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MAINLAND LECTURE CENTER

CIT353: INTRODUCTION TO HUMAN COMPUTER INTERACTION

Briefly describe the following effects:

i) Hypertext
ii) Hypermedia
iii) Animation

ANSWER

Hypertext is text displayed on a computer display or other electronic devices with references to other text that the reader can immediately access. Hypertext documents are interconnected by hyperlinks, which are typically activated by a mouse click, keypress set or by touching the screen.It is also described as a non-linear browsing structure and comprises simple,
universal protocols (e.g. HTTP) and mark-up languages (e.g. HTML) that made publishing and accessing easy.

Hypermedia
It is also referred to as multimedia.the term was used for simple audio and video effects.hypermedia is not just a text but hypertext system containing additional media such as illustrations,photograps,videos and sounds.links and hotspots may be media with their pictures,the time and location invideo

Animation
Animation is adding motions to images particularly images that can not change in time.examples are digital faces that takes seconds to tick past or warp into the next analogue face with hands swept around the clock face. Animation comprises live displays for showing status and progress, flashing caratact text entry location)busy cursors(in form of hour glass,clock and spinning disc) and progress bars.it is used for educational training making students see things through introduction of interesting and entertaining images

State the management issues concerned with:

i) Interactive design

ii) prototyping techniques

answer

Interactive design

- Time allocated to the design,
- Planning the design,
- Non-functional features of the design and
- Contracts of the design.

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prototyping techniques

- Storyboards which need not be computer-based but can be animated
- Limited functionality simulations in which some part of the system functionality is provided by designers. Such tools like HyperCard are common.
- Wizard of Oz technique
- Warning about the iterative design. These show concerns about the design inertia in which early bad decisions stay bad. It is better to diagnose the real usability problems in prototypes; and not just the symptoms

Briefly state and explain the four (4) tasks of the software process of Human Computer Interaction

Answer

- Software engineering and the design process for interactive systems
- Usability engineering
- Iterative design and prototyping
- Recording the design knowledge using the design rationale

How many stages are involved in the *Donald Normans model ?*

Answer

There are 7 stages involved in Donald Normans model and they are;

- The user establishes the goal
- The user formulates intention
- The user specifies actions at interface
- The user executes the action
- The user perceives the system state
- The user interprets the system state
- The user evaluates the system state with respect to goal

Explain the term 'Ergonomics'. Give any two examples

answer

This considers both the physical aspects of interfaces and the industrial interfaces.
Ergonomics is the study of the physical characteristics of interaction. It is known as human factors.
Ergonomics is good at defining standards and guidelines for constraining the way we design certain aspects of systems
Examples of Ergonomics include:
Arrangement of controls and displays such as the controls grouped according to function, frequency and sequence of use.
Surrounding environment such as the seating arrangements adaptable to cope with all sizes of user, health issues such as the physical position, environmental conditions (temperature, humidity), lighting, and noise

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Compare Participatory design and Ethnography design in Human Computer Interaction Answer

In **participatory design**, workers enter into design context while in **ethnography design**(as used for design), the designer enters into work context. Both make workers feel valued in design and encourages workers to 'own' the products. The user is an active member of the design team.

State the characteristics of Participatory design

Answer

Participatory design is context and work oriented rather than system oriented. It is collaborative and iterative

Methods involved are: brain-storming, storyboarding, workshops, pencil and paper exercises

State the ethics and methods involved in Participatory design

answer

The ethics involved the participatory socio-technical approach devised by Mumford.

It states that the system development is about managing change and that non-participants are more likely to be dissatisfied

Differentiate between the objectives of interactive design and prototyping

Answer

Iterative design overcomes inherent problems of incomplete requirements while prototypes simulate or animate some features of intended system.

Different types of prototypes can be identified as: (i) throw-away, (ii), incremental and (iii) evolutionary

State the various knowledge required to build an adaptive help system Answer

These use knowledge of the context, the individual user, the task, the domain and the instruction to provide help adapted to the user's needs.

Which of the knowledge in adaptive help system is easiest to provide? Where can the knowledge be got? What is its disadvantage?

Answer

Individual user is the easiest to provide.the knowledge can be gotten from practice and the disadvantage is the initiative(the question is whether the user retain control or can the system direct the interaction of the user, and can the system interrupt the user to offer help?)

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Which of the knowledge in adaptive help system is most difficult to provide and why? answer
The problems with adaptive help systems are that they require considerable knowledge, the interaction is not controlled and it is difficult knowing what should be adapted and the scope of the adaptation.

Extensively discuss video and audio effects in human computer interaction
Answer

Video and Audio effects.
The current technology on improved.Tools are now available to edit sound.They are easy to embed in web page.The memory occupied could be man It can however affect the download t
and sometimes frustrating. It may be hard to add 'links' in hyper Using animation and video.Animations and videos are potential arcade games. But how do we harness the full possibility.In order to gain more experience from theorists, cartoonists, artists and so on

A sound **effect** (or **audio effect**) is an artificially created or enhanced sound, or sound process used to emphasize artistic or other content of films, television shows, live performance, animation, **video**games, music, or other media.

