: - Economic feasibility study is the most **f**requently used method **for** evaluating the effectiveness of a new system. **C**ost benefit analysis is perform to determine the benefits & savings are expected from the new system and compare then with costs. The **benefit** of project includes **three types**.

i.) Cost saving of our project leads to the reduction in administrative & operational cost.
ii.) A cost avoided benefit of our project does not require any additional skill.
iii.) Encoding of **modules** is for improve **service** level of benefit.

Operational feasibility: - Will the system be used if it is **developed** and **implemented**.

Requirement Analysis: - It determines detailed understanding of all **i**mportant **f**acts of the business area under-investigation. **F**ollowing **key questions** must be satisfied.

Q.1. What is being done?
Q.2. How is it being done?
Q.3. How frequently does it occur?
Q.4. How great is the volume of transactions decision?
Q.5. How well is the task being performed?
Q.6. Does a problem exist?
Q.7. If a problem exists. How series is it? What is the underline?

Design: - It is bridge **between** problem and solution. Designers are **r**esponsible for providing programmer with **c**omplete and **c**learly out lined **s**oftware specifications.

Coding/Development of **s/w**: - Programmers are ready for coding of designed system. They are responsible for documenting the program, providing an explanation of how and why certain produces are coded in specific way. It is essential to test the program and carry on maintenance once the application has been installed.

Coding language may be C++, Java, C#, Dotnet etc.

Testing: - Once source code has been generated. Software must be tested to uncover (and correct) as many errors as possible **b**efore delivery to your customers.

Implementation: - It is the process of having system personal **check** out and put new equipment into use, train users. Install the new application and construct any files of data needed to use it.

Evaluation: - It is performed to **identify** its **s**trengths and **w**eaknesses. There are **f**ollowing dimensions of evaluations of system.

i.) Operational evaluation
ii.) Organisational Impact
iii.) User manager assessment
iv.) Development performance

Maintenance: - It is necessary to eliminate **error** in the working system **d**uring its working life and to **tune** the system to any variations in its working environment. The importance of maintenance is to **continue** to bring the new system to standards.

Short Note

Q.1. **Software Crisis**⇨ Software crisis can be broadly in the **following** major areas.

1. From Programmer's Point of View:-

i.) Problem of portability
ii.) Problem in documentation
iii.) Problem of **piracy**
iv.) Problem of maintenance in proper manner
v.) Problem of **compatibility**

2. From User's Point of View:-

i.) Problem of **virus**
ii.) Problem of S/W **bugs**
iii.) Problem of different version of S/W
iv.) Security problem for protected data in S/W

Q.2. **System Analysis**⇨ A system analyst is a person who conducts study identifies activity and objectives & determines a procedure to achieve the objectives.

Role of System Analyst: - A system analyst carries out the **following** job.

1) Define problem of proposed system.
2) Initially a system analyst does not know how to solve a specific problem.
3) Gathered the data relating a problem.
4) System analyst coordinates the processer of developing solutions.
5) System analyst is offer referred to as planners.
6) When the plan has been accepted, system is responsible for designing it so that management's goal could be achieved.
7) System must be thoroughly tested.

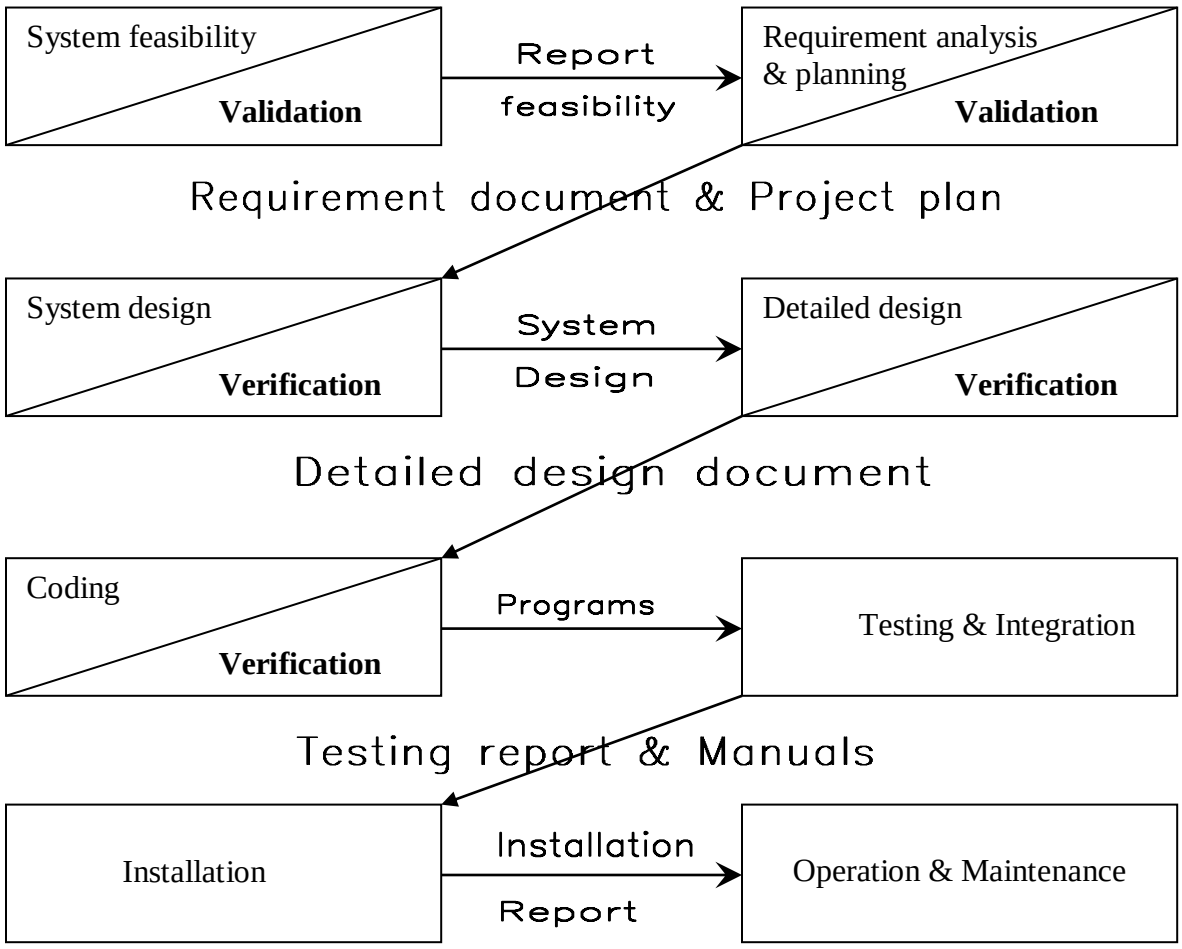
Attribute of System Analyst: - There are **following** attribute must have a system analyst.

1) Knowledge of people in organization
2) Knowledge of business functions
3) Ability of communicate
4) Flexibility
5) An analytical mind
6) Well educated with sharp mind

3. Process Model

1. Waterfall Model
2. Prototype Model
3. Interactive Model

1. <u>Waterfall Model</u>:-



Project (Proposed s/w taken from user):-

When s/w or proposed project are formally requested the system analyst under requested the system analyst under management direction, conduct a preliminary investigation to analysis to reasons for the request collect the various facts to respond the request in systematic way.

There are following **four** primary source of project request.

1. Request from **development** manager
2. Request from **senior** executive
3. Request from **system** analysts
4. Request from **outside** groups

1. **Request from development manager**: - Frequently department manager who deal with **day-to-say** business activities are looking for assistance within their department.
2. **Request fro senior executive**: - Senior executives like **Presidents**, **Vice President**, usually more information about the organization as compared to department managers.
3. **Request from system analyst**: - Sometimes system analysts **find areas** where it is possible to develop projects. In such cases, they may be preferred either writing systems proposal themselves **or** encouraging a manager to allow the writing of proposal on their **behalf**.
4. **Request from outside groups**: - Developments outside the organization **also** lead to project requests. Project request originated from this source also quite important.

Short Note

Q.1.**Managing Project Review and Selection**

There are **three committee** formats are commonly used.

1. Steering Committee
2. Information System Committee
3. User-Group Committee

1. **Steering Committee**: - This committee receives requests for proposal and evaluates them. The main responsibility of this committee is to take decision, which often requires more information more than proposal provides.
2. **Information System Committee**: - This committee approves or disapproves projects and set priorities, indicating which projects are most important and should receive immediate attention.
3. **User-Group Committee**: - This committee is responsible for designing & development of the system. According to this committee users required **following** request with respect to project.
   i.) What is the problem?
   ii.) What are the details of the problem?
   iii.) How significant is the problem?
   iv.) What does user feel is the solution?
   v.) How will the information system help?

Preliminary Investigation for project⇨ It includes **following** objectives.

1. Clarify & understand the project requests
2. Determine the size of the project.
3. Access cost & benefits of alternative approaches.
4. On above recombination outlining the acceptance or rejection of the proposal.

Feasibility testing for project⇨

1. **Technical feasibility**: - Study of **f**unction, **p**erformance & **c**onstraints that may affect the ability to achieve an **a**cceptable system. Technical feasibility centers on the **r**equired/existing computer system (**Hardware/Software**) &

to what extent it can support the proposed application.

2. **Economical feasibility**: - Economic feasibility study is the most **f**requently used method **for** evaluating the effectiveness of a new system. **Cost** benefit analysis is perform to determine the benefits & savings are expected from the new system and compare then with costs. The **benefit** of project includes **three types**.

   i.) Cost saving of our project leads to the reduction in administrative & operational cost.
   ii.) A cost avoided benefit of our project does not require any additional skill.
   iii.) Encoding of **modules** is for improve **service** level of benefit.

3. Operational feasibility: - Will the system be used if it is **developed** and **implemented**.

Conducting interview for project⇨ Interviews allows to learning more about the nature of the projects requests and reasons for submitting it.

On site observation for project ⇨ It is an important technique to collect data is on-site observation. In this method analyst observe the activities of the system directly.

Q.2. **Study for** cost/benefit **analysis for proposed Project**

Following consideration includes for cost/benefit analyst proposed project.

1. Cost saving benefits
2. Cost avoidance benefits
3. Improved service level benefits
4. Improved information benefits

1. Cost saving benefits: - It determine to reduction in administrative & operational cost.

2. Cost avoidance benefit: - It eliminates future administrative and operational cost.

3. Improve service level benefits: - It improves service level benefits that increase performance of a system in improve by a new computer based method.

4. Improve information benefits: - It uses computer based method lead to better information. Under this after delivery the s/w to many customers we collect information of feedback with respect to **strengthens** and **weakness**.

Q.3. **Categories of cost & benefits**

Cost & benefits can be classified as follows.

1. Tangible or Intangible
2. Fixed or Variable
3. Direct or Indirect

1. **Tangible or Intangible**: - Tangibility refers to the with which costs or benefits can be measured. These costs are known as estimated quite accurately. Where as intangible cost & benefits are included the total cost which exceeds the benefits that project undesirable investment.
2. **Fixed or Variable**: - Fixed cost of project remains constant where as variable cost of project must be varies.
3. **Direct or Indirect**: - Direct cost are those which are directly associated with system. Where as indirect are not directly associated with a specific activity in the system.

5. Feasibility Study

Feasibility⇨ Feasibility is the determination of whether or not a project is worth doing. The processes followed in making this determination are **called a feasibility study**. This type of study determines if a project can and should be taking. Once it has been determined that a project is feasible, the analyst can go ahead and prepare the project specification which finalizes project requirements. A feasibility study is carried out to select the best system that meets performance requirements.

There are **following** types of the feasibility study.

