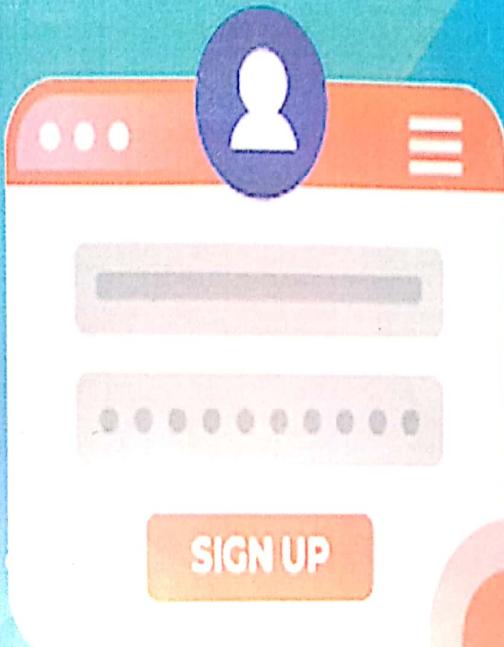


Feb 2019 - Edition



HUMAN MACHINE INTERACTION

(BE - COMPUTER)

8

SEM

(As per Revised Syllabus w.e.f 2015-2016)

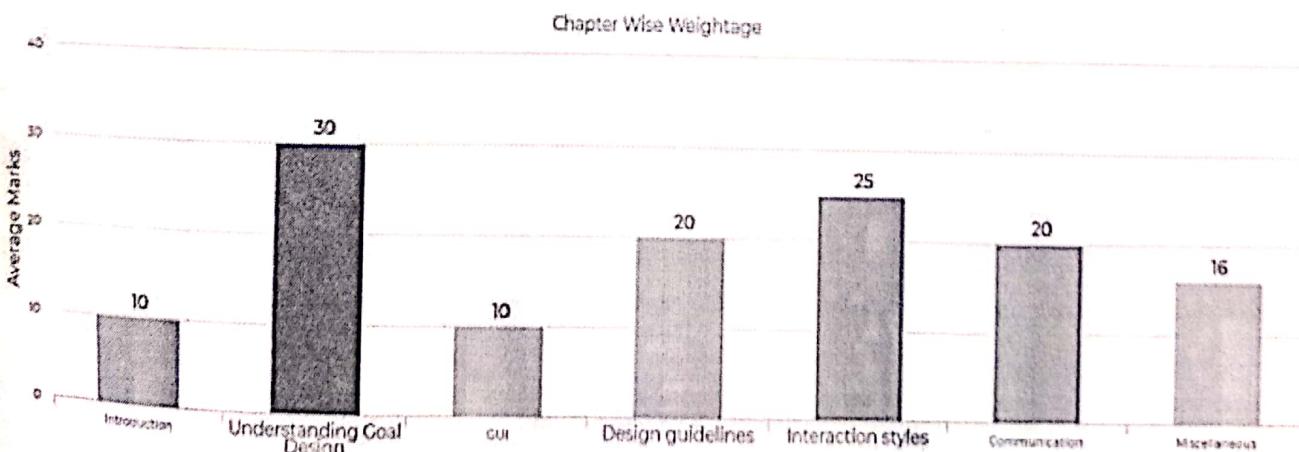
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Syllabus:

Exam	TT-1	TT-2	AVG	Term Work	Oral/Practical	End of Exam	Total
Marks	20	20	20	25	25	80	150

#	Module	Details Contents	Page No.
1	Introduction	Introduction to Human Machine Interface, Hardware, software and operating environment to use HMI in various fields. The psychopathology of everyday things – complexity of modern devices; human-centered design; fundamental principles of interaction; Psychology of everyday actions- how people do things; the seven stages of action and three levels of processing; human error;	01 30 10M
2	Understanding goal directed design	Goal directed design; Implementation models and mental models; Beginners, experts and intermediates – designing for different experience levels; Understanding users; Modeling users – personas and goals	06 10Q 30M
3	GUI	Benefits of a good UI; popularity of graphics; concept of direct manipulation; advantages and disadvantages; characteristics of GUI; characteristics of Web UI; General design principles	16 4Q 10M
4	Design guidelines	Perception, Gesalt principles, visual structure, reading is unnatural, color, vision, memory, six behavioral patterns, recognition and recall, learning, factors affecting learning, time.	23 7Q 20M
5	Interaction styles	Menus; windows; device based controls, screen based controls.	37 9Q 25M
6	Communication	Text messages; feedback and guidance; graphics, icons and images; colours.	58 17Q 20M

80 MISC
(6 M)**Chapter Wise Weightage:**

Marks Distribution:

#	MAY - 16	DEC - 16	MAY - 17	DEC - 17	MAY - 18	DEC - 18
1.	10	5	10	-	05	20
2.	30	20	30	25	25	35
3.	15	15	15	10	-	-
4.	15	30	25	35	20	10
5.	15	20	30	35	40	20
6.	25	20	15	20	35	10
7.	30	30	10	-	-	30
Repeated Marks	-	05	35	60	85	75

CHAP - 1: INTRODUCTION

- Q1. What are three levels of processing and seven stages of Action? How they are interrelated to each other?
- Q2. Explain three levels of processing in detail.

Ans:

[5 - 10M | May16, Dec16 & May17, May18, Dec18]

THREE LEVELS OF PROCESSING:

1. Three Levels of Processing is used in **Usability Design**.
2. Usability Design is a measure of the interactive user experience associated with a user interface.
3. User Interface can be a **website or software application**.
4. Three levels of processing was suggested by **Donald Norman**.
5. Figure 1.1 represents the three levels of processing.

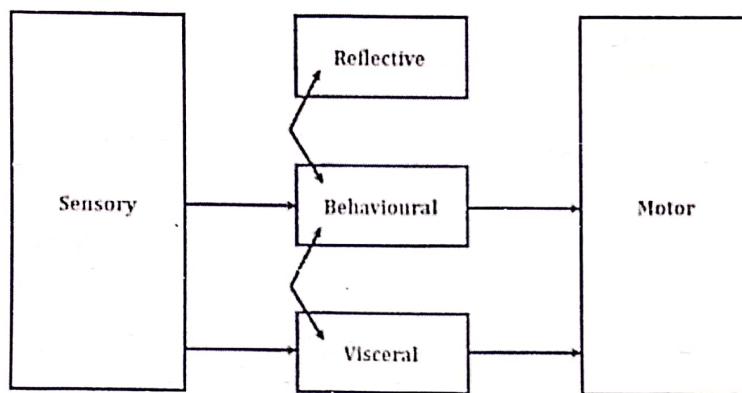


Figure 1.1: Three levels of processing.

I) Level – 1 (Visceral Level):

1. It is initial level of processing.
2. In this step of processing, human **react to visual and other sensory aspects** of a product before they actually interact with it.
3. It helps to make rapid decisions about what is good, bad, safe or dangerous.
4. Visceral design often refers to **enhancing visual appearance**.

II) Level – 2 (Behavioral Level):

1. It is middle level of processing.
2. Behavioral Level is used to manage simple, everyday behaviors.
3. Behavioral design tells us how to "behave" or "respond" to messages the products give us.
4. That is how to use or interact with the product in a certain way.
5. For **Example:** A simple push plate on a glass door tells us that this door can be opened by pushing, not pulling.

III) Level – 3 (Reflective Level):

1. It is final level of processing.
2. In this step of processing, the **analysis and reflection of all experiences done** in past is stored.
3. It is stored in human brain.
4. Using this past experiences, the future requirements to plan for goal is done.

5. For Example: Reflective design can tell us about the owner's taste in products.
6. Since the products that people allow others to see themselves possessing can be a reflection of what he/she wants to be in life.

SEVEN STAGES OF ACTION:

1. Seven stages of action is a term coined by the usability consultant **Donald Norman**.
2. As per Norman, human actions will have two basic aspects:
 - a. Execution.
 - b. Evaluation.
3. The task which is performed by human is referred as action i.e. **execution**.
4. Once action is performed that must be analyze for improvement i.e. **evaluation**.
5. So the model is divided into an execution phase and a phase of the evaluation.
6. Figure 1.2 represents seven stages of action.

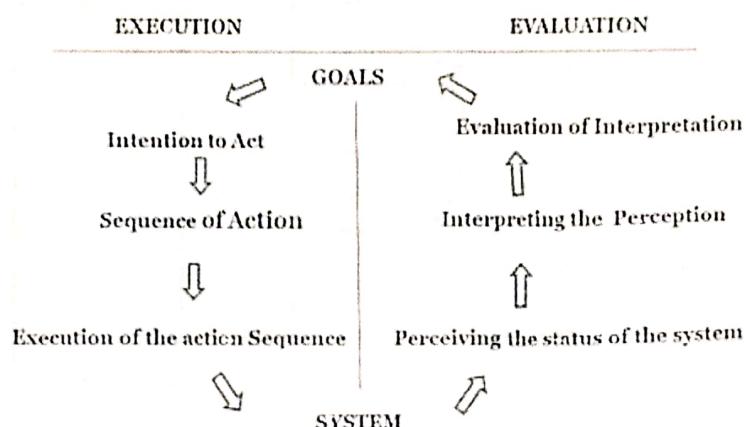


Figure 1.2: Seven Stage of Action.

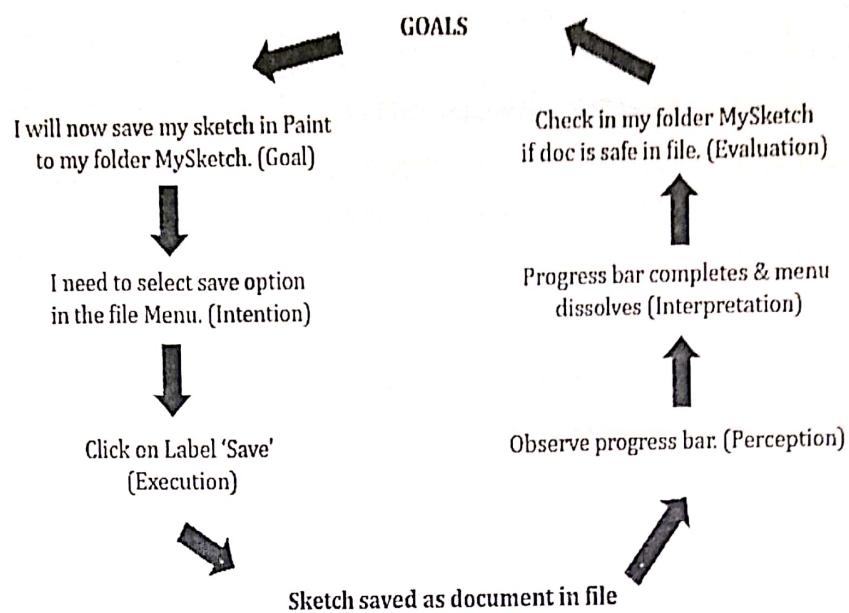
7. The model belongs to one of the most famous Interaction theories that have been used to model user behavior, evaluation, and to set up policies like to create user-friendly interfaces.
8. It starts with the **execution part**:
 - a. Setting goal of action. (mental action)
 - b. Setup plan of action. (mental action)
 - c. Selecting an action or a sequence of actions that will lead you to your set of goal. (mental action)
 - d. Execution of the action(s). (physical action)
- e. After the execution part, the **evaluation part** begins:
 - a. Identify the state of external world. (mental action)
 - b. Interpreting the state of external world. (mental action)
 - c. **Evaluating the outcome:** Is the evaluation successful the problem is solved , goal reached and so on (mental action)

EXAMPLE:

Need: Documenting work done.

Task: Save My Sketch.

Goal: Safely store the sketch in a place which I can fetch it from.



Q3. Human Centric Design.

Ans:

[5M | May15]

HUMAN CENTRIC DESIGN:

1. Human-centered design is a creative approach to **problem solving**.
2. It is a **design framework** that develops solutions to problems by involving the human perspective.
3. Human involvement typically takes place in:
 - a. Observing the problem within context.
 - b. Brainstorming.
 - c. Conceptualizing.
 - d. Developing and implementing the solution.
4. **User Satisfaction** is the main goal of human centric design.

HUMAN CENTRIC DESIGN PROCESS:

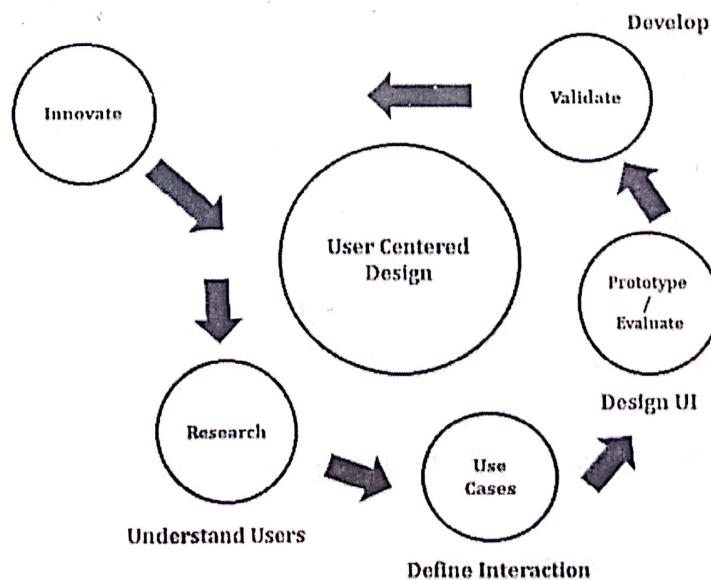


Figure 1.3: Human Centric Design Process.

1. Figure 1.3 shows the Human centric design process.
2. The reason this process is called "human-centered" is because it starts with the people we design for.
3. The design is based upon an **explicit understanding** of users, tasks and environments.
4. Users are involved throughout design and development.
5. The design is driven and refined by user-centered evaluation.
6. The process is **iterative**.

ADVANTAGES:

1. Improves usability and understandability of products.
2. It is used to overcome the poor design of products.

DISADVANTAGES:

1. Software complexity still remains.
2. It takes more time.

EXAMPLE OF HUMAN CENTRIC DESIGN:



1. When you look at No-Smoking sign board. You know that in surrounding area smoking is prohibited.
2. The image of no smoking sign board can be used to inform people that smoking is not permitted in premises.

Q4. Explain briefly software evolution process

Ans:

[10M | Dec18]

SOFTWARE EVOLUTION PROCESS:

1. The process of developing a software product using software engineering principles and methods is referred to as **software evolution**.
2. In software engineering, software evolution is referred to as the process of developing, maintaining and updating software for various reasons.
3. It includes:
 - a. Requirement changes.
 - b. Environment changes.
 - c. Errors or security breaches.
 - d. New equipment added or removed.
 - e. Improvements to the system.
4. Software changes are inevitable because there are many factors that change during the life cycle of a piece of software.
5. Figure 1.4 shows the software evolution process.

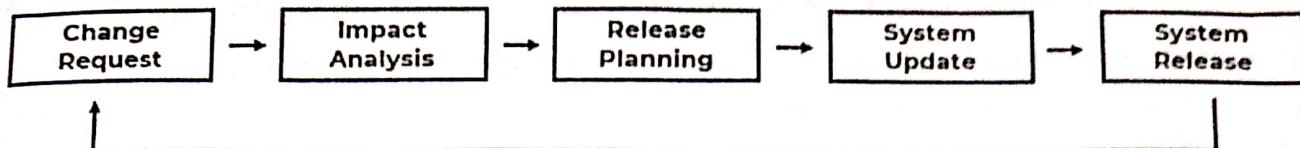


Figure 1.4: Software Evolution Process.

6. Evolution starts from the requirement gathering process.
7. After which developers create a prototype of the intended software and show it to the users to get their feedback at the early stage of software product development.
8. The users suggest changes, on which several consecutive updates and maintenance keep on changing too.
9. This process changes to the original software, till the desired software is accomplished.
10. Even after the user has desired software in hand, the advancing technology and the changing requirements force the software product to change accordingly.
11. Re-creating software from scratch and to go one-on-one with requirement is not feasible.
12. The only feasible and economical solution is to update the existing software so that it matches the latest requirements.

SOFTWARE EVOLUTION PROCESS LAWS:

Lehman has given laws for software evolution. He divided the software into three different categories:

1. **S-type (Static-type):**
 - a. This is a software, which works strictly according to defined specifications and solutions.
 - b. The solution and the method to achieve it, both are immediately understood before coding.
 - c. The s-type software is least subjected to changes hence this is the simplest of all.
 - d. For example, calculator program for mathematical computation.
2. **P-type (Practical-type):**
 - a. This is a software with a collection of procedures.
 - b. This is defined by exactly what procedures can do.
 - c. In this software, the specifications can be described but the solution is not obvious instantly.
 - d. For example, gaming software.
3. **E-type (Embedded-type):**
 - a. This software works closely as the requirement of real-world environment.
 - b. This software has a high degree of evolution as there are various changes in laws, taxes etc. in the real world situations.
 - c. For example, online trading software.

CHAP - 2: UNDERSTANDING GOAL DIRECTED DESIGN

- Q1.** What do you mean by persona? Mention steps in constructing persona.
- Q2.** Mention steps in constructing persona.
- Q3.** Explain the steps to design Persona.

Ans:

[5 - 10M | May16, Dec16, May17, Dec17 & May18]

PERSONA:

1. Persona can also know as **User Persona, Customer Persona or Buyer Persona**.
2. Persona basically means **User Experience**.
3. It is **user centric design**.
4. Persona is a way to model, summarize and communicate research about people who have been observed or researched in some way.
5. A persona is not an actual user.
6. It is a **fictional character** created to represent a user type.
7. User type might use a site, brand, or product.
8. Persona is used to **understand needs and problems** of user or groups of users.
9. The term persona is widely used in **online and technology applications** as well as in **advertising**.

USES OF PERSONA:

1. To gain perspective.
2. For Narrative Practice. **Example:** Story Telling.
3. Predicting outcomes.

STEPS IN CONSTRUCTING PERSONA:

Figure 2.1 represents various steps involved in constructing persona.

I) **Identify user behavioural patterns:**

1. This is initial step in constructing persona.
2. In this step, the user behavioural patterns are identified and analyzed.

II) **Arrange interview as per user behaviour:**

1. Depending on no. of users to represent personas, decide how many interviews you need to conduct or how many survey responses you need to get to be confident in your conclusions.

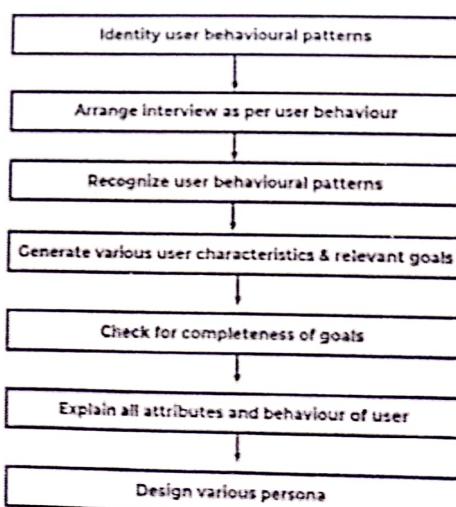


Figure 2.1: Various steps in constructing persona.

III) Recognize user behavioural patterns:

User behavioural patterns can be recognized using:

1. Open-ended responses to questions.
2. Utilize surveys.
3. Virtual/in-person group discussions.
4. Reverse Q&A sessions.

IV) Generate various user characteristics and relevant goals:

1. Based on recognized user behavioural pattern, user characteristics and relevant goals are generated.
2. This goals will help in building persona.

V) Check for completeness of goals:

1. Timely Schedule must be made to check the completeness of goals.

VI) Explain all attributes and behaviour of user:

1. In this step, attributes such as name, purpose and objectives is explained and behaviour of user is considered.

VII) Design various persona:

1. This is the final step.
2. Based on all above steps, a final persona is design.
3. Persona can include:
 - a. Role.
 - b. Goal.
 - c. Challenges.

Q4. What do you mean by Qualitative and Quantitative Research?

Q5. Qualitative and Quantitative Research.

Q6. Provide brief information on Qualitative and Quantitative Research

[5M | May16, Dec16 & May17]

Ans:

QUALITATIVE RESEARCH:

1. Qualitative Research is primarily **exploratory research**.
2. Exploratory research is an important part of any marketing or business strategy.
3. It helps to **develop ideas**.
4. Qualitative research methods are interpretative.
5. It aims to provide a **depth of understanding**.
6. Qualitative Research are based on words, perceptions, feelings etc. rather than numbers.
7. Qualitative data collection methods vary using unstructured or semi-structured techniques.
8. The most popular qualitative research methods include **interviews, case studies, observation, group discussions and questionnaires with open ended-questions**.

QUANTITATIVE RESEARCH:

1. Quantitative research measures the level of occurrences on the **basis of numbers and calculations**.
2. Moreover, the questions of "how many?" and "how often?" are often asked in quantitative research.

3. Quantitative Research uses measurable data to **formulate facts and uncover patterns** in research.
4. Quantitative data collection methods are much more structured than Qualitative data collection methods.
5. Quantitative data collection methods include various forms of surveys:
 - a. Online surveys.
 - b. Paper surveys.
 - c. Mobile surveys.
 - d. Kiosk surveys.
6. The most popular research methods from this category are **closed-ended questionnaires, experiments, correlation, and regression analysis methods.**

Q7. List techniques in qualitative research**Ans:****[5M | Dec18]****TECHNIQUES:****I) Direct observation:**

1. With direct observation, a researcher studies people as they go about their daily lives without participating or interfering.
2. This type of research is often unknown to those under study, and as such, must be conducted in public settings where people do not have a reasonable expectation of privacy.
3. For example, a researcher might observe the ways in which strangers interact in public as they gather to watch a street performer.