Digital Video Effects, commonly called **DVE**s, are visual effects that provide comprehensive video image manipulation, in the same form as optical printer effects in film. DVEs differ from standard video switcher effects (often referred to as "analog effects") such as wipes or dissolves, in that they deal primarily with resizing, distortion or movement of the image. Modern video switchers often contain internal DVE functionality.

Givetwo (2) advantage and one (1) challenge arising from the application of video and audio effects in web browsing and hypertext

answer

Advantages:
Greater immersion: Adding multimedia elements to a Web page make it easier to draw in viewers. While video is the most popular multimedia addition, sites also add audio and interactive content to attract and hold the attention of the viewers.

Better branding:
While HTML 5 text-based sites are more elaborate than websites of the past, they are still limited in many ways. It is hard to represent a brand's image without including audio or video content to support it. As such, multimedia sites are frequently preferred by marketing departments because of their ability to completely present branding

Challenges
Loading Times
While the days of measuring page load times on a slow, dial-up modem are over, multimedia content still takes longer to load than static content. Presenting a user who visits a site with a screen that says "Please Wait.....Loading" frequently results in a viewer clicking away to a different page.

Give two methods by which universal design can be realized? Give an example of each method. Answer
Universal design is the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design.

Delivery methods.
Use multiple, accessible instructional methods that are accessible to all learners. Example: Use multiple modes to deliver content; when possible allow students to choose from multiple options for learning; and motivate and engage students—consider lectures, collaborative learning options, hands-on activities, Internet-based communications, educational software, field work, and so forth.

Accommodation
Plan for accommodations for students whose needs are not met by the instructional design. Example: Know campus protocols for getting materials in alternate formats, rescheduling classroom locations, and arranging for other accommodations for students with disabilitie

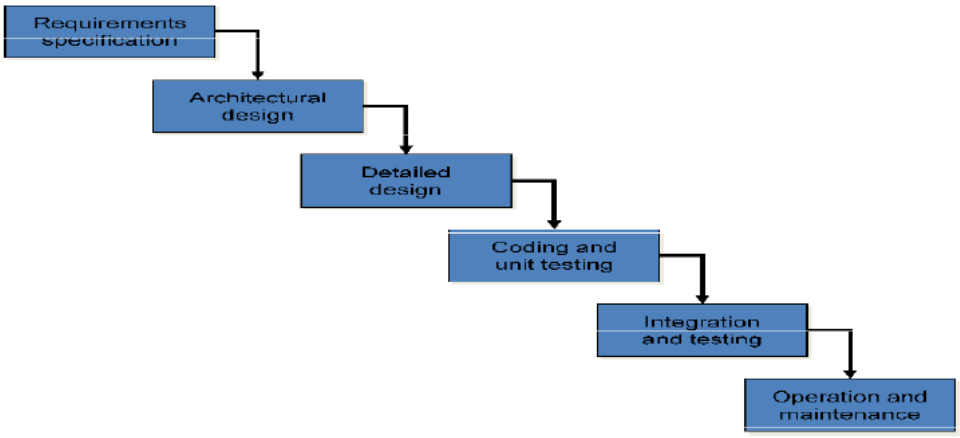
Assessment
regularly assess student progress using multiple accessible methods and tools, and adjust instruction accordingly. Example: Assess group and cooperative performance as well as individual achievement.

What is the function of the Boolean search used in conducting web search
Answer
Boolean search method that combines words with logic .g. if you want to find facts about engine only, write 'engin AND NOT car' . 'AND NOT 'is the Boolean expression

Describe"the Waterfall model" in the software design process of human computer interaction?
Answer
The waterfall model depicts the software life cycle.
The pictorial illustration that follows reflects a mountain top from where water f lls towards the bottom of the mountain, hence called a waterf ll. It shows the commencement of the life cycle (the requirements specification) through the design, co ding and testing processes to its ultimate ter mination (the operation and maintenance).

