Code Design:-

- The purpose of code is to make the easy for identification and retrieval of items of information.

- When there are many items in the same group, it becomes difficult to distinguish any particular item from another item only by description of the item.

- Hence in any computer system, data to be processed have codes so that sorting, retrieving, storing etc will become more efficient.

Thus codes are necessary because

- ➢ Data is easily identified.

- ➢ Data is simplified and standardized. Hence the numbers of mistakes are reduced to the extent possible.

- ➢ Data processing operations can be done easily.

- ➢ It helps to make the computer system work more efficiently.

Code

- ➢ A code is group of characters and/or digits that identify and describe an item. Example: - Postal identification Number (PIN) – 383225.

- ➢ Codes are frequently used to describe customers, product, materials or events.

- ➢ Hence descriptions of items are also needed.

- ➢ Normally, in data processing, code numbers are in data processing, code numbers are referred to as key fields on transactions and records.

Principle of code design:-

- ➢ **Uniqueness:** -The code for any particular item should be unique.
             Example: -The university Examination sets number should be Unique for each student.

- ➢ **Compactness:** - The length of the code should be as possible. However codes alone are not sufficient for easy identification and verification.

    Example: - The codes M and F can be used for males and females respectively.

> **Uniformity:** - Uniform sign and format is highly desirable in mechanized data processing system. This is to avoid inconsistencies and confusion in results.

> **Expansibility:** - The code structure should allow growth. Enough elbow room should he width provided in the construction itself for accommodating possible future e expansion.

> **Simplicity**: - The code should be simple to use and easy to understand by each user even with minimum experience.

> **Versatility:** - It should be easy to modify to reflect necessary changes in conditions characteristics and relationships of the encoded entities.

> **Clarification:** - For the user sorted output data in a predetermined format is valuable. Although, data must be sorted and collated, its representative code does not needed to be in sortable form. This can be achieved by correlating the representative code does not needed to be in sortable form. This can be achieved by correlating the representative code with another code which is sortable.

> **Stability:** - codes should be not updated or modified frequently. Modifications in codes are costly, take more time and also affect the user efficiency.

> **Meaningfulness:** - codes should be meaningful. Codes value should echo the characteristics of the encoded entities.

Types of Code:-

Significant Codes

- In significant codes, digits or letters may describe measurable or identifiable characteristics of the item.

- Significant codes are frequently used for coding inventory items.

- In coding electric bulbs for inventory purpose, the following coding may be used

1) **Product Classification:-**
   Bulbs:-

   ❖ Automobile
   ❖ Domestic use
   ❖ Clinical use

1 character codes such A, D and C can be allocated for automobile, domestic, and clinical bulbs respectively.

2) Color:-

1 digit code can be used.

- ❖ Colorless - 1
- ❖ Milky - 2
- ❖ Yellow – 3
- ❖ Red – 4
- ❖ Green -5 etc.

3) Wattage:-

5 digit codes occupying 3rd to 7th positions can be used.

- ❖ 25w.   - 00025
- ❖ 40w.   - 00040
- ❖ 100w.   - 00100
- ❖ 1000w. - 01000
- ❖ 10000w. – 10000

Example: - The domestic use bulb of the color red can be coded as *D400100.*

Logical Codes

- In logical codes the individual values are derived in conjunction with a conjunction with a consistent, well defined rate or procedure.

- **Logical codes have two types**
  1) Check digit codes:-
  2) Matrix code:-

1) Check digit code:-

- Check digit enables a number to be self checking the most common type of data entry error are transcription errors (I.e. 54786 is entered as 54789) and transposition error (I.e. 54786 is entered as 54768).

- We shall consider an example understand one of the popular check digit methods known as Modulus-11 check digit method.

Example:-

- Consider student permanent registration number with the university 4 2 5 8 6.

- Each student will have a unique number for all matters related to university.

  Weight 65432

- We assign weights to each digit from the low order (Right) position in the data using values 2 through 10 and moving to the left.

………	4	2	5	8	6
	6	5	4	3	2

  Numbers * Weight = 24 10 20 24 12

  Sum the results (24+10+20+24+12=90).