1. Technical feasibility
2. Operational feasibility
3. Economical feasibility
4. Social feasibility
5. Management feasibility
6. Legal feasibility
7. Time feasibility
8. Behavioral feasibility

1. **Technical feasibility**: - A study of function, performance and constraints that may affect the ability to achieve an acceptable system. Technical feasibility centers on the required/existing computer system (Hardware/software) and to what extent it can support the proposed application.
2. **Operational feasibility**: - Will the system be used if it is developed and implemented?
3. **Economical feasibility**: - Economical feasibility study is the most frequently used method for evaluation the effectiveness of a new system. **Cost benefit** analysis is perform to determine the benefits and saving are expected from the new system and compare them with costs. The benefit of project includes **three types**.
   i.) Cost saving of our project leads to the reduction in administrative and operational cost.
   ii.) A cost avoided benefit of our project does not require any additional skill.
   iii.) Encoding of modules is for improve service level of benefits.
4. **Social feasibility**: - Social feasibility is a determination of whether proposed project will be acceptable to the people or not. This determination typically examine the portability of the project be accepted by the group directly affected by the proposed system changed. My system will reduce the workled therefore it has a better social feasibility for the existing system.
5. **Management feasibility**: - It is the determination of whether the proposed project will be acceptable to the management. If management does not accept the project or gives a negligence support to it system will tend to view the project as a non-feasible one. My project provides a timely report to the management, so it is feasible for the management.
6. **Legal feasibility**: - Legal feasibility is the determination of whether the proposed project is legal, it fulfills the requirement of acts or not. My project is legally feasible as it does not violate may law and also provide essential help to the entire law system.
7. **Time feasibility**: - Time feasibility is a determination of whether the proposed project can be implemented within a stipulated time frame. My project will be completed within the time frame because of **water fall model** (**s/w Paradigm**) is applied.
8. **Behavioral feasibility**: - People are inherently resistant to change and computers have been known to facilitate change. It is common knowledge the computer installation has something to do with turnover, transfer, **re-training** and changes in employee's job status.

6. Fact Finding

It means learning as much as possible about present system.

How to do fact finding⇒

1. Conducting interview personal.
2. Prepare questionaries.
3. Observe the current system.
4. Collect forms & document currently in use.
5. Determinate the flow of data through the system.
6. Clearly defines the system requirements.

1. Conducting interview personal:-

- Who is involved with what you do?
- What do you do?
- Where do you do it?
- When do you do it?
- How do you do it?
- Do you have suggestion for change?

2. Prepare questionaries:-

- Question can follow **four formats**.
  - i.) Multiple choice
  - ii.) Open ended
  - iii.) Rating
  - iv.) Rank

3. Observe the current system:-

The analyst may want to observe the existing system personally by following transaction, such as in invoice, through it. **Following 15 questionaries** with respect to current system.

i.) Range of product

ii.) Decision support system

iii.) **In–House development**: - Can you provide business software for both **mainframe** and **micro computer**.

iv.) **On Line**: - Are your system truly online?

v.) Debugging & testing

vi.) Updates

vii.) Flexibility/Adaptability

viii.) **History**/Performance

ix.) **Other customers**: - It determine user of system with respect likeness/unlikeness.

x.) **Security: -** It **compares** security of data of **back** & **current system**.

xi.) **Networking**: - It **compares** networking feature back system & current system.

xii.) **In–House specialist**: - It determines how many training expert for **mainframe** & **micro computer**.

xiii.) **Special feature**: - It determines **easier to use rather than previous system**.

xiv.) **Upgrading**: - It determines flexibility of changing **new system without removing existing software**.

xv.) Training support

7. Data Flow Diagram (DFD)

It is graphical description of a systems data & how the processes transform the data is known as DFD. There are **following** symbols are used in DFD.

- Arrows →
- Circles ○
- Open ended box
- Squares □
- Parallel line (Storing data box)

Rule for designing DFD:-

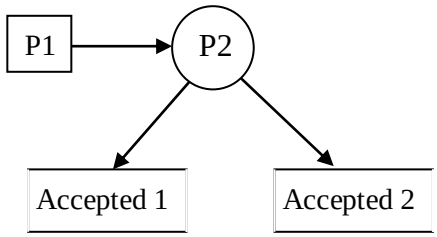
1. Arrow should not cross each other.
2. Squares, circle and files must bear names.
3. Decomposed data flow must be balanced.
4. No two data flows squares or circles can have the same.
5. Draw all data flow around the outside of the diagram.
6. Choose meaningful names for data flow, process and data stores.
7. Control information such as counts passwords and validation requirements are not pertinent to a data flow diagram.

Level of DFD:-

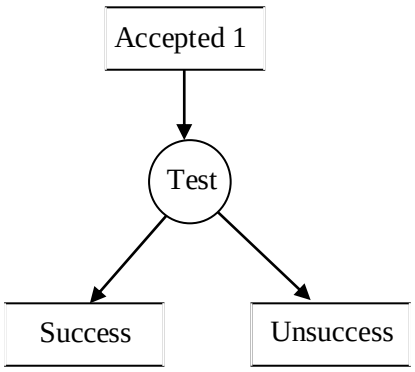
1. DFD-0 level
2. DFD-1 level
3. DFD-2 level
4. DFD-3 level
5. DFD-4 level

Example: 1. **Online University Admission system.**

DFD-0 level

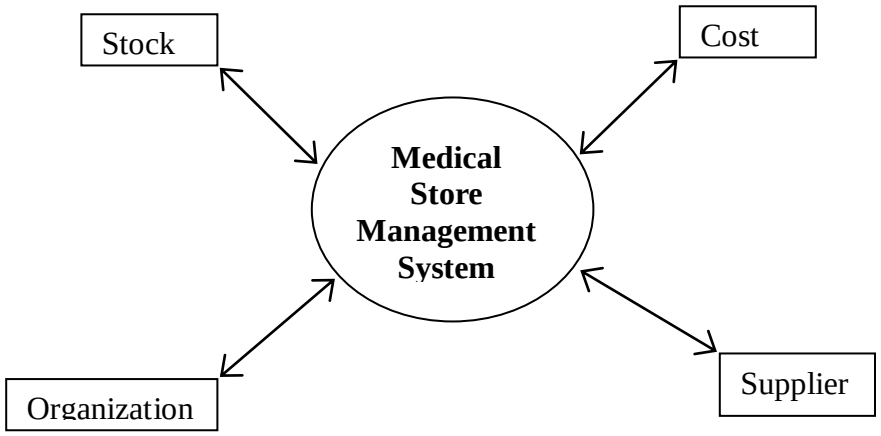


DFD-1 level

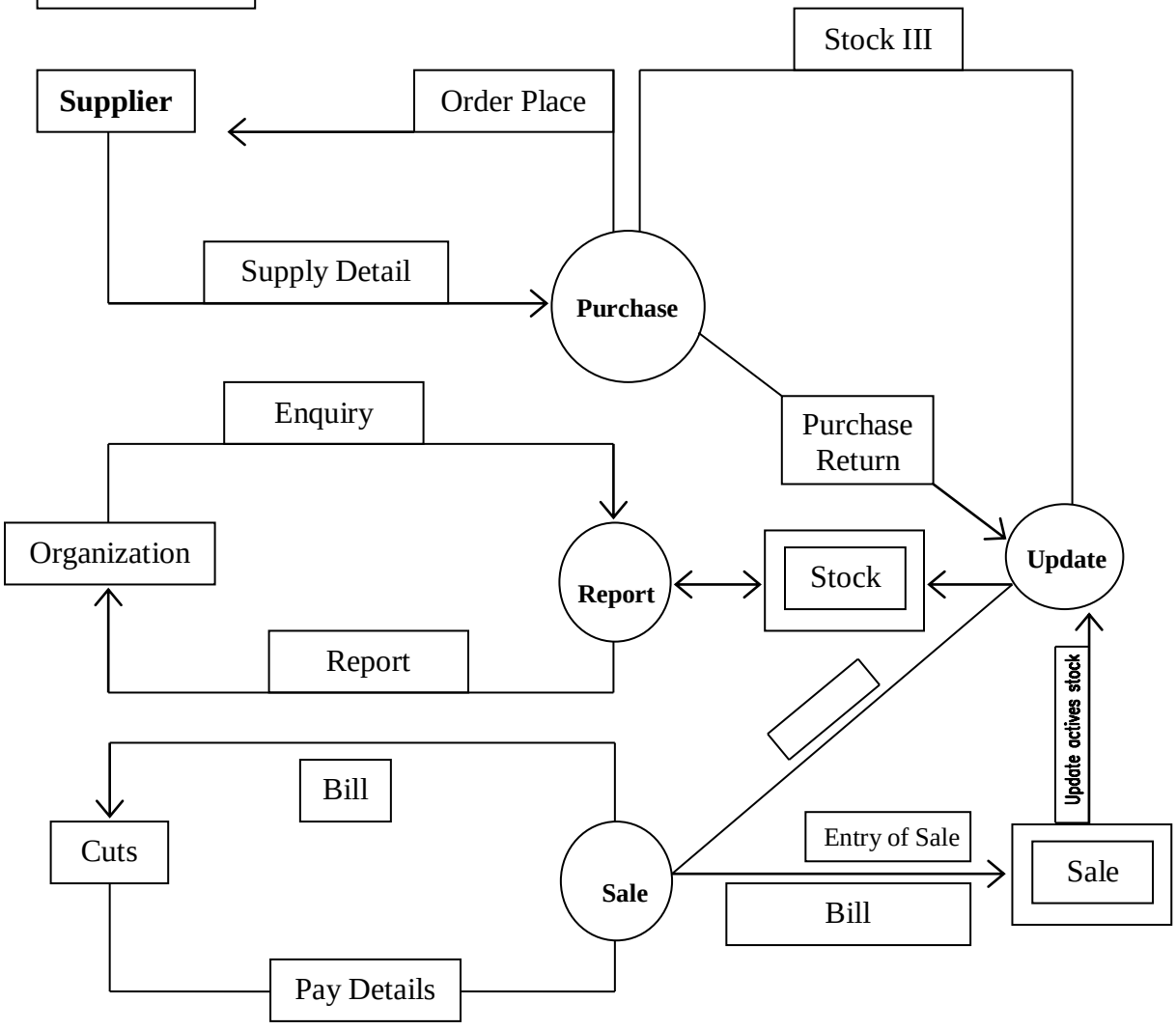


Q.2. DFD for Medical Store Management System.

