

CS6008-Human Computer Interaction**UNIT -I FOUNDATIONS OF HCI**

The Human: I/O channels - Memory - Reasoning and problem solving; The computer: Devices - Memory - processing and networks; Interaction: Models - frameworks - Ergonomics - styles - elements - interactivity- Paradigms.

PART-A**1 What is Input/Output channel?**

A person's interaction with the outside world occurs through information being received and sent: input and output. In an interaction with a computer the user receives information that is output by the computer, and responds by providing input to the computer - **the user's output becomes the computer's input and vice versa.** **Input** in the human occurs mainly through the senses and output through the motor control of the effectors.

2 What are the types of memory or memory function?

- (i) Sensory buffers ,
- (ii) Short-term memory or working memory,
- (iii) Long term memory

3 What is meant by sensory memory?

The sensory memories act as buffers for stimuli received through the senses. A sensory memory exists for each sensory channel: *iconic memory* for visual stimuli, *echoic memory* for aural stimuli and *haptic memory* for touch. These memories are constantly overwritten by new information coming in on these channels.

4 What is iconic memory?

We can demonstrate the existence of iconic memory by moving a finger in front of the eye. Can you see it in more than one place at once? This indicates a persistence of the image after the stimulus has been removed. A similar effect is noticed most vividly at firework displays where moving sparklers leave a persistent image. Information remains in iconic memory very briefly, in the order of 0.5 seconds.

5 Write brief on existence of echoic memory.

The existence of echoic memory is evidenced by our ability to ascertain the direction from which a sound originates. This is due to information being received by both ears. However, since this information is received at different times, we must store the **stimulus in the meantime. Echoic memory allows brief 'play-back' of information.**

6 Write short notes on short term memory or working memory.

Short-term memory or working memory acts as a 'scratch-pad' for temporary recall of information. It is used to store information which is only required fleetingly. For example, calculate the multiplication 35×6 in your head. Short-term memory can be accessed rapidly, in the order of 70 ms. However, it also decays rapidly, meaning that information can only be held there temporarily, in the order of 200 ms. Short-term memory also has a limited capacity. There are two basic methods for measuring memory capacity. The first involves determining the length of a sequence which can be remembered in order.

7 **What are the two types of long term memory?**

- Episodic memory
- Semantic memory

8 **State Reasoning. What are the types of reasoning?**

Reasoning is the process by which we use the knowledge we have to draw conclusions or infer something new about the domain of interest. There are a number of different types of reasoning:

1. deductive ,2.inductive ,3.abductive.

9 **What is problem solving?**

Reasoning is a means of inferring new information from what is already known, problem solving is the process of finding a solution to an unfamiliar task, using the knowledge we have. Human problem solving is characterized by the ability to adapt the information we have to deal with new situations. However, often solutions seem to be original and creative.

10 **State Gestalt theory.**

Psychology concept is used in training. It proposes that what is 'seen' is what appears to the seer and not what may 'actually be there,' and that the nature of a unified whole is not understood by analyzing its parts. It views learning as a reorganizing of a whole situation in contrast to the behavioral psychology view that learning consists of associations between stimuli and responses. Gestalt experiments show that the brain does not act like a sponge but actively filters, structures, and matches all incoming information against known patterns to make sense of it.

11 **What are the basic levels of skill in Anderson's ACT* model?**

1. The learner uses general-purpose rules which interpret facts about a problem. This is slow and demanding on memory access.
2. The learner develops rules specific to the task.
3. The rules are tuned to speed up performance.

12 **List out all text entry devices.**

- 1.The alphanumeric keyboard,
- 2.Chord keyboards,
- 3.Phone pad and T9 entry,
- 4.Handwriting recognition,
- 5.Speech recognition.

13 What are touch screens?

Touch screens are another method of allowing the user to point and select objects on the screen as **they detect the presence of the user's finger, or a stylus, on the screen** itself. They work in one of a number of different ways: by the finger (or stylus) interrupting a matrix of light beams, or by capacitance changes on a grid overlaying the screen, or by ultrasonic reflections. The touch screen is very fast, and requires no specialized pointing device. Because the screen acts as an input device as well as an output device, there is no separate hardware to become damaged or destroyed by dirt; this makes touch screens suitable for use in hostile environments.