Draw a well-labelled diagram of the Waterfall model
answer

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State and briefly explain the activities involved in the Software lifecycle Answer

Requirements specification:

Here, the designer and client try to capture the system is expected to provide and can be expressed in natural language or more precise language such as a task analysis would provide

Architectural design:

This is a high-level description of the system will provide the services required. It describes how to factor system into major components of the system and how they are interrelate. It shows the needs to satisfy both functional and non-functional requirement

Detailed design

This concerns a refinement of architectural components and their interrelations to identify modules to implemented separately The refinement is governed by the non-functional requirement

Verification and validation

Verification: This is ensuring that the product is designed right

Validation: This is ensuring that the right product is designed

List five elements of interaction as provided by print technology

Answer

Fonts, Page description, What You See Is What You Get (WYSIWYG), Scanning, Optical Character Reading (OCR)

Discuss four of the elements of interaction listed in print technology

ANSWER

Fonts

Font is a particular style of text according to some examples given below;

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Courier font, Helvetica font, Palatino font, Times Roman font, IIIITICIIIMITI (special symbol) Size of a font is measured in points (1 point is about 1/72"), about related to its height

Page Description Languages
Useful when pages become very complex with different fonts, bitmaps, lines, digitised photos, etc. Description languages can convert all into a bitmap and send to the printer.
Using a page description language sends a description of the page for example, instructions for curves, lines, text in different styles, etc. can be sent. It is like a programming language for printing!
PostScript is the most common form of Page description language

Optical Character Recognition (OCR):
Optical character recognition (OCR) converts bitmap back into text with different fonts creating problems for simple "template matching" algorithms.
However, more complex systems segment text, decompose it into lines and arcs, and decipher characters that way.
Page formatting is done on columns, pictures, headers and footers

Scanners
These accept paper and convert it into a bitmap Two sorts of scanner exist:
Flat-bed: Here paper is placed on a glass plate with whole page converted into bitmap Hand-held: Here scanner is passed over paper, digitising strip typically 3-4" wide Shines light at paper and note intensity of reflection with colour or greyscale
Typical resolutions are from 600-2400 dpi
Scanners are used in desktop publishing for incorporating photographs and other images.
They are used in document storage and retrieval systems thereby doing away with paper storage. Special scanners exist for slides and photographic negatives

Human Computer Interaction (HCI) is also sometimes referred to as Man–Machine Interaction (MMI) or Computer–Human Interaction (CHI). Explain?

ANSWER

Since human-computer interaction studies a human and a machine in conjunction, it draws from supporting knowledge on both the machine and the human side. On the machine side, techniques in computer graphics, operating systems, programming languages, and development environments are relevant. On the human side, communication theory, graphic and industrial design disciplines, linguistics, social sciences, cognitive psychology, and human performance are relevant. Engineering and design methods are also relevant

Outline with valid examples five goals of HCI.

ANSWER

− Methodologies and processes for designing interfaces in their related styles (i.e., given a task and a class of users, design the best possible interface within given constraints, optimizing for a desired property such as learn ability or efficiency of use)
− Methods or techniques for implementing interfaces (e.g. software toolkits and libraries; efficient algorithms)
− Techniques for evaluating and comparing interfaces

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− Developing new interfaces and interaction techniques
− Developing descriptive and predictive models and theories of interaction
− Design systems that minimize the barrier between the human's cognitive model of what they want to accomplish and the computer's understanding of the user's task.

Discuss the concepts of Multi-modal and Multi-media systems

ANSWER

Multi-modal systems

These use more than one sense (or mode) of interaction as in visual and aural senses. For example, a text processor may speak the words as well as echo them to the screen

Multi-media systems

These use a number of different media to communicate information. For example, a computer-based teaching system may use video, animation, text and still images; different media all using the visual mode of interaction. These may also use sounds, both speech and non-speech. Of course two or more media now use different modes.

In your own words, explain in clear terms the following concepts:

Ergonomics

Common Interaction styles

Multi-Sensory Systems

ANSWER

ERGONOMICS

Ergonomics is the study of the physical characteristics of interaction. It is known as human factors. Ergonomics is good at defining standards and guidelines for constraining the way we design certain aspects of systems

Common Interaction styles

Two major classes of interaction styles will be considered, they are:- Dialogue Style of Interaction between computer and user Distinct styles of interaction.
Both are expressed in the following common forms of interfaces:
Command line interface
Menus
Natural language
Question and answer, and query dialogue

Multi-Sensory Systems

Here, more than one sensory channel are involved in interaction as in sounds, text, hypertext, animation, video, gestures and vision.
They are used in a range of applications particularly for users with special needs and virtual reality.
The components of Multi-Sensory systems are: Speech, Non-speech sounds, Handwriting, together with their applications and principles

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Differential between these participatory design
User-design versus User-centered design
Ethnography and Participatory design
Discuss briefly the distributed participatory design

ANSWER

User-design versus User-centered design:

There is a very significant differentiation between user-design and User-centered design.
There is an emancipatory theoretical foundation and systems theory bedrock on which user-design is founded. In user-centered design, users are taken as centers in the design process, consulting with users heavily, but not allowing users to make the decisions, nor empowering users with the tools that the experts use. For example, most of the internet documentation and information content are user-designed. Users are given the necessary tools to make their own entries. While users are allowed to propose changes or have input on the design, a smaller and more specialized group decide about features and system design