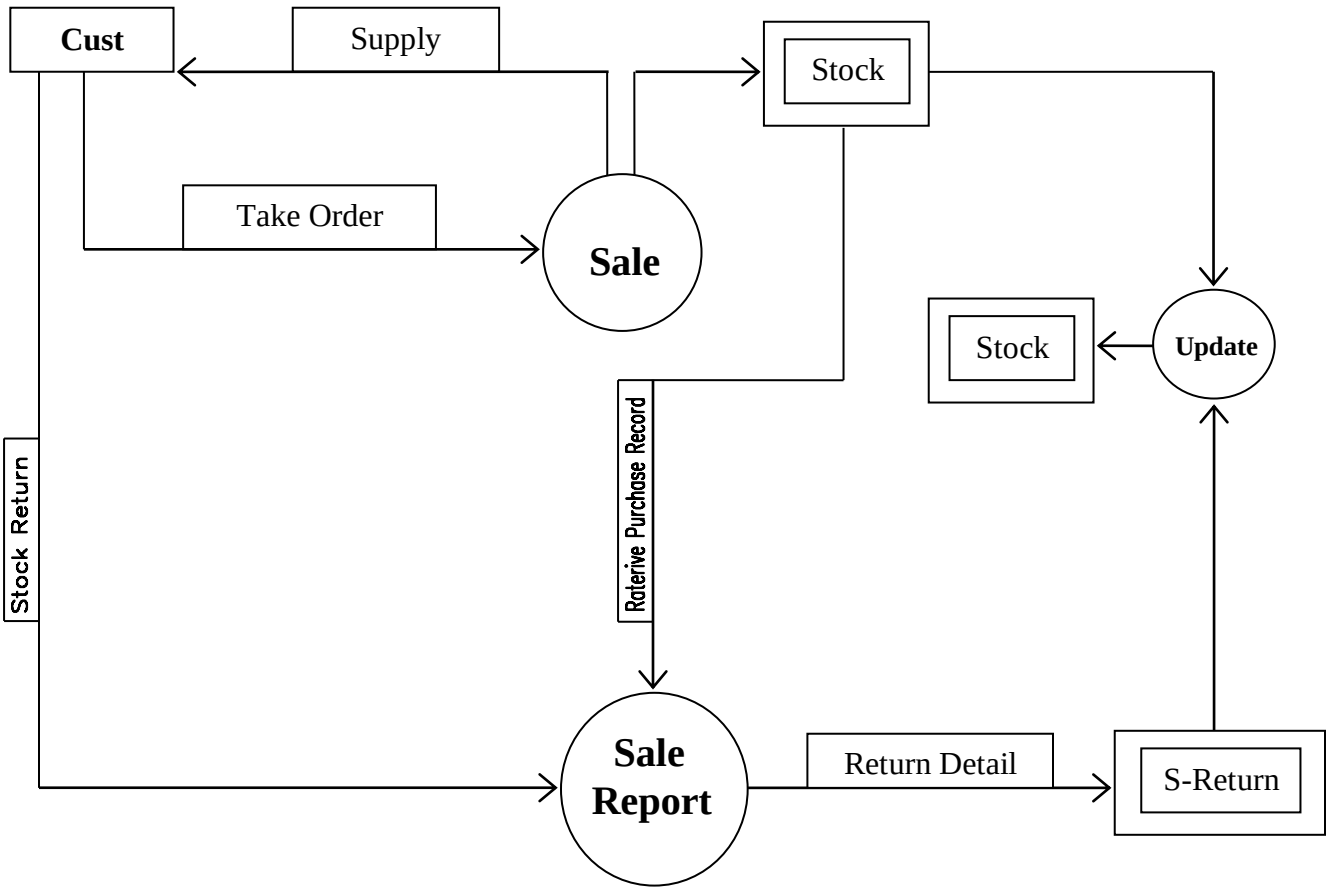
0-Level DFD



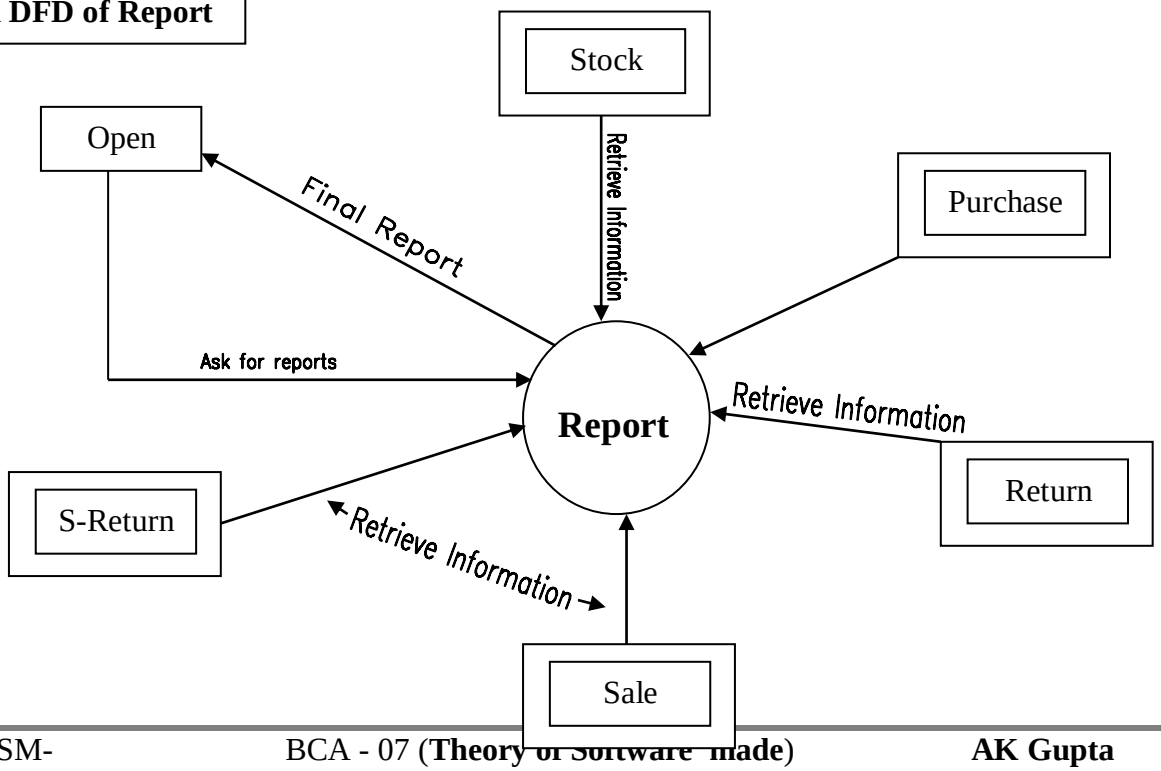
1-Level DFD



2-Level DFD of Sale

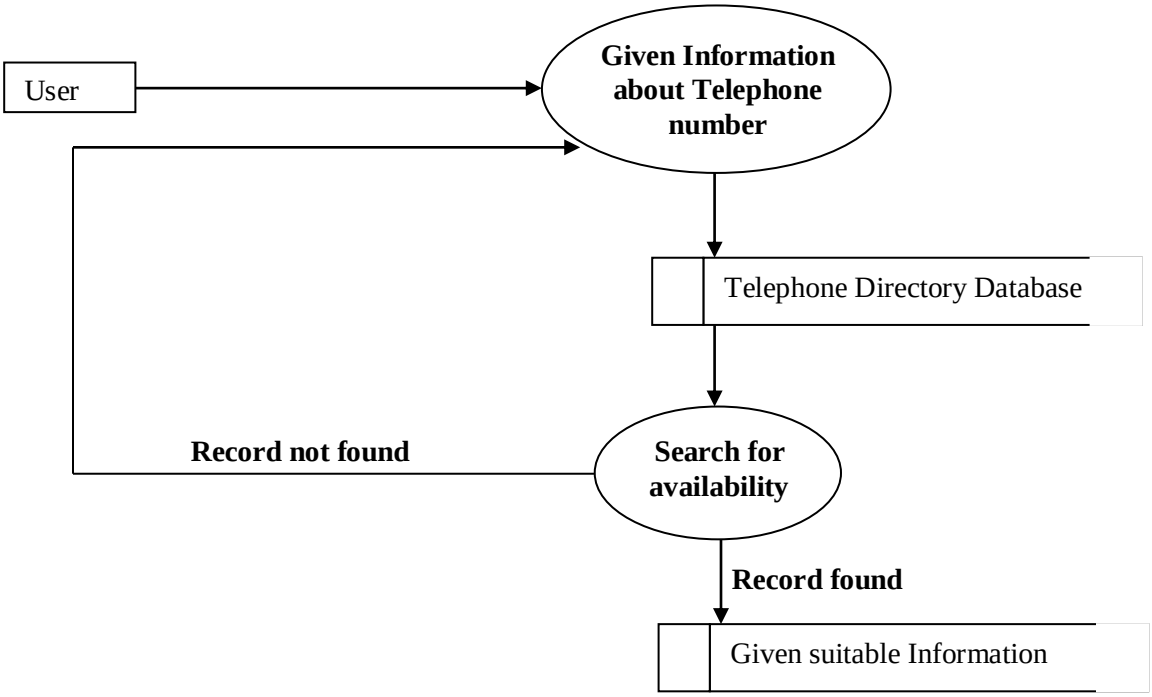


3-Level DFD of Report

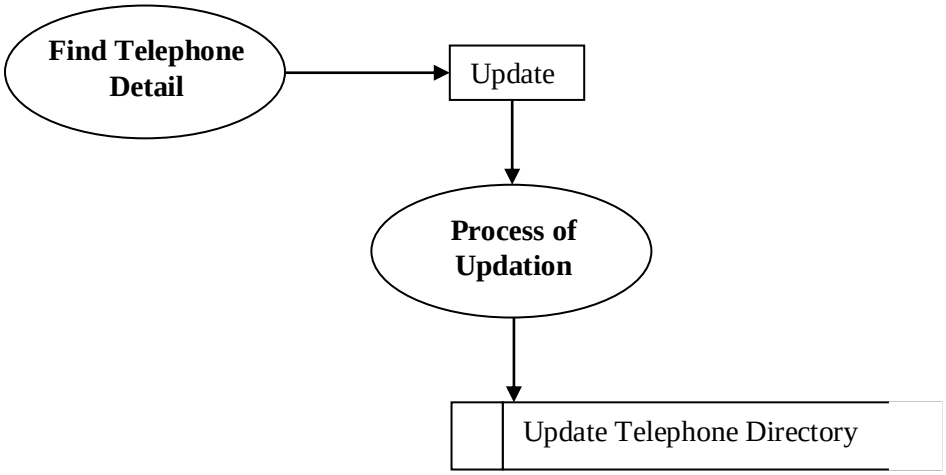


Q.3. DFD for Telephone Directory System.

0-Level DFD



1-Level DFD



8. Data Dictionary

A data dictionary defines each term (**called** a data element) encountered during the analysis and design of a new system. Data elements can describe files and data flow diagram (DFD→ it indicate processes of the system) or processes. **Following symbols** are used in data dictionary.

1. = Equivalent to
2. + And
3. [ ] Either/or
4. () Optional entry

General Example:-

Student	=	Name of student	+
		Name of Father	+
		Name of Mother	+
		Name of City	+
		Name of State	+
		Pin Number	+
		Date of Birth	+
		E-mail	[ ]
		Mobile Number	( )
		Passport Number	( )

Types of Data Dictionary⇒ There are **two types**

1. Integrated data dictionary
2. Stand-line data dictionary

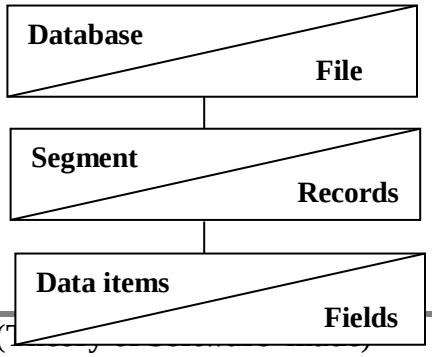
1. **Integrated data dictionary**:-It is related to one data base management system. The extent the organization data is under this DBMS. It is global or organization wide. Details description of data about data is called **metadata**.
2. **Stand-line data dictionary**:-It is not tied to any one DBMS. It has special advantages for one DBMS such as DB-DC data dictionary.

Functions of Data Dictionary⇒ There are following **three categories** of function of data dictionary.

1. Passive function
2. Active function
3. In-line dictionary

1. **Passive function**: - It performs documentations only. This variety of dictionary could be maintained as a manual rather than automated database.
2. **Active function**: - Such function of data dictionary perform operation development by exporting definition and program data storage definition language such as C, C++, C#, Cobol, Pascal, JCL etc.
3. **In-line dictionary**: - It is a data dictionary which is active during program execution performing transaction, validation and editing of facts.

Minimum Data Dictionary⇒



9. S/w design & Software tools

There are following **four specific tools** are described below:

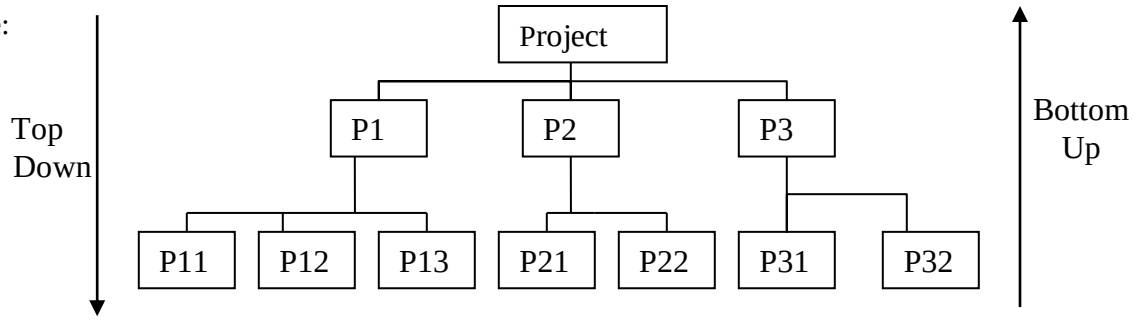
1. Structure flowchart 2. HIPO diagram 3. Warnier /or Diagram 4. N-S Chart

1. Structure flowchart: - There are **three basic elements** are used in developing structured flowchart.

a) **Process**: - It represents steps in program that are shown by using rectangle box.
b) **Decision**: - It represents alternative conditions that can occur and that the program must have a manner of handling.
c) **Iteration**: - It represent looping & repletion of operation.

2. HIPO (Hierarchy plus Input Process Output) ⇒ It is another tool which is commonly used for developing system s/w and based on highly structured modular design.