14 What is Eyegaze?

Eyegaze systems allow you to control the computer by simply looking at it. Some systems require you to wear special glasses or a small head-mounted box. A low-power laser is shone into the eye and is reflected off the retina. The reflection changes as the angle of the eye alters, and by tracking the reflected beam the eyegaze system can determine the direction in which the eye is looking. Eyegaze is a very fast and accurate device, but the more accurate versions can be expensive.

15 What is icon wars?

Icon wars, occurs on window systems. The user clicks the mouse on a menu or icon, and nothing happens; for some reason the machine is busy or slow. So the user clicks again, tries something else and then, suddenly, all the buffered mouse clicks are interpreted and the screen becomes a blur of flashing windows and menus. This time, it is not so much that the response is too slow - it is fast enough when it happens - but that the response is variable. The delays due to swapping programs in and out of main memory typically cause these problems.

16 What are the limitations on interactive performance?

1. Computational bound,
2. Storage channel bound
3. Graphics bound,
4. Network capacity

17 What are the stages in Norman's model of interaction?

1. Establishing the goal.
2. Forming the intention.
3. Specifying the action sequence.
4. Executing the action.
5. Perceiving the system state.
6. Interpreting the system state.
7. Evaluating the system state with respect to the goals and intentions.

18 State Ergonomics.

Ergonomics (or human factors) is traditionally the study of the physical characteristics of the interaction: how the controls are designed, the physical environment in which the interaction takes place, and the layout and physical qualities of the screen. A primary focus is on user performance and how the interface enhances or detracts from this. In seeking to evaluate these aspects of the interaction, ergonomics will certainly also touch upon human psychology and system constraints.

19 What are the common interface styles?

Common interface styles includes,

1. command line interface
2. menus
3. natural language
4. question/answer and query dialog
5. form-fills and spreadsheets
6. WIMP
7. point and click
8. three-dimensional interfaces.

20 Write notes on WIMP interface.

WIMP stands for windows, icons, menus and pointers (sometimes windows, icons, mice and pull-down menus), and is the default interface style for the majority of interactive computer systems in use today, especially in the PC and desktop workstation arena. Examples of WIMP interfaces include Microsoft Windows for IBM PC compatibles, MacOS for Apple Macintosh compatibles and various X Windows-based systems for UNIX.

UNIT-II DESIGN & SOFTWARE PROCESS

Interactive Design basics - process - scenarios - navigation - screen design - Iteration and prototyping. HCI in software process - software life cycle - usability engineering - Prototyping in practice - design rationale. Design rules - principles, standards, guidelines, rules. Evaluation Techniques - Universal Design.

PART-A

1 What is Design?

Design is defined as achieving Goals within constraints and encompasses work tasks data design, architectural design, interface design and component-level design and create a design model or design specification.

2 What are the steps for Interaction Design process?

- Requirements
- Analysis and Design
- Iteration and prototyping
- Implementation and Deployment.

3 What are the classification of evaluation techniques?

Cognitive walkthrough, Heuristic evaluation, Review based, Model based

4 What are the advantages and disadvantages of Prototyping Model?

Advantages:

- It produces the products quickly and thus saves the time and solves the waiting problem in waterfall model.
- It minimizes the cost and product failure.
- It is possible for the developers and client to check the function of preliminary implementations of system models before committing to a final system.
- It obtains feedback from clients and changes in system concept.

Disadvantages:

- It ignores quality, reliability maintainability and safety requirements. Customer satisfaction is not achieved.

5 What are the Levels of Interaction?

Widgets, Screen design, Navigation design, Other apps and operating system

6 What are the two things you need in order for prototyping methods to work?

1. To understand what is wrong and how to improve.
2. A good start point.

7 What are the activities in the waterfall model of the software life cycle?

1.Requirements specification, 2.Design, 3.Construction, 4.Integration and Testing, 5.Installation and Maintenance.

8 What are the Emphasis for usability engineering

The emphasis for usability engineering is in knowing exactly what criteria will be used **to judge a product for its usability. The ultimate test of a product's usability is based on measurements of users' experience with it. Therefore, since a user's direct experience** with an interactive system is at the physical interface, focus on the actual user interface is understandable.