- Divide by modulus number 90/11=8 with Remainder 2.

- Subtract remainder from modulus number to get check digit (11-2=9)

- Attach the check digit to the original registration number at the right hand side end.

- 4   2   5   8   6   9
- Let us see how the check digit program will find out whether the permanent registration number entered is correct or not.

- We shall enter wrong permanent registration number, say 5 2 5 8 6.

5	2	5	8	6
6	5	4	3	2

  Number * weight = 30 10 20 24 12

  Sum the results (30+10+20+24+12=96).

- Divided by modulus 96/11=8 with remainder 8.

- Check digit (11-8=3).

- But the digit given is 9.

- Therefore permanent registration number entered is wrong.

2) Matrix code:-

- The code is based on the X-Y coordinate locations. It is useful in coding relationships between two entities.

Example:-

- The following matrix gives the Distance between the cities (In kms).

    1. IDAR
    2. HIMATNAGAR
    3. MEHSANA
    4. VISNAGAR

X ⟹

	1	2	3	4
Y 1	0	28	80	66
2	28	0	60	45
3	80	60	0	14
4	66	45	14	0

- The (X, Y) Co-ordinate (3.2) will refer the distance between Mehsana and Himatnagar which is **60**.

Collating Codes

- Collating codes are by far the widely used code system.

- The collating code structure is designed so that when sorted by the code number, the items represented by the codes are placed in predetermined sequence.

- **The collating codes are of four types.**
    1) Alphabetic codes
    2) Hierarchical codes.
    3) Classification codes

4) Chronological codes

1) Alphabetic codes

- For effectiveness, alphabetic coding requires.

- Placement of all items in alphabetic sequence, then assignment of a code ever increasing value.

Example:-

✓ Consider the following students appearing for B.C.A examination.

1	Parikh Samir V.
2	Oza Pratik N.
3	Joshi Umesh M.
4	Raval Hardik J.
5	Ponkiya Mayur T.

✓ In allocating Examination seat number, these students can be given the numbers by the alphabetic order in which their surname appears.

001	Joshi Umesh M
002	Oza Pratik N.
003	Parikh Samir V.
004	Ponkiya Mayur T.
005	Raval Hardik J.

✓ *Advantages of Alphabetic codes:*
  - It is easy for sorting.

  - It is easy for maintenance.

  - With any initial encoding we can access the code.

✓ *Disadvantages of Alphabetic codes:*

- All the items will have to be encoded at one time to get reasonable spacing for new entries.

- It has relatively short life.

- There is a necessity of center control to number issuing.

2) **Hierarchical codes**

- Hierarchical codes provide a top down interpretation for an item.
- Every item coded is factored into group, subgroups and so forth.
- For instance we could code salesman by considering the following Hierarchy.

✓ *Region* :-
- Eastern, Western, Southern, Northern, central.

- (Denote this by one character code E, W, N, S, C).

- City- this will occupy the position 2 to 4 in character from (e.g. PUNE-PUN, NASIK-NSK, BOMBAY-BBY, DELHI-DLI, and MDRAS-MDS).

✓ *Group:-*
- The salesman in a particular city can be divide into manageable groups of ten to twelve per group.

- Each group can be denoted by two digits occupying fifth and sixth position from the left in code.

✓ *Salesman Number*:-
- Each salesman can be given a two digit number within the group.

- This will occupy the last two positions (seventh and eight) in the code.

✓ *Example :-*
- A salesman with number twelve in the group number three in the Nasik city belongs to western region Denoted by **WNSK0312.**

3) **Classification codes**

- Classification codes place separate entities such as events people, or objects into distinct, called classes.

- A code is used to distinguish one class from another.

- A classification is by nature and order systematic structure.

- Classification codes are of two types
  A. Decimal codes.
  B. Faceted codes.

A. **Decimal codes**

A widely known classification code commonly used in libraries for uniquely coding the books is decimal coding.

Sociology	300
Philology	400
Natural Science	500
Mathematics	510
Physics	530
Mechanics	531
Machine	531.1
Level and Bank	531.11
Wheel and Axle	531.12
Cord and Centenary	531.13
Pulley	531.14

Decimal codes are useful when we cannot tell the exact quantity of items to be codes.