II) Open-ended surveys:

1. While many surveys are designed to generate quantitative data, many are also designed with open-ended questions that allow for the generation and analysis of qualitative data.
2. For example, a survey might be used to investigate not just which political candidates voters chose, but why they chose them, in their own words.

III) Focus group:

1. In a focus group, a researcher engages a small group of participants in a conversation designed to generate data relevant to the research question.
2. Focus groups can contain anywhere from 5 to 15 participants.

IV) In-depth interviews:

1. Researchers conduct in-depth interviews by speaking with participants in a one-on-one setting.
2. Sometimes a researcher approaches the interview with a predetermined list of questions or topics for discussion but allows the conversation to evolve based on how the participant responds.

V) Oral history:

1. The oral history method is used to create a historical account of an event, group, or community.
2. It typically involves a series of in-depth interviews conducted with one or multiple participants over an extended period of time.

VI) Participant observation:

1. This method is similar to observation, however with this one, the researcher also participates in the action or events in order to not only observe others but to gain the first-hand experience in the setting.

VII) Ethnographic observation:

1. Ethnographic observation is the most intensive and in-depth observational method.
2. Originating in anthropology, with this method, a researcher fully immerses herself into the research setting and lives among the participants as one of them for anywhere from months to years.

VIII) Content analysis:

1. This method is used by sociologists to analyze social life by interpreting words and images from documents, film, art, music, and other cultural products and media.
2. The researchers look at how the words and images are used, and the context in which they are used to draw inferences about the underlying culture.

Q8. Differentiate between Qualitative and Quantitative Research**Ans:**

[10M | Dec17, May18 & Dec18]

Table 2.1 shows the comparison between Qualitative and Quantitative Research.

Table 2.1

Points	Qualitative Research	Quantitative Research
Meaning	Qualitative research is a method of inquiry that develops understanding on human and social sciences, to find the way people think and feel.	Quantitative research is a research method that is used to generate numerical data and hard facts, by employing statistical, logical and mathematical technique.
Nature	Holistic.	Particularistic.
Objective	To explore and discover ideas used in the ongoing processes.	To examine cause and effect relationship between variables.
Approach	Subjective.	Objective.
Methods	Non-structured techniques like In-depth interviews, group discussions etc.	Structured techniques such as surveys, questionnaires and observations.
Response Option	Unstructured or semi-structured.	Fixed.
Research type	Exploratory.	Conclusive.
Reasoning	Inductive.	Deductive.
Sampling	Purposive.	Random.
Data	Verbal.	Measurable.
Inquiry	Process-oriented.	Result-oriented.
Hypothesis	Generated.	Tested.
Elements of analysis	Words, pictures and objects.	Numerical data.
Result	Develops initial understanding.	Recommends final course of action.

Q9. Mental Model.**Ans:**

[5M | Dec16 & Dec17]

MENTAL MODEL:

1. A Mental Model is an explanation of someone's thought process about how something works in the real world.
2. It is a person's thought process of **understanding the world**.
3. It represents the surrounding world.
4. Like all models, mental models are **abstractions of reality**.
5. This model is less complex than the real world.

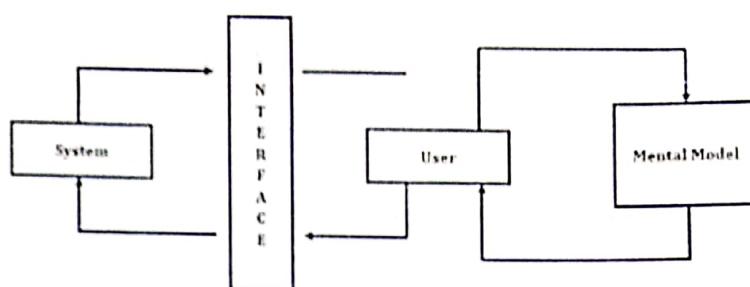


Figure 2.3: Concept of Mental Model.

PROBLEMS, CHALLENGES AND CONFUSIONS IN MENTAL MODEL:

1. Mental Models are incomplete.
2. It is unstable.
3. It can lead to wrong decisions.
4. Mental model are parsimonious.

EXAMPLE OF MENTAL MODEL:

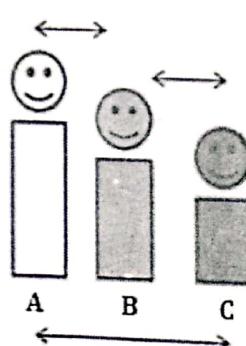
How do you solve the following problem?

A is taller than B.

B is taller than C.

So what do you know about A and C

To solve this problem, we translate the given information into predicate calculus. Example of men model is shown below. Finally we can conclude that A is taller than C.



Q10. Differentiate between mental model and implementation model

Ans:

[5M | Dec18]

Table 2.2 shows the comparison between mental model and implementation model.

Table 2.2

Implementation Model	Mental Model
User Interfaces that conform to the implementation model are bad .	User Interfaces that conform to the implementation model are good .
As a HMI Designer, you have no control over the implementation model.	As a HMI Designer, you have very little control over the implementation model.
Implementation Model are based on certain internal assumptions .	Mental Model are based on end user's idealized vision .
In Implementation model the result is (almost certainly) Poor UX .	In Implementation model the result is (almost certainly) Good UX .
Hitting the implementation model sweet spot is usually possible.	Hitting the Mental model sweet spot is usually impossible

Figure 2.4 shows the example of implementation and mental model.

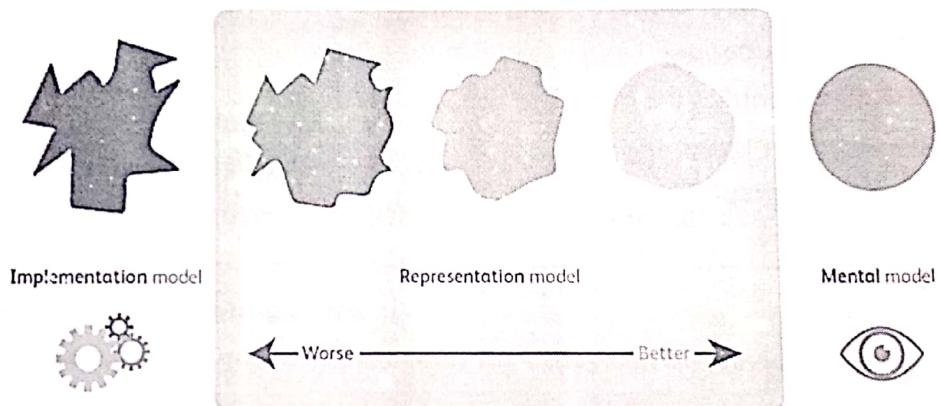
User experience models

Figure 2.4: Example of implementation and mental model.

Q11. State various interview techniques?

Ans:

[5M – May16 & Dec18]

INTERVIEW TECHNICS:

There are three different formats of interviews: structured, semi-structured and unstructured.

I) Structured interviews:

1. Structured interviews is also known as **standardized interview**.
2. It is a quantitative research method.
3. It consist of a series of pre-determined questions that all interviewees answer in the same order.
4. Data analysis in structured interviews usually tends to be more straightforward compared to other forms of interviews.

II) Unstructured Interviews:

1. Unstructured Interviews are also known as **non-directive interview**.
2. It is a quantitative research method.
3. It is an interview in which questions are not prearranged.
4. Interview is conducted in an informal manner.

III) Semi-structured Interviews:

1. It contain components of both, structured and unstructured interviews.
2. It is also a quantitative research method.
3. In semi-structured interviews, interviewer prepares a set of same questions to be answered by all interviewees.
4. However, additional questions might be asked during interviews to clarify and/or further expand certain issues.

Q12. Explain Goal Directed design process in brief.

Q13. Goal Directed Design.

Ans:

[5 - 10M | Dec16, May17, Dec17, May18 & Dec18]

GOAL DIRECTED DESIGN PROCESS:

1. Goal Directed Design is a **user-centered methodology**.
2. It was developed by **Alan Cooper**.
3. Goal Directed Design identifies the goals and behaviors of users.
4. Goal Directed Design combines:
 - a. Techniques of ethnography.
 - b. Stakeholder's interviews.
 - c. Market Research.
 - d. Detailed user models.
 - e. Scenario based design.
 - f. A core set of interaction principles and patterns.
5. The process is broken down into the following steps as shown in figure 2.2.

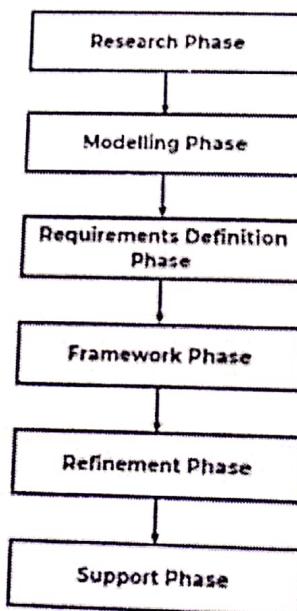


Figure 2.2: Goal Directed Design Process.

I) Research Phase:

1. Research Phase mainly focuses on market survey, conducting user interviews and user observation.
2. This phase will help to understand gap between user and developer.
3. This phase will generate **actual user information**.

II) Modelling Phase:

1. The output of research phase is converted to user model.
2. User model includes **information flow** and **work flow**.
3. This phase will help to understand user in details.

III) Requirement Definition Phase:

1. This phase is very important phase.
2. This phase is used for requirement collection.
3. This phase is used to provide the **connectivity** between the user, models and product framework.

IV) Framework Phase:

1. Framework Phase is used to provide actual product design and framework for the system behaviour.
2. It also proposes **product interaction framework**.

V) Refinement Phase:

1. Refinement Phase mainly emphasizes on details of system and product implementation.
2. It helps to create story board at very high level of details.

VI) Support Phase:

1. This phase tries to meet all future requirements.
 2. Application and design level support is provided.
 3. This phase will perform UAT to make sure that all developmental goals are fulfilled.
-

Q14. Designs for accommodating Users.

Q15. What are the three categories of the users? How they can be provided with facilities to ensure feasibility in operation?

Ans:

[5M | May15 & May17]

DESIGNS FOR ACCOMMODATING USERS:

1. The main goal of the designer is to identify **user is expect or a beginner**.
2. This understanding helps the designer to design system as per user requirements.
3. Since the system user do not belong to similar group of expertise as they are mixed bunch of people.
4. Users can be divided as:
 - a. Beginners.
 - b. Intermediates.
 - c. Experts.
5. These categories can be decided from their age, IQ level, skills etc.

I) Beginning User:

1. Every user is beginner user at earlier phase of their life.
2. The beginning user may require lot of help from system to understand process.

3. The main focus area of beginning user is on:
 - a. Menus.
 - b. Messages.
4. Questions from beginning user:
 - a. Which program should I use?
 - b. From where should I start?
 - c. Am I doing right things?
5. **Example:** In case of Microsoft Office – Word
 - a. The beginner user will take help of assistant to understand few functions of system.

II) Intermediator User:

1. Maximum users are the Intermediator users.
2. Intermediator user is always looking for desired features and way to easily access them.
3. Questions from Intermediator user:
 - a. I know it exists,... but where?
 - b. How did I do this again...?
4. **Example:** A tooltip text can help Intermediator user to find out new ways to do same things more effectively.

III) Expert User:

1. The number of expert users is always smaller than other type of users.
2. Expert users are very important type of users because their effectiveness is very high.
3. Questions from expert user:
 - a. Can I use a shortcut?
 - b. Can I personalize?
4. Expert users always look for **customization or automation** in available system.

Q16. Logo Design.

[5M | May16]

Ans:

LOGO DESIGN:

1. A logo is a **graphic mark, emblem, or symbol**.
2. It is commonly used by commercial enterprises, organizations and even individuals to promote instant public recognition.
3. Logos are either purely graphic (symbols/icons) or are composed of the name of the organization.
4. Since a logo is the visual entity signifying an organization, logo design is an important area of graphic design.

TYPES OF LOGO DESIGN:

Logos fall into three classifications:

I) Iconic/Symbolic:

1. Logo is design using Icon or Symbol.
2. Icons and symbols are simple images that physically resemble what they are trying to portray.

3. Example:**II) Logotype/Wordmark:**

1. Logo is design using letters.
2. Usually it show the name or initials of an organization in a memorable way.

3. Example:**III) Combination Marks:**

1. Combination Marks are graphics with both text and a symbol or icon that signifies the brand image.
2. Short text can complement an icon or symbol while providing additional clarity as to what business is all about.

3. Example:

CHAP - 3: GUI

Q1. What do you mean by direct manipulation and indirect manipulation?

[5M | May16, Dec16 & Dec17]

Ans:

DIRECT MANIPULATION:

1. Direct Manipulation is a **human-machine interaction style**.
2. The term direct manipulation is given by **Shneiderman** in 1982.
3. Direct Manipulation involves continuous representation of objects of interest.
4. It is used to describe **graphical systems**.

Characteristics:

1. The system is portrayed as an extension of the real world.
2. Objects and actions are continuously visible.
3. Actions are rapid and incremental with visible display of results.
4. Incremental actions are easily reversible.

Example:

Figure 3.1 shows example of direct manipulation in office system, here the user interacts with artificial world.

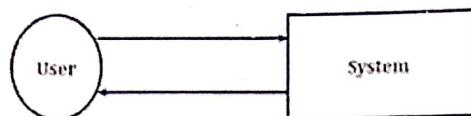


Figure 3.1: Direct Manipulation (Office System)

Advantages:

1. Easy to learn.
2. It permits error avoidance.

Disadvantages:

1. It is difficult to code.
2. It requires graphics displays and pointing devices.

IN-DIRECT MANIPULATION:

1. Indirect Manipulation is a **human-machine interaction style**.
2. The term Indirect Manipulation is given by **Shneiderman** in 1982.
3. Indirect manipulation represents a task that effectively executes another.
4. In Indirect manipulation, symbols are replaced by words and texts.
5. Pointing is replaced by typing.

Example:

Figure 3.2 shows example of indirect manipulation in industrial system, here the user interacts with world through interface.

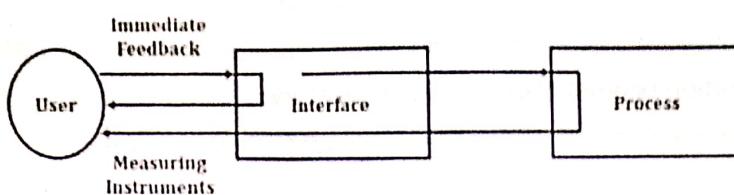


Figure 3.2: Indirect Manipulation (Industrial System)

Advantages:

1. Easy to code & implement.
2. It does not require pointing devices.

Disadvantages:

1. Greater design complexity.
2. Inconsistencies in technique.

Q2. List general principles of user interface design, explain any 4 in detail.

Ans:

[TOM | May17]

USER INTERFACE DESIGN:

1. User Interface Design is also known as **User Interface Engineering**.
2. User Interface Design is the design of user interfaces for machines and software, such as computers, home appliances, mobile devices, and other electronic devices.
3. It basically focuses on **maximizing usability and the user experience**.
4. The goal of user interface design is to make the user's interaction as simple and efficient as possible.

GENERAL PRINCIPLES OF USER INTERFACE DESIGN:

Figure 3.3 shows the general principles of user interface design.

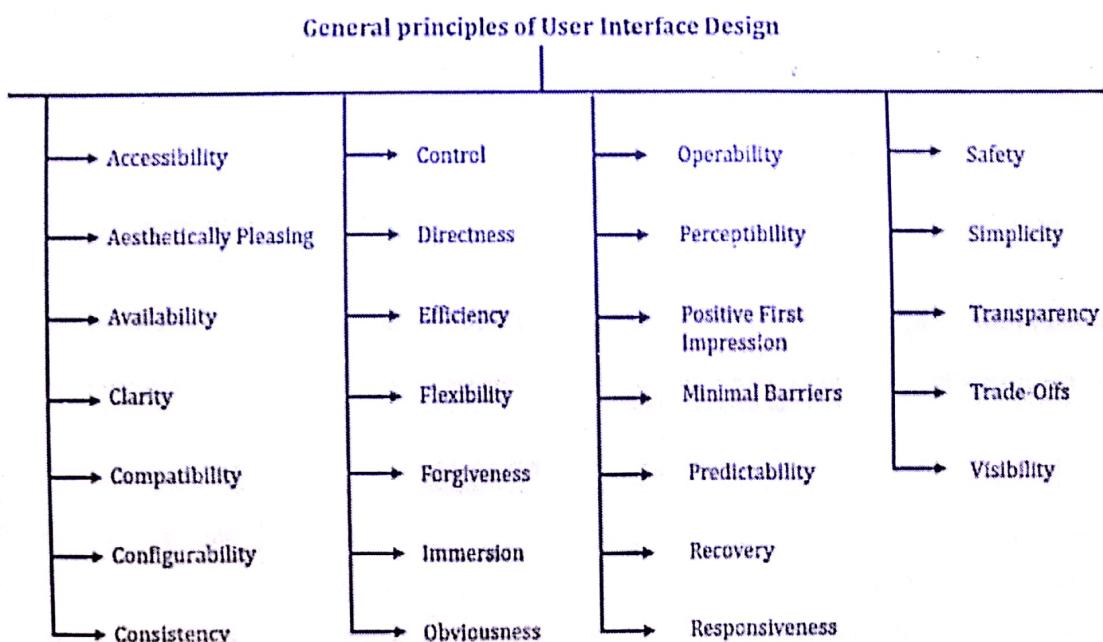
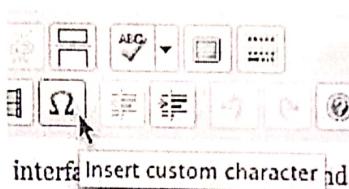


Figure 3.3: General principles of user interface design.

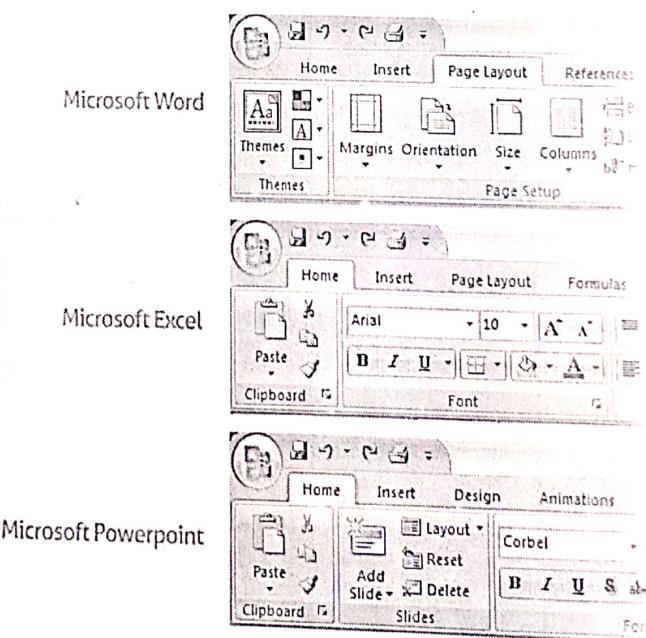
I) Clarity:

1. Clarity is the most important element of user interface design.
2. It means the information content is **conveyed accurately**.
3. Clarity must be reflected in the concepts, languages and vision including:
 - a. Visual Elements.
 - b. Functions.
 - c. Metaphors.
4. **Example:** Tooltip is used to explain the functionality of buttons.



II) Consistency:

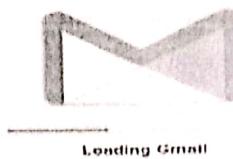
1. Consistency means the design and behavior across every part of the system should be **similar**.
2. A system should look, act, and operate the same throughout.
3. Similar components should:
 - a. Have a similar look.
 - b. Have similar uses.
 - c. Operate similarly.
4. The same action should always yield same result.
5. Consistency enables users to **develop usage patterns**.
6. **Example:** The Microsoft Office user interface is consistent for all applications such as Word, Excel, PowerPoint etc.



III) Responsiveness:

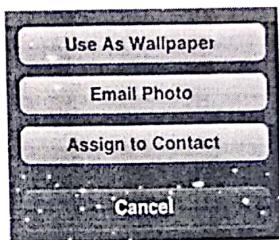
1. Responsive means a couple of things, basically responsive means **fast**.
2. That is the system must quickly respond to the request made by the user.
3. Responsive also means the interface provides **some form of feedback**.
4. Knowledge of results, or feedback, increases confidence.

5. **Example:** Instead of gradually loading the page, Gmail shows a progress bar when you first go to your inbox. This allows for the whole page to be shown instantly once everything is ready.



IV) Efficiency:

1. Efficiency means achieving maximum productivity with minimum effort.
2. A good interface should allow user to perform functions faster and with less effort.
3. Efficiency minimize eye and hand movements and other control actions.
4. To achieve efficiency, real world metaphors must be provided.
5. **Example:** Providing buttons to accomplish each of some functions in the photo controls.



V) Forgiveness:

1. Users are bound to make mistakes when using your software or website.
2. A forgiving interface is one that can save your users from costly mistakes.
3. Human errors that are inevitable must be tolerated and forgiven.
4. Disastrous error must be provided strong protection.
5. Error must be supported with productive, effective and positive messages.
6. **Example:** Trashed the wrong email by mistake? Gmail lets you quickly undo your last action.