9 What are the Criteria by which measuring method can be determined?

1. Time to complete a task 2. Per cent of task completed 3. Per cent of task completed per unit time 4. Ratio of successes to failures 5. Time spent in errors 6. Per cent or number of errors 7. Per cent or number of competitors better than it

10 What are the possible ways to set measurement levels in a usability specification?

1. Existing system or previous version
 2. competitive systems
 3. carrying out the task without use of a computer system
 4. an absolute scale
 5. your own prototype
 6. user's own earlier performance
 7. each component of a system separately
 8. a successive split of the difference between best and worst values observed in user tests

11 What are the three main goals of Evaluation?

1. To assess the extent and accessibility of the system's functionality.
 2. To assess users' experience of the interaction.
 3. To identify any specific problems with the system.

12 Define Design rationale.

Design rationale is the information that explains why a computer system is the way it is, including its structural or architectural description and its functional or behavioral description.

13 What is the beneficial to have access to the design rationale?

1. design rationale provides a communication mechanism among the members of a design team so that during later stages of design and/or maintenance it is possible to understand what critical decisions were made, what alternatives were investigated .
 2. Accumulated knowledge in the form of design rationales for a set of products can be reused to transfer what has worked in one situation to another situation which has similar needs.

14 **What is Design space Analysis?**

The design space is initially structured by a set of questions representing the major issues of the design. Since design space analysis is structure oriented, it is not so important that the questions recorded are the actual questions asked during design meetings.

15 **What are the principles to support Usability?**

Learnability - the ease with which new users can begin effective interaction and achieve maximal performance

Flexibility - the multiplicity of ways in which the user and system exchange information. Robustness - the level of support provided to the user in determining successful achievement and assessment of goals.

16 **Define Usability and Effectiveness.**

Usability- The effectiveness, efficiency and satisfaction with which specified users achieve specified goals in particular environments.

Effectiveness -The accuracy and completeness with which specified users can achieve specified goals in particular environments.

17 **Define Standards.**

Standards for interactive system design are usually set by national or international bodies to ensure compliance with a set of design rules by a large community. Standards can apply specifically to either the hardware or the software used to build the interactive system.

18 **Define Efficiency and Satisfaction.**

Efficiency -The resources expended in relation to the accuracy and completeness of goals achieved.

Satisfaction- The comfort and acceptability of the work system to its users and other people affected by its use

19 **Define HCI Patterns.**

A pattern is an invariant solution to a recurrent problem within a specific context. **Patterns address the problems that designers face by providing a 'solution statement'**. Patterns are an approach to capturing and reusing this knowledge - of abstracting the essential details of successful design so that these can be applied again and again in new situations.

20 **Define Universal Design principles.**

It is the process of designing products so that they can be used by as many people as possible in as many situations as possible.

UNIT -III MODELS AND THEORIES

Cognitive models -Socio-Organizational issues and stake holder requirements -
Communication and collaboration models-Hypertext, Multimedia and WWW.

PART -A

1. **What is a Cognitive model?**
A **Cognitive model** is the designer's intended mental model for the user of the system: a set of ideas about how it is organized and operates.
2. **What is a models and theories?**
"analyze and design user interfaces and new user-interface technologies", "created software tools and development environment to facilitate the construction of graphical **user interfaces**", "**pioneered the user of voice and video in user interfaces, hypertext links, interactive tutorials and context-sensitive help systems.**"
3. **Define Cognition psychology.**
Cognitive psychology is the study of mental processes such as "attention, language use, memory, perception, problem solving, creativity, and thinking
4. **Define user modeling?**
User modeling is the subdivision of human-computer interaction which describes the process of building up and modifying a conceptual understanding of the user. The main goal of user modeling is customization and adaptation of systems to the user's specific needs. The system needs to "say the 'right' thing at the 'right' time in the 'right' way".
5. **What do we do when there are several ways of solving a problem, or if the solutions to two sub goals interact?**
Users will often have more than one way to achieve a goal and there must be some way of representing how they select between competing solutions.
6. **What are issues for goal hierarchies** 1.Granularity,
2.Routine learned behavior, not problem solving,
3.Conflict,
4.Error
7. **What is GOMS.**
GOMS is a specialized human information processor model for human-computer interaction observation that describes a user's cognitive structure on four components. a set of **Goals**, a set of **Operators**, a set of **Methods** for achieving the goals, and a set of **Selections** rules for choosing among competing methods for goals.
8. **Define Goals and Operators.**
Goals are symbolic structures that define a state of affairs to be achieved and determinate a set of possible methods by which it may be accomplished
Operators are elementary perceptual, motor or cognitive acts, whose execution is necessary to change any aspect of the user's mental state or to affect the task environment

9. **Define Methods and Selections.**

Methods describe a procedure for accomplishing a goal

Control Structure: Selection Rules are needed when a goal is attempted, there may be more than one method available to the user to accomplish it.