B. **Faceted codes**

- Certain kinds of classification code are known as faceted codes.
- This kind of code represents different facets of the decoded item.
- Each fact is given as many characters as required.
- In contrast to hierarchical classification a position does not have to be   associated with a higher level in order to as certain meaning.
- E.g. Footwear manufacturers code can have as its facts.

Type	sex	size	Style	Material
(Shoes – SH Chapels - CH)	(Gents/ Ladies)	1 to 10	(A three digit code)	(three characters PLA,LEH,RUB)

- ✓ A variable classification system must be flexible enough to accommodate changes in types and attributes.

- ✓ It's classes must be expandable.

- ✓ Also classification code must be comprehensive (i.e. converting all types classes and subclasses) and mutually exclusive in categorizing.

4) Chronological codes

- As the name suggest, this code is assigned in the order of events so that each code has a little value than the last code assigned.

- E.g. preparing the student list of names according to the data of birth starting the code with the earliest born.

- **Abbreviation:-**
    - ✓ Many times coding is done by taking the abbreviation of the name of an entity.

    - ✓ There are two methods of doing this.

        a) **Mnemonic codes:-** (Pattern or Words remember easy something)
        b) **Acronyms codes:**

A) Mnemonic codes
- ➢ Mnemonic means assisting the memory.
- ➢ The codes should help to convey the meaning quickly to the user.
- ➢ E.g. to describe a 21 inch color television set, a useful code is TV-CL-21 and a BLACK and WHITE is TV-BW-21.

- ➢ In the university education this is commonly used.

- ➢ For E.g.
  M.C.A. for Master in computer application.

  M.B.A for Master in Business administration.

B) Acronyms codes

> ➤ It is a particular type of mnemonic representation constructed from the first letter or letter of several words.

> ➤ An acronym often becomes a word in itself.

> ➤ For E.g.
> **WHO** – World Health Organization.
>
> **ROM** – Read Only Memory.
>
> **COBOL** – Common Business Oriented Language.

Non – significant Code

- A Non – significant Codes conveys no information by itself.

- E.g. A range of number may be allocated to customer Account codes, stock codes, etc.

- The non significant codes are of two types.
    - **A) Sequential codes**
    - **B) Random codes**

A) Sequential Codes

- Sequential codes are either numbers or letters assigned in series.

- They tell order in which events have occurred.

- For in the saving bank accounts of the bank numbering for the pass books is done sequentially.
- The code value has no significance in itself but does uniquely identify the entity.

- It makes no provision for classifying groups of like items.

- It is useful when the only readjustment is for a short, convenient, and Easily applicable representation.

- Block coding is a variation of s Sequential coding;

- A set of Sequential or serial codes is divided into block that classify item Into specific classes.

- Thus a block is asset of serial numbers classified into smaller groups based

On certain general characteristic of the entities. E.g.

Steel red	:	0001 to 0170
Steel pile	:	0171 to 0340
Steel Plates	:	0341 to 0500
Copper Red	:	0501 to 0650
Copper pile	:	0651 to 0850
Copper plates	:	0851 to 1000

B) Random codes: -

- Random code is drawn from a number list which is not delectable in order Of sequence.

- Random number lists are available in statistical tables or can be generated Though a computer program.

- On this method each additional item may not be given the next serial Number.

- E.g. The item followed the item with code number 300 can be any Random number chosen from the random number list provided.

- In random code there is no logical way to predict the next number.

- Random code may be used in case where security of the data is needed.

- Since this method is not often used in practice.

Form Design

- Forms are very important means of communication.

- In any organization the forms are used for both input and output purposes

- The staff read from forms, writes on forms and spent sufficient amount of time in Handling and filing forms.

- As the time taken for filing up these is large, they must be designed Carefully.

- In organization there may be difficult types of forms like quotations, purchase Order, delivery, invoice, goods, received etc.

- Normally the data is transformed through various forms forms and information is Obtained through forms.

- Hence we can say that form is a physical carries of data as well as information.