The conversation has been moved to the Trash. [Learn more](#) [Undo](#)

Q3. What are the advantages and Disadvantages of Digital or Graphical systems? Explain in brief.

Q4. What are various advantages of Digital and Graphics Systems?

Ans:

Graphical system allows users to interact with electronic devices through graphical icons and visual indicators such as secondary notation.

ADVANTAGES:

I) Symbols recognized faster than text:

1. It is similar to phrase action speaks louder than words therefore symbols are recognized faster than text.
2. Graphical attributes of icons, such as shape and color, are very useful for quickly classifying objects, elements, or text by some common property.

II) Faster learning:

1. Research has also found that a graphical, pictorial representation aids learning, and symbols can also be easily learned.
2. Using symbols one can easily identify the objects.

III) More attractive:

1. Direct manipulation system is more entertaining, cleverer and more appealing.
2. Examples of these can be games such as temple run.

IV) Easier remembering:

Because of greater simplicity, it is easier for casual users to retain operational concepts.

V) Fewer errors:

1. More concrete thinking affords fewer opportunities for errors.
2. Reversibility of actions reduces error rates because it is always possible to undo the last step.
3. Error messages are less frequently needed.

VI) Less anxiety concerning use:

New users feel less anxiety when using the system.

VII) May consume less space:

Icons may take up less space than the equivalent in words.

VIII) Low typing requirement:

Pointing and selection controls such as mouse and trackball eliminate the need for typing skills.

IX) Increased feeling of control:

1. The user initiates actions and feels in control.
2. This increases user confidence and hastens system mastery.

X) Smooth transition from command language system:

Moving from command language to a direct manipulation system has been found to be easy.

DISADVANTAGES:**I) Greater design complexity:**

1. Designing unique icons or symbols which represent a particular meaning about the object is complex.
2. With graphics, the skill of the designers is increasingly challenged.

II) Learning still necessary:

1. The meaning of many words and icons may not be known.
2. Severe learning requirement is imposed on many users and it takes a while to get up to speed.

III) Inconsistencies in technique and terminology:

1. Inconsistency occurs because of copyright and legal implication.
2. This inconsistency severely affects the graphical system.

IV) Working domain is the present:

While direct manipulation system provides context, they require the user to work in the present.

V) Hardware limitations:

1. Good design also requires hardware of adequate power, processing speed, screen resolution, and graphic capability.
2. Insufficiencies in these areas can prevent a graphic system's full potential from being realized.

Q5. Give Brief description on GUI versus Web Page.

Ans:

[10M | May16]

SIMILARITIES BETWEEN GUI AND WEB INTERFACE DESIGN:

1. Both are software designs.
2. Both are Interactive.
3. Both are heavily visual experiences presented through the screens.
4. Both are generally composed of many similar components.

DIFFERENCE BETWEEN GUI AND WEB INTERFACE DESIGN:

Table 3.1 shows comparison between GUI and Web Page.

Table 3.1

Points	GUI	Web Page
Definition	GUI is the type of interface which allows users to interact with electronic devices through graphical icons and visual indicators.	Web page designing is a process of creating a plan and originating the development of a specific web page.
User focus	Data & applications.	Information & navigation.
Hardware variation	Limited.	Enormous.
User tasks	Install, configure, personalize, start, use and upgrade programs.	Link to a site, browse or read pages, fill out forms, register for services etc.
Presentation element	Windows, menus, control, data, message, toolbars etc.	Two components browse and pages.
Navigation	Through menus, lists, trees, dialogs and wizards.	Through links, bookmarks and typed URLs.
Interaction	Interactions such as clicking menu choices, pressing buttons, selecting list choices.	Basic interaction is single click.
Response time	Nearly instantaneous	Quite variable depending on transmission speeds, page content and so on.
Users conceptual space	Controlled and constrained by program.	Infinite and generally unorganized.
Context	Sense of context is neatly maintained.	Sense of context is poorly maintained.
Security	Highly secure, no problems with home PC Users.	Security problems due to unreliable websites, hackers, and limited to the browser provided and software provided security.
Reliability	Highly reliable.	Vulnerable to interruptions.
Task Efficiency	Limited by the type of program supporting it.	Limited to the type of browser and capabilities of the network used.
Visual Style	Limited to toolkits.	Supports artistic and unlimited presentation styles.
Consistency	Universal consistency is provided.	Standards are normally set particularly within the site.

Q6. How images and graphics are important in Design

Ans:

[4M | May17]

ROLE OF IMAGES IN DESIGN:

1. Images are the first thing a user sees in design.
2. Images **draw attention & trigger emotion.**
3. Images are worth a thousand words.
4. One image can define the mood, content, audience, and tone of the design.
5. Images provide easier navigation in design.
6. Images with links are clicked on more than text links, when given the option.
7. Users like images more.
8. **For example:** Most of the time users clicked "Like" on images 53% more than text posts in Facebook Page.

ROLE OF GRAPHICS IN DESIGN:

1. Graphics in design is also known as a means for **visual communication**.
2. It intends to convey a specific message with a purpose.
3. Graphics is a method of communication that we use to portray our ideas to our audience.
4. Graphic design is the process of combining visual elements (like text and images) in an appealing way.
5. The activity of graphic designing involves social, economic, cultural, technological and aesthetic values as well as graphically communicated ideas.
6. The words and graphics in user interfaces can make important differences in people's perceptions, emotional reactions, and motivations.

CHAP - 4: DESIGN GUIDELINES

- Q1. Gestalt's Principles.
 Q2. Explain in detail about Gestalt's Principles
 Ans:

[5 - 10M | Dec16, May17, Dec17 & Dec18]

GESTALT'S PRINCIPLES:

1. Gestalt is a German word for "Shape" or "Figure".
2. It is also known as the **Law of Simplicity**.
3. Gestalt theorists followed the basic principle that the **whole is greater than the sum of its parts**.
4. Gestalt is a psychology term which means "**unified whole**".
5. It refers to theories of **visual perception** developed by German psychologists in the 1920s.
6. These theories attempt to describe how people tend to organize visual elements into groups when certain principles are applied.
7. These principles are:

I) Similarity:

1. Similarity occurs when objects look similar to one another.
2. People often perceive them as a group or pattern.
3. The example above (containing 11 distinct objects) appears as a single unit because all of the shapes have similarity.
4. Unity occurs because the triangular shapes at the bottom of the eagle symbol look similar to the shapes that form the sunburst.



II) Continuation:

1. Continuation occurs when the eye is compelled to move through one object and continue to another object.
2. Continuation occurs in the example below, because the viewer's eye will naturally follow a line or curve.
3. The smooth flowing crossbar of the "H" leads the eye directly to the maple leaf.



III) Closure:

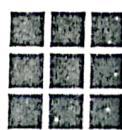
1. Closure occurs when an object is incomplete or a space is not completely enclosed.
2. If enough of the shape is indicated, people perceive the whole by filling in the missing information.
3. Although the panda below is not complete, enough is present for the eye to complete the shape.
4. When the viewer's perception completes a shape, closure occurs.

**IV) Proximity:**

1. Proximity occurs when elements are placed close together.
2. They tend to be perceived as a group.



3. The nine squares above are placed without proximity.
4. They are perceived as separate shapes.
5. When the squares are given close proximity, unity occurs.
6. While they continue to be separate shapes, they are now perceived as one group.

**V) Figure and Ground:**

- The eye differentiates an object from its surrounding area.
- A form or shape is naturally perceived as figure (object), while the surrounding area is perceived as ground (background).
- In this image, the figure and ground relationships change as the eye perceives the form of a shade or the shape of a face.



Q3. Provide all factors of Interface design? Provide innovative web application by integrating the technologies that are used in Interface design.

Q4. Provide various factors of Interface Design, justify your answer with proper example

Ans:

[10M | May16 & Dec16, Dec17 & May18]

INTERFACE DESIGN:

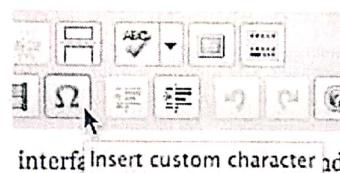
1. Interface Design is also known as **User Interface Engineering**.
2. Interface Design or User interface design is the design of user interfaces for machines and software such as computers, home appliances, mobile devices, and other electronic devices.
3. It basically focus on **maximizing usability and the user experience**.
4. The goal of user interface design is to make the user's interaction as simple and efficient as possible.

FACTORS OF INTERFACE DESIGN:**I) User-Interface Independence:**

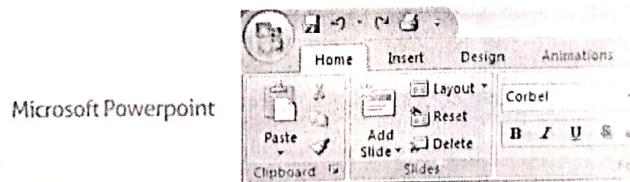
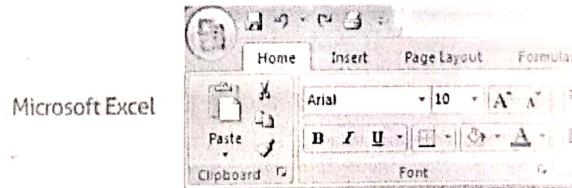
1. UI should be supported in multiple platforms.
2. It should enforce standards.
3. It should enable multiple user-interface strategies.
4. Establish role of user-interface architect.

II) Clarity:

1. Clarity is the most important element of user interface design.
2. It means the information content is **conveyed accurately**.
3. Clarity must be reflected in the concepts, languages and vision including:
 - a. Visual Elements.
 - b. Functions.
 - c. Metaphors.
4. **Example:** Tooltip is used to explain the functionality of buttons.

**III) Conciseness:**

1. Conciseness means giving a lot of information clearly and in a few words.
2. The idea is to save the valuable time of the users by keeping things as **concise** as possible.
3. **Example:** The volume controls use little icons to show each side of the scale from low to high.

**IV) Consistency:**

1. Consistency means the design and behavior across every part of the system should be **similar**.
2. A system should look, act, and operate the same throughout.

3. Similar components should:
 - a. Have a similar look.
 - b. Have similar uses.
 - c. Operate similarly.
4. The same action should always yield same result.
5. Consistency enables users to **develop usage patterns**.
6. **Example:** The Microsoft Office user interface is consistent for all applications such as Word, Excel, PowerPoint etc.

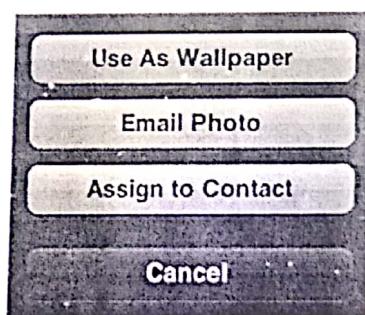
V) Responsiveness:

1. Responsive means a couple of things, basically responsive means **fast**.
2. That is the system must quickly respond to the request made by the user.
3. Responsive also means the interface provides **some form of feedback**.
4. Knowledge of results, or feedback, increases confidence.
5. **Example:** Instead of gradually loading the page, Gmail shows a progress bar when you first go to your inbox. This allows for the whole page to be shown instantly once everything is ready.



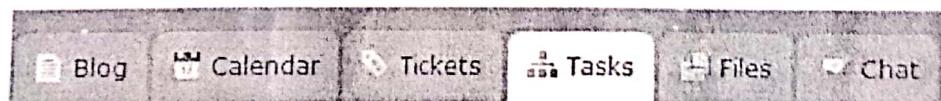
VI) Efficient:

1. Efficiency means achieving maximum productivity with minimum effort.
2. A good interface should allow user to perform functions faster and with less effort.
3. Efficiency minimize eye and hand movements and other control actions.
4. To achieve efficiency, real world metaphors must be provided.
5. **Example:** Providing buttons to accomplish each of some functions in the photo controls.



VII) Familiarity:

1. Familiarity means having the knowledge of something.
2. A good interface design should integrate all the familiar things in a system such as menus and tabs.
3. **Example:** Tabs.



VIII) Attractive:

1. Attractive means having qualities or features which evoke interest.
2. A good interface design should make the use of interface enjoyable.
3. **Example:** Google are known for their minimalist interfaces that focus on function over form and makes the site attractive.



Google Search I'm Feeling Lucky

IX) Forgiveness:

1. Users are bound to make mistakes when using your software or website.
2. A forgiving interface is one that can save your users from costly mistakes.
3. **Example:** Trashed the wrong email by mistake? Gmail lets you quickly undo your last action.

The conversation has been moved to the Trash. [Learn more](#) [Undo](#)

X) Software Support:

1. It should increase productivity.
2. Offer constraint and consistency checks.
3. A poorly designed interface can cause a user to make catastrophic errors.
4. Facilitate team approaches.

EXAMPLE: WEB APPLICATION

Innovative User interface for Online Air Ticket Reservation System is shown below in figure 4.3

1. **Navigation Components includes:** Menus (Home, Manage your trip, Special offers and Contact us)

2. Input Controls:

- a. Labels such as One way, Round trip, Fixed dates, Flexible dates etc.
- b. Radio Button for One way and Round trip.
- c. Textbox for from and to destination.
- d. Button like Book.

Figure 4.1: Online Air Ticket Reservation System.

Chap - 4 | Design Guidelines**Q5. Discuss issues related to Long Term Memory and short Term Memory.**

[4M - May16 & Dec16]

Ans:

1. Memory actually takes many different forms.
2. We know that when we store a memory, we are storing information.
3. But, what that information is and how long we retain it determines what type of memory it is.
4. The biggest categories of memory are short-term memory (or working memory) and long-term memory, based on the amount of time the memory is stored.
5. Both can weaken due to age, or a variety of other reasons and clinical conditions that affect memory.

SHORT TERM MEMORY:

1. Short term memory is closely related to **working memory**.
2. Short-term memory is the very short time memory that you keep something in mind before either dismissing it or transferring it to long-term memory.

Issues related to Short-term memory:

1. Short-term memory typically requires concentrated effort.
2. If individual become distracted by some factors then that concentration can be broken.
3. Thus content of short-term memory may be lost.
4. For **Example:** Even a momentary distraction can cause a user to forget the name of a file or of a password that they haven't used before.

Long Term Memory:

1. Long-term memory is our brain's system for storing, managing, and retrieving information.
2. Not everything is stored, only major part of the information is filtered and only some components are stored.

Issues related to Long-term memory:

1. Not everything that is stored can be retrieved i.e. the recall process is difficult.
2. Not everything that is recall is correct i.e. recall process is not reliable.
3. Long-term memory typically it is less easy to remember information that has passed from short-term to long-term memory.
4. **Example:** Even expert computer users may make mistakes if they attempt to perform two familiar tasks in parallel. Both may draw upon long-term memory but there can be interference effects.

Q6. How reading is important in UI Design? Write your comments related to the quote "Poor Design may affect Reading".**Q7. Explain the term "Poor Design Affects Reading"****Ans:**

[5 - 10M | Dec16 & Dec17]

READING IN UI DESIGN:

1. Education helps people in most parts of the world to be able to read and write.
2. Every morning we read newspaper, and most of our activities through the day involve some kind of reading (Whatsapp Text Messages :P)
3. Reading is very important part in UI Design.

4. Every UI has some kind of color used to make it attractive.
5. But it need to be ensure that screens are still readable.
6. The best way to do this is to follow the **contrast rule**.
7. Use dark text on light backgrounds and light text on dark backgrounds.
8. Reading blue text on a white background is easy, but reading blue text on a red background is difficult.
9. The problem is not enough contrast exists between blue and red to make it easy to read, whereas there is a lot of contrast between blue and white.
10. Figure 4.2 shows the example of reading.

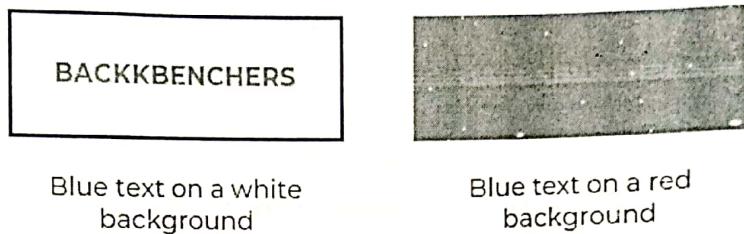


Figure 4.2: Example of Reading.

POOR DESIGN MAY AFFECT READING:

Factors which may affects reading in UI Design

I) Tiny Fonts:

1. Tiny fonts also makes reading of text in the UI Design difficult.
2. For example try to reading the font below.

BackkBenchers

II) Text on noisy background:

1. Noise too play an important role in disrupting the reading process.
2. Visible noise that may be present in, around all over the text can add to the woes of reading.
3. Figure 4.3 represents the example of text on noisy background.

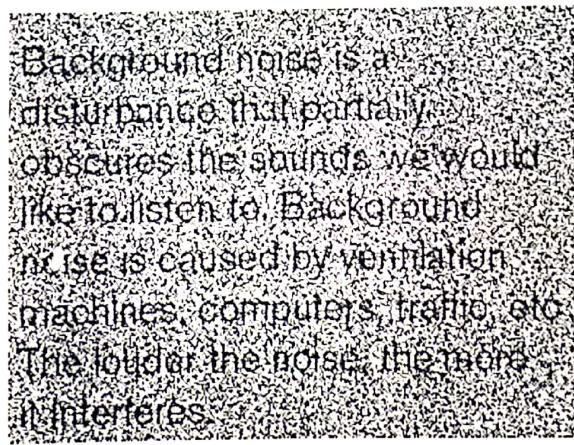


Figure 4.3: Text on noisy background.

Q8] What are the factors that are considered to choose colors?

Q9] Explain How Colors Play Major Role in Human Interface Design?

[5 - 10M | May17 & Dec17]

Ans:

COLORS IN DESIGN:

1. Color and accessibility are indelibly linked to one another.
2. Bad color combinations create bad user environments.
3. The right colors can show users that they are doing the right thing or the wrong thing.
4. Color can be used as a grouping method or to draw attention to certain aspects of the system.
5. There are several traditional color schemes known to enhance usability including but not limited to monochromatic, analogous, complementary, triad and split complementary.
6. Some common issues with color use are: too many colors, complementary colors placed too close together, excessive saturation, inadequate contrast and inadequate attention to color impairment.
7. Color can be used to create images that appear 3D.
8. The colors in design need to be purposeful and have meaning in their use.
9. Color displays are attractive to users and can often improve task performance.
10. Color can:
 - a. Sets the tone of the message.
 - b. Guides the eye where it needs to go.
 - c. Emphasize the logical organization of information.
 - d. Draw attention to warnings.
 - e. Evoke strong emotional reactions of joy, excitement, fear, or anger.

GUIDELINES FOR CHOOSING AND USING COLOR IN DESIGN:

1. Color schemes have a large impact on human-computer interaction.
2. Color can greatly improve user interfaces if used correctly, but can also reduce the functionality of the interface if used inappropriately.
3. Important factors of designing color interfaces includes.

I) Simplicity:

1. Firstly, you want to keep the color scheme fairly simple.
2. Simplicity can be achieved by using the four primary colors, which are red, green, yellow, and blue.

II) Consistency:

1. Consistency is also another important factor when designing an interface.
2. Colors should be assigned to a particular type of concept or to help classify information.
3. This technique helps users to retain more information in their short term memory.

III) Clarity:

Clarity and the concise use of color aids in helping users identify items more efficiently.

IV) Colorblindness and Usability:

1. Colorblindness plays a major role in designing websites.
2. You may lose up to 10% of the users to your site because of colorblindness.

3. Studies have shown that 40% of users to a site will not return if the site is not colorblind friendly.
4. The biggest solution to the problem is adjusting the contrast.
5. Make sure the text and its background have a strong contrast difference for its usability.

V) Accommodating Color Blindness:

1. Color blindness effects nine to twelve percent of the male population and less than one percent of the female population.
2. The most common type of color blindness is the confusion between red and green and can be classified by dividing the deficiency into hue, saturation and brightness (HSB).
3. User Interfaces need to take into account this issue during the design stage.
4. The main area to be concerned with is the use of "color-coding" or "color-cueing."
5. When designing an interface, an approach to take is to snapshot the interface and view it in grayscale.
6. The results do not necessarily represent what a color-blind person sees, but gives a good indication of the effect of the chosen color scheme with regard to hue, saturation and brightness.

VI) Other factors:

1. Recognize the power of color to speed or slow tasks.
2. Ensure that color coding supports the task.
3. Make color coding appear with minimal user effort.
4. Design for monochrome first.
5. Be consistent in color coding.
6. Be alert to common expectations about color codes.
7. Be alert to problems with color pairings.
8. Use color changes to indicate status changes.
9. Use color in graphic displays for greater information density.

Q10. Learning.

Ans:

[5M – May17]

LEARNING:

1. It is common tendency of humans to generalize what they see and experience and extract conclusions based on the experiences.
2. Human keep learning from their experiences automatically and the process is constant.
3. Some experiences learnt on a daily basis are shared below:
 - a. Stay away from wild animals.
 - b. Don't cross railway lines.
 - c. Don't eat roadside food.
 - d. WhatsApp is addictive and waste of time.
4. Learning is the process of encoding in long-term memory information that is contained in short-term memory.