Ethnography and Participatory design

In participatory design, workers enter into design context while in ethnography (as used for design), the designer enters into work context. Both make workers feel valued in design and encourages workers to 'own' the products. The user is an active member of the design team

Distributed participatory design

Distributed Participatory design (DPD) is a design approach and philosophy that supports the direct participation of users and other stakeholders in system interaction analysis and design work. Nowadays design teams most often are distributed, which stress a need for support and knowledge gathered from design of distributed systems. Distributed Participatory design aims to facilitate understanding between different stakeholders in distributed design teams by giving each the opportunity to engage in hands-on activities

Define the concept HCI design pattern and outline five of its' characteristics

ANSWER

An HCI design pattern is an approach to reusing knowledge about successful design solutions Patterns do not exist in isolation but are linked to other patterns in languages which enable complete designs to be generated

The characteristics of patterns include the following:

- Capturing the design practice and not the theory
- Capturing the essential common properties of good examples of design
- Representing design knowledge at varying levels of social, organisational, and conceptual framework
- Embodying values and expressing what is humane in interface design
- Patterns are intuitive and readable and can therefore be used for communication between all stakeholders
- A pattern language should be generative and assist in the development of complete designs.

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Explain the paradigms of interaction in HCI

ANSWER

Paradigms of interaction conceptually outline the arrival of new technologies creating a new perception of the human-computer relationship.
Some of these paradigms shifts can be traced in the history of interactive technologies as follows:. Batch processing
Timesharing
Networking
Graphical display
Microprocessor
World Wide Web (WWW)

What do you understand by the expression Human Computer Interaction?

ANSWER

"Human-computer interaction is a discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them.

Because of the interaction that occurs between users and computers at the interface of software and hardware such as between computer peripherals and large-scale mechanical systems in aircraft and power plants, human-computer interaction is the study of that interaction between people (otherwise calledusers) and computers. It can also be regarded as the intersection of computer science, behavioral sciences, design and several other fields of study.

Explain any 5 innovations relating to the history of paradigm shifts

ANSWER

batch processing
The initial paradigm started with **batch processing** that signified impersonal computing.

timesharing
The paradigm shifts commenced from **timesharing** processing system that signified an interactive computing

networking
This was followed by another paradigm shift in **networking** that represented a community computing

graphical display
The **graphical display** was an innovation whose era indicated a paradigm shift to direct manipulation of devices

Micro processor
The **Micro processor** innovation provided opportunity for personal computing as an example of another provided paradigm shift

World Wide Web (www)

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The **World Wide Web (www)** turned the world into a global village by creating environment for a global information access and transmission. This represents a significant paradigm shift in the life of education people all around the world

Ubiquitous computing
Ubiquitous computing can be regarded as another paradigm shift as it is presently a symbiosis of physical and electronic worlds in service of everyday activities

Mention any 5 scientific methods of conducting research in human-computer interaction.
ANSWER

field study, user requirements, iterative design, usability evaluation, task analysis, focus groups, formal heuristics evaluation, user interviews, prototype without user testing, surveys, informal expert review, card sorting, participatory design

What do you understand to be "Touch Sensitive Screen"?
ANSWER

A touch-sensitive screen detects the presence of finger or stylus on the screen. It works by interrupting matrix of light beams, capacitance changes or ultrasonic reflections. It is a direct pointing device.

Mention 3 advantages and 2 disadvantages of the touch sensitive screen interface
ANSWER

Advantages are:
– It is fast, and requires no specialised pointer
– It is good for menu selection
– It is suitable for use in hostile environment; being clean and safe from damage.
- **Disadvantages:**

– Finger can mark the screen
– It could be imprecise because the finger is a fairly blunt instrument!, hence difficult to select small regions or perform accurate drawing
– The user lifting his arm can be tiring

Mention 5 health hazards that may likely exist as a result of interacting with the CRT.
ANSWER

X-rays are largely absorbed by the screen though not from the rear.

Ultra Violet and Intra Red radiations emanate from phosphors in the tube but at insignificant levels. Radio frequency emissions, plus ultrasound about 16kHz, are common.

Electrostatic field leaks out through tube to the user. The Intensity is dependent on distance and humidity and this can cause rashes to the user.

Electromagnetic fields between 50Hz and 0.5MHz create induction currents in conductive materials,

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including the human body. Two types of effects are attributed to this: effect on visual system with high incidence of cataracts in VDU operators, and concern over reproductive disorders such as miscarriages and birth defects

What are multisensory systems and their components

ANSWER

Multi-Sensory Systems

Here, more than one sensory channel are involved in interaction as in sounds, text, hypertext, animation, video, gestures and vision.

They are used in a range of applications particularly for users with special needs and virtual reality.

The components of Multi-Sensory systems are: Speech, Non-speech sounds, Handwriting, together with their applications and principles

Explain the three types of Recognition and Gestures mode of interaction.
Mention areas where each is effectively applied.