- Form can be defined as a document having constant printed information and Having a space to add variable information (Data).

- Hence form design is an important aspects of improving the efficiency of the Organization.

- The purpose of forms is convey or collect information quickly and completely

- In fact , a good form does not occur by chance.

- The design of the form is often responsible for every aspect of it, form Determining the purpose , contact , and layout to checking the final version from the Printer or on screen.

- The form design should not be handed over to a clerk because he/she cannot Visualize the design in totality and future view.

- The form design activity will be meaningful if it involves users and systems Analyst.

Type of forms

- ✓ Action forms
- ✓ Record Memory and
- ✓ Report

Form Type	Characteristics	Example
Action	1. Orders 2. Achieve result 3. Movable	Purchase orders Application form. Test Report. Sales slip
Record Memory	1. Data generally Used for Reference. 2. Show historical Data. 3. Serves a control On certain Details.	Inward/outward Register. Policies. Stock ledger. Purchase Record.
Report	1. Summary of Jobs/project. 2. Normally used By manager with Authority to Effect change. 3. Used as a basics For decision Making.	Balance sheet , Profit, and Loss. Sales analysis , trial Balance.

- Any Form may be classified as action form , record , or memory , report form Or some combination thereof.

- The form can also be classified as input or output forms depending on their Function in a system environment.

- Input forms provide information form the environment to the system.

- Output forms provide communication from the system to the environment.

- Many of the input forms are also action forms.

- E.g. adding/issuing from an inventory.

- Most of the output forms are reports.

Objectives for form Design

- The form should be simple as possible to understand and compile.

- The language used should be flow in logical sequence.

- In a pay slip the logical order is earning , deductions and net pay.

- Layout and form sizes should be standardized as far is practicable.

- This will reduce the difficulties encountered in handling the forms.

Ease of use

- The format of the form should be such that it can be Filled up easily and quickly without missing any Information.
- Duplication of data should be avoided wherever possible.

- Combine related form when feasible.

- Too much operation on form to be operated by different people will be
- Confusing and time consuming resulting in information bottle-necks.

Form Design Consideration/Guideline

- There ere certain considerations one should keep in mind in the actual Preparation of the form.
- ✓ Title
- ✓ Spacing
- ✓ Logical arrangement
- ✓ Abbreviation
- ✓ Cost
- ✓ Numbering the forms
- ✓ Size and color of paper to be used.

> **Title**
- Every form must have a little clearly indicating of objective of the purpose Of the form-the university forms have clear titles such as Examination Form for engineering,Admission form, and so on.
- This will help to identify the form by its title.

> **Spacing**
- Spacing for each item of information needs proper planning and Imagination.
- This should be convenient for the person filling up the form and person Analyzing it.
- The least and the maximum number of spaces needed under normal Requirements for each and every item of information must be considered.

> **Logical arrangement: -**
- The data requested should be in logical sequence.
- Also related data should be in the adjacent positions.

- As far as possible the data copied a should be in the same sequence as in the source document.
- ➢ **Abbreviation: -**
- If used should be explained at some suitable space in the form itself.

- ➢ **Cost: -**
- The form must be cost effective by eliminating unnecessary data.
- The paper quality , printing , aspects must balance the cost and the Purpose of form.

- ➢ **Numbering the forms: -**
- For effective control all important forms must be serially numbered at the proper place in the form.
- ➢ **Size and color of paper to be used: -**
- A range of paper sizes are available in the market.
- The designer must choose the size taking into considerable the utility System constraints.
- Colored paper may be needed to distinguish different document and Facilitate sorting and identification.

Form Design Consideration

- In order to design any form , the designer may follow the steps indicated here: -

  o Define objective of form.

  o Specify its data content.

  o Decide upon quantity required and likely method of production.

  o Decide the format and layout of the form on a drawing board preferably.

  o Revisions with the user , revise using new guide sheet , if necessary.

  o Produce fair specimen.

  o Submit to forms controller for approval.

  o Consider limited production run and field test.

  o Revise if necessary.

  o Place order via forms controller.