LEARNING ABILITIES ARE RESTRICTED IN SEVERAL WAYS:

I) Complex situations:

1. When there are many variables involved that might be subject to variable forces, people find it difficult to learn, generalize and conclude from it.
2. For example: Even the most experienced weather man from the meteorological department can not exactly predict the weather for the next two days.

II) Experiences from our own lives:

1. Experiences from our own lives or from those of our close relatives and friends would be more influential for making conclusions than what is heard or read.
2. For example, if someone says not to watch a certain movie which would result in waste of time and money, even the newspaper reviews are strongly negative, but we may still go and watch it since our close friends told us otherwise.

III) Mistakes made by people:

1. Unfortunate ones learn from their own mistakes, and the lucky ones learn from other's mistakes.
2. We learn from our mistakes, if we don't learn the right lesson then by the time we realize it, it may be too late.

IV) Generalization:

1. People learning from experience generalize it.
2. At times they over generalize it, meaning generalizing without complete data or knowledge about it.
3. For example, many people assume that all roses are red because they have initially heard about it and have seen only red roses, but it is not true, because there are yellow, orange, pink and white roses too.

Q11. Explain six behavioral patterns in detail

Ans:

[10M | May17]

SIX BEHAVIORAL PATTERN:

1. Interaction of humans with the external world exhibits certain behavioural pattern.
2. Design rules for UI that are directed towards these patterns would therefore indirectly encompass the limits of working memory and attention.
3. Figure 4.4 shows six important patterns of human behaviour.

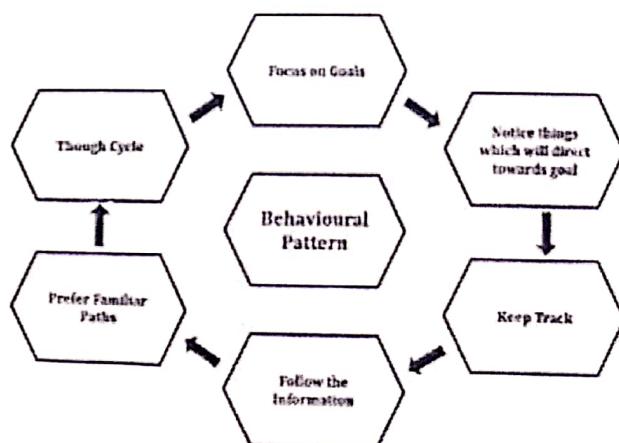


Figure 4.4: Six Behavioural Pattern.

I) We focus on our goals and pay little attention to our tools:

1. While performing a task people are more focused on the outcomes or goals and the information (data) related to that task only.
2. Little or no attention goes towards the tools that are being used to perform the task.
3. Example, you have been told to finish typing some documents in word.
4. Your main focus is on typing the words and sentences than on the keyboard or mouse.
5. If suddenly your keyboard stops functioning properly, you immediately stop typing and shift your attention towards attending to the keyboard.
6. You check the cables, ports, power etc. related to the keyboard and even try to restart your computer.
7. Here too you pay very little attention to the tools you are using to rectify the problems of the keyboard as you had paid little attention to the keyboard when typing was your primary task.
8. After the keyboard starts functioning properly again your attention shifts back to the typing.
9. This shift might cause you to forget what you were typing or doing before you stopped to attend the keyboard.

II) We notice things more when they are related to our goals:

1. World is full of information.
2. Our brains cannot process or store so much of information, therefore it rather focuses on processing, keeping track and storing only those which is of significant importance to us, dropping out everything else.
3. In this way we do not waste resources.
4. When something happens, we notice and remember few details about it which are latter important and may be used by us in the future.

III) We use external aids to keep track of what we are doing:

1. Since our short-term memory and attention are so limited, we learn not to rely on them.
2. Instead, we mark up our environment to show us where we are in a task.
3. Examples includes:
 - a. **Counting objects:** We use hand held counters, fingers, counting beads on a string, writing down numbers, separating objects that are already counted or use marking on those already counted if the objects are not movable.
 - b. **Reading books:** While reading a novel, if we are interrupted and need to attend something that has interrupted or we decide to stop reading for some time, to remember which page we were, we insert bookmarks or occasionally we highlight that paragraph which we want to return to when we come back, with a marker or a pencil (if permitted to do so).
 - c. **Arithmetic:** We use writing tools i.e. paper and pen, or we use a calculator.
 - d. **Checklists:** We use them in multiple instances so that we do not forget to take important things with us.
 - e. **Editing documents:** Mails are marked as read and unread, in order to assist people remember what they have read and what is not read.

IV) We follow the information "Scent" towards our goal:

1. Our attention is always focused on attaining goals, while doing so we overlook or ignore several things, whatever we see on the screen or hear over the phone menu is interpreted in a literal way.
2. We don't pay much attentions to the intricate details of anything else, like instructions, icons, navigation tabs and bar items, or any such aspects of the UI or tools we use.
3. For example: your motive to buy a pen drive over the Internet, your attention will be solely focused on things related to pen drives and your attention might be attracted to anything that displays the terms "Flash memory", "Flash drive", "Storage devices", "SD cards", "USB flash," etc. any other bargains will not catch your eye.
4. This tendency of people to notice only things on a computer display that match their goal is called as "following the scent of information toward the goal".

V) We prefer familiar paths:

1. It is a known fact that majority humans do not prefer taking risks.
2. In the quest of acquiring a goal we take familiar paths wherever and whenever possible rather than exploring new ones, especially when the task has to be done in a short span of time.
3. This tendency is because we are sure of attaining the goal using the path which we frequent the most.
4. For example: take a case when you are in a hurry to reach the airport to catch a flight, your friend had told you about a short cut route to the airport which you have never used.
5. Which route would you consider? Since time is the major hurdle you would definitely prefer the longer route which you know.
6. Similarly when you are buying something online, you would prefer those websites only from where you have been buying regularly and you know it is trusted.

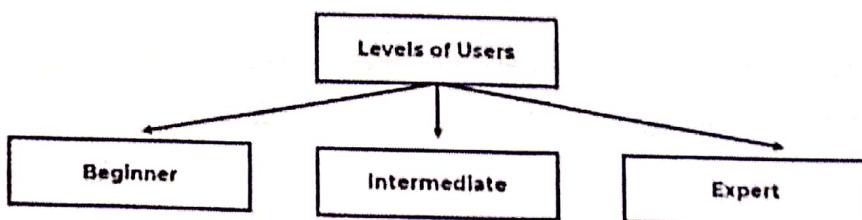
VI) Our thought cycle: Goal, Execute, Evaluate:

1. To reach a goal we need to follow certain steps or protocols for successful accomplishment.
2. This behavior of the users indicates cyclic patterns which holds true for a variety of activities:
 - a. Form a goal (e.g., drink tea, get a health checkup done, text a friend).
 - b. Choose and execute actions that would take you towards the goal progressively.
 - c. Evaluate that is, keep checking whether the actions gave the desired results and check for its progress.
 - d. Repeat the process, until the goal is reached.

Q12. What are three levels of users? Explain how to accommodate them in user interface

Ans:

[10M - May 18]

LEVELS OF USERS:

I) Beginner User:

1. Every user is beginner user at earlier phase of their life.
2. To make beginner user to intermediate designers we must ensure that the things they see and use to remain in their mental models.
3. The main usability of beginning users is their main focus area is on,
 - a. Menus
 - b. Messages
4. For dialogs and notifications user may refer them slower, trying to understand them thoroughly.
5. The beginning user may require lot of help from system to understand process.
6. Question of Beginning User?
 - a. Which program should I use
 - b. What will this program do
 - c. From where should I start
 - d. What is the way to do it
 - e. Am I doing right things

II) Intermediate User:

1. Intermediate user is always looking for desired features and way to easily access them.
2. Majority numbers of users are intermediates.
3. Intermediate level users will have some different requirements.
4. The basic skill to operate system is already known to them.
5. As they are familiar with basics they will now find out new techniques to operate system very effectively.
6. We will optimize user experiences for intermediates as majority of users are Intermediator.

III) Expert User:

1. The number of expert users is always smaller than other type of users as they become expert by longer experience and excellent skill set.
2. This group of user becomes very important group of users as they become expert by longer experience and excellent skill set.
3. This group of user becomes very important group of users although there number is very small but their effectiveness is very high.
4. As always company trust on expert people and ask them for advice as well as design help.
5. Experts may know additional functionalities and abilities of system to perform all tasks.
6. Experts always look for customization or automation in available system.

ACCOMMODATE USERS IN USER INTERFACE:**I) Beginner User:**

1. The main usability of beginning users is their main focus area is on,
 - a. Menus
 - b. Messages.

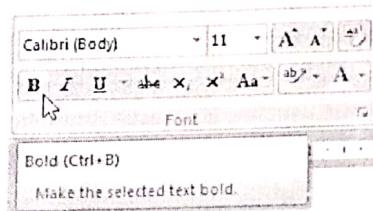
2. They tend to use above options hierarchical system architectures, reading all the labels and understanding of location where specific options and features are placed.

3. Example:

- a. In case of Microsoft office – Excel.
 - b. The beginner user will take help for office assistant to understand few functions of system.
 - c. User majority times refer menu given at the header in system.

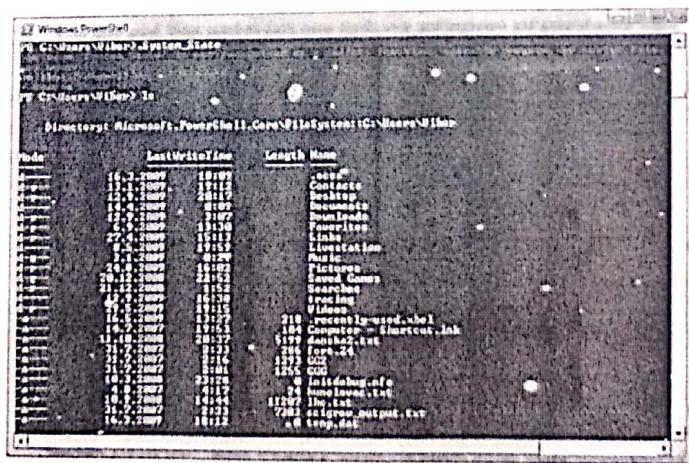
II) Intermediates Users:

1. While beginners were looking for answers to questions like "What does this program do?", "Where do I start?" and "How to do I use this?"
 2. Intermediates are looking for access to desired features.
 3. UI pattern really helping a lot is the **usage of ToolTips**.
 4. Though beginners will find so called "rich tooltips" useful as well, intermediates will use ToolTips as helpful notes showing the functions and features in the simplest way.



III) Expert Users:

1. Experts might be into some rarely used features needed for really complex scenarios, they will definitely require some shortcuts and abilities to manipulate the UI without the mouse.
 2. They will be looking into possibilities for significant customizations, automation and maybe even for some level of extensibility.
 3. They will even find that some graphical user interfaces are, in fact, slowing them down and might turn to consoles – interfaces like the one from PowerShell on the picture below.



4. However, experts do need them for their very specific tasks and you should organize and architecture your UI to enable them to find them and use them

CHAP - 5: INTERACTION STYLES

Q1. What do you mean by keyboard accelerators?

Q2. What do you mean by keyboard accelerator and keyboard equivalent?

Ans:

[5 – 10M | May16, Dec16, May17, Dec17 & May18]

KEYBOARD ACCELERATORS:

1. Keyboard Accelerators are also known as **Hot Keys**.
2. Keyboard Accelerators are keys or combination of keys that would initiate an action, irrespective of the cursor or pointer position, when pressed.
3. The main function is to trigger a menu item or action without actually opening the menu.
4. It is a special way of translating a key or combination of keys pressed by the user into WM_COMMAND messages.
5. Keyboard accelerator is used to **improve productivity**.
6. Figure 5.1 shows the example of keyboard accelerators.

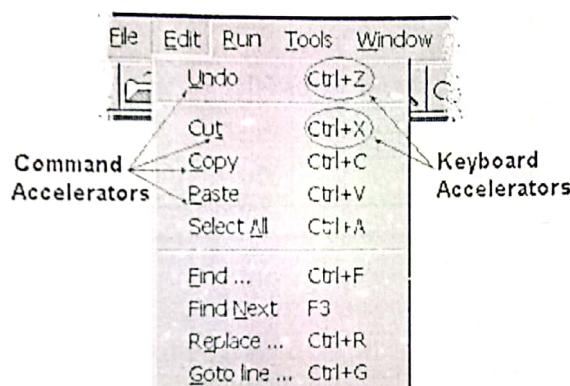


Figure 5.1: Example of Keyboard Accelerators.

Table 5.1 shows some keyboard accelerators and their actions.

Table 5.1

Accelerators	Action
Ctrl + A	All
Ctrl + C	Copy
Ctrl + X	Cut
Ctrl + V	Paste
Ctrl + F	Find
Ctrl + N	New
Ctrl + O	Open
Ctrl + P	Print
Ctrl + Z	Undo
Ctrl + Y	Redo

KEYBOARD EQUIVALENTS:

1. Keyboard Equivalents are also known as **Command Accelerators**.
2. To make a selection of a menu choice using keyboard, each menu item must be assigned a keyboard equivalent mnemonic.
3. One good way of creating mnemonics is **simple truncation**.
4. The first character of the menu item's description should be nothing but the mnemonic.

5. In case of duplication in first characters, use another character in the duplicated item's description.
6. The first succeeding consonant must be preferred to be chosen.
7. The mnemonic character must be designated by **underlining it**.
8. Other methods include different **character color**.
9. Industry-standard keyboard access equivalents must be used.
10. Underlined keyboard equivalents are illustrated in Figure 5.1 above.

Table 5.2 shows some command accelerators and their actions.

Table 5.2.

<u>A</u> bout	<u>B</u> ack
<u>C</u> lose	<u>D</u> elete
<u>E</u> dit	<u>F</u> ind
<u>H</u> elp	<u>I</u> nsert
<u>M</u> aximize	<u>M</u> inimize
<u>M</u> ove	<u>N</u> ew
<u>O</u> pen	<u>P</u> rint
<u>R</u> edo	<u>S</u> ave
<u>U</u> nado	<u>V</u> iew

Q3. Menus in HMI.

Q4. Menus

Q5. Explain Various Menus in HMI

Ans:

[5M – 10M | May16, May17, Dec17 & May18]

MENUS:

1. In computing and telecommunications, a menu or menu bar is **graphical control element**.
2. It is a list of options or commands presented to an operator by a computer or communications system.

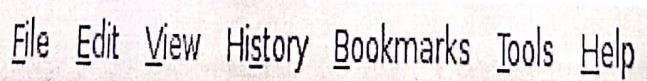
FUNCTIONS OF MENUS:

1. Navigate to a new menu.
2. Execute an action.
3. Display information.
4. Input data or parameters.

TYPES OF MENUS:

I) Menu bar:

1. A menu bar is a graphical control element which contains **drop down menus**.
2. Menu bars are typically present in graphical user interfaces that display documents.
3. **Example** of menu bar is shown below.



Advantages:

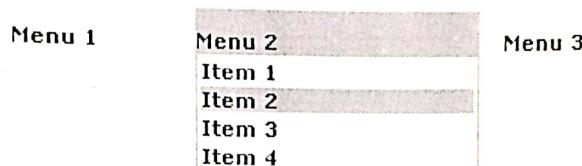
1. Are always visible, reminding the user of their existence.
2. Use of Keyboard Equivalents are allowed.

Disadvantages:

1. It may consume full row of screen space.
2. Their horizontal orientation is less efficient for scanning.

II) Pull-down menu:

1. It is also called as **drop down menu**.
2. A pull down menu is a graphical control element, similar to a list box that allows the user to choose one value from a list.
3. When a drop-down list is inactive, it displays a single value.
4. When activated, it displays (drops down) a list of values, from which the user may select one.
5. When the user selects a new value, the control reverts to its inactive state, displaying the selected value.

**Advantages:**

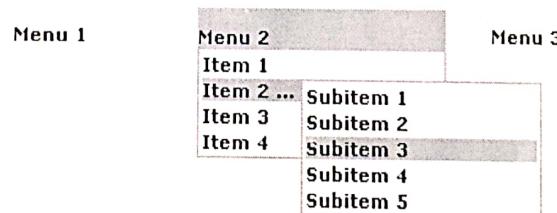
1. No window space is consumed when they are not in used.
2. They allow for display of both keyboard equivalents and accelerators.

Disadvantages:

1. They require looking away from main working area to read.
2. It may obscure the screen working area.

III) Cascading menus:

1. Cascading menu is a secondary menu that appears while you are holding the cursor over an item on the primary menu.
2. To simplify a menu, cascading menus are used.
3. **Example** of cascading menu is shown below.

**Advantages:**

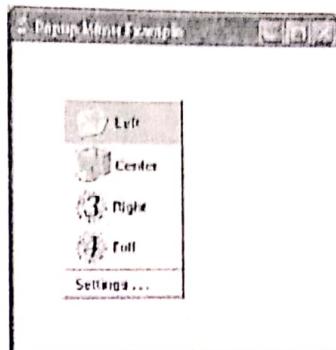
1. The top-level menus are simplified because some choices are hidden.
2. More first-letter mnemonics are available because men possess fewer alternatives.

Disadvantages:

1. Access to submenu items requires more steps.
2. Access to submenu items requires a change in pointer movement direction.

IV) Pop-up menus:

1. Pop up menu is also called as **context menu**.
2. A pop up menu is a menu in a graphical user interface (GUI) that appears upon user interaction, such as a right-click mouse operation.
3. A Popup Menu displays a Menu in a modal popup window anchored to a View.

**Advantages:**

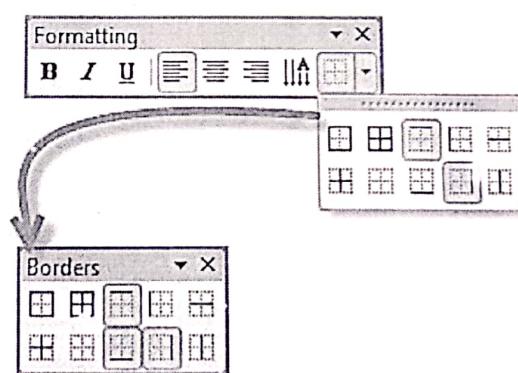
1. They appear in the working area.
2. They do not use window space when not displayed.
3. No pointer movement is needed if selected by button.
4. They allow for display of both keyboard equivalents and accelerators.

Disadvantages:

1. Their existence must be learned and remembered.
2. They require a special action to see the menu (mouse click).
3. They may obscure the screen working areas.
4. Their display locations may not be consistent.

V) Tear off menus:

1. Tear off menu is a menu which is capable of being moved to another portion of screen.
2. Tear-off menu is moved from the top portion of the window to the left, right, or bottom of the window.
3. It may also be called a **pushpin, detachable, or roll-up menu**.
4. An example of a software program that has tear-off menus is Microsoft Internet Explorer 6.0.

**Advantages:**

1. They do not use window space when not displayed.
2. The top-level menus are simplified because some choices are hidden.

Disadvantages:

1. Their existence must be learned and remembered.
2. It may obscure the screen working area.

VII) Iconic menus:

1. An iconic menu is the objects in a **graphic or pictorial form**.
2. The purpose of an iconic menu is to remind users of the functions, commands, attributes, or application choices available.

**Advantages:**

1. Are always visible, reminding the user of their existence.
2. Use of Keyboard Equivalents are allowed.

Disadvantages:

1. It may consume full row of screen space.
2. Their horizontal orientation is less efficient for scanning.

VIII) Pie menus:

1. Pie menu is also called as **radial menu**.
2. Pie menu is a circular context menu where selection depends on direction.
3. It is a graphical control element.
4. A pie menu is made of several "pie slices" around an inactive center and works best with stylus input, and well with a mouse.

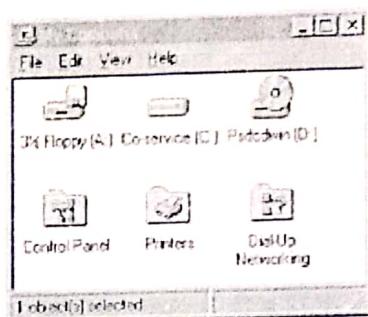
**Q6. Windows.****Ans:****[5 - 10M | May16, Dec17 & May18]****WINDOWS:**

1. A window is an area of the screen, usually rectangular in shape, defined by a border that contains a particular view of some area of the computer.
2. It can be moved and rendered independently on the screen.
3. A window may be small, containing a short message or a single field, or it may be large, consuming most or all of the available display space.

4. There are seven types of windows:

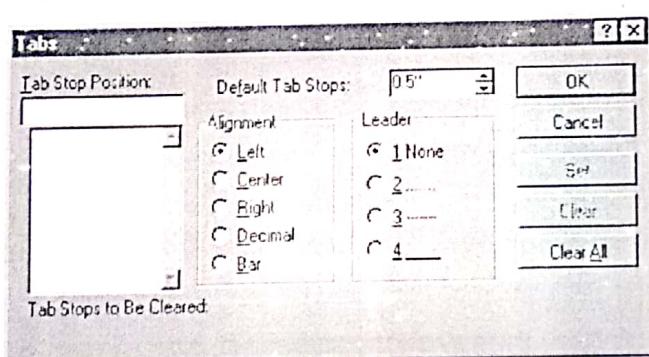
I) Primary Window:

1. The primary window is the first window which appears on the screen when activity or action is started.
2. Primary window represents an independent function or application.
3. Primary window is used to present information that is continually updated for example: Date and time.