ANSWER

Touch recognition

It comprises of Haptic interaction made up of cutaneous perception that provide tactile sensation and vibrations on the skin.it also comprises Kinaesthetic comprising movement and position and force feedback.

Touch recognition also includes information on shape, texture, resistance, temper ature, and comparative and spatial factors.

Handwriting recognition

Handwriting is another communication mechanism which we are used to in day-to-day life The technology of handwriting consists of complex strokes and spaces.

The handwriting is captured by digitising tablet through strokes transformed to sequence of dots. Large tablets available are suitable for digitising maps and technical drawings.

Smaller devices, some incorporating thin screens are used to display the information. Such include PDAs such as Palm Pilot and tablet PCs.

Gesture technology

This can be found in its various applications such as in gestural input - e.g. "put that there" and sign language. The technology comprises data glove and position sensing devices such as MIT Media Room. Gesture provides the benefits of natural form of interaction by pointing.

Mention any 3 devices that aid the elderly and the disabled in human computer interaction.

ANSWER

Visual impairment: Use of screen readers and Sonic Finder

Hearing impairment: Use of text communication, gesture and captions

Physical impairment: Use of speech input and output, eye gaze, gesture, predictive systems (e.g. reactive keyboard)

Speech impairment: Use of speech synthesis and text communication

Dyslexia: Use of speech input and output

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Autism: Use of communication and education devices

What is Knowledge representation?

ANSWER

Knowledge representation

Knowledge representation occurs when knowledge is presented as rules, and facts are interpreted using inference mechanism.
The domain and task modelling of the knowledge representation covers common errors and tasks particularly the current task.
It usually involves the analysis of command sequences.
However the problems here are concerned on how to represent the tasks particularly when interleaved, and how to know the user's intention.

Describe the rule based, the frame based and the networked based techniques of Knowledge representation

Answer

Network based

The knowledge is network based when represented as relationships between facts and can be used to link frames.
It is example based when the knowledge is represented implicitly within decision structure and trained to classify rather than programmed with rules. This one requires little knowledge acquisition

Rule based

The techniques for knowledge representation are rule based (e.g. logic, production rules) when knowledge are presented as rules and facts are interpreted using inference mechanism. They can also be used in relatively large domains..

frame based

It is frame based (such as a semantic network) when knowledge stored in structures with slots are to be filled but useful for a small domain

What is the problems with knowledge representation and modeling?

ANSWer

The problems here include knowledge acquisition, the resources and the interpretation of user behavior

What are the major components of the web technology?

answer

The major components of web technology are protocols, browsers and standards

Mention the four golden rules of the design

answer

1. Strive for consistency

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2. Enable frequent users to use shortcuts
3. Offer informative feedback
4. Design dialogs to yield closure
5. Offer error prevention and simple error handling
6. Permit easy reversal of actions
7. Support internal locus of control
8. Reduce short-term memory load

What is the full meaning of the following acronyms? (i) PDAs (ii) CSCW (iii) WYSIWYG (iv) MMI (v) RAM (vi) CAD (vii) DVST (viii) GUI

Answer

PDAS:Personal digital assistant
CSCW: computer supported cooperative work
WYSIWYG: What You See Is What You Get
MMI:MAN-MACHINE INTERACTION
RAM: Random Access Memory
CAD:COMPUTER AIDED DESIGN
DVST: Direct view storage tube
GUI:GRAPHICAL USER INTERFACE

What do you understand by principles of Robustness. answer

Principle of Robustness: This is the level of support provided the user in determining successful achievement and assessment of goal-directed behavior

Mention AND EXPLAIN three (3) principles of Robustness answer

Observability: This is the ability of the user to evaluate the internal state of the system from its perceivable representation. It considers the browsability, the defaults, the reachability, the persistence , and the operation visibility.
Recoverability: This concerns the ability of the user to take corrective action once an error has been recognized. It looks at the reachability, the forward and backward recovery and the commensurate effort.
Responsiveness: This is how the user perceives the rate of communication with the system and how stable is the response.
Task conformance: This explains the degree to which system services support all of the user's tasks, the task completeness and its adequacy.

Give the full meaning of the following acronyms: (i) TCP (ii) IP (iii) WAP (iv) WI-FI (v) MAN (vi) ATM (vii) WWW (viii) GPS

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ANSWER

TCP: Transmission Control protocol
IP: Internet Protocol
WAP: Wireless Advance Protocol **WI-FI:** wireless fidelity **MAN:**Metropolitan area network **ATM:** Automated Teller Machine **WWW:**WORLD WIDE WEB
GPS:GLOBAL POSITIONING SYSTEM

List and explain three types of topologies
answer

STAR TOPOLOGY

A star network is an implementation of a spoke–hub distribution paradigm in computer networks. In a star network, every host is connected to a central hub. In its simplest form, one central hub acts as a conduit to transmit messages. The star network is one of the most common computer network topologies

RING TOPOLOGY

A ring network is a network topology in which each node connects to exactly two other nodes, forming a single continuous pathway for signals through each node - a ring. Data travels from node to node, with each node along the way handling every packet.