10. **Describe Cognitive complexity theory**

Cognitive complexity theory, begins with the basic premises of goal decomposition from GOMS and enriches the model to provide more predictive power. CCT has two parallel descriptions: **one of the user's goals and the other of the computer system (called the device in CCT).**

11. **Describe various problem with CCT.**

There are various problems with CCT. As with many 'rich' description methods, the size of description for even a part of an interface can be enormous.

Furthermore, there may be several ways of representing the same user behavior and interface behavior, yielding different measures of dissonance.

12. **How to Representative of the linguistic approach?**

Representative of the **linguistic approach is Reisner's use of Backus-Naur Form (BNF) rules** to describe the dialog grammar. This views the dialog at a purely syntactic level, ignoring the semantics of the language. BNF has been used widely to specify the syntax of computer programming languages, and many system dialogs can be described easily using BNF rules.

13. **What is Task Action Grammar?**

Measures based upon BNF have been criticized as not 'cognitive' enough. They ignore the advantages of consistency both in the language's structure and in its use of command names and letters. Task-action grammar (TAG) [284] attempts to deal with some of these problems by including elements such as parametrized **grammar rules to emphasize consistency and encoding the user's world knowledge**

14. **Define Keystroke Level Model (KLM).**

KLM (Keystroke-Level Model) uses this understanding as a basis for detailed predictions about user performance. It is aimed at unit tasks within interaction - the execution of simple command sequences, typically taking no more than 20 seconds.

16. **Define three-state model.**

The three-state model, which captures some of these crucial distinctions. He begins by looking at a mouse. If you move it with no buttons pushed, it normally moves the mouse cursor about. This tracking behavior is termed state 1. Depressing a button over an icon and then moving the mouse will often result in an object being dragged about. This he calls state 2.

17. **Define term computer-supported cooperative work' (CSCW).**

The term 'computer-supported cooperative work' (CSCW) seems to assume that groups will be acting in a cooperative manner. This is obviously true to some extent; even opposing football teams cooperate to the extent that they keep (largely) within the rules of the game, but their cooperation only goes so far. People in organizations and groups have conflicting goals, and systems that ignore this are likely to fail spectacularly.

18. **What is use of storekeeper ?**

The storekeeper always used to understate stock levels slightly in order to keep an emergency supply, or sometimes inflate the quoted levels when a delivery was due from a reliable supplier. Also, requests for stock information allowed the storekeeper to keep track of future demands and hence plan future orders.

19. **What is Free rider problem ?**

A few free riders in a conference system are often not a problem, as the danger is more likely from too much activity. In addition, in electronic conferences the patterns of activity and silence may reflect other factors such as expertise. However, it is easy for the number of free riders gradually to increase and the system slide into disuse.

20. **What is 'Critical Mass' ?**

Critical mass is the point at which a growing company becomes self-sustaining, and no longer needs additional investment to remain economically viable.

21. **Who are the stakeholders?**

Understanding stakeholders is key to many of the approaches to requirements capture, since in an organizational setting it is not simply the end-user who is affected by the introduction of new technology

22. **Define CUSTOM methodology.**

CUSTOM is a socio-technical methodology designed to be practical to use in small organizations. It is based on the User Skills and Task Match (USTM) approach, developed to allow design teams to understand and fully document user requirements . CUSTOM focusses on establishing stakeholder requirements: all stakeholders are considered, not just the end-users.

23. **What are the CATWOE approach?**

Primary stakeholders are people who actually use the system – the end-users.

Secondary stakeholders are people who do not directly use the system, but receive output from it or provide input to it (for example, someone who receives a report produced by the system).

Tertiary stakeholders are people who do not fall into either of the first two categories but who are directly affected by the success or failure of the system (for example, a director whose profits increase or decrease depending on the success of the system).

Facilitating stakeholders are people who are involved with the design, development and maintenance of the system.

24. **Define Open System Task Analysis (OSTA)**

OSTA is an alternative socio-technical approach, which attempts to describe what happens when a technical system is introduced into an organizational work environment. Like CUSTOM, OSTA specifies both social and technical aspects of the system. However, whereas in CUSTOM these aspects are framed in terms of stakeholder perspectives, in OSTA they are captured through a focus on tasks.