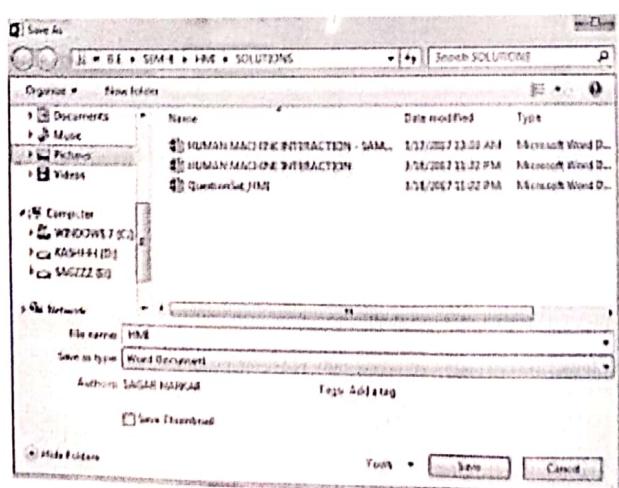
II) Secondary windows:

1. Secondary windows are **supplementary windows**.
2. Secondary windows may be dependent upon a primary window or displayed independently of the primary window.
3. Secondary windows are used for performing subordinate, supplementary or ancillary actions.



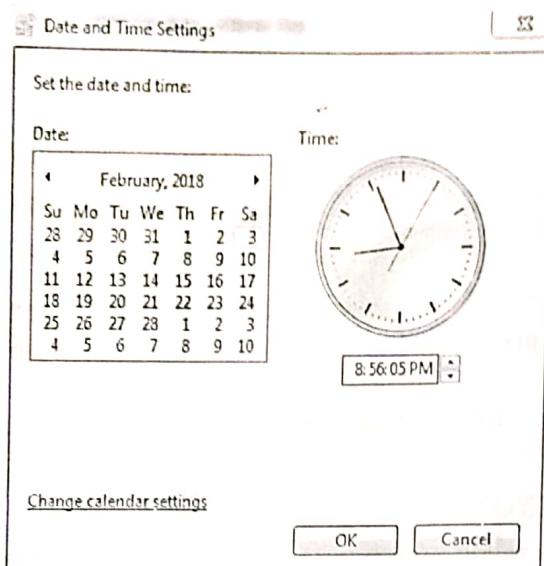
III) Dialog Boxes:

1. It is used for **presenting brief messages**.
2. It includes command buttons such as OK, Cancel etc.
3. It is also used to perform actions that take short time to complete and are not frequently changed.
4. **Example** of dialog box is shown below.

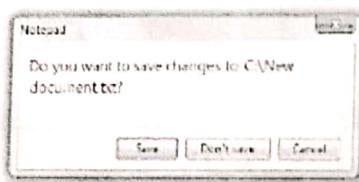


IV) Property Sheets and Property Inspectors:

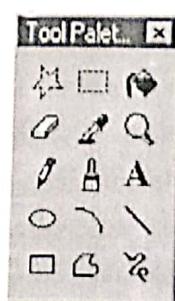
1. It is used for presenting complete set of properties for an object.
2. The recommended sizes for property sheets are:
 - a. 252 DLUs wide x 218 DLUs high.
 - b. 227DLUs wide x 215 DLUs high.
 - c. 212 DLUs wide x 188 DLUs high.
3. It includes the command buttons like Ok, Cancel, Apply, Reset etc.

**V) Message Boxes:**

1. It is used to display a message about a particular situation or condition.
2. It includes command buttons such as OK, Cancel, Help, Yes and No etc.
3. It is used to enable title bar close box only if the message includes a cancel button.
4. Example of message box is shown below.

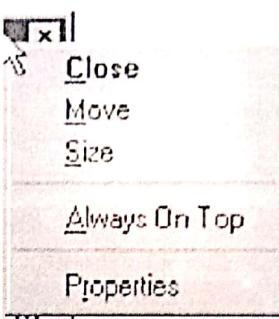
**VI) Palette Windows:**

1. It is used to present a set of controls.
2. It is designed as resizable. Alternately, design them as fixed in size.



VII) Pop Up Windows:

1. It is used to display addition information.
2. It is also used to display **context sensitive help information**.
3. It displays textual labels for graphics controls.
4. **Example** of pop up window is shown below.



Q7. What are different presentation styles of windows? State advantages and disadvantages of each style of window

Ans:

[10M | May17]

WINDOW PRESENTATION STYLES:

1. The presentation style of a window refers to its spatial relationship to other windows.
2. There are two basic styles, commonly called **tiled** or **overlapping**.

I) Tiled Windows:

1. Tiled windows derive their name from common floor or wall tile.
2. Tiled windows appear in one plane on the screen and expand or contract to fill up the display surface as needed.
3. Most systems provide two-dimensional tiled windows, adjustable in both height and width.
4. Figure 5.2 represents Tiled Windows.

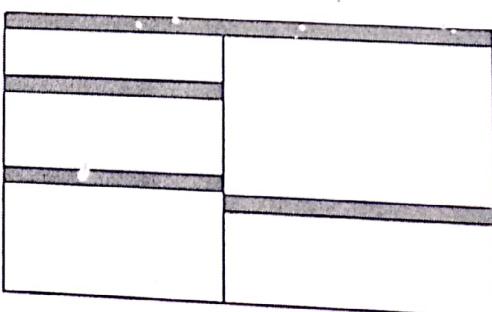


Figure 5.2: Tiled Windows.

Advantages:

1. Windows are positioned automatically, so there is no need for the user to decide on positioning.
2. Open windows are always visible, eliminating the possibility of them being lost and forgotten.
3. Every window is always completely visible, eliminating the possibility of information being hidden.
4. They are easier, according to studies, for novice or inexperienced people to learn and use.
5. They yield better user performance for tasks.

Disadvantages:

1. Only a limited number can be displayed in the screen area available.
2. As windows are opened or closed, existing windows change in size. This can be annoying.
3. As windows change in size or position, the movement can be disconcerting.
4. As the number of displayed windows increases, each window can get very tiny.
5. The changes in sizes and locations made by the system are difficult to predict.
6. They permit less user control because the system actively manages the windows.

III) Overlapping Windows:

1. Overlapping windows may be placed on top of one another like papers on a desk.
2. They possess a three-dimensional quality, appearing to lie on different planes.
3. Size of the overlapping window can be altered.
4. Location as well as the plane of the windows is user controlled.
5. Figure 5.3 represents overlapping windows.

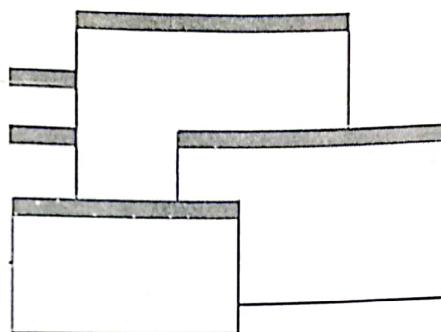


Figure 5.3: Overlapping Windows.

Advantages:

1. Visually, their look is three-dimensional, resembling the desktop that is familiar to the user.
2. Greater control allows the user to organize the windows to meet his or her needs.
3. Windows can maintain larger sizes.
4. Windows can maintain consistent sizes.
5. Windows can maintain consistent positions.
6. Screen space conservation is not a problem, because windows can be placed on top of one another.
7. They yield better user performance for tasks where the data requires much window manipulation to complete the task.

Disadvantages:

1. They are operationally much more complex than tiled windows.
2. More control functions require greater user attention and manipulation.
3. Information in windows can be obscured behind other windows.
4. Windows themselves can be lost behind other windows and be presumed not to exist.
5. That overlapping windows represent a three-dimensional space is not always realized by the user.
6. Control freedom increases the possibility for greater visual complexity and crowding.
7. Too many windows, or improper offsetting, can be visually overwhelming.

III) Cascading Windows:

1. It is a special type of overlapping window.
2. It has the windows automatically arranged in a regular progression.
3. Each window is slightly offset from others, as illustrated in Figure 5.4.

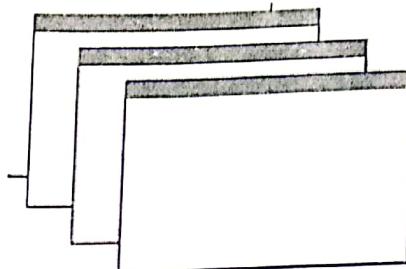


Figure 5.4: Cascading Windows.

Advantages:

1. No window is ever completely hidden.
2. Bringing any window to the front is easier.
3. It provides simplicity in visual presentation and cleanliness.

PICKING A PRESENTATION STYLE:**Use tiled windows for:**

1. Single-task activities.
2. Data that needs to be seen simultaneously.
3. Tasks requiring little window manipulation.
4. Novice or inexperienced users.

Use overlapping windows for:

1. Switching between tasks.
2. Tasks necessitating a greater amount of window manipulation.
3. Expert or experienced users.
4. Unpredictable display contents.

Q8. What do you mean by device based and screen based control, Explain?

Ans:

[10M | Dec16 & May18]

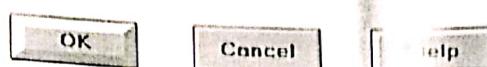
SCREEN BASED CONTROL:

1. Screen-based controls are also called **widgets**.
2. They are the elements of a screen that constitute its body.
3. By definition, they are graphic objects that represent the properties or operations of other objects.
4. It includes:

I) Operable controls:

1. Operable controls are those that permit the entry, selection, changing, or editing of a particular value.
2. It can also cause a command to be performed.

3. Example: Buttons.

Advantages:

1. Always visible, reminding one of the choices available.
2. Faster than using two-step menu bar.

Disadvantages:

1. Consumes screen space.
2. Requires moving the pointer to select.

II) Text entry/ read-only controls:

1. A Text Entry/Read-Only control contains text that is exclusively entered or modified through the keyboard.
2. It may also contain entered text being presented for reading purposes only.

3. Example: Textboxes.

Advantages:

1. Very flexible.
2. Consumes little screen space.

Disadvantages:

1. Requires use of typewriter keyboard.
2. Requires user to remember what must be keyed.

III) Selection controls:

1. All the possible choices, alternatives, conditions etc. are presented by selection controls.
2. The user can select the required item from the list of choices.
3. Selection controls include radio buttons & check boxes.
4. Example of selection control is shown below.

Advantages:

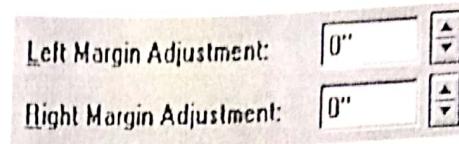
1. Easy-to-access choices.
2. Easy-to-compare choices.

Disadvantages:

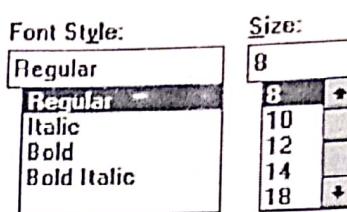
3. Consume screen space.
4. Limited number of choices.

IV) Combination entry/selection controls:

1. It is combination of both a text field and a selection field.
2. In this type of control, information may either be keyed into the field or selected and placed within.
3. The types of combination entry/selection fields are spin boxes, attached combination boxes, and drop down/pop-up combination boxes.
4. **Example** of Spin Boxes is shown below.



5. **Example** of Combo Boxes is shown below.

**Advantages:**

1. Consumes little screen space.
2. Flexible, permitting selection or typed entry.

Disadvantages:

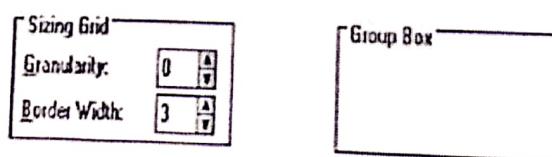
1. Consumes little screen space.
2. Flexible, permitting selection or typed entry.

V) Presentation controls:

1. Presentation controls are **purely informational**.
2. They provide details about other screen elements or controls.
3. Common presentation controls are static text fields, group boxes column headings, ToolTips, balloon tips, and progress indicators.
4. Example of Static Text Fields is shown below.

Caption:
HEADING
This message is very important!

5. Example of Group Boxes Fields is shown below.

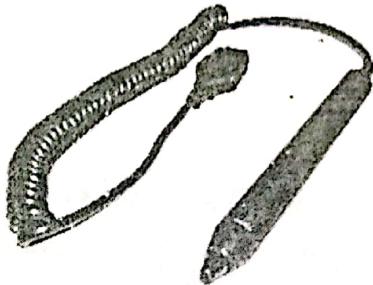
**DEVICE BASED CONTROLS:**

1. Device-based controls is also known as input devices.
2. Device based controls are the mechanisms through which people communicate their desires to the system.

3. It includes:

I) Lightpen:

1. A light pen is the example of **direct device**.
2. A light pen is a computer input device in the form of a light-sensitive wand used in conjunction with a computer's CRT display.
3. It allows direct control by pointing to a spot on the display.
4. It enables the user to perform a select, position or other task.



Advantages:

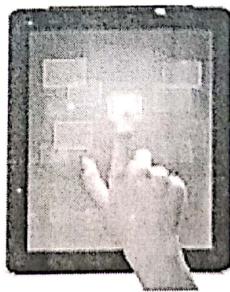
1. Best for high use applications.
2. Accuracy is very high as compared to finger touch applications.

Disadvantages:

1. Hand may obscure part of screen.
2. Requires picking it up to use.

II) Touch screen:

1. Touch screen is another example of direct methods.
2. It permits the user to point and select objects directly from the screen.
3. It has a special surface that is touch sensitive either to finger or stylus.
4. Touchscreens are common in devices such as game consoles, personal computers, tablet computers, and smartphones.



Advantages:

1. It is very fast.
2. It does not require any additional devices for pointing.

Disadvantages:

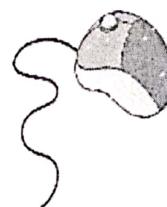
1. Since finger has to be used, it will block some part of the screen.
2. Requires moving the hand far from the keyboard to use.

III) Stylus:

1. A stylus is a small **pen-shaped instrument**.
2. It is used to input commands to a computer screen, mobile device or graphics tablet.
3. The stylus is the primary input device for personal digital assistants (PDA).
4. Stylus (S-Pen) is used in the famous Galaxy Note series manufactured by Samsung Electronics.

**IV) Mouse:**

1. Mouse is an input device used to **control motion of pointer on screen**.
2. A mouse has two or three buttons called Left, Right and Middle button.
3. Buttons are used to perform different functions.
4. It has a rubber or metal ball inside its body.
5. Mouse is rolled over a flat surface called mouse pad.
6. It is also used for playing video games on computer.

**Advantages:**

1. Screen vision is not blocked.
2. Easy to select objects as the required buttons are on the mouse.

Disadvantages:

1. Proper eye coordination is necessary.
2. Movement is not direct.

V) Track Ball:

1. Track Ball is an input device like a mouse.
2. It is used in Lap top computers to control motion of pointer on screen.
3. It is a pointing device like upside down mouse.
4. It has a ball on its upper side.
5. This ball is moved by fingers or thumb and the pointer moves accordingly on screen.



Advantages:

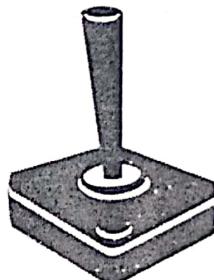
1. Direct relationship between hand and pointer movement in terms of direction and speed.
2. Does not require additional desk space (if mounted on keyboard).

Disadvantages:

1. Requires a degree of eye-hand coordination.
2. Requires different hand movements.

VII) Joysticks:

1. Joystick is an input device used to play games on computer.
2. It is used to control motion of an object quickly in game with the help of a hand held stick.
3. This stick can be moved forward, backward or sideways.
4. This stick is mounted on a ball.
5. When stick is moved the ball is moved and signals are sent to the computer.

**Advantages:**

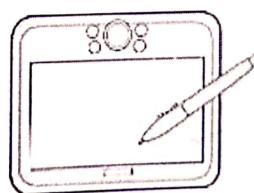
1. Visibility of screen is not obstructed.
2. Does not require additional desk space (if mounted on keyboard).

Disadvantages:

3. Movement is indirect.
4. Hand eye coordination is required for great extent.

VIII) Graphic Tablet:

1. A graphics tablet consists of a special pen called stylus and a flat pad.
2. The image is created on the monitor screen as the user draws it on the pad with the help of stylus (special pen).
3. Graphics tablet is also called a **digitizer**.

**Advantages:**

1. Visibility of screen is not obstructed.
2. Very good comfort when operated in horizontal plane.

Disadvantages:

1. Movement is indirect.
2. Hand eye coordination is required for great extent.

- Keyboard is the most familiar input device.
- It is most widely used input device to enter data and instructions into the computer.
- Keyboard has a set of keys like a typewriter.
- It has alphabetic keys for A,B,C...Z or a,b,c,...z.
- It has numeric keys like 0,1,2,3,...9.
- It has function keys F1,F2,...F12 used to perform specific tasks.
- It has other keys used for editing like Delete, Backspace, Home, End, etc.

:	!	@	#	\$	%	^	&	*	()	-	=	Delete
Tab	Q	W	E	R	T	Y	U	I	O	P	{	}	
Caps	A	S	D	F	G	H	J	K	L	:	"	:	Enter
Shift	Z	X	C	V	B	N	M	<	>	?	/	Shift	
Ctrl		Alt								Alt		Ctrl	

Advantages:

- They are accurate.
- Very useful for:
 - Entering text and alphanumeric data.
 - Inserting in text and alphanumeric data.
 - Keyed shortcuts – accelerators.
 - Keyboard mnemonics – equivalents.

Disadvantages:

- Slow for non-touch-typists.
- Slower than other devices in pointing.

Q9] Provide different device based and screen based control for following. [10M]

- Filling up Online Application for Admission to Engineering Course.**
- Online payment of Utility Bills such as Telephone, Electricity and Water charges etc.**

Ans:

[10M | May17]

FILLING UP ONLINE APPLICATION FOR ADMISSION TO ENGINEERING COURSE:

Screen based Controls:

- Operable Controls:** This application has various operable controls like buttons (for submitting the online form) with labels containing images or graphics.
- Text Entry Controls:** Text boxes for entering the names, marks, stream and other details of the student necessary for filling the form which may be single line or multiple lined boxes.
- Selection Controls:** For selecting the gender of the student and the stream in which the student is interested, there is a provision of radio buttons in the application.
- Combination Entry controls:** It includes drop down list for selecting the college and the city the student wants to apply for, and maybe spin boxes for scrolling up and down the page.
- Presentation Controls:** It consists of static text fields which holds information about the engineering college or stream.

1. Devices for input: (mostly used)
 - a. Mouse
 - b. Keyboard
2. Devices for output: (mostly used)
 - a. Scanner
 - b. Printer

ONLINE PAYMENT OF UTILITY BILLS SUCH AS TELEPHONE, ELECTRICITY AND WATER CHARGES:

Screen based Controls:

1. **Operable Controls:** This application has various operable controls like buttons (for online payment submission) with labels containing images or graphics.
2. **Text Entry Controls:** Text boxes for entering the name, login details and other details of the utility bills and their payment such as consumer code, credit/debit card details necessary for online payment which may be single line or multiple lined boxes.
3. **Selection Controls:** For selecting the online mode of transaction (net banking, credit/debit card) in which the user needs to pay the bill, there is a provision of radio buttons in the application.
4. **Combination Entry Controls:** It includes drop down list for selecting the electricity or water board supply and the city the student has the utility connection, and maybe spin boxes for scrolling up and down the page.
5. **Presentation Controls:** It consists of static text fields which holds information about the selected electricity or telephone exchange.

Device based controls:

1. Devices for input: (mostly used)
 - a. Mouse
 - b. Keyboard
2. Devices for output: (mostly used)
 - a. Scanner
 - b. Printer

Q10] Web Navigation.

[5M | Dec16]

Ans:

WEB NAVIGATION:

1. Web Navigation refers to the process of navigating a network of information resources in the World Wide Web.
2. The user interface that is used to do so is called a **web browser**.

TYPES OF WEB NAVIGATION:

There are many different types of website navigation:

1) **Hierarchical website navigation:**

1. The structure of the website navigation is built from general to specific.
2. This provides a clear, simple path to all the web pages from anywhere on the website.

II) Global website navigation:

1. Global website navigation shows the top level sections/pages of the website.
2. It is available on each page and lists the main content sections/pages of the website.

III) Local website navigation:

1. Local navigation is the links within the text of a given web page, linking to other pages within the website.

EXAMPLE:

Figure 5.2 shows the example of web navigation.

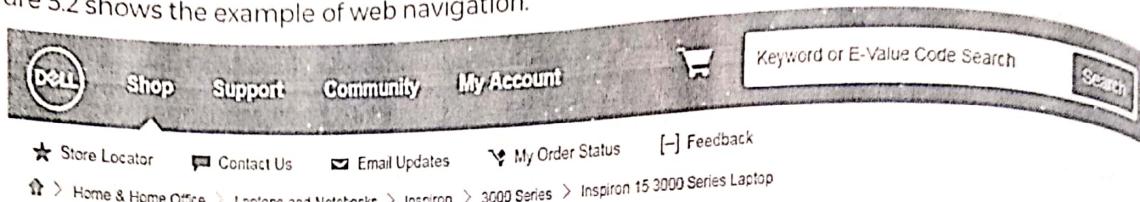


Figure 5.2: Example of web navigation.

Advantages:

1. User can easily navigate to any page on website.
2. It is simple and easy to understand.

Q11. Differentiate between Web Page Navigation and Printed Page Navigation.