TREE TOPOLOGY

A tree network, or star-bus network, is a hybrid network topology in which star networks are interconnected via bus networks. Tree networks are hierarchical, and each node can have an arbitrary number of child nodes.

List AND EXPLAIN any three types of prototype methods?
answer

Rapid Prototyping

Rapid prototyping is a method used in the early stages of development to validate and refine the usability of a system. It can be used to quickly and cheaply evaluate user-interface designs without the need for an expensive working model. This can help remove hesitation to change the design, since it is implemented before any real programming begins. One such method of rapid prototyping is paper prototyping.

Subject Testing methods

These usability evaluation methods involve testing of subjects for the most quantitative data. Usually recorded on video, they provide task completion time and allow for observation of attitude

Remote usability testing

Remote usability testing is a technique that exploits users' environment (e.g. home or office), transforming it into a usability laboratory where user observation can be done with screen sharing applications.

List any three (3) examples of Positioning, Pointing and Drawing Devices Answer

mouse, touchpad, trackballs, joysticks, touch screens, eye gaze and cursors.

Write short notes on the following: (i) Widgets
(ii) Command Line
(iii) Menus

Answer

Widgets

Widgets are bits that make the Graphical User Interface. They are the individual items on a Graphical User Interface (GUI). They can also be called the elements of the WIMP interface. Examples of widgets include the check boxes, the tool bars, the buttons, etc.

Command line interface

This is the way of expressing instructions to the computer directly through the function keys, single characters, short abbreviations, whole words, or a combination suitable for repetitive tasks.
The interface is better designed for expert users than novices because it offers direct access to system functionality.

Menus

Menus is a set of options displayed on the screen. The Menu Options are visible, it has a less recall characteristic that make it easier to use.
The visible options rely on recognition so the names should be meaningful. The selection is done through numbers, letters, arrow keys, mouse and/or combination of any of them e.g. mouse plus accelerators
Often, the options are hierarchically grouped. But sensible grouping is needed. Menus are restricted form of full WIMP system .

Write a short note on each of the following: (i) Graphics
(ii) Hypertext
(iii) Prototype

Answer

Graphics are visual images or designs on some surface, such as a wall, canvas, screen, paper, or stone to inform, illustrate, or entertain. In contemporary usage, it includes a pictorial representation of data, as in computer-aided design and manufacture, in typesetting and the graphic arts, and in educational and recreational software

Hypertext

Hypertext enables you to find inform ation by navigating the hyperspace using th webtechnology Hypertext is made up of rich content of graphics, audio, video, computation and nteraction **Prototype**
Prototypes are able to be modified quickly, often are faster and easier to create with less time invested by designers and are more apt to change design; although sometimes are not an adequate representation of the whole system, are often not durable and testing results may not be parallel to those of the actual system.

List five application software you know answer

Mozilla firefox
Whatsapp
Sofascore

Google chrome
VLC

Write short note on the following: (i) Icon
(ii) Stylus and light pen (iii) Networked computing

ANSWER

ICON
Icons comprise small picture or image that represents some object in the interface t often represents a window or action. The windows can be closed down or iconized. small representation may fit into any accessible windows.

Stylus and light pen
Stylus is a small pen-like pointer to draw directly on screen which may use touch sensitive surface or magnetic detection.
It is used in PDA, tablets PCs and drawing tables
Light Pen is now rarely used but uses light from screen to detect location.
Both stylus and light pen are very direct and obvious to use but they can obscure the screen.

Networked computing
Networks allow access to large memory and processing, access to other people (such as in groupware and email) and other shared resources especially the web
Issues relating to interaction in network computing are network delays which cause slow feedback, and unexpected processing delay as a result of many people updating data simultaneously.
Lastly is the unpredictability nature of networks

list two benefits of Usability

answer

The key benefits of usability are:
Increased user efficiency
Reduced development costs
Reduced support costs
Corporate integration

Distinguish between an interaction technique and an interaction style

answer

an interaction technique is an idea and a way to solve a particular user interface design problem. It does not always need to be bound to a specific input or output device. For example,
menus can be controlled with many sorts of pointing devices while in interaction style, Interaction techniques that share the same metaphor or design principles can be seen as belonging to the same interaction style. Examples are command line and direct manipulation user interfaces.
More details are provided in subsequent chapter of this guide

Differentiate between printers and scanners

answer

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Scanners
These accept paper and convert it into a bitmap Two
sorts of scanner exist:
Flat-bed: Here paper is placed on a glass plate with whole page converted into bitmap Hand-held: Here scanner is passed over paper, digitising strip typically 3-4" wide Shines light at paper and note intensity of reflection with colour or grayscale

Printers
This is an image made from small dots. It allows any character set or graphic to be printed. Critical features are resolution expressed in size, spacing of the dots in dots per inch (dpi). Speed is usually measured in pages per minute.