Figure:



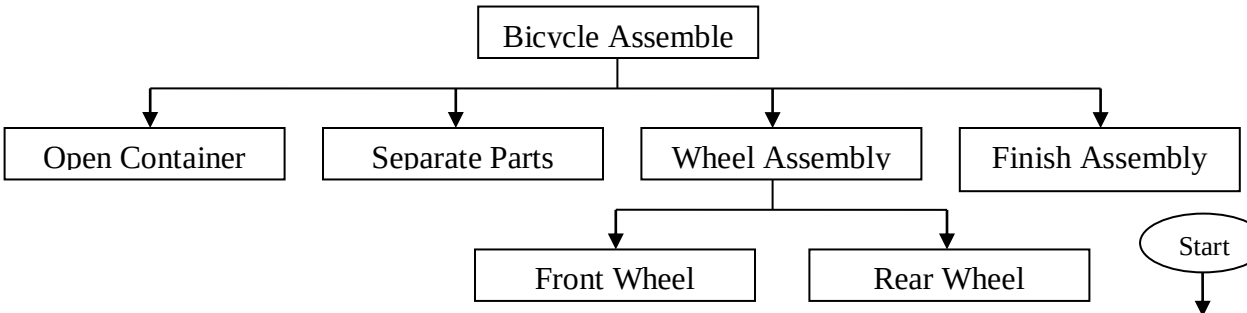
There are following **two types** of HIPO diagram.

1. Visual Table of Contents (**VTOC**) 2. Input Process Output (**IPO**)

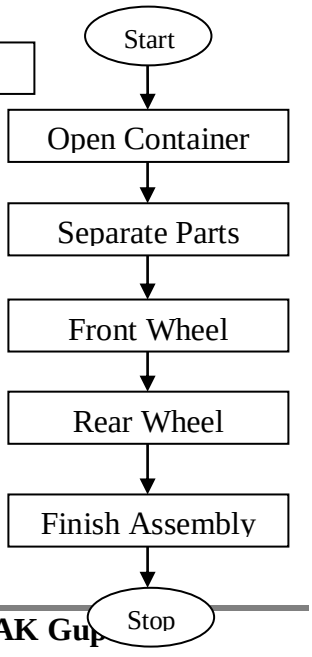
Together these diagrams assist in designing programs and their **functions**.

1. **Visual Table of Contents**: - It arranges the program modular in order of priority, and it read top down and from left to right. Each module of the program appears as a rectangle which contains a brief description of the modules purpose.

Example of VTOC→ Diagram for assemble a bicycle



Example of VTOC→ Flowchart for assemble a bicycle

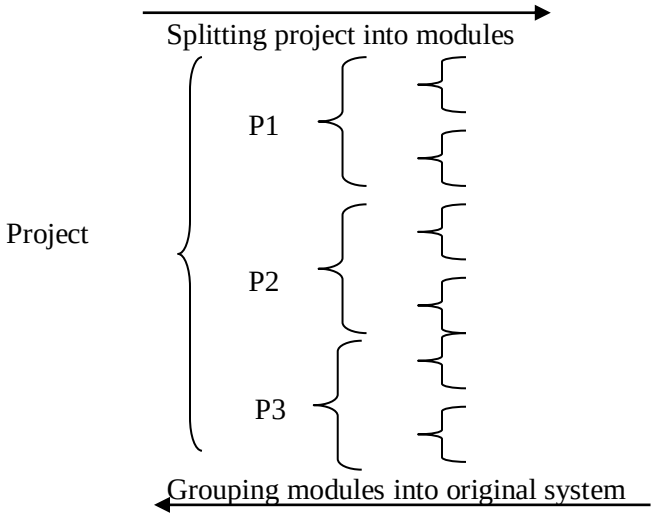


2. Example of IPO→ for bicycle: - It defines the input, processing and outputs for each module in the program.

Example of building bicycle by using IBO method→

Input	Process	Output
Frame Front wheel Rear wheel Seat Chain Handlebars	Bolt front and rear wheel assembly Attach handlers Attach chain Attach seat	Complete cycle

3. Warnier/or Diagram ⇒ It is also known as logical construction of program. It is very powerful tools aimed at designing of program structures by identifying the output and processing result. This diagram is shown in following figures.



4. N-S Charts (Nassi-Shneidermann) ⇒

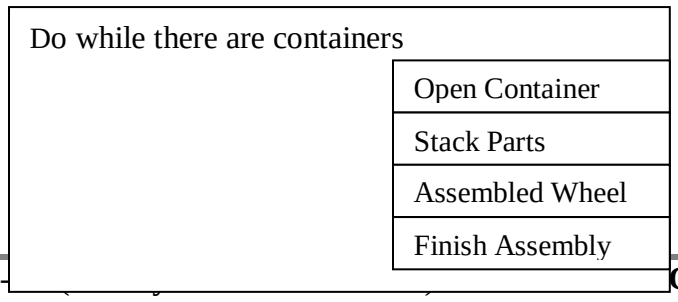
It is a chart offer and alternative to either pseudo code or program flow charts. Named their authors **N-S charts** are much more compact than program flow charts, include pseudo code like statements and feature sequence, decision and repetition constructs.

***Pseudo Code**: - It is a technique for writing logic of solving computer program. Pseudo code writes into natural English language. This pattern based on user way.

Example:-1 **Write pseudo code for checking year is leap or not**

Step 1. Start writing of pseudo code.
Step 2. First we enter year value.
Step 3. We will calculate remainder after diving by four.
Step 4. We will write logic for check remainder is zero or not.
Step 5. If remainder is zero than print year is leap year.
Step 6. If remainder is not zero than print year is not leap year.
Step 7. Stop writing of pseudo code.

N-S chart for bicycle assembly:-



10. Testing

Long Question

Once source code has been generated. Software must be tested to uncover (and correct) as many errors as possible before delivery to your customer. Following steps are used in testing of s/w.

1. Internal program logic exercised using "**White Box testing**"
2. Software requirements are exercised using "**Black Box testing**"
3. V&V Testing. (Verification And Validation)
4. Alpha testing (developer Site Program testing)
5. Beta Testing(User Site testing)
6. Special testing

1. White Box testing (Module testing):- It is also known as **glass box testing.** Using this methods of testing the s/w engineer can derive test cases.

Case 1:- Guarantee that all independent path in module.
Case2:- Exercise all logical decisions on their true and false side.
Case 3:- Execute all loops at their boundaries.
Case4:- Exercise Internal data structure.

2. Black Box testing (System testing):- It is also known as **behavioral testing**, focuses on the functional requirements of the s/w. It arises following questions.

i.) How is functional validity test?
ii.) How is system behavior and performance tested?
iii.) What classes of input will make good test case?
iv.) How are the boundaries of a data class isolated?

3. V&V Testing. (Verification and Validation):-

Verification:-"Are we building the product right?"
Validation: - "Are we building the right product?"

6. Special system testing: - There are other six tests which fall under special category.

i) **Peak load test**: - It determines whether the system will handle the volume of activities that occur whether the system is at peak of its processing demand.

ii) **Storage testing**: - It determines the capacity of the system to store transaction data on a disk or in other files.

iii) **Performances Time testing**: - It determines the length of time system used by the system to process transaction data.

iv) **Recovery testing**: - This testing determines the ability of user to recover data or restart system after failure.

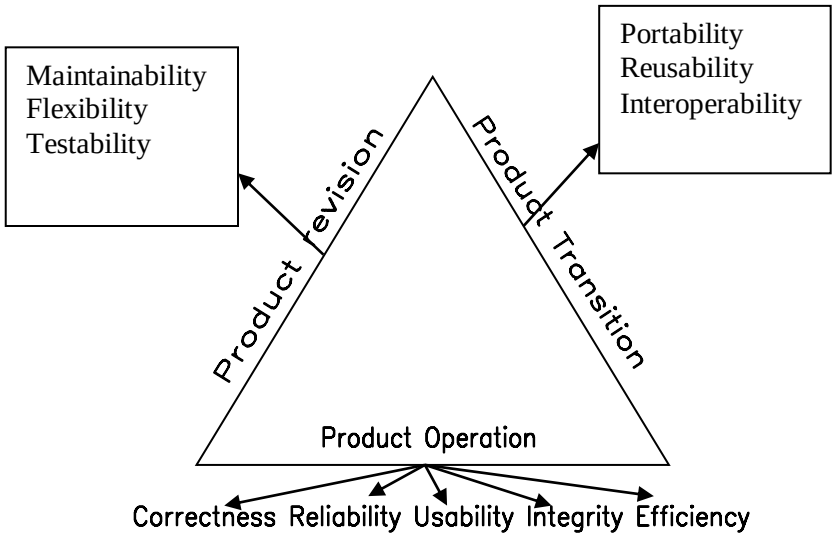
v) **Procedure testing**: - It determines the clearity of documentation on operation and use of system having users to do exactly what manual request.

vi) **Human Factor testing**: - It determines how users will use the system when processing data or preparing reports.

11. McCall's Quality Factors

It includes following descriptions:-

1. Correctness
2. Reliability
3. Efficiency
4. Integrity
5. Usability
6. Maintainability
7. Flexibility
8. Testability
9. Portability
10. Reusability
11. Applications
12. Interoperability



1. Correctness:-It satisfies its specifications and fulfills the customers missions objective.
2. Reliability:-It satisfies failure free operations.

3. Efficiency:-The amount of computing resources and code required by a program to perform its functions.
4. Integrity:-Data by unauthorized persons can be controlled.

5. Usability:-Effort required to learn, operate, prepare, input and interpret output of a program.

6. Maintainability:-Effort require to locate and fix an error in a program.

7. Flexibility:-Effort required to modify an operational program

8. Testability:-Effort required to test a program.

9. Portability:-Effort required to transfer the program from one h/w to another H/w

10. Reusability:-Extent to which a program can be reused in other applications.

12. Interoperability:-Effort required completing one system to another.

12. How to Measurement of s/w **Reliability** & **Availability**

Measurement of Reliability: - A simple measure of reliability is **mean time between failures** (MTBF).

MTBF = MTTF + MTTR

Where: - **MTTF** is Mean time to Failure.

MTTR Mean Time to Repair.

Measurement of Availability:- It is defined as:

Availability = [MTTF/ (MTTF+MTTR)]*100%

13. Quality Standards

A quality assurance may be defined as the organizational **structure**, **responsibilities**, **procedures**, **processes** and **resource** for implementing quality management. Some of the standards are give below.

- **ISO 9001**:- It is a set of guidelines such as:

1. Responsibility
2. Design Control
3. Inspection
4. Traceability
5. Product Identification
6. Contract review
7. Document & data Control
8. Statistical technique
9. Process Control

14. Benchmark Testing

It is a **simple program** specially **designed** to evaluate the performance of different computers and their s/w. This is necessary because computers will not generally use the same instructions, word of memory or machine to solve particular problems.

Note: - Benchmark testing **does not affect** standards of the project. It optimize (achieving the best) the solution of proposed project.

Example: - Vendors selection for h/w & standard of **ISO**.

15. E-R Model (Entity-Relationship)

It is a technique for designing database. For managing database we must need a reliable DBMS.

e.g. of DBMS: Oracle, SQ Pulls Server, FoxPro, DB-2, Ingress etc.

Entity: - It is an object, which is **distinguishable** from other object.

e.g.

Enrollment=02181050001.
SB A/c number=234567.
Passport Number=AB968754.

Entity Set: - Collection of entity is called entity set.

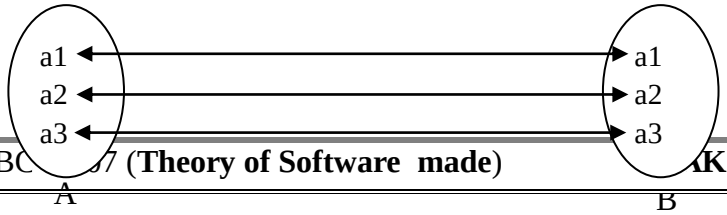
e.g.

Employee table.
Students Records table.

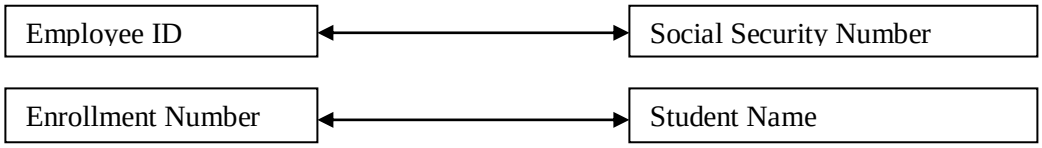
Relationship (Mapping):- Relations between attributes of two entity sets is called mapping. There are **following types** of relationships.