Ans:

COMPARISON BETWEEN WEB PAGE NAVIGATION AND PRINTED PAGE NAVIGATION:

[10M | Dec17]

Table 5.1 shows difference between Web Page Navigation and Printed Page Navigation.

Table 5.1.

Points	Web Page Navigation	Printed Page Navigation
Dimensionality	Web Page Design is 3D.	Printed Page Design is 2D.
Response Time	Response Time is low as compared to printed page.	Printed Page is immensely superior to the web in terms of speed, type and image quality
Bandwidth	Bandwidth is fast enough to download a web page.	Slow as compared to Web Page.
Page size	They have variable size.	
Page rendering	Web pages elements are often rendered slowly, depending upon things like line transmission speeds and page content.	They are fixed in size. Printed pages are immensely superior to Web pages in rendering.
Page layout	With Web pages, layout is more of an approximation, being negatively influenced by deficiencies in design toolkits and the characteristics of the	With the printed page, layout is precise with much attention given to it.

Page navigation	user's browser and hardware, particularly screen sizes.	
Page resolution	Navigating the Web requires innumerable decisions concerning which of many possible links should be followed.	Navigating printed materials is as simple as page turning.
Interactivity	Web design involves letting the hands move the information (scrolling, pointing, expanding, clicking, and so on) in conjunction with the eyes.	Printed page design involves letting the eyes traverse static information, selectively looking at information and using spatial combinations to make page elements enhance and explain each other.
Page independence	Page is independent in web page.	Page is not independent in printed page.

Q12. What are the four interfaces that give name WIMP

[5M | Dec18]

Ans:

WIMP:

1. WIMP stands for "windows, icons, menus and pointer".
2. It was coined by Merzouga Wilberts in 1980.
3. WIMP is an acronym that emerged in the 1980s and describes the graphical user interface (GUI) of personal computers.
4. It includes both Windows and Macintosh interfaces, as well as other less common operating systems, such as Linux and NeXT.
5. WIMP is technically a subset of GUIs.
6. This means all WIMP interfaces are GUIs, but not all GUIs are WIMPs.
7. WIMP-based systems are designed to be used with a keyboard and mouse, since the mouse controls the pointer (or cursor) and the keyboard is used to enter data.
8. Other GUIs may support different types of input, such as a touchscreen display.

ELEMENTS OF WIMP:

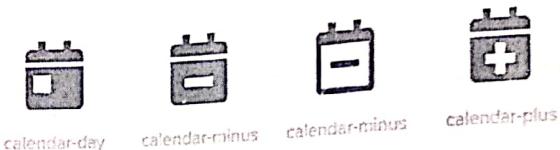
I) Windows:

1. Window is the areas of the screen through which a particular software or data file may be viewed.
2. Types of WIMP interfaces Windows:
 - a. Single Document Interface (SDI): They open new primary windows for each instance of an application document E.g. Notepad.

- b. **Multiple Document Interface (MDI)**:
 - i. Windows resides under a single parent Window.
 - ii. Multiple documents to be simultaneously visible.
 - iii. Example: Visual Basic ,Adobe Photoshop
- c. **Tabbed Document Interface (TDI)**: Window are arranged in a tab. E.g. Firefox.

II) Icons:

1. Icons are small images or symbols that represents files, commands, or windows.
2. A good design of icons is important.
3. It should be:
 - a. Concrete and familiar.
 - b. Visual and conceptually distinct.
 - c. Simple – unnecessary information is not needed.

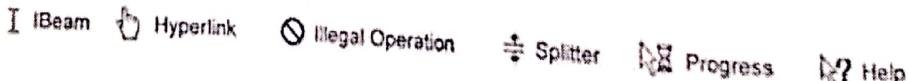


III) Menus:

1. Menus allow user to make selection from the list.
2. Some Kinds of Menus:
 - a. **Pull-down menu**: A menu that is pulled down from the menu bar and that remains available as long as the user holds it open.
 - b. **Drop-down menu**: A menu that drops from the menu bar when requested and remains open without further action until the user closes it or chooses a menu item.
 - c. **Pop-up menus**: Pop-up menus is a menu in a graphical user interface (GUI) that appears upon user interaction, such as a right-click mouse operation.
 - d. **Pie menus**: Pie Menus is arranged in a circle.

IV) Pointers:

1. Pointers usually looks like arrows and are used to select Icons and the options found in the menu.
2. WIMP style relies on pointing and selecting things.
3. The pointer moved around the screen via mouse.
4. The shape of the pointer can sometimes change depending on the application you are using at that time.



Q13. List pros and cons of any one modern device in design of a tutor for kids
Ans:

IPAD - ADVANTAGES:

[5M | Dec 18]

1. Using IPad in the classroom allows you to experiment more in pedagogy and get instant feedback.
2. IPad design in the classroom helps ensure full participation.

3. There are
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IPAD - DISA

1. IPad in t
2. Technolo
3. Technolo
4. Student
5. The qua
6. Lesson

Q14. A l
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Ans:

Refer Q8 (

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3. There are countless resources for enhancing education and making learning more fun and effective.
4. Technology can automate a lot of your tedious tasks.
5. With IPad in the classroom, your students have instant access to fresh information that can supplement their learning experience.
6. We live in a digital world, and technology is a life skill.

IPAD - DISADVANTAGES:

1. IPad in the classroom can be a distraction.
2. Technology can disconnect students from social interactions.
3. Technology can foster cheating in class and on assignments.
4. Students don't have equal access to technological resources.
5. The quality of research and sources they find may not be top-notch.
6. Lesson planning might become more labor-intensive with technology.

**Q14. A UI designer wants to design an application for people with difficulty using keyboard.
Comment on selecting proper device based controls**

Ans:

[10M | Dec18]

Refer Q8 (Device Based Controls Section)

CHAP - 6: COMMUNICATION

Q1. Graphics, Icons and Images
Ans:

[5M | May16, Dec16 & May18]

GRAPHICS:

1. Graphics is one of the **most powerful communication techniques**.
2. Graphics do not have language barriers, so it can be understood by everyone.
3. Graphics are visual images or designs on some surface, such as a wall, canvas, screen, paper, or stone to inform, illustrate, or entertain.
4. Graphics can be **functional or artistic**.
5. **Examples** are photographs, drawings, Line art, graphs, diagrams, etc.

Advantages:

1. Easy to recognize.
2. It can attract attention of the user far more than text is used properly.

ICONS:

1. Icons is picture that represents an **object or program**.
2. An icon is a graphical representation of a program or file that, when clicked on, will be run or opened.
3. Icons are used with **Graphical User Interface (GUI) operating systems**.
4. GUI operating systems includes Microsoft Windows and the Apple MAC-OS etc.
5. **Example:** My Computer icons in Microsoft Windows.

Advantages:

1. It helps to add a creative touch to the website or application.
2. Icons can communicate an idea in seconds.

IMAGES:

1. Images is a representation of the external form of a person or thing in art.
2. An image is a picture that has been created or copied and stored in electronic form.
3. Common image file format includes:
 - a. Joint Photographic Experts Group (JPEG).
 - b. Graphics Interchange Format (GIF).
 - c. Portable Network Graphics (PNG).
 - d. Scalable Vector Graphics (SVG).
 - e. Tag Image File Format (TIFF).
4. **Example:** Two-dimensional picture, that has a similar appearance to some subject — usually a physical object or a person.

Advantages:

1. Easy to recognize.
2. It can attract attention of the user far more than text is used properly.

- Q2. What do you mean by response time? What are various methodologies adopted for Feedback and guidance?
- Q3. What do you mean by response time?
- Q4. What do you mean by response time? Explain salient features that are adopted with respect to response time.
- Q5. What are various methodologies adopted for Feedback and Guidance? Explain in detail Feedback and Guidance.
- Q6.

Ans:

[5 – 10M | May16, Dec16, May17, May18 & Dec18]

RESPONSE TIME:

1. In technology, response time is the **time** a system or functional unit takes to react to a given input.
2. It is total amount of time it takes to respond to a request for service.
3. That service can be anything such as
 - a. From a memory fetch.
 - b. To a disk IO.
 - c. To a complex database query.
 - d. Loading a full web page.
4. Ideally the response time should be within half a second.
5. When concentration levels required are not very high and only a little use of working memory is to be used then response time of 2 to 4 seconds are tolerated.
6. The human thought process is very fast, so the system response must be competitive with this speed.

FEEDBACK AND GUIDANCE:

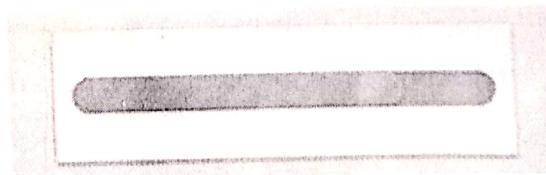
1. Feedback and guidance assist the users to learn and use the system correctly and quickly.
2. It helps to **avoid frustration**.
3. An accurate and well-timed guidance is very important.

FEEDBACK & GUIDANCE METHODOLOGIES:

Some of the feedback and guidance methodologies are given below.

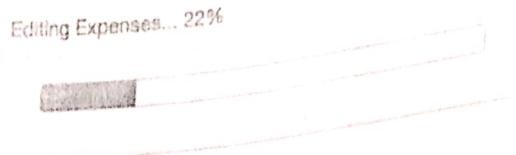
I) Progress Indicator:

1. A progress indicator is an element of a graphical user interface that is intended to inform the user that an operation is in progress.
2. It is an animated rectangular box that is initially empty and fills up corresponding to the progress of the operation.
3. Example of progress indicator is shown below.

**II) Percent Complete Message:**

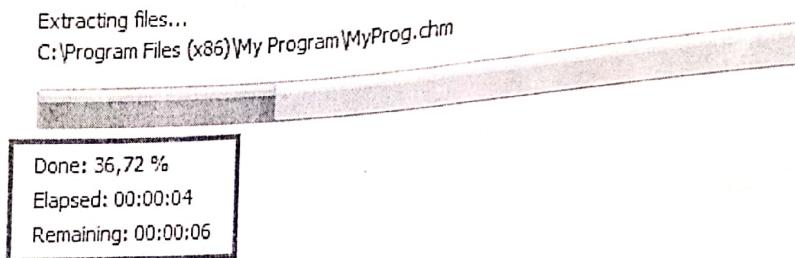
1. This feedback method shows the percentage of completion of operation.

2. It is useful for operations which takes a long time to complete.
3. Example of percent complete message is shown below.



III) Elapsed Time Message:

1. It is similar to progress indicator.
2. It is used for presenting only the amount of time elapsed during the progress of an operation.
3. Example of elapsed time message is shown below.



IV) Blinking for Attention:

1. The attention of the user can be drawn by flashing indicator towards those applications which are lying inactive and must be informed to the user.
2. For example for windows that are closed its icon can be flashed.



V) Hourglass pointer:

1. Hourglass pointer is also known as **Windows Wait Cursor**.
2. It is a cursor that indicates that an application is busy performing an operation.
3. It can be accompanied by an arrow if the operation is being performed in the background.
4. The action is changed from the mouse pointer to an image of an hourglass while a macro is running.
5. This action can provide a visual indication that the macro is running.
6. This is especially useful when a macro action or the macro itself takes a long time to run.



VII) Button click acknowledgment:

1. All the clicks made must be confirmed by some audible sound.
2. A visual indicator can also be used so that the user is assured of performing the button click.

Q7. Explain following with respect to Handle response Time

- (i) Progress Indicator.
- (ii) Elapsed Time Message.
- (iii) Hourglass Pointer.

[10M | May17]

Ans:

Refer Q5.

Q8. What are various methodologies, adopted for Feedback and guidance? Consider multimedia, File Download and Software installation and state how we can create a dialog with user to communicate the Time factor for each one.

Q9. How one can create a dialogue with interface user? Explain with appropriate example

[5 - 10M | May16]

Ans:

FEEDBACK AND GUIDANCE:

1. Feedback and guidance assist the users to learn and use the system correctly and quickly.
2. It helps to avoid frustration.
3. An accurate and well-timed guidance is very important.

FEEDBACK & GUIDANCE METHODOLOGIES:

Refer Q3.

EXAMPLE:

1. Consider multimedia, File Download and Software installation and state how we can create a dialog with user to communicate the Time factor for each one.
2. Figure 6.1 shows the file download and figure 6.2 shows software installation.

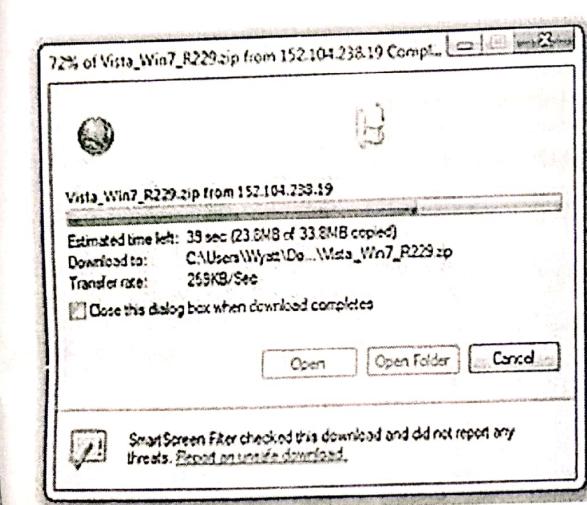


Figure 6.1: File Downloading.

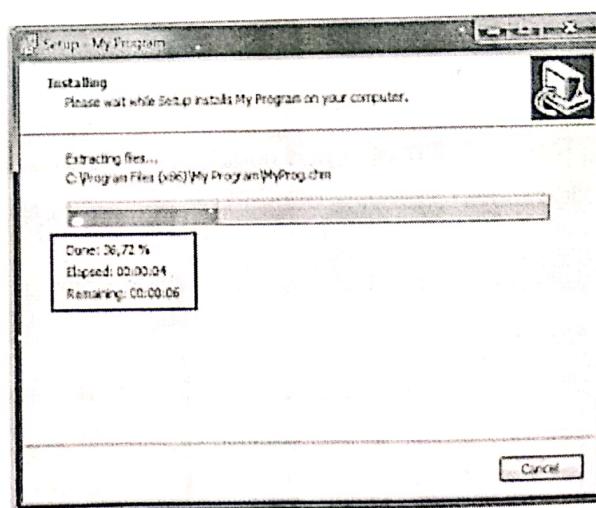


Figure 6.2: Software Installation.

3. A dialog with the user for communicating the time factor for multimedia file download and software installation is shown in figure 6.1 and 6.2.
4. The progress indicator is shown which is used to display the percentage of task completion as shown in figure 6.1.
5. Lapsed time indicator is used to display amount of time left as shown in figure 6.2.

Q10. Explain importance of Text Messages with respect to communication with user.

[4M | May16]

Ans:

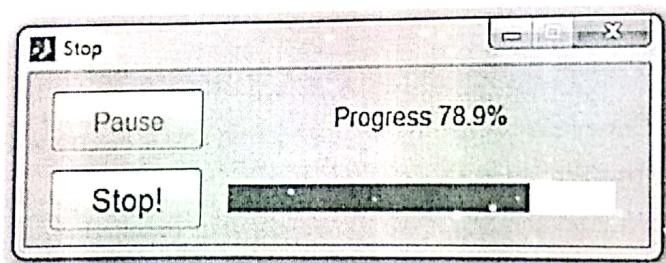
TEXT MESSAGE:

1. Text based communication is a dominant form of direct communication.
2. Text message are the form of text based communication.
3. Text message are communication provided on the screen to the user or viewer.
4. Screen messages fall into two broad categories:
 - a. **Instructional messages (prompting message):** Tell the user how to work with, or complete the screen displayed.
 - b. **System messages:** Generated by the system to keep the user informed of the system's state and activities.

TYPES OF SYSTEM MESSAGES:

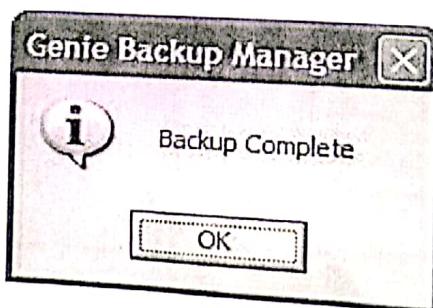
I) **Status messages:**

1. It provides information concerning the progress of a lengthy operation.
2. It usually contains a progress indicator and a short message.
3. It contain a cancel button to stop the operation being performed.
4. Pause and resume buttons may also be included.



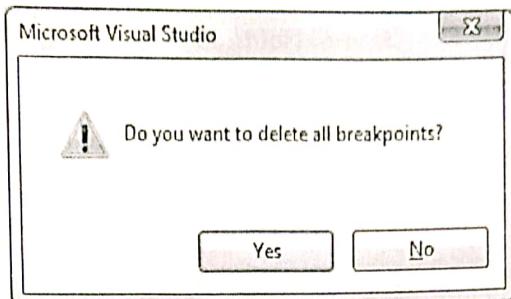
II) **Informational messages:**

1. It is also known as notification messages.
2. This kind of message is usually identified by an "i" icon to the left of the message.
3. It is used to provide the information about the state of system.

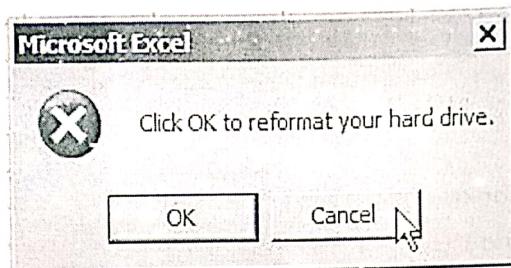


III) Warning messages:

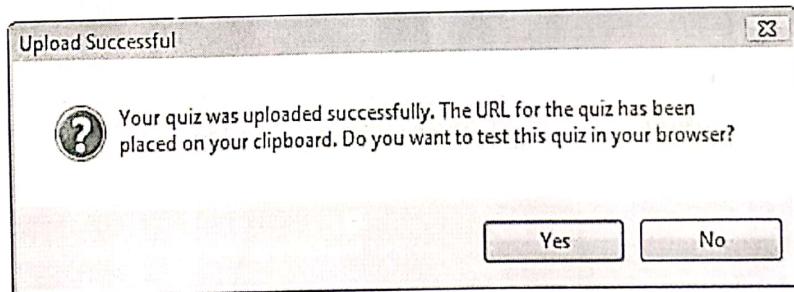
1. They are usually identified by an "!"
2. The user must determine whether the situation is in fact a problem and may be asked to advise the system whether or not to proceed.
3. A deletion request by a user is any action that commonly generates a warning message.

**IV) Critical messages:**

1. They are also known as Action Messages.
2. A message describing an erroneous situation is usually presented as a critical message.
3. Some products use a "Do Not" symbol while others use a "Stop" sign. An X in a circle used by Microsoft Windows.
4. Critical messages require user action to continue.

**V) Question Messages:**

1. A question message asks a question and offers a choice of options for selection.
2. It is designated by a "?" icon preceding the message text.
3. This type of message is used when there is a question to be asked.

**IMPORTANCE OF TEXT MESSAGE:**

1. Wording of the interface and its screens is the basic form of communication with the user.
2. Clear and meaningfully crafted words, messages, and text lead to greatly enhanced system usability.
3. Clear Text Message minimize the user confusion that leads to errors.

Words:

1. Do not use technical words, made-up words or terms such as filespec, abend, or spool, Ungroup or de-archive.
2. Do not use abbreviations or acronyms.

Sentences & message:

1. Brief and simple.
2. Directly and immediately usable.

Q11. Colors.

[5M | Dec16]

Ans:

COLORS:

1. Colors play an important role in adding dimensions, reality and life to the screen vision.
2. Color is the aspect of things that is caused by differing qualities of light being reflected or emitted by them.
3. To see color, you have to have light.
4. Color attracts attention of the user's eye.
5. Our eyes only see the colors that are bounced off or reflected.

TYPES OF COLORS:

I) RGB:

1. The RGB color model is an additive color model.
2. RGB stands for red, green, and blue.
3. The main purpose of the RGB color model is for the sensing, representation, and display of images in electronic systems, such as televisions and computers.

II) HSV & HSL:

1. HSL stands for Hue-Saturation-Lightness and HSV stands for Hue-Saturation-Value.
2. These are the two most common cylindrical-coordinate representations of points in an RGB color model.
3. It was developed in the 1970s for computer graphics applications.
4. HSL and HSV are used today in color pickers, in image editing software, and less commonly in image analysis and computer vision.

USES OF COLORS:

1. Use color to assist in formatting.
2. It is also used in highlighting or calling attention to important information.
3. Use to identify Screen captions and data.
4. Used to identify Status of information.

Ans:

[5M – Dec17, May18 & Dec18]

STATISTICAL GRAPHICS:

1. Statistical graphics are graphics in the field of statistics used to visualize quantitative data.
2. A statistical graphic is data presented in a **graphical format**.
3. A well-designed statistical graphic, also referred to as a chart or graph.
4. It gives its viewer the greatest number of ideas, in the shortest time, and in the smallest space, and with least possible clutter.
5. It will also induce the viewer to think of substance, not techniques or methodology.
6. A well designed statistical graphic display also avoids distortions by telling the truth about the data.