25. **Define Soft systems methodology(SSM).**

Soft systems methodology (SSM) arises from the same tradition but takes a view of the organization as a system of which technology and people are components. There is no assumption of a particular solution: the emphasis is rather on understanding the situation fully.

26. **Define ETHICS methodology.**

Effective Technical and Human Implementation of Computer-based Systems (ETHICS) ETHICS considers the process of system development as one of managing change: conflicts will occur and must be negotiated to ensure acceptance and satisfaction with the system. If any party is excluded from the decision-making process then their knowledge and contribution is not utilized and they are more likely to be dissatisfied. However, participation is not always complete.

27. **What is FACE-TO-FACE communication?**

Face-to-face contact is the most primitive form of communication – primitive, that is, in terms of technology. If, on the other hand, we consider the style of communication, the interplay between different channels and productivity, we instead find that face-to-face is the most sophisticated communication mechanism available. The first thing to note is that face-to-face communication involves not just speech and hearing, but also the subtle use of body language and eyegaze.

28. **What is Speech act theory?**

A particular form of conversational analysis, speech act theory, has been both influential and controversial in CSCW. Not only is it an analytic technique, but it has been used as the guiding force behind the design of a commercial system, Coordinator.

29. **What is the use Text-based communication?**

Text-based communication is familiar to most people, in that they will have written and received letters. The text-based communication in groupware systems is acting as a speech substitute, and, thus, there are some problems adapting between the two media.

30. **What are four types of textual communication in current groupware?**

discrete – directed message as in email. There is no explicit connection between different messages, except in so far as the text of the message refers to a previous one.

linear – participants' messages are added in (usually temporal) order to the end of a single transcript.

non-linear – when messages are linked to one another in a hypertext fashion.

spatial – where messages are arranged on a two-dimensional surface.

32. **What is use of distributed cognition**

A school of thinking has recently developed which regards thinking as happening not just within the head, but in the external relationships with things in the world and with other people. This viewpoint is called distributed cognition

33. What is hypertext, multimedia and the world-wide web.

- Hypertext allows documents to be linked in a non-linear fashion.
- Multimedia incorporates different media: sound, images, video.
- The world wide web is a global hypermedia system.

34. What is the advantage of animation?

1. Communication Skills
2. Building Bridges
3. Self-expression
4. Technical Skills
5. Presentation Skills

35. Define web technology and issues.

The web consists of a set of protocols built on top of the internet that, in theory, allow multimedia documents to be created and read from any connected computer in the world. The web supports hypertext, graphics, sound and movies, and, to structure and describe the information, uses a language called HTML (hypertext markup language) or in some cases, XML (extensible markup language).

36. Define web servers and clients

A Web server is a program that uses HTTP (Hypertext Transfer Protocol) to serve the files that form Web pages to users, in response to their requests, which are forwarded by their computers' HTTP clients. Dedicated computers and appliances may be referred to as Web servers as well.

37. What is the difference between static and dynamic web pages?

In simplest terms, static Web pages are those with content that cannot change without a developer editing its source code, while dynamic Web pages can display different content from the same source code. When it comes to using static or dynamic pages for parts of your company's website, having the most advanced code on each of your pages is not important.

38. What are the Network issues

- bandwidth.
- latency.
- Jitter

UNIT IV-Mobile HCI

Mobile Ecosystem: Platforms, Application frameworks- Types of Mobile Applications: Widgets, Applications, Games- Mobile Information Architecture, Mobile 2.0, Mobile Design: Elements of Mobile Design, Tools.

PART- A

1 List out the layers of the mobile ecosystem.

- 1.Services, 2.Applications
- 3.Application Frameworks
- 4.Operating Systems
- 5.Platforms
- 6.Devices
- 7.Aggregators
- 8.Networks
- 9.Operators.

2 What are the services?

Services include tasks such as accessing the Internet, sending a text message, or being able to get a location –basically, anything the user is trying to do.

3 What do you mean by Operators?

The base layer in the mobile ecosystem is the *operator*. Operators go by many names, depending on what part of the world you happen to be in or who you are talking to. Operators can be referred to as Mobile Network Operators (MNOs); mobile service providers, wireless carriers, or simply carriers; mobile phone operators; or cellular companies.

4 What is the use of application layer?

Application frameworks are used to create applications, such as a game, a web browser, a camera, or media player. Although the frameworks are well standardized, the devices are not. The largest challenge of deploying applications is knowing the specific device attributes and capabilities.