1:- 1:1(One: One) Mapping.
2:- 1: M (One: Many) Mapping.
3:- M: N (Many: Many) Mapping.

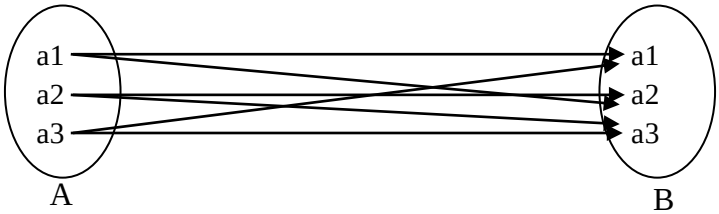
1. e.g. 1:1(One: One) Mapping



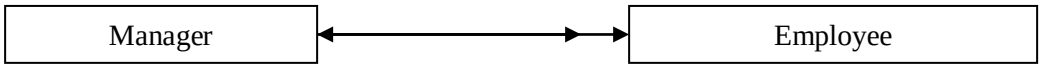
- Relationship between enrollment number and student.
- Relationship between Passport number and person.



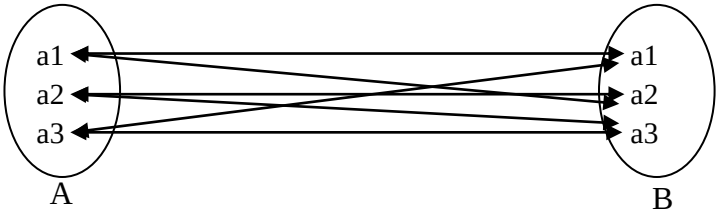
2. e.g. 1: M (One: Many) Mapping.



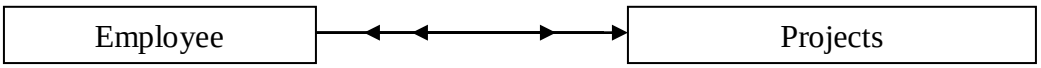
- Relationship between Manager and Employee.



3. e.g. M: N (Many: Many) Mapping



- Relationship between Employee and Project.

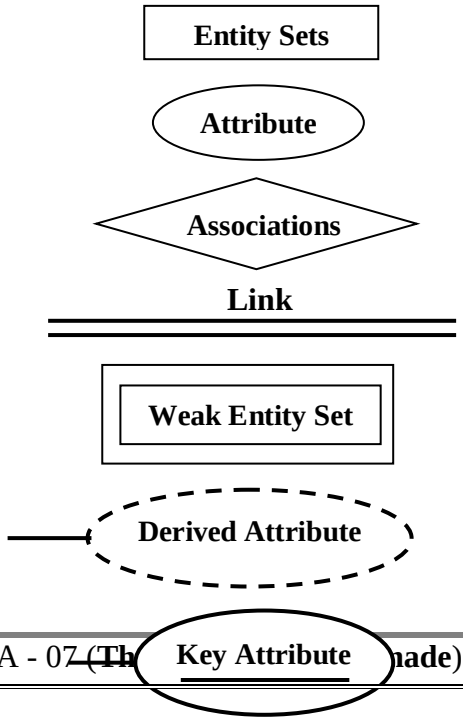


Types of Entity: - 1. Strong Entity 2. Weak Entity

Strong Entity: - An entity object which gives almost maximum related attributes information is called strong entity.
e.g.: - Passport Number, **SSN** (Social security Number), **UID** (Unique Identification number)
Employee Number

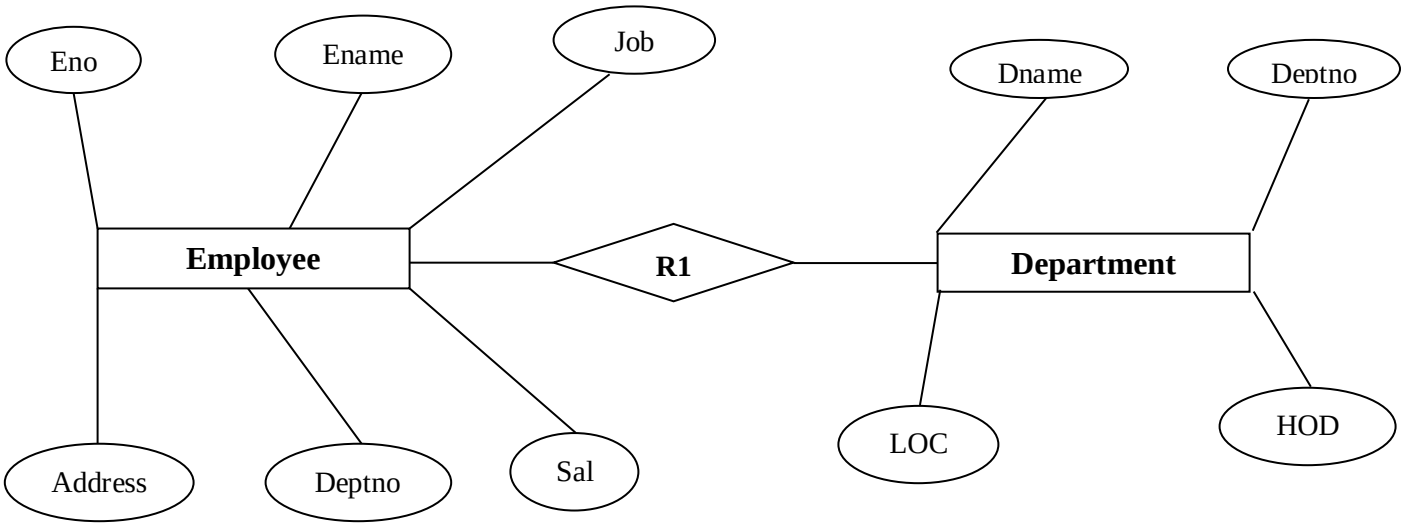
Weak Entity: - An entity object which gives minimum related attributes information is called weak entity.
e.g.: - Voter Id, Deptno

Symbols Used In E-R Model:-

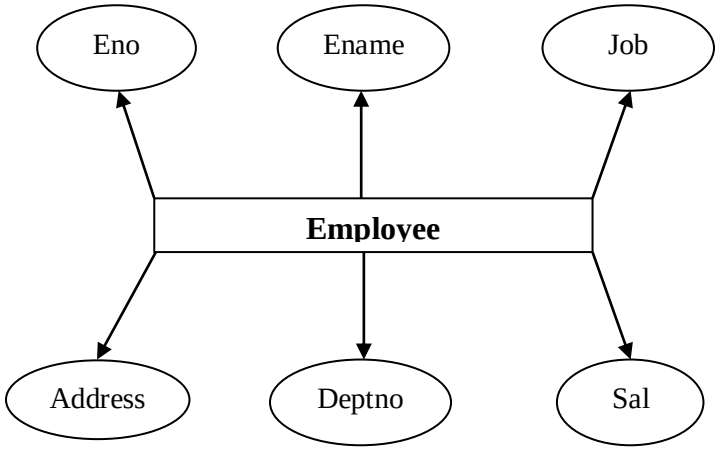


Example of E-R Model:-

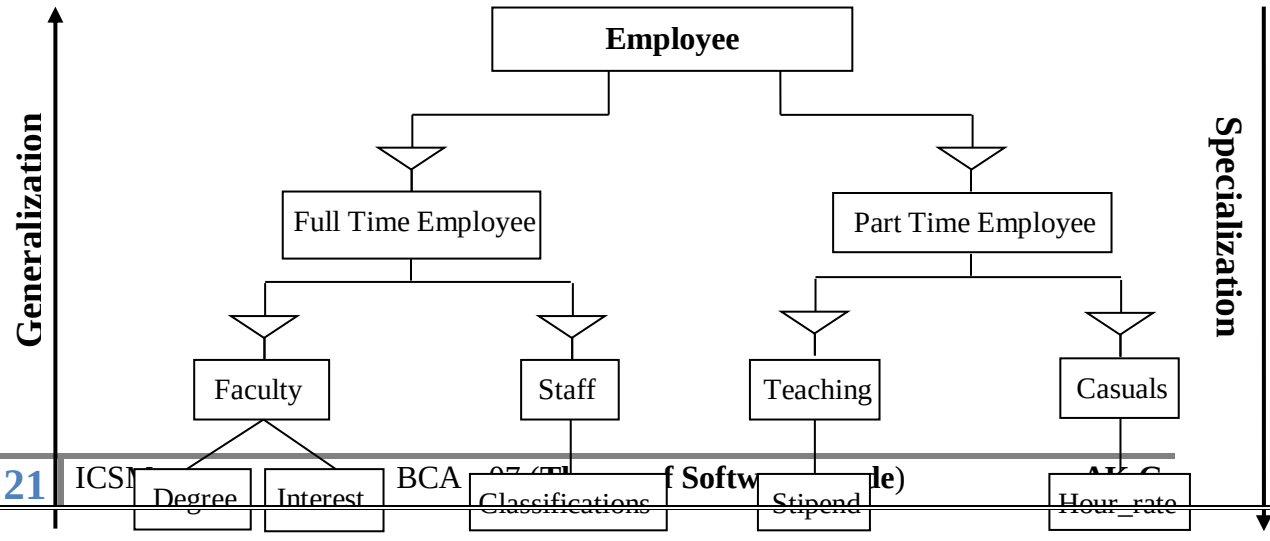
Employee- Department



Concept of Aggregation:-



Concept of Generalization & Specialization:-



16. Documentation

Long Question

A system cannot be completely effective unless it is adequately documented. It consists of complete information about system. **Such as**:

- Introduction of system
- Complete details about **SDLC**
- H/w and S/w information
- Information of programming elements
- Information about implementation
- Acknowledgement
- **Table of contents**
- Definition of problem
- System study(By means of feasibility)
- **Cost and Benefit Analysis System**
- **Fact finding**
- **Project technical details**
- **DFD**
- **E-R Model**
- Source code
- Complete testing of System
- **Process Model**
- Conclusion
- User Manuals
- Installation Procedure
- Bibliography

Characteristics of good documentation: - Documentation is considered to be **good** if it has following qualities:

- Availability
- Objectivity
- Cross-referable
- Easy to maintain
- Completeness

Types of documentation:-

1. Program documentation
2. Operation documentation
3. User documentation
4. Management documentation
5. System documentation

Bibliography:-

1) The C++ COMPLETE of G.S. BALUJA of Khanna Publications.
2) The C++ PROGRAM DESIGN of DIETEL & DIETEL.
3) The TURBO C++ of ROBERT LAFORE.

17. Input and Output Design

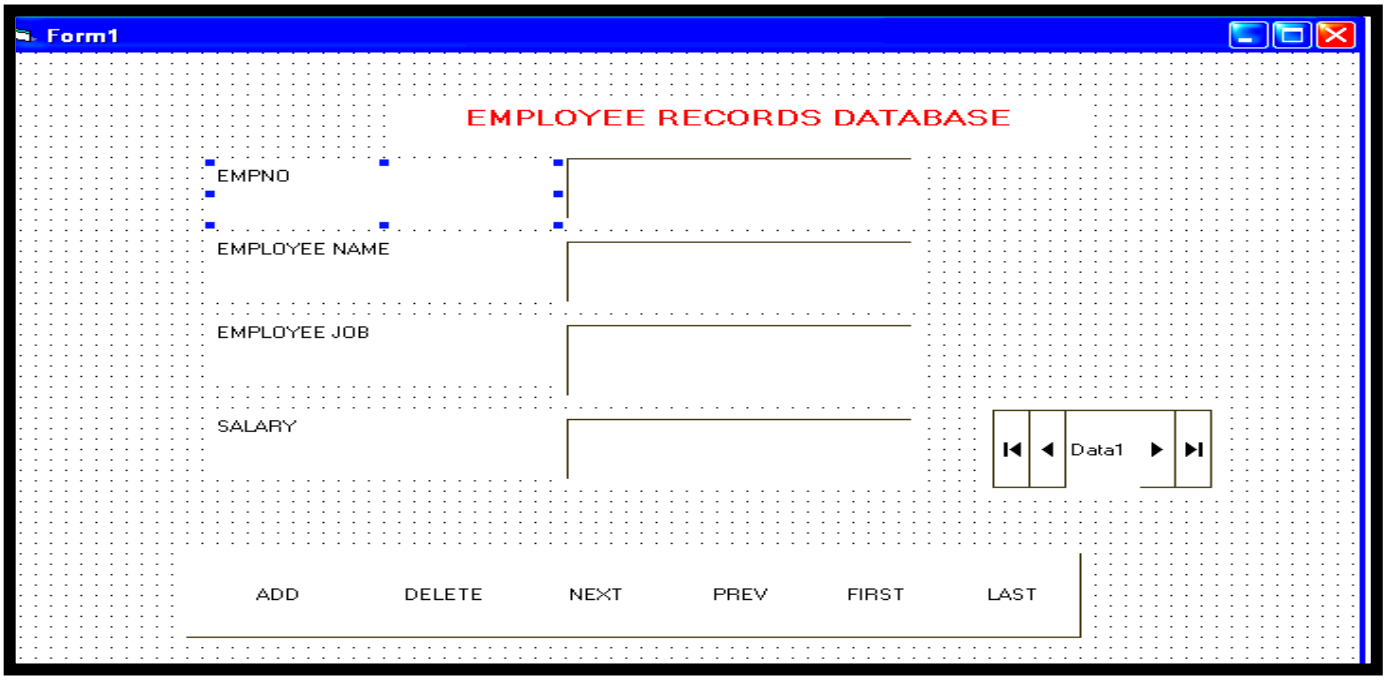
Designing of I/O screen for proposed project must be user-friendly.