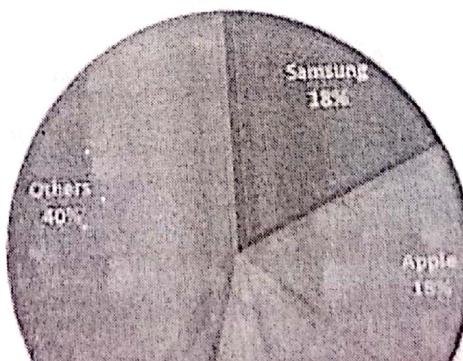
USE OF STATISTICAL GRAPHICS:

1. Reserve for material that is rich, complex or difficult.
2. Data Presentation.
3. Emphasize the data.
4. Minimize non data elements.
5. Minimize redundant data.
6. Fill the graph's available area with data.
7. Show data variation.

TYPES OF STATISTICAL GRAPHS:

1. Curve and line graphs.
2. Single graph.
3. Surface graph.
4. Scatter plot.
5. Bar graph.
6. Segmented or stacked bars.
7. Flow charts.
8. Pie charts.

Figure 6.3 shows statistical graph (pie chart) for mobile phone users in India.



Q13. Interview Techniques

Ans:

[5M | Dec17 & May18]

INTERVIEWING:

1. Interviewing is the meeting of two people for the purpose of exchanging information and ideas through questions and responses.
2. This exchange involves communication and leads to joint understanding about a particular topic.
3. The purpose of interviewing is to discover what is on/in someone's mind, not to put ideas in the person's mind.
4. The type of questions that the one asks in an interview is instrumental in determining the value of data collected in interviews.
5. Consequently, the quality of information gained in an interview is based very much on the skills of the interviewer.
6. Interviewers must proceed with the assumption that the knowledge and experience of the person being interviewed is of value, and it is the interviewer's job to uncover that knowledge and experience.

TYPES OF INTERVIEWS:**i) Informal conversational interview:**

1. This type of interview relies on the generation of questions that naturally arise based on observations in a setting.
2. It is conversational in nature, and the person being interviewed may not even realize they are being interviewed.

ii) General interview guide:

1. In this type of interview, the interviewer prepares an outline of issues/topics to be discussed.
2. The interviewer does not write specific questions in advance, but asks questions during the interview based on the outline of topics to be discussed.
3. The prepared outline serves as a guide to help the interviewer make good use of limited time with the interviewee and cover key topics.

III) Standardized open-ended interview:

1. In this type of interview, the interviewer prepares a set of questions in advance and uses the same wording and order with each person interviewed.
2. This type of interview is used when it is important to pose the same questions to each interviewee.
3. This type of interview would most likely be used if different members of a team were trying to gather specific information from employees at the same or different locations.

IV) Closed, fixed response interview:

1. This type of interview is essentially a **verbal questionnaire**.
2. Questions and choices of responses are determined in advance.
3. The interviewee selects from the given responses.

V) Focus group interviews:

1. This type of interview is a group interview conducted by a moderator with a fixed set of questions.
2. Focus group interview helps the interviewer understand the culture and language of an organization.

3. This can lead to a better understanding of a situation since participants are interacting with each other rather than the interviewer.

MISCELLANEOUS

- Q1]** Provide suitable Analysis and Interface Design for State Road Transport corporations Information KIOSK that will be installed on major Bus stands of Indian state and it will have Local National and International Language (English) consider Hindi or Marathi as a local Language and provide detailed analysis.
- Q2]** Provide suitable analysis and Interface design for state road transportation system [10M – May16 & Dec18]

Ans:

INFORMATION KIOSK:

1. Information KIOSK is an electronic device which provides information.
2. It can be used for **communication, commerce, entertainment, and education.**
3. Figure 7.1 represents Information KIOSK.
4. Example of kiosk is **automatic passbook printing kiosk** in ATM.

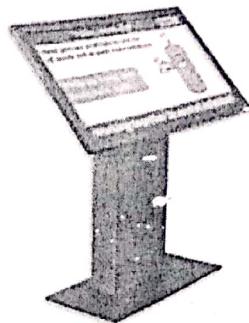
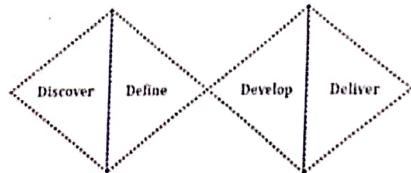


Figure 7.1: Information KIOSK.

ANALYSIS & INTERFACE DESIGN FOR STATE ROAD TRANSPORT CORPORATIONS INFORMATION KIOSK:

I) Design Process:

1. For State Road Transport Corporations Information Kiosk, **Double Diamond** process of design is used.
2. It is based on principle of **divergence and convergence.**



Discover:

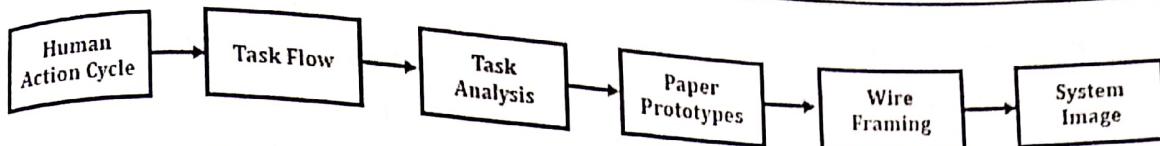
1. A **human interaction centric activity** is discovered.
2. Every user can relate to this activity while interacting with KIOSK System.

Define:

1. In this level, user **persona** is defined.
2. Persona is defined based on literacy levels and technological competence.

Develop:

1. According to the persona, design is developed.
2. It includes following steps:

**Deliver:**

1. Final product is delivered.
2. It has low learn ability curve.

II) Human Action Cycle:

1. Figure 7.2 shows Scenario 1: Where the individual finds the state transport by asking other people.
2. Figure 7.3 shows Scenario 2: Where the individual finds a bus via Visual AID like Charts & Signage.

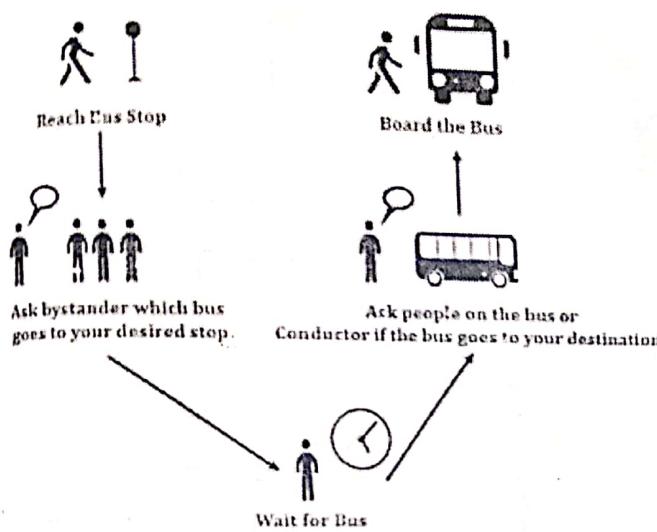
Scenario 1: Finding the State Transport by Asking People

Figure 7.2: Scenario 1.

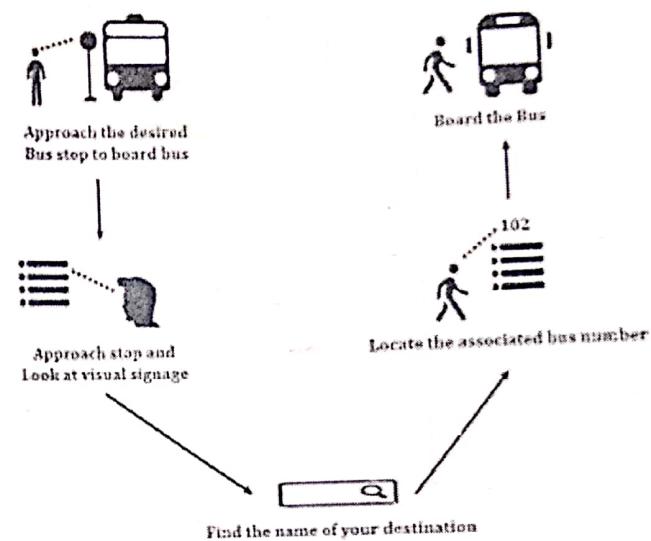
Scenario 2: Finding a bus via Visual AID: Charts & Signage

Figure 7.3: Scenario 2.

III) Task Flow:

1. Figure 7.4 shows the task flow for state road transport information kiosk.
2. It includes finding the bus, searching stop, printing route map.

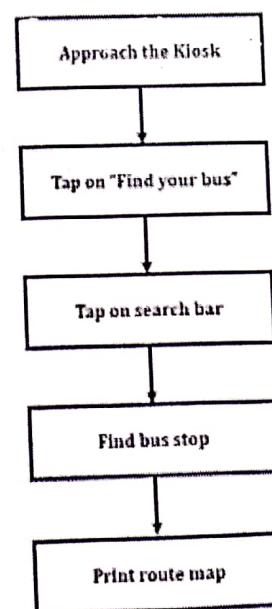
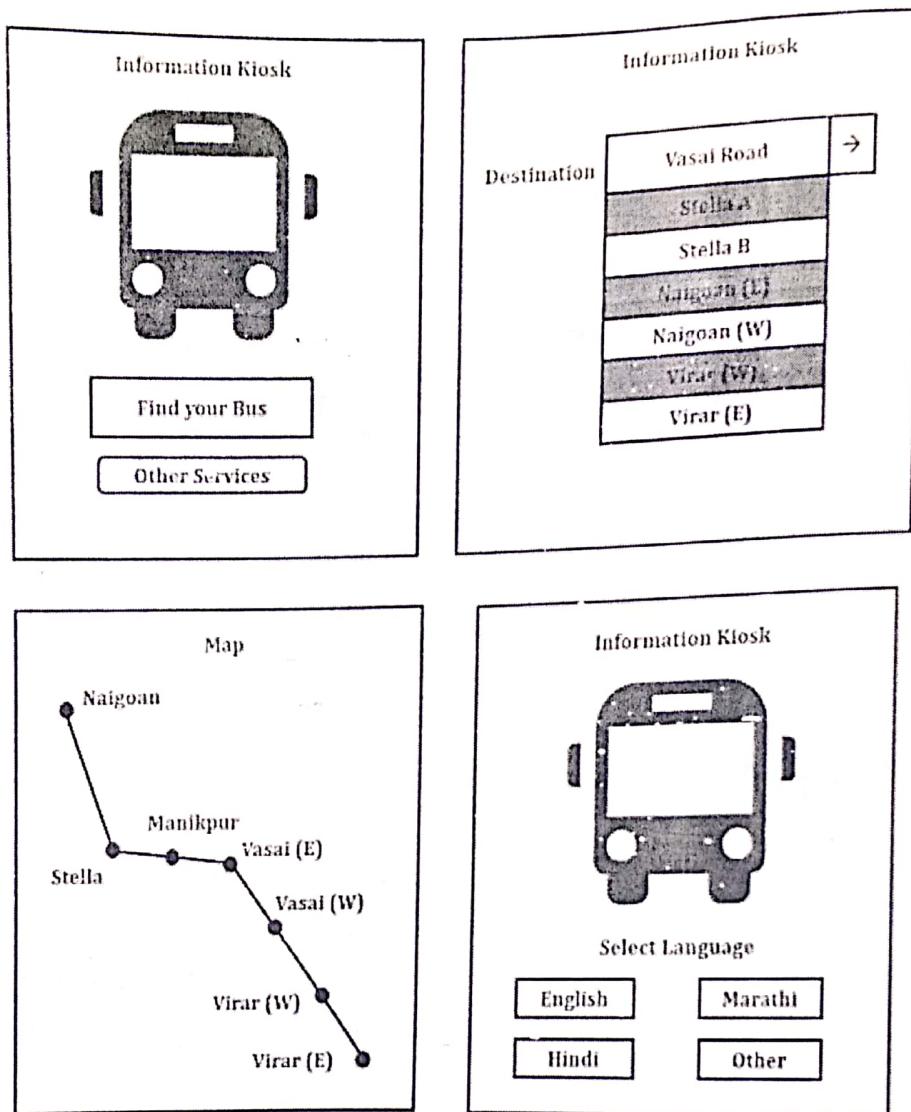


Figure 7.4: Task Flow.

IV) System Image:

- Some of the Interface Design for State Road Transport corporations Information KIOSK is shown below.
- It includes finding bus, searching destination, route map etc.

**Objectives achieved by the Kiosk:**

- Making the overall experience of using the state road transport system human enquiry and error free.
- Ensuring easy in finding directions around the state.
- Making a kiosk interface which is approachable to low literate groups of society as well.

Q2] It is necessary to provide state of an art digital KIOSK for Rural India where citizens can register for Birth/ Death Certificates, Insurance premium payments, Postal Schemes such as Investments, Money Transfer etc. The application will be easy and multilingual to be configured in Local Language. Provide suitable Analysis and Interface design for the same.

[10M - Dec16]

Ans:

INFORMATION KIOSK:

1. Information KIOSK is an electronic device which provides information.
2. It can be used for **communication, commerce, entertainment, and education.**
3. Figure 7.5 represents Information KIOSK.

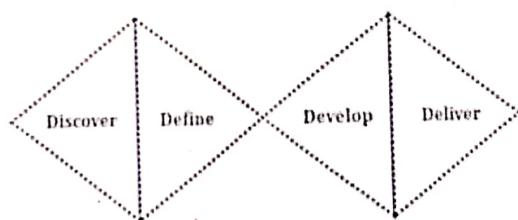


Figure 7.5: Information KIOSK.

ANALYSIS & INTERFACE DESIGN FOR ART DIGITAL KIOSK FOR RURAL INDIA:

I) Design Process:

1. Here Double Diamond process of design is used.
2. It is based on principle of divergence and convergence.



Discover:

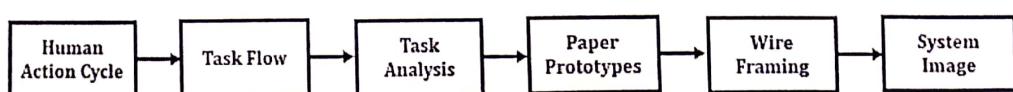
1. A **human interaction centric activity** is discovered.
2. Every user can relate to this activity while interacting with KIOSK System.

Define:

1. In this level, user **persona** is defined.
2. Persona is defined based on literacy levels and technological competence.

Develop:

1. According to the persona, design is developed.
2. It includes following steps:



Deliver:

1. Final product is delivered.
2. It has low learn ability curve.

II) Human Action Cycle:

1. Figure 7.6 shows Scenario 1: Where the individual makes insurance payments or money transfer by asking other people.
2. Figure 7.7 shows Scenario 2: Where the individual makes insurance payments or money transfer via Visual AID like Charts & Signage.

Scenario 1: Insurance payments or money transfer by asking other people

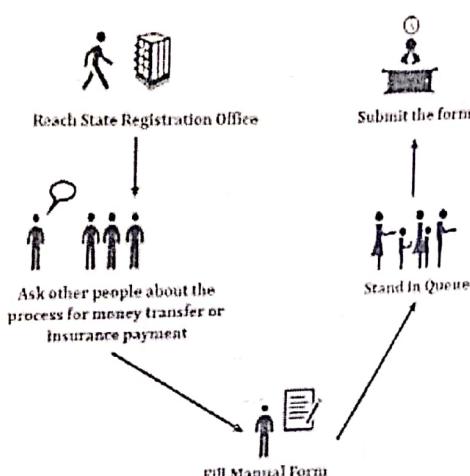


Figure 7.6: Scenario 1.

Scenario 2: Insurance payments or money transfer via Visual Chart: Charts & Signage

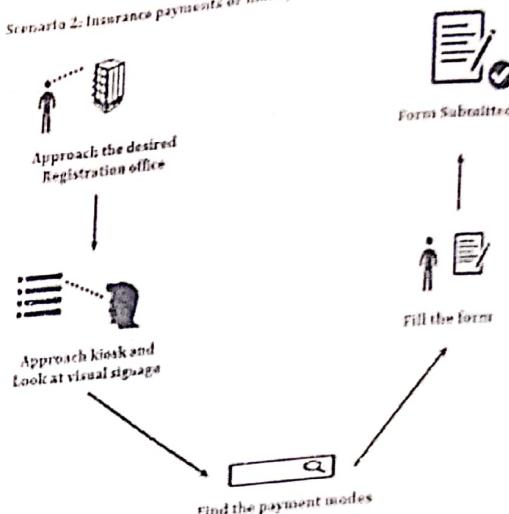


Figure 7.7: Scenario 2.

III) Task Flow:

1. Figure 7.8 shows the task flow for Rural Digital Kiosk.
2. It includes finding the bus, searching stop, printing route map.

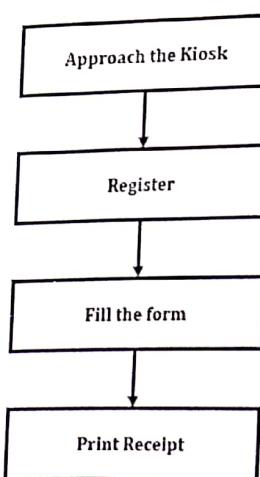
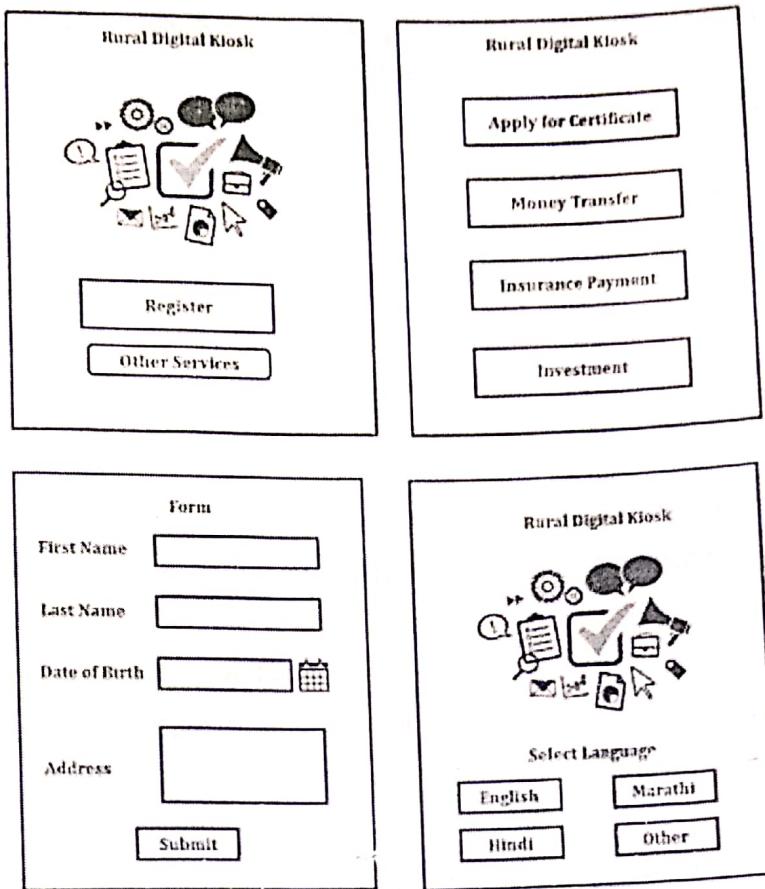


Figure 7.8: Task Flow.

IV) System Image:

1. Some of the Interface Design for Rural Digital KIOSK is shown below.
2. It includes Registration of Birth/Death Certificate, Make Insurance Payment, Money Transfer etc.

**OBJECTIVES ACHIEVED BY THE KIOSK:**

1. Making the overall experience of using the rural digital kiosk system error free.
2. Ensuring easy for making payments & applying for certificate.
3. Making a kiosk interface which is approachable to low literate groups of society as well.

Q3] Provide a systematic design analysis for Municipal Corporation's Mobile App; that provides information about the wards, their ward office, corporates in the ward, Schools Hospitals in the ward and other information of the Municipal Office, your analysis should consist of all necessary interface guidelines.

[TOM | May16 & Dec18]

Ans:

SYSTEMATIC DESIGN ANALYSIS:

1. Systematic Design Analysis is detailed analysis about the system in systematic way.
2. It is used to identify and develop the design requirements.
3. It is based on principle of **divergence and convergence**.
4. Systematic design analysis includes following steps as shown in figure 7.9.

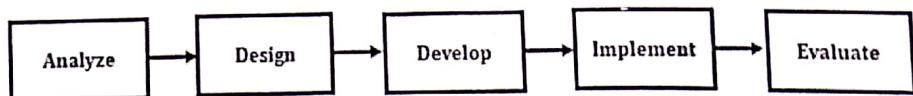


Figure 7.9: Systematic Design Analysis.

SYSTEMATIC DESIGN ANALYSIS FOR MUNICIPAL CORPORATION'S MOBILE APP:

I) Analyze:

1. In this phase, **system goal** is identified.
2. All the requirement for the Municipal Corporation Mobile App is collected and analyzed.
3. All the information about the wards, their ward offices, corporate offices, schools and colleges are identified and analyzed.

II) Design:

1. In this phase, the **user persona** is design.
2. Persona is defined based on literacy levels and technological competence.

III) Develop:

1. According to the persona, design is developed.
2. Municipal Corporation Mobile App is developed by considering all the requirements which were analyzed.