5 What is the need of Application Framework layer?

The first layer that you have any control over is the choice of application framework. Application frameworks often run on top of operating systems, sharing core services such as communications, messaging, graphics, location, security, authentication, and many others.

6 What is the use of Mobile Application medium type?

The *mobile medium type* is the type of application framework or mobile technology that presents content or information to the user. It is a technical approach regarding which type of medium to use; this decision is determined by the impact it will have on the user experience. The technical capabilities and capacity of the publisher also factor into which approach to take.

7 What is Web Widget?

A mobile web widget is a standalone chunk of HTML-based code that is executed by the end user in a particular way.

8 Write about pros and cons of the Mobile web applications. Pros:-

- α. They are easy to create, using basic HTML, CSS, and JavaScript knowledge.
- β. They are simple to deploy across multiple handsets.
- χ. They offer a better user experience and a rich design, tapping into device features and offline use.
- δ. Content is accessible on any mobile web browser.

Cons:-

- The optimal experience might not be available on all handsets.
- They can be challenging (but not impossible) to support across multiple devices.
- They don't always support native application features, like offline mode, location lookup, filesystem access, camera, and so on.**

9 Give short notes on Immersive Full Screen Applications.

The immersive full-screen applications is like a game, a media player, or possibly even a **single-screen utility**. **These applications are meant to consume the user's focus**, often doing so by filling the entire screen, and leaving no trace of the device user interface to distract the user. Again, the majority of mobile engagement occurs when the user has idle periods of time; the immersive context is typical in most entertainment applications, one of the most popular mobile content areas.

10 What is the use of Productivity Application Context?

The productivity application context is used for content and services that are heavily task-based and meant to increase the users' **sense of efficiency**. **With these types of applications**, we can assume that the users are more committed to accomplishing a particular goal, like managing content such as messages, contacts, or media, but we should still assume that they are doing so during idle periods.

11 List down the disciplines of mobile Information architecture.

- α. *Information architecture*-The organization of data within an informational space. In other words, how the user will get to information or perform tasks within a website or application.
- β. *Interaction design*-The design of how the user can participate with the information present, either in a direct or indirect way, meaning how the user will interact with the website of application to create a more meaningful experience and accomplish her goals.
- χ. *Information design*-The visual layout of information or how the user will assess meaning and direction given the information presented to him.

- δ. *Navigation design*-The words used to describe information spaces; the labels or triggers used to tell the users what something is and to establish the expectation of what they will find.
- ε. *Interface design*-The design of the visual paradigms used to create action or understanding.

12 What is the use of Clickstreams?

Clickstream is a term used for showing the behavior on websites, displaying the order in which users travel through a site's information architecture, usually based on data gathered from server logs. Clickstreams are usually historical, used to see the flaws in your information architecture, typically using heat-mapping or simple percentages to show where your users are going.

13 Why Wireframes required?

Wireframes are a way to lay out information on the page, also referred to as information design. Site maps show how our content is organized in our informational space; wireframes show how the user will directly interact with it. they also serve to separate layout from visual design, defining how the user will interact with the experience.

14 Write about different types of Mobile Prototyping.

Paper prototypes-The most basic level we have is paper prototyping: taking our printed-out wireframes or even drawings of our interface, and putting them in front of people.

Context prototype-Take a higher-end device that enables you to load full-screen images on it. Take your wireframes or sketches and load them onto the device, sized to fill the device screen.

HTML prototypes-This is a prototype that you can actually load onto a device and produce the nearest experience to the final product, but with static dummy content and data. It takes a little extra time, but it is worth the effort.

15 Define Subpixels.

A subpixel is the division of each pixel into a red, green, and blue (or RGB) unit at a microscopic level, enabling a greater level of antialiasing for each font character or glyph. The addition of these RGB subpixels enables the eye to see greater variations of gray, creating sharper antialiasing and crisp text.

16 What is Pixel Density?

The pixel density is determined by dividing the width of the display area in pixels by the width of the display area in inches. As this applies to mobile devices, the higher the density of pixels, the sharper the screen appears to the naked eye. This guideline especially applies to type, meaning that as text is antialiased on a screen with a high density of tiny pixels, the glyph appears sharper to the eye.

17 What are all the ways of defining a Color Palette?

Sequential:- In this case, there are primary, secondary, and tertiary colors. Often the primary color is reserved as the “brand” color or the color that most closely resembles the brand’s meaning. The secondary and tertiary colors are often complementary colors.