Screen for Input Design:-

1. Example Student Admission System:-

Admission Form of UPRTOU ALLAHABAD										
Enter Name of Student										
Enter Name of Father										
Enter Name of Mother										
Enter Name of Course										
Enter Amount	DD No/Challan Number					Name of bank				
E-Mail Address			Complete Address					Contact Number		
Paper Codes										
Submit	Cancel	Edit	Help	Display	Next	Back				

2. Example Employee Record Database System:-



Screen for Output Design:-

UPRTOU Admission Report			
Control number	S-158/AC0012		
Enrollment Number	921581050001		
Student name	Amit Kumar Patel		
Father name	Umashankar Verma		
Mother name	Shanti Verma		
Course name	BCA	III[rd] Semester	
Address	Babatpur Varanasi-221206		
Contact number	8924893500		
Return Main Form	**Edit Record**	**Help**	

Short/Long Note- Guarantee 15/8 marks

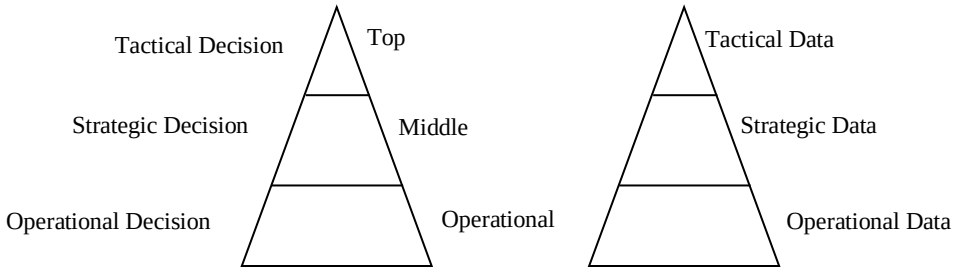
18. MIS (Management Information System)

It is constitutes of following elements.

1. **Planning:-**It call for a lot of environmental information like shifting markets, changing technology as well as internal information like core competitive strength of organization. Operational planning staff scheduling would need a lot amount of internal information like schedules, attendance etc.
2. **Organizing:-**In this stage we will organize gathering of planning information. We will also provide training information for staffs.
3. **Coordinating:-**Coordination would call for industry wide data corresponding to technology availability.
4. **Directing:-**Organization provides directions for successful running works.
5. **Control:-**It provides total quality management that produce better performance.

Organization, Information and Decision:-

Successful development of information system call for a deep understanding of the organizational structure and dynamics of enterprise. Any successful information system should take into account such as a pattern of information needs by the management. It is pictorially displayed in the form of management Vs Information Pyramid.



Typical MIS System:-

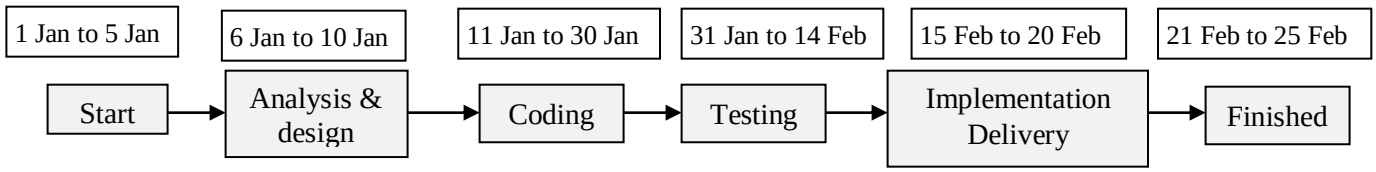
	Production	Finance	Personal	Marketing
Strategic	New Plant location	Alternative financing	Welfare policy	Competitor survey
Tactical	Production Bottleneck	Variance analysis	Performance appraisal	Advertising
Operational	Daily scheduling	Payroll	Leave records	Sales analysis

19. Project Planning & Control / Project Scheduling

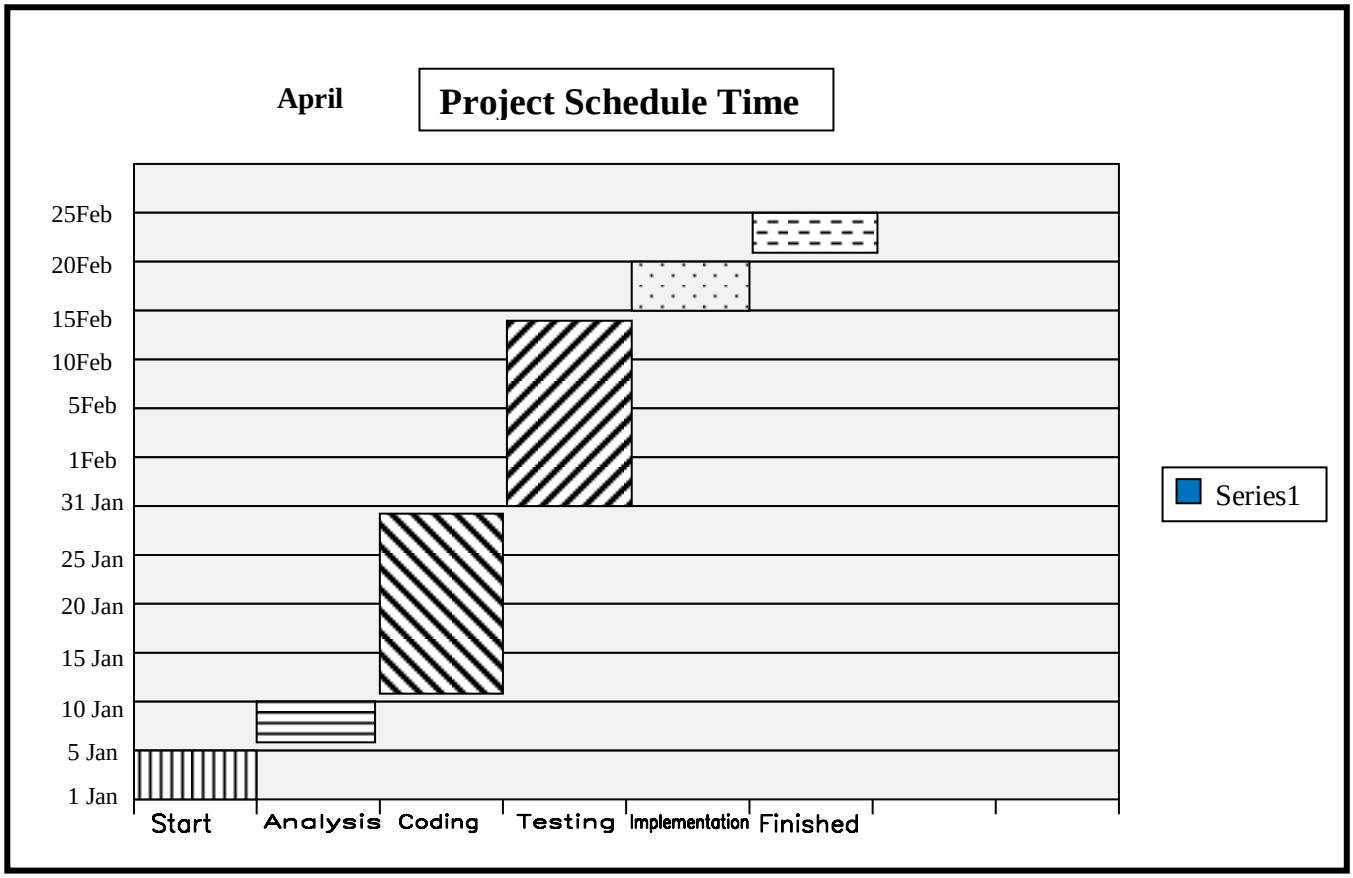
The **planning**, **design** and **installation** of a system is called **project**. It is directed by project leader. Following **four steps** for project planning.

1. **Organizing the resources available for project**:-
   a) Need of Suitable H/w and S/w
   b) Language expert's People
   c) Database designers
   d) Predesigned document
2. **Scheduling the event in the project**:-
   It is charting technique of project.
   a) PERT Chart (Project Evaluation and review technique)
   b) Gant Chart (Bar Chart)

   Example of PERT Chart (Project Evaluation and Review Technique) –

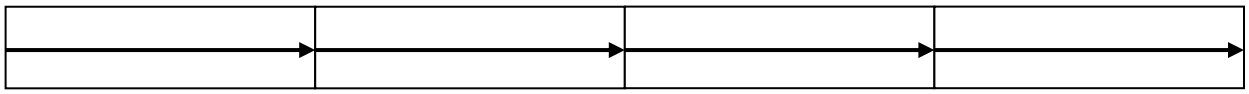


Example of GANT Chart–



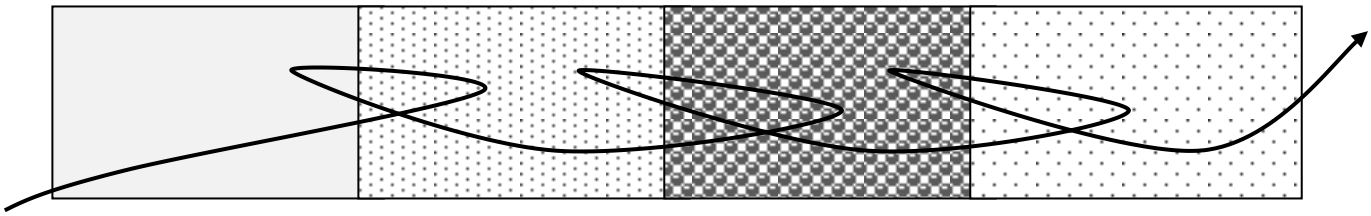
3. **Evaluation Progress**:-
   a) Ideal Project Progress.
   b) Reality of Project progress.

a). Ideal Project Progress:-



Study Design Construction Implementation

b). Reality of Project progress:-



Study Design Construction Implementation

4. **Establishing standards for the project:-**

   a) Review project progress.
   b) Analyze the impact of delays on the entire project.
   c) Examine any problems existing in the quality of data.
   d) S/w must be satisfied **MC Call theory** (For SQA).
   e) Measurement of Reliability & Availability.
   f) Satisfy **ISO 9001** Quality sets.

20. CASE Tools (Computer Added Software Engineering)

It is a tool for developing s/w. Which categorized into following **four types**?

1. **Front End CASE Tools**: - It deals with design, Specification, analysis and requirements.
2. **Back-End Tools**: - It deals with the detailed design, coding, assembly and testing of s/w.
3. **Maintenance tool**: - It deal with s/w after initial release. It may assist in tracking bug fixes and enhancements requests.
4. **Support s/w and frameworks**: - It provides basic functionality required in tools of type 1, 2 and 3.