IV) Implement:

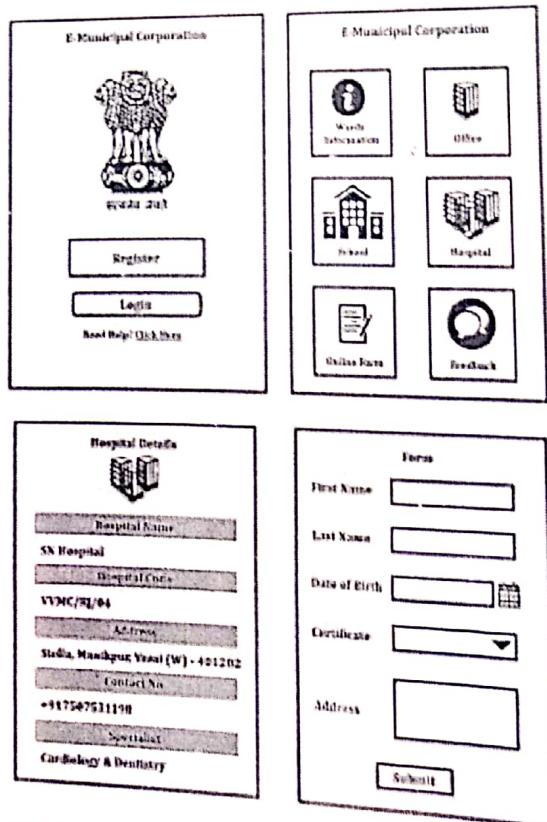
1. Final App is implemented.
2. It has **low learn ability curve**.

V) Evaluate:

1. Once the system is developed, it is then evaluated.
2. All quality check is performed.

SYSTEM DESIGN:

1. Some of the Interface Design for Municipal Corporation's Mobile App is shown below.
2. It includes Registration, wards & office information, school and hospital details, online form filling and feedback.



GUIDELINES FOR INTERFACE DESIGN:

1. There should be Consistency in User Interface Design.
2. The Shortcuts must be provided for frequent users.
3. Provide simple error handling mechanism.
4. The dialogs must be designed for closure.
5. Allow easy reversal of actions.
6. Offer Informative Feedback.

Q4] Provide a systematic design analysis for Municipal Corporation's Mobile App; to perform Tax and billing related transactions such as Registration of client, describe the Property, get Tax and water Charge bills, pay tax, Complaints and many other relevant operations.

[10M | Dec16]

Ans:

SYSTEMATIC DESIGN ANALYSIS:

1. Systematic Design Analysis is detailed analysis about the system in systematic way.
2. It is used to identify and develop the design requirements.
3. It is based on principle of **divergence and convergence**.
4. Systematic design analysis includes following steps as shown in figure 7.10.



Figure 7.10: Systematic Design Analysis.

SYSTEMATIC DESIGN ANALYSIS FOR MUNICIPAL CORPORATION'S MOBILE APP:**I) Analyze:**

1. In this phase, **system goal** is identified.
2. All the requirement for the Municipal Corporation Mobile App is collected and analyzed.
3. All the information about the client's registration, property tax, water billing etc. are identified and analyzed.

II) Design:

1. In this phase, the **user persona** is design.
2. Persona is defined based on literacy levels and technological competence.

III) Develop:

1. According to the persona, design is developed.
2. Municipal Corporation Mobile App is developed by considering all the requirements which were analyzed.

IV) Implement:

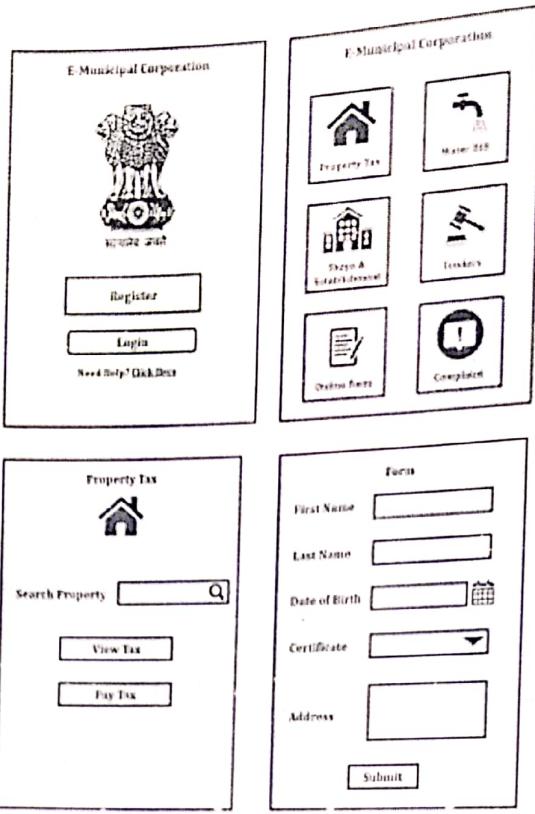
1. Final App is implemented.
2. It has **low learn ability curve**.

V) Evaluate:

1. Once the system is developed, it is then evaluated.
2. All quality check is performed.

SYSTEM DESIGN:

- Some of the Interface Design for Municipal Corporation's Mobile App is shown below.
- It includes Client's Registration, Property Tax Payments, bills, complaints, online form filling and many other operations.

**GUIDELINES FOR INTERFACE DESIGN:**

- There should be Consistency in User Interface Design.
- The Shortcuts must be provided for frequent users.
- Provide simple error handling mechanism.
- The dialogs must be designed for closure.
- Allow easy reversal of actions.
- Offer Informative Feedback.

Q5. In the state of Maharashtra, Rationing Department want to provide self-help portal for its customers. The portal consists of Information about basic need supplies, online application for ration cards, Schemes for Low income groups, adding a name of family members, deletion of name, Complaints and other facilities. Being a Subject Matter Expert (SME) provide the detailed analysis and for the same provide the Interface that will be used by people in all Districts of Maharashtra.

Ans:

SYSTEMATIC DESIGN ANALYSIS:

[TOM | May16]

- Systematic Design Analysis is detailed analysis about the system in systematic way.
- It is used to identify and develop the design requirements.

3. It is based on principle of **divergence and convergence**.
4. Systematic design analysis includes following steps as shown in figure 7.11.

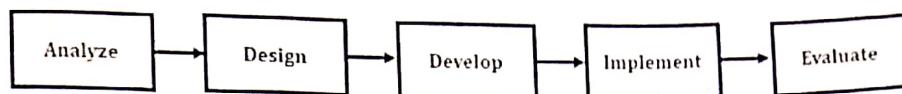


Figure 7.11: Systematic Design Analysis.

DETAILED DESIGN ANALYSIS FOR RATIONING DEPARTMENT SELF-HELP PORTAL:

I) Analyze:

1. In this phase, **system goal** is identified.
2. All the requirement for the rationing department is collected and analyzed.
3. All the information about basic need supplies, online application for ration cards, Schemes for Low income groups, adding a name of family members, deletion of name, Complaints and other facilities etc. are identified and analyzed.

II) Design:

1. In this phase, the **user persona** is design.
2. Persona is defined based on literacy levels and technological competence.

III) Develop:

1. According to the persona, design is developed.
2. Self-help portal for rationing department is developed by considering all the requirements which were analyzed.

IV) Implement:

1. Final web portal is implemented using various coding languages like .NET, PHP or Java.
2. It has **low learn ability curve**.

V) Evaluate:

1. Once the system is developed, it is then evaluated.
2. All quality check for the self-help portal is performed.

SYSTEM DESIGN:

1. Some of the Interface Design for rationing department self-help portal is shown below.
2. It includes information about basic need supplies, online application for ration cards, Schemes for Low income groups, adding a name of family members, deletion of name, Complaints and other facilities etc.

Home Page of Self-Help Portal:

Home Page of Self-Help Portal is shown below.

Online Application:

Online Application of Self-Help Portal is shown below.

The screenshot shows a web-based application form titled "E - Rationing Self-Help Portal". At the top, there are navigation links: "Home", "Scheme" (with a dropdown arrow), "Right to Information", "Citizen's Charter", and "Contact Persons". Below these, a section titled "Online Application" contains fields for "First Name", "Middle Name", "Last Name", "Date of Birth" (with a calendar icon), "Contact No.", and "Address". To the right of these fields is a "Family Details" table with three rows. The table columns are "Sr. No.", "Family Members", "Relation", "Age", and "Income". The first row has entries: 1, ABC, Self, 55, 40,000. The second row has entries: 2, XYZ, Wife, 52, - (empty). The third row has entries: 3, LMN, Son, 22, 35,000. There is also a link "+ Add New" and a "Submit" button at the bottom of the table. On the right side of the form, there is a field for "Annual Income".

- Q6] In the state of Maharashtra, Water Distribution Company want to provide self - help portal for its customers. The portal consists of online meter logging facility, Bill Payments. VDS i.e. Voluntary Deposit Scheme for Bill. Complaints and other facilities. Being a Subject Matter Expert (SME) provide the detailed analysis and for the same provide the Interface that will be used by people in all Districts of Maharashtra.

[10M | Dec16]

Ans:

SYSTEMATIC DESIGN ANALYSIS:

1. Systematic Design Analysis is detailed analysis about the system in systematic way.
2. It is used to identify and develop the design requirements.
3. It is based on principle of **divergence and convergence**.
4. Systematic design analysis includes following steps as shown in figure 7.12.

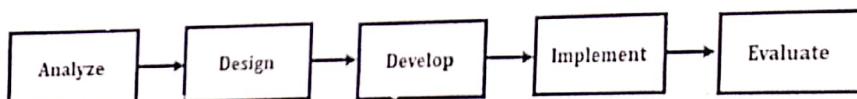


Figure 7.12: Systematic Design Analysis.

DETAILED DESIGN ANALYSIS FOR WATER DISTRIBUTION SELF-HELP PORTAL:

I) Analyze:

1. In this phase, **system goal** is identified.
2. All the requirement for the water distribution company is collected and analyzed.
3. All the information about online meter logging facility, Bill Payments. VDS i.e. Voluntary Deposit Scheme for Bill. Complaints and other facilities etc. are identified and analyzed.

II) Design:

1. In this phase, the **user persona** is design.
2. Persona is defined based on literacy levels and technological competence.

III) Develop:

1. According to the persona, design is developed.

2. Self-help portal for Water Distribution Company is developed by considering all the requirements which were analyzed.

IV) Implement:

1. Final web portal is implemented using various coding languages like .NET, PHP or Java.
2. It has **low learn ability curve**.

V) Evaluate:

1. Once the system is developed, it is then evaluated.
2. All quality check for the self-help portal is performed.

SYSTEM DESIGN:

1. Some of the Interface Design for Water Distribution Company self-help portal is shown below.
2. It includes information about online meter logging facility, Bill Payments. VDS i.e. Voluntary Deposit Scheme for Bill, Complaints and other facilities etc.

HOME PAGE OF SELF-HELP PORTAL:

Home Page of Self-Help Portal is shown below.

E - Water Distribution Self-Help Portal				
Home	Scheme ▼	Right to Information	Citizen's Charter	Contact Persons
 <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 5px; border-radius: 10px; width: 150px;"> Meter Logging Bill Payment VDS Help Complaints </div> <div style="margin: 0 20px;"> User Login </div> <div style="border: 1px solid black; padding: 5px; border-radius: 5px; width: 150px;"> <input placeholder="Username" type="text"/> <input placeholder="Password" type="password"/> <input type="button" value="Login"/> </div> </div> <p style="font-size: small; margin-top: 10px;">Don't Have Account? Click Here to Signup</p>				

Online Bill Payment:

Online Bill Payment Screen is shown below.

E - Water Distribution Self-Help Portal				
Home	Scheme ▼	Right to Information	Citizen's Charter	Contact Persons
View / Pay Bill Consumer Type: <input type="text"/> Consumer No: <input type="text"/> Billing Unit: <input type="text"/> <input type="button" value="Submit"/> <input type="button" value="Clear"/>				

Q7] Petroleum Company want to establish unmanned petrol Pumps at major locations, Where Vehicle owners can fill the petrol on their own and the payment will be either by cashless in the form of Debit Card or Credit Card or at some points there may be Bank Note payment (Cash) by automatic machines. Following are some functional requirements: There will be automatic gate that will not allow owners to take their vehicles if they didn't make the payment. Provide detailed system analysis and possible interaction design that will help to execute the same for petroleum companies. Your design should also contain suitable diagrams.

Ans:

[TOM | May/17]

SYSTEMATIC DESIGN ANALYSIS:

1. Systematic Design Analysis is detailed analysis about the system in systematic way.
2. It is used to identify and develop the design requirements.
3. It is based on principle of **divergence and convergence**.
4. Systematic design analysis includes following steps as shown in figure 7.13.

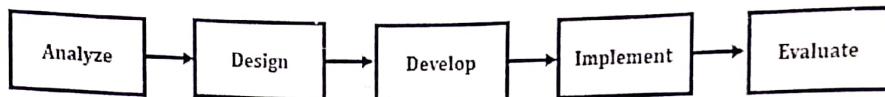
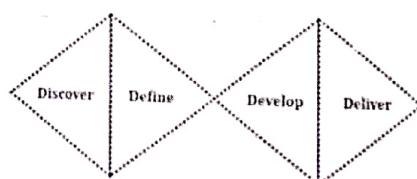


Figure 7.13: Systematic Design Analysis.

ANALYSIS & INTERFACE DESIGN FOR PETROL PUMPS OF PETROLEUM COMPANY:

I) Design Process:

1. For Automatic Petrol Pumps of Petroleum companies, **Double Diamond** process of design is used.
2. It is based on principle of **divergence and convergence**.



Discover:

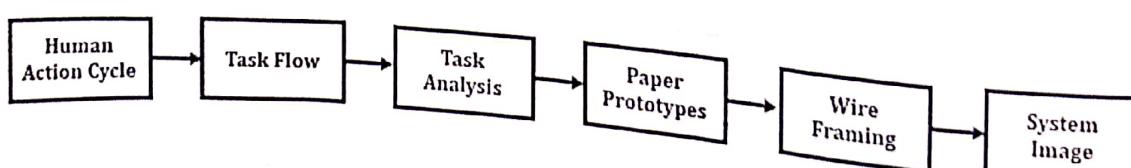
1. A **human interaction centric activity** is discovered.
2. Every user can relate to this activity while interacting with automatic processing system.

Define:

1. In this level, user **persona** is defined.
2. Persona is defined based on literacy levels and technological competence.

Develop:

1. According to the persona, design is developed.
2. It includes following steps:



deliver:

- Final product is delivered.
- It has low learn ability curve.

II) Human Action Cycle:

- Figure 7.14 shows Scenario 1: Where the individual fills the petrol at normal petrol pumps using operators.
- Figure 7.15 shows Scenario 2: Where the individual fills the petrol at automatic petrol pumps by their own.

Scenario 1: Filling the petrol at normal petrol pumps using operators

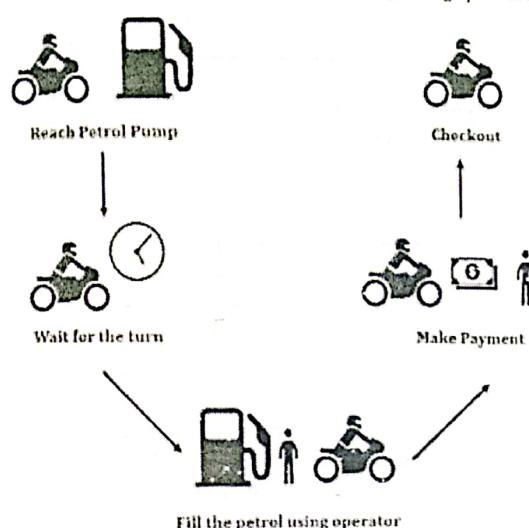


Figure 7.14: Scenario 1.

Scenario 2: Filling the petrol at automatic petrol pumps by their own

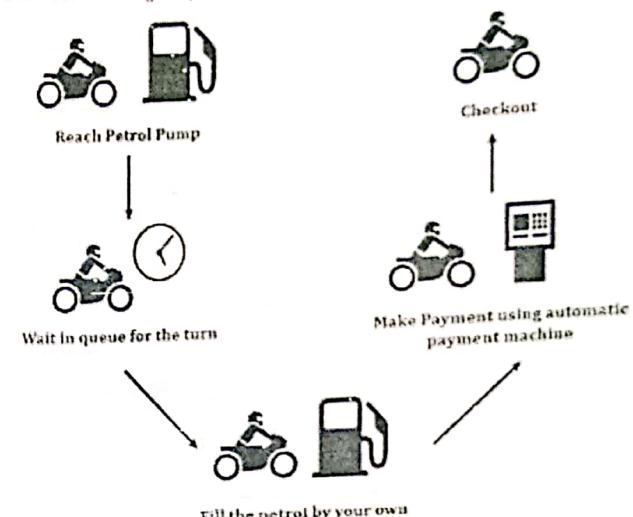


Figure 7.15: Scenario 2.

III) Task Flow:

- Figure 7.16 shows the task flow.
- It includes waiting in queue, filling the petrol and making payment.

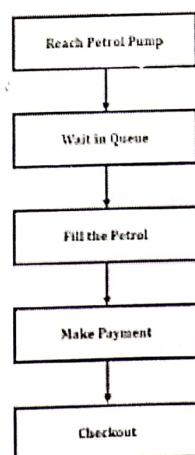
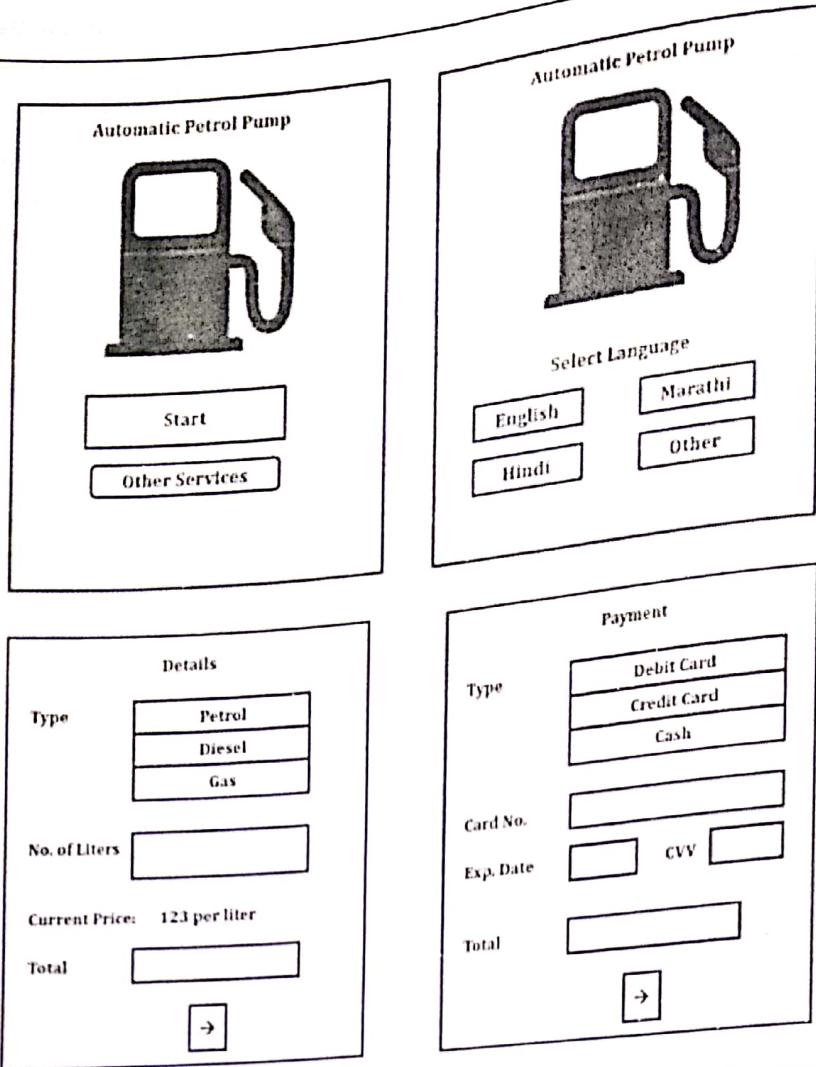


Figure 7.16: Task Flow.

IV) System Image:

- Some of the Interface Design for Automatic Petrol Pump is shown below.
- It includes selecting languages, entering no. of liters, selecting type and making payment.



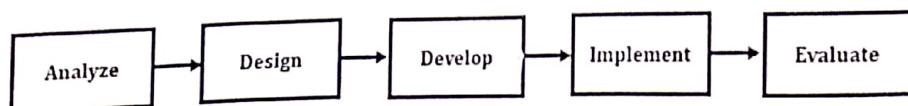
Q8] Design a UI for any multimedia application

[10M | Dec18]

Ans:

SYSTEMATIC DESIGN ANALYSIS:

1. Systematic Design Analysis is detailed analysis about the system in systematic way.
2. It is used to identify and develop the design requirements.
3. It is based on principle of **divergence and convergence**.
4. Systematic design analysis includes following steps.



DETAILED DESIGN ANALYSIS FOR MULTIMEDIA APPLICATION:

I) Analyze:

1. In this phase, **system goal** is identified.
2. All the requirement for the multimedia application is collected and analyzed.

II) Design:

1. In this phase, the **user persona** is design.
2. Persona is defined based on literacy levels and technological competence.

III) Develop:

1. According to the persona, design is developed.
2. Multimedia Application is developed by considering all the requirements which were analyzed.

IV) Implement:

1. Final web portal is implemented using various coding languages like .NET, PHP or Java.
2. It has **low learn ability curve**.

V) Evaluate:

1. Once the system is developed, it is then evaluated.
2. All quality check for the self-help portal is performed.

SYSTEM DESIGN:

1. Some of the Interface Design for Multimedia Application is shown below.
2. It includes Songs Library and Song Play.