INPUT DESIGN

- Input design involves capturing of data as well as inputting it to the computer. Accordingly input design consists of data capturing and data validation.

DATA CAPTURE

- Data capture covers all the stages from the recording of basic data to the feeding of this data into the computer for processing basic steps in this process are :-
- Basic Steps of Data Capture:-

  1   Original Recording

  2   Data Transmission

  3   Data Preparation

  4   Verification

  5   Sorting

  6   Control

  7   Computer input

(1) Original Recording: -

This is the collection of data at its source. This involves clerical preparation of source documents including manual checks.

E.g.:- (1) Preparing an examination mark list.

(2) Filling out job application from giving details of name, address, qualification & experience.

In recent years there has been a tendency to reduce human intervention in the recording procedure.

(2) Data transmission: -

The data moves from the point of origin to the data processing center.

E.g.:- (1) The group of related mark list are bunched into batch and sent to data processing center.

(2) If a main processor has terminals the transfer of data from a particular terminal to the main processor can be regarded as data transmission.

(3) Data Preparation: -

The transcriptions of source documents on to an input media such as magnetic tape, magnetic disk, magnetic drum etc. Is data preparation. In the off line system the transfer of data from mark list to magnetic floppy disk is the case of data preparation.

(4) Verification:-

It is to verity that the transcription has been done correctly. This is vital because it can result in wrong output.

(5) Sorting: -

Sorting is the process of arranging data into some desired sequence. Sorting may be done manually or mechanically. E.g.:- In the rest while system purchased cards have to be arranged in a logical order for the production of particular input or output. The cards are sorted out & arranged in the desired sequence.

(6) Control:-

Throughout all the stages listed above it is essential the checking, verifying & validity controls are maintained. This is the ensure that all the data collected, transmitted & input are correct.

(7) Computer Input:-

The data is read by the input devices like manager disk drive & transferred to the internal store where it undergoes validity checks. Invalid data will pass back to go through the entire stages again.

- In any particular application these functions may not all exist or they may take place in a different sequence form that listed above.
- The data capturing process will also depend on ,The type of input data,Type of application & The hardware configuration available.
- Data are the facts which describe events and entities.
- Data are communicated by various types of symbols such as letters of the alphabets, numbers, speech patterns, dots and dashes, hand signals, pictures and so on.
- The processed data with specific purpose are called information.
- Data obtained in general are not suitable for directly feeding into the computer.
- To get the data into the computer the analyst has to design the form, Design the input record.
- Design methods for getting the data into the computer.
- The computers will only accept those data which are in machine sensible form.
- If its original form is unacceptable, then it has to be brought into the acceptable form.
- There can no information system without data. Data are the facts which describe events and entities. Data are various types of data like variable, alphabetic data.

Terms of Data Capture

This work of the analyst is

1   Complex

2   Time consuming and

3   Expensive

4   But unavoidable

Basic terms of data capture are as under

1 Data collection: -

The process of getting data to the computer in a machine sensible form for processing.

2 Data capture:-

Sometimes used as a substitute term for data collection but more significantly refer to data capture.

3 Data Entry:-

Is the process of translating the source document into the machine readable format?

4 Data Input: -

To the computer comes only after the data has been entered into one of he machine readable formats.

5 Data Base: -

A collection of data fundamental to a system.

Objectives

If the data input is bad then output will be worse. This calls for clear data capture objectives such as:-

- Reduction in the volume of input to the extent possible.
- Lesser [smaller] manual preparation.
- An input design which will ease the work of the person engaged [busy] in input preparation.
- Minimizing the number of steps practicable [possible] in the data capturing process.

Five objectives of designing user interfaces

- Match the user interface to the task.
- Make the user interface efficient.

- Provide appropriate feedback to users.
- Generate usable queries.
- Improve productivity of computer users.

What is User Interface

- User interface is a design for softwares and machines such as computers, mobile devices etc.
- It is the first impression of a software where user interacts with a computer or a software system.
- A software must fulfill the requirement of a user.
- User interface determines how the information is displayed on the screen.
- Poor user interface design causes a user to make fatal errors and a software system never used.