Factors Affecting CASE TOOLS:-

i.) The people that are to develop the product
ii.) The methodologies and tools that they use
iii.) The need to produce quality product
iv.) The politics of the organization
v.) The psychology of the term member
vi.) The need of standarization

Types of CASE Tools: - There are **two types**

1. **Selecting CASE Tools: -** (It was **developed** by **P-CUBE Corporation**).
   a) Developing a menu of features and facilities.
   b) Improve long term productivity and quality significant.
   c) It maximizing performance per unit is the objective.

2. **Deft CASE tools:-**
   a) Assist them in gathering the initial requirements from end-users.
   b) design the system general algorithms.
   c) Check their designs for completeness and consistency.

d) Automatically generates the **RDBMS** (tables and Forms).

21. 4GL (Fourth Generation Language)

It is also known as **Very high level language(VLSI)**. Following basic types of language tools fall into this category.

1. Query Language.
2. Report Generator.
3. Application Generators.
4. Decision Support System & Financial Planning.
5. Some Microcomputer application S/w.

e.g.: - Oracle, **Sql Server**, **FoxPro**, **LINC,DB2** etc.

Emp table (empno, ename, job, sal, deptno, address):-

1:- To display **all employee** records.

```
Select * from emp;
```

2:- To display **empno**, **ename** and **job** only.

```
Select empno, ename, job from emp;
```

3:- To display **employee records** who is found **salary more than 10000**.

```
Select empno, ename, job, Sal from emp where sal>=10000;
```

How to Solve 4 GL to help solving problem

1. They are much easier to learn use.
2. They provide more power full feature.
3. They provide convenient feedback on systematic mistakes.
4. It is much faster than 3GL.

Impact of 4 GL: - It deserve management attention such as

1. Productivity and s/w development
2. Restructuring of the system development process.
3. Emphasis on **DSS** and **End User** Computing

5GL:- (Fifth Generation Language):-

It is **also known as HAL** (Human Accessible Language) based language.
This language **make to smarter**. **e.g.**: - **LOTUS-1-2-3**

22. Green PC

The Green PC is characterized by consumption of the less power and feature of consuming only say 20 w in the stand by mode. It does not use chlorofluorocarbons in the manufacturing process and uses recyclable packaging material. Green PC consumes less than 30 W of power is stand by mode.

Types of Green PC: - There are **two types**

1. Dark Green PC:-It consumes 15-20 W in stand by mode.
2. Light Green PC:-It consumes 25-30 W in stand mode.

23. Object Oriented Design Model of System (OODMS)

This Model must be support following three properties.

1. Polymorphism (P)
2. Inheritance (I)
3. Encapsulation (E)

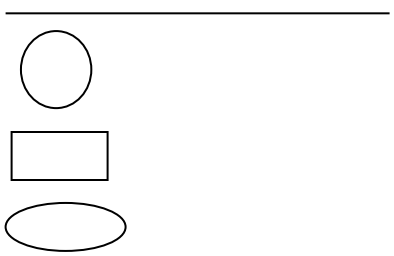
1. Polymorphism: - A single function may perform various types of tasks depending upon **arguments**.

e.g. draw (line)

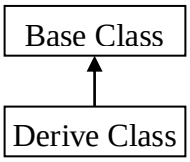
draw (Circle)

draw (Rectangle)

draw (oval)



2. Inheritance: - It means **reusability**. That is property of base class is going to access by it's derive class.



3. Encapsulation: - It is an abstraction process of **binding** and **hiding** properties.

Concepts of Class & Objects:-

Class: - It is combination of **data member (Attributes)** and **member functions (Behaviors)**. It has no physical existence.

Example: - Class person
Class Animal
Class Vehicle
Class Vegetable
Class Students Etc.

Object: - It is **an instance of class** is called object.

Example: - Ravi is an object **of class person**.
Monkey is an object **of class animal**.

Format of class Declaration:-

```
class <class_Name>
{
private:
    Data_members;
    Member_functions;
public:
    Data_members;
    Member_functions;
protected:
    Data_members;
```

Member_functions;
};

Where:-

Private, public and protected are called **visibility mode**.

Function of Object Oriented Modeling:-

1 Basic user requirements must be communicated **between the customers and methods** are defined.
2 Classes must be identified.
3 A class hierarchy must be specified
4 Object to object relationships should be represented.
5 Object behavior must be modeled.
6 Tasks 1 to 5 are reapplied iteratively until the model is complete.

24. Introduction of Data Base Management System (DBMS)

Database⇨ It is collection of **well-organized related records** in coherent manner. These records stored in the **form of table**. It consists of **rows** and **columns**. Rows are known as **tuples** and columns are known as **attributes**.

Example: - Employee records, Students records, telephone Directory, Inventory control, Patients records, etc.

EMP (Table):-

Eno	Ename	Job	Sal	Deptno
101	Amit	Steno	12000	10
102	Vijay	Manager	22000	20
103	Ram	Clerk	10000	10

Where: Eno, Ename, Job, Sal, Deptno are also known as→ **Fields name**/**Attributes name**/**Column name**

Number of Attributes = 5
Number of Tuples = 3
Cardinality of EMP table = **3**
Degree/Arity of EMP = 5

Data Base Management System⇨ It is **an efficient system**/software by which we manage database.

Example: - MS Access, Oracle, SQL Server, DB-2, Ingress, FoxPro etc.

Functions of DBMS:-

1. Creation of New database.
2. Deletion of existing database.
3. Renaming database.
4. Updating database.
5. Searching of records.
6. Sorting of records(A to Z or Z to A)
7. Indexing of records.
8. Creation of View (Logical table/Virtual table).
9. Performing efficient query (Questionaries) on database.
10. Applying constraints (validation rules) on database.

Evaluation of DBMS: - Following technical criteria could be the following for evaluation of DBMS.

1. SQL implementation
2. Transaction Management
3. Programming Interface
4. Database server environment

5. Data storage feature
6. Connectivity
7. DBMS integrity(Integrity-1,Integrity-2)

Note: - Also add complete **E-R Model**.

25. Concept of **File**

It is **heart** of any application s/w and **collection** of related informations.

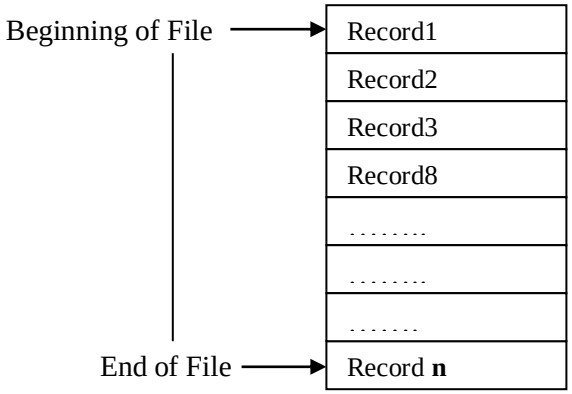
There are following **types** of files.

1. **Master File**(Permanent Storage/**Physical Storage**)
2. **Transaction file**(Logical File)
3. **Table**: - It is created by DBMS. Which consist of **rows** and **columns**?
4. **Backup**: - It is for further use if files accidentally losses.
5. **Dump File**:-It is mainly used for making a copy of software for further use.
6. **Archive File: -** It is created by user when save. It automatically created by system for taking backup.

File Organization: - There are following **four categories** of file organizations.

1. Sequential file Organization.
2. Relative File Organization.
3. Indexed Sequential File Organization
4. Multi Key File organization

1. **Sequential file Organization:-** In this file organization file records are written consecutively when the file is created and must be accessed consecutively when the file is **later used for input** in a **sequential file**, records are maintained in **the logical sequence** of their primary key values.



3. **Index-Sequential File Organization: -** To retrieval of records by using indexed table in sequential manner. Indexed table may consist of **key value** and **address**. It is suitable for large files. **It improves query response**.

Types of indexes:-

1. Primary Indexes
2. Clustering Indexes
3. Secondary Indexes
4. Multilevel Indexing Schema

1. **Primary Indexes: -**
   It is an index specified on ordering key field of an ordered file of records. It associated with two fields.
   (i) Ordering Key field.
   (ii) Pointer field to a **disk block**.

Block 1:-

Eno	Ename	D O B	Job	Sal	Gender
101	Amit	5/5/1977	Clerk	12000	Male
102	Sumit	15/5/1975	Steno	20000	Male
103	Ram	25/4/1978	Manager	30000	Male

Block 2:-

Eno	Ename	D O B	Job	Sal	Gender
****	****	****	****	****	****
****	****	****	****	****	****
****	****	****	****	****	****

Block 3:-

Eno	Ename	D O B	Job	Sal	Gender
****	****	****	****	****	****
****	****	****	****	****	****
****	****	****	****	****	****

…….

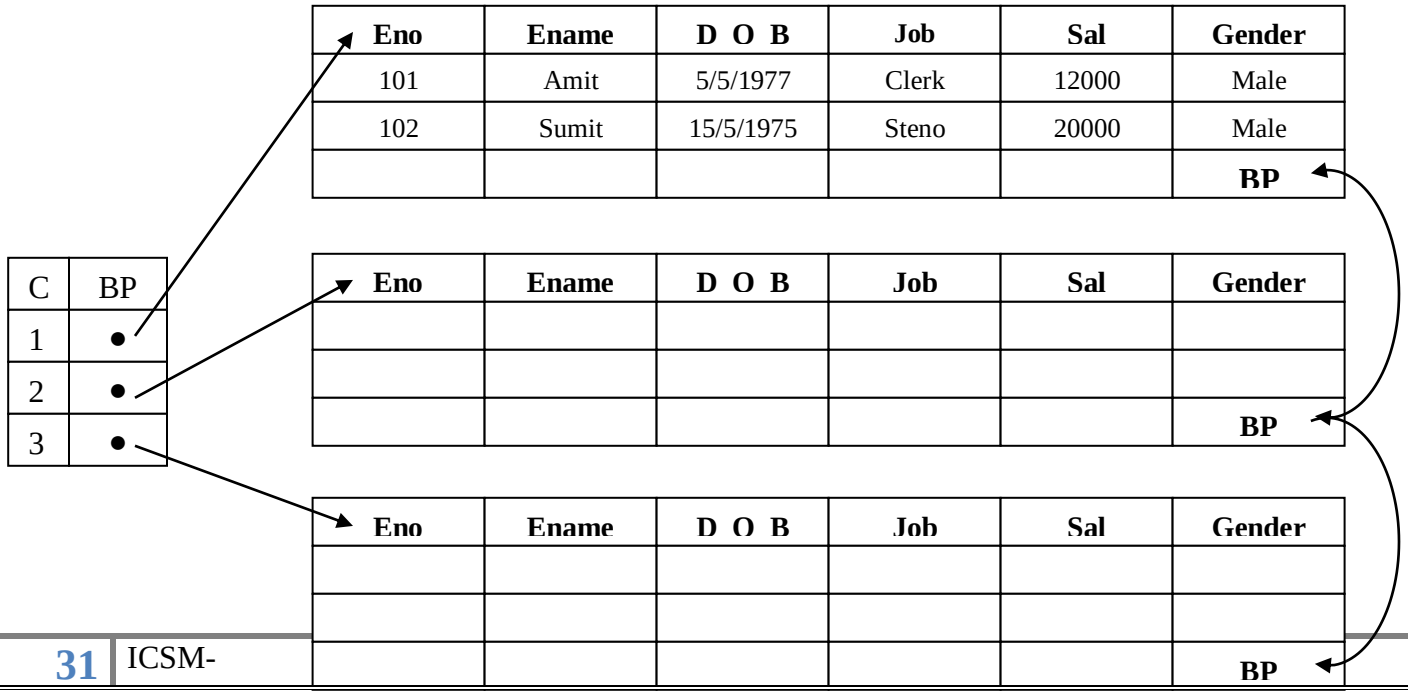
…….

Block **n**:

2. Clustering Indexes:-

If records of a file are physically ordered on a monkey field that does not have a distinct value for each record, that field is called the clustering field of the file. Now we will create a different type of index, called clustering index. It increases speed of accessing of records. It is shown in following figure.

CF **Cluster Field**
BP **Block Pointer**



26. Audit Trail

The DBMS has certain routines that maintain audit trail or journal. It is the path which a transaction traces through a data processing system from source document to summary reports. In other word it refers to the facilities or procedures which allow a transaction to be traced through all stages of data processing beginning with its appearance on a source documents and ending its transformation into information on a final output document.