Adaptive:- An adaptive palette is one in which you leverage the most common colors present in a supporting graphic or image.

Inspired:- This is a design that is created from the great pieces of design you might see online or offline, in which a picture of the design might inspire you. This could be anything from an old poster in an alley, a business card, or some packaging. Like with the adaptive palette, you actually extract the colors from the source image, though you should never ever use the source material in a design.

18 List out the rules to be followed for Readability in mobile design?

- α. Use a high-contrast typeface
- β. Use the right typeface
- χ. Provide decent leading (rhymes with “heading”) or line spacing
- δ. Leave space on the right and left of each line; don’t crowd the screen
- ε. Generously utilize headings
- ϕ. Use short paragraphs

19 What is an Iconography?

The most common form of graphics used in mobile design is icons. Iconography is useful to communicate ideas and actions to users in a constrained visual space. The challenge is making sure that the meaning of the icon is clear to the user.

20 List out some Design tool and interface toolkits for different mobile frameworks?

Mobile framework	Design tool	Interface toolkits
Java ME	Photoshop, NetBeans	JavaFX, Capuchin
BREW	Photoshop, Flash	BREW UI Toolkit, uiOne, Flash
iPhone	Photoshop, Interface Builder	iPhone SDK
Android	Photoshop, XML-based themes	Android SDK
Palm webOS	Photoshop, HTML, CSS, and JavaScript	Mojo SDK
Mobile web	Photoshop, HTML, CSS, and JavaScript	W3C Mobile Web Best Practices
Mobile widgets	widgets Photoshop, HTML, CSS, and JavaScript	Opera Widget SDK, Nokia Web Runtime
Mobile web apps	Photoshop, HTML, CSS, and JavaScript	iUI, jQTouch, W3C Mobile Web App Best Practices

UNIT-V WEB INTERFACE DESIGN

Designing Web Interfaces – Drag & Drop, Direct Selection, Contextual Tools, Overlays, Inlays and Virtual Pages, Process Flow. Case Studies.

PART-A

1 **List any five events available for cueing the user during a drag and drop interaction?**

- Page Load
- Mouse Hover
- Mouse Down
- Drag Initiated
- Drag Leaves Original Location.

2 **Define Grid.**

The grid is a handy tool for planning out interesting moments during a drag and drop interaction. It serves as a checklist to make sure there are no “holes” in the interaction.

3 **Explain Placeholder targeting and Midpoint boundary.**

Placeholder targeting - Most explicit way to preview the effect.

Midpoint boundary - Requires the least drag effort to move modules around.

4 **Explain Full-size module dragging and Ghost rendering.**

Full-size module dragging - Coupled with placeholder targeting and midpoint boundary detection, it means drag distances to complete a move are shorter.

Ghost rendering - Emphasizes the page rather than the dragged object. Keeps the preview clear.

5 **What do you mean by drag lens?**

A drag lens provides a view into a different part of the list that can serve as a shortcut target. It could be a fixed area that is always visible, or it could be a miniature view of the list that provides more rows for targeting. The lens will be made visible only during dragging. Example: Dragging the insertion bar while editing text on the iPhone.

6 **When a drop will be invalid in Yahoo! Mail?**

- The dragged object’s icon becomes a red invalid sign.
- If over an invalid folder, the folder is highlighted as well.

7 **When a drop will be valid in Yahoo! Mail?**

- The dragged object’s icon changes to a green checkmark.
- The drop target highlights.

8 **Write the good rule of thumb on drag initiation from the Apple Human Interface Guidelines.**

Your application should provide drag feedback as soon as the user drags an item at least three pixels. If a user holds the mouse button down on an object or selected text, it should become draggable immediately and stay draggable as long as the mouse remains down.

9 **What do you mean by drag and drop collection?**

A variation on dragging objects is collecting objects for purchase, bookmarking, or saving into a temporary area. This type of interaction is called Drag and Drop Collection.

10 **List the four broad areas where Drag and Drop may be employed.**

Module, List, Object, Action

11 **What do you mean by Object Selection?**

On the desktop, the most common approach is to initiate a selection by directly clicking on the object itself. We call this selection pattern Object Selection. Object Selection is used for initiating a drag drop.