There are three types of User Interfaces

1. Command language
2. Menus
3. Graphical User Interface (GUI)

Types of UI	Description
Command Language	It indicates that the user must know the machine language and program language.
Menus	It indicates that the user chooses the commands or menus from the lists displayed on the screen.
Graphical User Interface	In this, user gives command by clicking or selecting the icons displayed on the screen.

There are following aspects which help to care or think about the user interface:

1. Financial affairs
2. Effect
3. Morality

1. Financial affairs

- Financial affairs are the important consideration in UI.
- It helps to recognize how much cost will be incurred for usability testing.
- Greater usability leads to increased sales and greater competitive advantage for commercial organizations.
- It helps to reduce the support costs.

2. Effect

- User-focused resource increases a resource impact.
- Effect is a vital consideration when creating funding applications.
- It leads to increased user engagement.

3. Morality

- All resources have potential users.
- User interface design is a branch of human computer interaction focused on anticipating user needs and meeting those needs through user-centered design.
- Moral and ethics helps user to achieve a goal and to expand corporate interests such as the acquisition of personal information.

DATA VALIDATION

Data validation

- The objective of a data validation system is to be detecting errors at the earliest possible stage before costly activities are performed on invalid data.
- Some data validation is done by way of manual verification data capture stage itself.
- This checks will classify valid and invalid data.
- This is generally done with the help of a DATA VET or DATA VALIDATION program.
- Invalid data is also identified and recorded separately.
- This invalid data is checked manually for low casting errors.
- After correcting these errors the data is again subjected to above data validation process of accurate input.

Validation Checks

There are various categories of checks which can be applied to data during a validation run.

(1) Field check:-

(a) Limit check:- May be applied to each field of a record to ensure that its contents lie within predefined size.

(b) Picture checks:- May be applied to each field to deleted entry of incorrect character in the field.

(c) Valid code check:- to valid input against predefined transaction codes. These predefined codes may either be embedded in the programs or stored in files.

(d) Check digit:- It is used to delete transposition errors when recording "key" fields.

(e) Arithmetic check:- are used to ensure the validity of the results by performing arithmetic operation in different ways.

(f) Cross checks:- may be applied to verify fields appearing in different fields to verify that result fully.

(2) Transaction checks:-

(a) Sequence checks:- are applied to delete any missing transaction.

(b) Format completeness:- are used to checks the presence & position of all fields in a transaction.

(c) Redundant data checks:- are employed to check the validity of codes with reference to description.

(d) Combination checks:- may be applied on various fields of a file.

(e) Probability checks:- are used to avoid unnecessary rejection of data.

(f) Pass words:- may be exercised to check entry of data by unauthorized person in on in system.

(g) Check:- may be incorporated to ensure that transaction pertains to the current period.

(h) Batch total:- Can be used to ensure that transaction have been transcribed currently. A total of some common components of a batch of data so as to enable a control to be maintained over the validity of data.

(i) Hash total: - A control total i.e. the sum of values in a particular field or record area of a file, to ensure that transactions have been transmitted currently.

OUTPUT DESIGN

- The output generally refers to the result and information that are generated by the system.
- One of the most important features of an information system from the point of view of users is the output produces.
- If output is of poor quality, the whole system is in problem because the users will then avoid using it.
- No system can be designed properly without knowing what output is exactly required.

DESIGN PRINCIPLE OF OUTPUT

- A system designer should try to incorporate the following design principles for output.

Principle of starting with output

- This principal is known as "PRINCIPAL OF STARTING WITH OUTPUT" means that organizations output needs should be considered first before devising Appropriate methods and procedures, Databases, Planned inputs and Effective internal control.

Principle of acceptability (suitability) of reports.

- The end user has to accept these outputs since they are the people who will be using it for their desired purpose.
- Hence it is ideal (perfect) to have their participation in the output design phase for the greater success of the system.

Principle of timely output.

- An output in time can help to make better decisions.
- The output must be given in the specific time period.

Principle of enhancing the decision making process.

- After all the system are designed for the manager and other personnel to make better decision.
- Naturally the output report must be prepared keeping this principle constantly in mind.

Principle of practicing (involve, working) "management by exception".