It records:-

- Who
- When
- Where
- What

27. Ergonomics

To develop a system/software/project with discipline manners using process management. Successful implementation of all SDLC phases, fact finding, design user friendly documentation etc.

28. Knowledge Based System (KBS)

Data treated as raw materials. It is also known as **fact & figures** → after processing data it produces **information** → collection of related information produce **knowledge** → a collection of related knowledge produce **intelligence** → **genius**.

Categories of KBS: - There are two categories.

1. Natural intelligence
2. Artificial intelligence

Example: ROBOT, Fighter Plane.

Artificial intelligence system based on **logic of statements**/propositions. A statement must be either universal true or false.

Example: Sun rises from east → True statement
Sun set in west → True statement
Value of gravity is 10.6 → False statement

Operation on Statement:-

■Connectives

1. Conjunction ∧ 2. Disjunction ∨ 3. Negation ~ 4. Conditional →
5. Biconditional ↔ 6. Symmetric ⊕

True → 1 → T and **False** → 0 → F

1. **Conjunction**: -

A	B	A ∧ B
F	F	F
F	T	F
T	F	F
T	T	T

Rule:
1. Conjunction (∧):- For **multiple** (F×F=F, F×T= F & T×T=T)
2. Disconjunction (∨):- For **addition** (F+F=F, F+T= T & T+T=T)
3. Negation (~):- For **inter change** (F → T and T→ F)
4. Condition (→):- For (on same **T** and on diff. **A** to **B**)
5. Biconditional (↔):- For (on same **T** and other **F**)
6. Symmetric (⊕):- For (on same **F** and other **T**)

2. **Disjunction**: -

A	B	A ∨ B
F	F	F
F	T	T
T	F	T
T	T	T

3. **Negation**: -

A	B	A ∨ B	~ (A ∨ B)
F	F	F	T
F	T	T	F
T	F	T	F
T	T	T	F

4. **Conditional**: -

A	B	A → B
F	F	T
F	T	T
T	F	F
T	T	T

5. **Biconditional**: -

A	B	A ↔ B
F	F	T
F	T	F
T	F	F
T	T	T

6. **Symmetric**:-

A	B	A⊕B
F	F	F
F	T	T
T	F	T
T	T	F

Application of KBS:-

1. Modern Petrol Pump **2.** ATM **3**. Dish TV **4**. Satellite **5**. Mobile phone **6.** CT scan machine **7.** MRI Machine **8.** Airlines Controlling System **9**. Railways Controlling System **10**. Shuttle Space Controlling System **11.** ROBOT **12**. Fighter Plane **13**. Internet and Interact **14**. Super Computer **15.** Mainframe Computer.

29. Formal Technique Review (FTR)

It can be define as **filter** for the software engineering process. The purpose of any review is to discover errors in analysis, design coding, testing and implementation of software development cycle.
There are basically **two types** of reviews.

1. **Informal Technical Review**: - It modifies the proposed system **between discussion of customer** & **analyst**.
2. **Formal Technical Review**: - It modifies the proposed system **between senior** (they have sharp mind) and **genius.**

30. Multimedia

It produces **virtual reality** in which **sound**, **text**, **graphics**, **animation** and **video** create effect of reality by means of multimedia hardware and software.Virtuality extends the interaction – oriented features of multimedia by the concept of **cyberspace**.

Multimedia = Sound + Text + Graphics + Animation + Video → (Produce effect Virtual reality

Example of Multimedia of software:

- Power Point.
- Paint Brush.
- VLC.
- Win Amp.
- Window Media Player.
- Internet Explorer.
- Real Time.
- Photoshop.
- Coral Draw.
- Master Blaster.

- HP Director.
- Director.
- Premier.
- FLASH.
- Wave front.
- FrontPage.

etc.

Example of Multimedia of hardware:

- DVD Digital video disk
- CD ROM Compact Disk Read Only
- Speaker
- Woofer
- **QWERTY** Key board/Multimedia Keyboard.
- Scanner
- Printer
- Web cam
- VDU(CRT/LCD/LED/PLASMA/PROJECTOR)
- PLOTTER
- LIGHT PEN
- TOUCH SCREEN SYSTEM
- MODEM (Modulator And Demodulator)
- MOUSE
- CPU
- BLU RAY DISC
- USB(Universal Serial BUS)
- PEN Drive
- Mike
- CARD READER

Photoshop: - It is used for editing images for industry digital imagine.

Wave front: - It is used for making 3 D tools for games, films.

Flash: - It is vector based animation tools.

Front Page: - It is used for designing web page.

Premier: - It is used for making digital video.

Coral Draw: - It is used for designing.

PowerPoint: - It is used for making presentation, based on any topics.

Scanner:-It is used for scanning images into digital form.

Window Media Player: - It is used for playing video film.

Paintbrush: - It is used for simple drawing.

Extension Name/Secondary File name of Multimedia Software:-

.ppt	power point
.wav	sound
.mov	Video file
.VOC	For Sound
.PCD	Photographs stored in CD
.gif	graphics interchange format
.jpeg	image file (Joint Picture Expert group).
.flc	(High Quality photographs)

.mff (Music file).
.bmp bit map picture.
.mp3 audio file.

Components of Multimedia:-

1. Textual Information
2. Images
   a. (Bitmap Image)
   b. (Vector Image)
3. Animation
   a. (2D Animation) **Two Dimensional Animation**
   b. (3D Animation) **Three Dimensional Animation**
4. Digital Audio
5. Digital Video

1. Textual Information:-

This component of multimedia can have various types of fonts and type sizes to suit the professional presentation of the multimedia software.

Example:-1 Times New Roman
Tahoma
Verdana
Algerian
Etc.

Example:-2 Word Art.
Font Color.
Style of Fonts (Bold, Italic, Underline).
Alignment (Left|Right|Center|Justify).
Format Painter.

2. Images:-

It is interesting components of multimedia. People do not like reading large amount of textual matter on the screen. Image describes all information with respect to text.
There are **two types** of images

a) Bitmap Images.
b) Vector Images.

a) Bitmap Images:-

It consists of **two dimensional squares**, which are called **pixels** (Picture elements) or dots on the screen. Quality of pictures depends upon **number of pixels**. Pixels are organized in **rows** and **columns**. One pixel consists of **one bit**.

0 Black
1 White

Example: - Paintbrush.

b) Vector Image:-

An image is formed as a set of straight line or curved instead of dots. A line can be represented by mathematical equations, whose number can be stored as a set of binary codes.

Example: - CAD (Computer aided design).
CAM (Computer aided Manufacturing)

3. Animation:-

An animation is just a continuous series of still images that are displayed in a sequence.

There are **two types** of animation.

i) 2D Animation.
ii) 3D Animation.

i) 2 D Animation: - It is **pixels based animation**, which produces flat images. There are **two effect** produces.
   a) Morphing.
   b) Warping.

ii) 3 D Animation: - It produces **realistically portray** with depth. It includes X, Y and Z-axis. There are **three steps** for making 3 D animations
   a) Modeling Steps.
   b) Animation Steps.
   c) Rendering Steps.

Morphing : - It takes two images seamlessly **changes one image to another**.

Warping : - Image actually seems to grow out of the first one.

4. Digital Audio:-

Digital audio is always embedded in the sound to provide additional capabilities without affecting the CPU.A common digital sound file existing in personal computers are known as .WAV files. The MIDI (Musical Instruments Digital Interface) sound saves disk space as it only stores the instructions about how to play musical instruments. It is **two-way transformation.**

Analog ⟷ Digital

There are **following components** for audio and video.

Examples:-

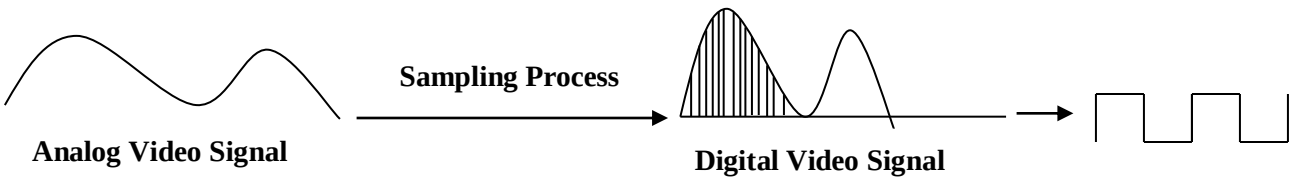
Sound cards
Speaker
Mike
Digital Recorder.
Voice speech Synthesizer.
Win amp.
Window media Player.
VLC
Etc.

5. Digital Video:-

Digitized video is one of the many technologies used in the development of interactive multimedia. It offers a **wide range** of flexibility as compared to standard video signal. The process of converting analog video signal to digital video signal is called **sampling.**

Example:-

MPEG (Moving Picture Expert Group).
AVI (Abstract Video Interface).



31. System Implementation

Well designed system can succeed or fail because of the way they are operated and used. Therefore the quality of training received of personal involved with the system in various capacities help and may even prevent the successful implementation of management information system. Both system **operators** and **user need training**.

Training for System Operators:-

Running of the system successfully depend on the **personal working** in the computer center. They are responsible for providing the **necessary support**. Their training must ensure that they are able to handle all possible operations. Operators training should include such fundamentals as **how** to turn the equipment on and use it, **how** to power off and knowledge of **what** constitutes normal operation.

Training also includes familiarization with run procedures, which involves working through the sequence of activities needed to use a new system on an on going basis.

Training for User Operators:-

User may trained on use of equipment. Such users may also trained on how to operate the system also. It is safe to turn off equipment without denger of data loss, are significant problem to new users who are not familiar to computer.

System implementation:- Most Important

Well designed system can succeed or fail because of the way they are operated and used.Therefore, the quality of training received of personal involved with the system in various capacities helps and may even prevent the successful implementation of MIS.Both systems operators and users need training.

Training for System operators:-

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Training for User:-

User may trained on use of equipment. Such users may also trained on how to operate the system also.It is safe to turn off equipment without danger of data loss,are significant problems to new users who are not familiar to computer.

Training Method:-

- Vendor and in-service training.
- In-house training.

Vendor and In-service Training:-Often the best source of training on equipment is the vendor who supplies the equipment. Most vendors offer extensive educational programs as part of their services.

In- house Training:-The main advantage of offering in-house training is that instruction can be tailored according to the equipment of the organization. Often the vendors negotiate fees

and charges that are more economical so that company can involve more personnel in the training program than is possible when travel is required.

Conversion Method:-It is the process of changing from the old system to the new system. It must be properly planned and executed.There are following four methods are common in use.

1. Parallel Conversion Method.
2. Direct Conversion Method.
3. Pilot system Conversion Method.
4. System phase-in.

Parallel Conversion Method:-Under this approach, user continues to operate the old system in usual manner but they also start using the new system.

Direct Conversion Method: - This method converts from the old to new system abruptly, sometime over a weekend or even overnight. There are no parallel activities.

Pilot System Conversion Method: -The users in this area are aware that they are piloting a new system and that changes can be made to improve the system.

System Phase –in Conversion Method: -This method is used when it is not possible to install a new system throughout an organization all at once.

Post Implementation Review

After system is implemented and conversion is complete, a review should be conducted to determine whether the system is meeting expections and where improvements are needed. A post implementations review measures the system's performance against pre defined requirements. It is an evaluation of a system in terms of the extents to which the system accomplishes stated objectives and actual project costs exceeds initial estimates.

Review Plan:-

The review team prepares a formal plan around the objectives of the review, the type of evaluation to be carried out and the time scheduled required.An overall plan covers following areas.

- Administratative Plan:-The following two activities are revived under this plan.
  - User Objective
  - Operating Costs and Benefits
- Personal requirements Plan:-Under this plan review performance objectives and training performance to data.
- Hardware Plan:-Under this review performance specifications of H/W and S/W.
- Documentation Review Plan:-Under this the reason for review plan is to evaluate the accuracy and completeness of the documentation. It should be user friendly.

Respective Responsibilities of Vendors and Buyers:-

- Provide Documentation for self troubleshooting of system.
- Suggest H/W based on testing of benchmark.
- Delivery and acceptance.
- Right of use of equipment from other vendors.
- Warranties
- Guarantees
- Payments

- Bankruptey

Criteria for vendor selection:-

Following criteria must be satisfied for vendor selection:-

- Economic factor
- Hardware factors
- S/w Factors
- Service Factors
- Reputation of Manufacturer