What is Virtual memory and its benefit in Computer processing?

answer

Problems calling for the use of virtual memory include running lots of programs. Each program could be very large but with insufficient RAM size to run it, hence the need for the use of Virtual memory.
The solution provided by Virtual memory is to store some programs temporarily on disk thereby making RAM appear bigger. But the program on disk that needs to run again and copied from disk to RAM slows down processing

What do you know of haptic devices and biosensors?

answer

Touch, feel and smell devices otherwise called haptic devices.
Here touch and feeling are important such as in games that involve vibration, and force feedback Also important in simulation that requires the feel of surgical instruments.
However, current technology in texture, smell and taste is very limited

Describe the function and value of Page Description

answer

Page Description Languages
Useful when pages become very complex with different fonts, bitmaps, lines, digitised photos, etc. Description languages can convert all into a bitmap and send to the printer.
Using a page description language sends a description of the page for example, instructions for curves, lines, text in different styles, etc. can be sent.
It is like a programming language for printing!
PostScript is the most common form of Page description language

Explain the characteristics of the eye gaze interaction.What are the specific difficulties experienced in handwriting recognition as a human interaction Medium

Answer

Eye gaze
This controls interface by eye gaze direction such as looking at a menu item to select it. It uses laser beam reflected off retina at a very low power laser!
It is mainly used for evaluation and has potential for hands-free control.

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Its high accuracy requires headset. The cheaper and lower accuracy devices are available under the screen like a small web cam.

The difficulties experienced for handwriting recognition

The problems associated with handwriting recognition are personal differences in letter formation and coarticulation effects. The breakthroughs in this technology is the creation of stroke not just bitmap found in special 'alphabet' like Graffeti on PalmOS

The technology is usable even without training though many people prefer to use the keyboards

What is the reason for the difference in the arrangement of Numeric keypads existing between your phone keyboard and the calculator keyboard

answer

The keys are very, very cheap, but slow and provide basic motion for text-editing tasks.

What are the four constituent aspects of Context analysis? How are they of benefits to the user interacting with the computer system?

Answer

physical context, technical context, organizational context, and social and cultural context.

Overall, context analysis can provide ideas for design factors such as metaphor creation, selection and patterns of communications between users and the system.

What are Cascading menus and Keyboard accelerators?

Answer

Cascading menus

This has a hierarchical menu structure in which a menu selection opens new menu and so in ad infinitum

Keyboard accelerators

This comprises key combinations with same effect as menu item. They operate in two modes

− active when menu open — usually first letter and

− active when menu closed — usually Ctrl + letter

What are slips and mistakes in human Computer interaction and how do you avoid such slips and mistakes before they occur?

Answer

Slips may include lack of understanding the system goal,incorrect formulation of actions,incorrect actions and mistake of not even having the right goal.

To fix slips, better interface design should be carried out while to avoid mistakes, one should better understand the system

What is speech Synthesis and how is it valuable to the computer user? Give two examples of its application.

answer

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Speech systhesis
This is a generation of speech.it is useful because of its natural and familiar way of receiving information. It is successful in certain constrained applications when the user has few alternatives and is particularly motivated to overcome problems.examples are Auditory Icons,family ear con

Distinguish between an auditory icon and an earcon. Explain the limitation of their applications

answer

Auditory Icons
These use natural sounds to represent different types of object or action.natural sounds have associated semantics which can be mapped into similar meaning in the interaction.problems sometimes arises because not all things have associated meanings
Earcons
These are synthetic sounds used to convey information.they may comprise of the combination or notes or or motives that represent actions of the object. It is harder to associate with the interface task since there is no natural mapping

Organizational factors can make or break a system". Explain the concepts of this expression as it affects users in an organization when designing a new interactive computer system.

Answer

Organisational factors can make or break a system. Studying the work group is not sufficient since any system is used within a wider context and the crucial people need not be the direct users.
Therefore, before installing a new system, one must understand:

- Who benefits?
- Who puts in effort?
- The balance of power in the organisation and how the system will be affected. Even

when a system is successful, it may be difficult to measure that success

What do you understand by a Computer Supported cooperative Work (CSCW) in an organization. Why is it important to identify and consider stakeholders when designing interactive systems in an organization?

Answer

In computer supported cooperative work (CSCW), people and groups have conflicting goals hence the systems design assumes cooperation will fail! For example, in a computerised stock control, the store man looses control of information and may decide to subvert the system before or after it becomes operational. Therefore, it is important to identify stakeholders — not just the users.