- Management controls through completed tasks.
- The report should be designed not only for what has happened but for deviations (difference) were there from actual plans.

- Significant deviations as and when it occurs are brought to the notice of the management through exception reports of the system.

Principle of duplication reduction in reports.

- Duplication or unnecessary information in the reports should be minimized to extent the possible.
- This automatically reduces the cost of processing.

Principle of simplicity in reports.

- Reports should be simple and self explanatory.

OUTPUT OBJECTIVES

- Before designing output, the objectives of each output must be clear.
- It must accomplish one or more of the following objectives:-
- The objective of the each output must be clear.
- The output is very attractive or it has used the latest computer technology, output cannot be regarded as good.

An Output Must

1 Convey information about

    a) Past Activities   - ex. Personnel file, Vendor History

    b) Current Status   - ex. Inventory on Hand, Cash on Hand

    c) Future Projections   - ex. Sales or Cost of manufacturing a new item.

 2 Confirm an action   - ex. Completed task

 3 Trigger an alarm   -ex. Rush purchase, market loss

 4 Signal events   -ex.Through exception reporting or report on luring opportunities etc.

TYPES OF OUTPUT

There are various types of output required by most system. The main types of output are as below.

1 External Outputs: -

Those intended to go outside the user's organization eg. Invoices, Pay slips, Tax return etc.

2 Internal Outputs: -

Those used within the user's organization and it requires careful design because they are user's main interface with computer

3 Operational Outputs:-

The use of this is in general within the computer department. For example: Program list.

4 Interactive Outputs: -

This involves the user communication directly with the computer.

5 Turnaround Outputs: -

The data will be added to this document before they are returned to the computer for further processing.

OUTPUT CONSIDERATIONS:-

- While designing outputs, system analyst must consider the following points.
- Determine what information is to be present.
- Decide whether to display, print or speak the information and select the output medium.
- Arrange the presentation of information in an acceptable form.
- Decide how to distribute the output to intended users.

- After considering all the above questions, the analyst and the user can define output more clearly in terms of following:-

1. Types of output

2. Content (Heading? Numeric? Alphanumeric? Tools?)

3. Format (Hardcopy? Remote? Transmitted? Transported?)

4. Location (Local? Remote? Transmitted? Transported?)

5. Frequency (Daily? Weekly? Hourly?etc)

6. Response (Immediate? With a period ?etc)

7. Volume (Number of Documents? Growth?)

8. Sequencing (Account no? Within sales area)

9. Action Required(Error detection)

OUTPUT MEDIA:-

- Output from a computer system can take a variety of forms.
- The systems analyst has to determine the most appropriate medium the output.

- The most common media are as under:-

1. Printed Output

The device used for printed output may be line printer, dot matrix printer, laser printer or plotter.

2. Visual Output

With the increasing emphasis on the design of interactive management information systems, the CRT [cathode ray tube] unit is becoming a widely used form of output.

For example, order entry system, account payable/receivable, airlines and hotel reservation systems may be find this medium most useful.

3. Turnaround Document Output

In order to reduce the input workload at a later date, turnaround documents in the form of punched cards are widely used.

 The applications include credit card billing and employee time cards.

Additionally OCR (optical character recognition) that means simple scanner, forms can be prepared as output which at a later date serves as input to the computer system.

4. Secondary Storage Output

This generally includes magnetic disk, magnetic drums, and magnetic tapes.

5. Microfilm or Microfiche output

 Microfilm is photographically reduced documents on films.

Here output is written on to a magnetic tape which is then fed into a machine called a microform recorder.

The information can subsequently be inspected by using a viewer which projects on to screen.

This is actually referred to as COM (computer output on microfilm).

6. Audio Response Output

A newer form of output is the audio response unit.

The unit is capable of providing on line inquiry into the systems where output is restricted to short messages.

This system consists of message handling unit, touch tone telephone unit and standard telephone lines for an online mode.

For example, in banking system the customer can get balance in his/her accounts.

Case Tools Components

CASE COMPONENTS

The work shop for software engineering is called an integrated project support environment & the tools set that fill the workshop is called computer Aided software Engineering.(CASE).