12 **What is meant by Toggle Selection?**

The most common form of selection on the Web is Toggle Selection. Checkboxes and toggle buttons are the familiar interface for selecting elements on most web pages. Example: Yahoo! Mail Classic. Toggle Selection is used for selecting bookmarks for editing, deleting, etc.

13 **Define Collected Selection.**

Collected Selection is a pattern for keeping track of selection as it spans multiple pages. Gmail does provide a way to select all items across different pages. When selecting all items on a individual page (with the "All" link), a prompt appears inviting the user to "Select all 2785 conversations in Spam". Clicking that will select all items across all pages. The "Delete Forever" action will operate on all 2785 conversations, not just the 25 selected on the page.

14 **Explain Hybrid Collection.**

Hybrid Selection brings with it the best of both worlds. You can use the checkbox selection model as well as normal row selection. You get the benefit of explicit selection and simplified multiple selection that Toggle Selection brings. And you get the benefit of interacting with the message itself and direct object highlighting.

15 **Define Fitts's Law.**

Fitts's Law is an ergonomic principle that ties the size of a target and its contextual proximity to ease of use. Bruce Tognazzini restates it simply as:

The time to acquire a target is a function of the distance to and size of the target.

In other words, if a tool is close at hand and large enough to target, then we can improve **the user's interaction.**

16 **What do you mean by Contextual Tools?**

Contextual Tools are **the Web's version of the desktop's right-click menus.** Instead of having to right-click to reveal a menu, we can reveal tools in context with the content.

17 **What are the issues with showing contextual tools in an overlay?**

1. Providing an overlay feels heavier. An overlay creates a slight contextual switch for **the user's attention**.
2. The overlay will usually cover other information – information that often provides context for the tools being offered.
3. Most implementations shift the content slightly between the normal view and the overlay view, causing the users to take a moment to adjust to the change.
4. The overlay may get in the way of navigation. Because an overlay hides at least part of the next item, it becomes harder to move the mouse through the content without **stepping into a "landmine."**

18 **Define Mystery Meat and Soft Mode.**

Mystery Meat - It is a common anti-pattern that occurs when you have to hover over an item to understand how to use it.

Soft Mode - If a mode is *soft* it is usually acceptable. By **"soft"** we mean the user is not trapped in the mode.

19 **Define Muttons.**

Muttons (menu + button = mutton) are useful when there are multiple actions and we **want one of the actions to be the default**. Yahoo! Mail uses a mutton for its **"Reply"** button. It is a variation on Multi-Level Tools. Muttons are used to:

- Provide a default button action (**"Reply to Sender"**)
- Provide a clue that there are additional actions.
- Provide additional actions in the drop-down.

20 **Define overlays and inlays.**

Overlays - Instead of going to a new page, a mini-page can be displayed in a lightweight layer over the page.

Inlays - Instead of going to a new page, information or actions can be inlaid within the page.

21 **List the three specific types of overlays.**

- Dialog Overlays
- Detail Overlays
- Input Overlays

22 **When should an overlay be used?**

- Use an overlay when there may be more than one place a dialog can be activated from
- Use an overlay to interrupt the process.
- Use an overlay if there is a multi-step process.

23 When should an inlay be used?

- Use an inlay when you are trying to avoid covering information on the page needed in the dialog.
- Use an inlay for contextual information or details about one of many items (as in a list): a typical example is expanding list items to show detail.

24 What are the Patterns that support virtual pages?

- Virtual Scrolling
- Inline Paging
- Scrolled Paging
- Panning
- Zoomable User Interface

25 Compare paging and scrolling.

- When the data feels “more owned” by the user** – in other words, the data is not transient but something users want to interact with in various ways. If the users want to sort the data, filter it, and so on, consider Virtual Scrolling (as in Yahoo! Mail).
- When the data is more transient (as in search results) and will get less and less relevant the further users go in the data, Inline Paging works well (as with the iPhone).
- For transient data, if you don’t care about jumping around in the data to specific sections, consider using Virtual Scrolling** (as in Live Image Search).
- If you are concerned about scalability and performance, paging is usually the best **choice. Originally Microsoft’s Live Web Search also provided a scrollbar.**
- If the content is really continuous, scrolling is more natural than paging.
- If you get your revenue by page impressions, scrolling may not be an option for your business model.
- If paging causes actions for the content to become cumbersome, move to a scrolling model.

26 List out the process flow patterns.

- Interactive Single-Page Process
- Inline Assistant Process
- Configurator Process
- Overlay Process
- Static Single-Page Process