(1) Diagramming tools:-

It support analysis & documentation of application requirements. Means has the capability to produce dataflow diagram. Data structured diagram & program structure chart. It extensively in corporate structured analysis method. They support the capability to draw diagram & chart to store details internally. When changes is described it automatically redrew entire diagram. The ability to change & redrew eliminates an activity that analyst find Tedious.

(2) Information repository:-

The capture, analysis, processing & distribution of all system information is aided by information repository or data dictionary. The dictionary contains data flow, data items, processes, the volume of information's & frequency of information of each activity. They also include built in controls & safe guard which preserve the accuracy and consistency.

(3) Interface Generator :-

Interface are the means through which users interact with application to enter information & data or to receive information. Interface generator provide the capability to prepare prototype and mockups of user interface. They supports the rapid creation of menus presentation screen & report layout.

(4) Code generators:-

They incorporate methods that allow the conversion of system specification into executable source code. Code generation is not yet perfected. Hence, it must be written by hand.

(5) Management tools: -

Case system also assists project manager in maintaining efficiencies & effectiveness through out the application development process. It assists in scheduling, design activities & the allocation of resources ion some management tools allow to specify custom element they can select graphic, symbols, they want to describe processes, people & department etc. Others allow installation to define own method including validation roles, standard for data & procedure name.

Benefits of CASE

(1) Easing revision of application:-

Case tools provide a substantial benefit to organization by easing the burden of application revision. The central repository facilited the revision process by providing a bases for definition & standards data. Internal generation capabilities if present provides the means of modify the system by changing specification rather than by adjusting the source code.

(2) Support of system prototype:-

Application prototyping takes a several forms some times screen & report are develop to show organization or lay out data, headings or messages. Necessary design adjustments are made quickly to change the presentation & interface features. Prototype can produce a working system only a few support full prototyping.

(3) Code generation:-

The most visible advantage of code generation is the reduction of time to prepare & operational program it also insure a consistence & standard program structured & reduction of errors & thus improving software quality. It also facilities reuse of software as well as standard. Structure to generate code & allows specification changing.

(4) Improved ability to meet user requirements :-

It appears that case tools reduce development time they affect the nature & the amount of interaction between developer & user. Graphic description & diagrams reports & screen lay outs. Can bring an effective interchange ideas.

(5) Supports iterative development process:-

Expression has shows that the development of system is an iterative process. Case tools supports iterative steps by eliminating manual tedium for diagramming cataloging an a classification & thus review & revise of system will be frequently & devices.

Weakness of CASE:-

(1) Reliance of structured method:-

Many case tools are built on foundation of structured method. Approximately half of this organization uses this method & if some one does not use structured analysis method. The value of the case will be reduce. In some cases analyst avoid case tools.

(2) Absence of standard level:-

There are two meaning to the words support. (1)Support the diagram.

(2) Support its rules its processes. *There are trades of methodology independent rules cannot   enforces the rules & standard of a complete methodology. They provide components like DFD,   data dictionary but not the rules procedures that actually constitute the core of the methodology.

Tools that provide limited methodology support can rigorously enforce the rules procedures as   well as knowledge base expert assistance. However the more methodologies a tool support the   less comprehensive the assurances & assistances offered for each is likely to be.

(3) Conflicting use of diagram:-

Tools vary in their use of diagram this may constraints an organizations normal   development process care must be taken when selecting a tools to supports existing methods.

(4) Diagram not used:-

Some instance where graphic tools automated or manual may not used at all. Hence, the   communication improvement is not done which reduce the interaction of a program.

(5) Limited Function:-

A SDLC may generally uses tool which are primary & for one specifies tools & hence tools has limited function to meet the requirement.

(6) Limited scope:-

Many computer based tools include the capability of checking in complete specifications virtually no analysis of application requirements accurse. The scope of development activity   with current automated tools is thus quite limited.

(7) Human tasks remain critical:-

The critical   activities are not development graphic charts. That document the current system but rather the human inter active task requirements determination & verification of the user. Eliciting & under standing requirements are still human tasks & are most likely to remain show.