Its important to identify and consider stakeholders when designing interactive systems in an Organization because Stakeholder is anyone affected by success or failure of system. the success or failure of the new system

Who is a stakeholder in a human computer interaction? Differentiate between a primary stakeholder, a secondary stakeholder and a facilitator of a newly designed interactive system

answer

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Stakeholder is anyone affected by success or failure of system. The primary stakeholders actually use the system, the secondary receive output or provide input, while the tertiary have no direct involvement but are those affected by
the success or failure of the new system

Differentiate between the different goals of the six stage model of Stakeholders' focus and the eight stage model of ESTA within the human aspects of interactive design.

Answer

ESTA (Eight Stage Task Analysis)
This is an eight stage model that focuses on taskThe primary task is identified in terms of users' goals
Secondly, task inputs to the system are identified
Thirdly, the external environment into which the system will be introduced is described, including physical,economic and political aspects
Fourthly, the transformation processes within the system are described in terms of actions performed on or with objects
In the **fifth stage**, the social system is analyzed by considering existing internal and external work-groups and relationships
At the **sixth stage**, the technical system is described in terms of configuration and integration with other systems
At the **seventh stage**, the performance satisfaction criteria are established, indicating social and technical requirements of the system.
The **last stage** specifies the new technical system.

Stakeholders' Focus
This comprises six stage processes that focus on stakeholders
The **first** describes the organizational context, including primary goals, physical characteristics, political and economic background.
The **second** identifies and describes the stakeholders including personal issues, role in the organization and their job.
The **third** identifies and describes the work-groups whether formally constituted or not
The **fourth** identifies and describe task—object pairs; these are tasks to be performed and objects used The **fifth** identifies the stakeholder needs: Stages 2—4 described above are in terms of both current and proposed system, the stakeholder needs are identified from the differences between the two.
Lastly, we consolidate and check the stakeholder requirements against earlier criteria.

What is the full meaning of the acronym "CATWOE"?

answer

Clients, Actors, Transformation, World View, Owner, Environment

Explain what you understand by Participatory Design of Human Computer Interaction. What are its characteristics and the Ethics involved?

answer

Participatory design
In participatory design, workers enter into design context while in ethnography (as used for design), the designer enters into work context. Both make workers feel valued in design and encourages

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workers to 'own' the products. The user is an active member of the design team

Characteristics
Participatory design is context and work oriented rather than system oriented. It is collaborative and iterative
Methods involved are: brain-storming, storyboarding, workshops, pencil and paper exercises

Ethics
The ethics involved the participatory socio-technical approach devised by Mumford.
It states that the system development is about managing change and that non-participants are more likely to be dissatisfied.
There are three levels of participation: consultative, representative, and consensus.
Design groups including stakeholder representatives make design decisions and job satisfaction is the key to solution

Explain the following methods of inquiry in usability evaluation: Task analysis, Group Focus, Questionnaire and Survey methods

ANSWER

Task Analysis
Task analysis means learning about users' goals and users' ways of working. Task analysis can also mean figuring out what more specific tasks users must do to meet those goals and what steps they must take to accomplish those tasks.

Group Focus
A focus group is a focused discussion where a moderator leads a group of participants through a set of questions on a particular topic. Although typically used as a marketing tool, Focus Groups are sometimes used to evaluate usability.

Questionnaires/Surveys
Surveys have the advantages of being inexpensive, require no testing equipment, and results reflect the users' opinions

Briefly explain the following inspection methods: Card sorting (ii) Ethnography (iii) Heuristic evaluation (iv) Usability inspection (v) Activity analysis

ANSWER

CARD SORTING
Card sorting is a way that involves users in grouping information for a website's usability review. Participants in a card sorting session are asked to organize the content from a Web site in a way thatmakes sense to them. Participants review items from a Web site and then group these items into categories. Card sorting helps to learn how users think about the content and how they would organize the information on the Web site.

Ethnography
Ethnographic analysis is derived from anthropology. Field observations are taken at a site of a possible user, which track the artifacts of work such as Post-It notes, items on desktop, shortcuts, and items in trash bins.

Heuristic evaluation

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Heuristic Evaluation is a usability engineering method for finding and assessing usability problems in a user interface design as part of an iterative design process. It involves having a small set of evaluators examining the interface and using recognized usability principles (the "heuristics").

Usability inspection

Usability Inspection is a review of a system based on a set of guidelines. The review is conducted by a group of experts who are deeply familiar with the concepts of usability in design

Activity Analysis

Activity analysis is a usability method used in preliminary stages of development to get a sense of a situation. It involves an investigator observing users as they work in the field. Also referred to as user observation, it is useful for specifying user requirements and studying currently used tasks and subtasks

What is the full meaning of the acronym GOMS as a cognitive model? Explain each of the terms in the GOMS

answer

GOMS is an acronym that stands for Goals, Operator, Methods, and Selection Rules. Goals are what the user has to accomplish. An operator is an action performed in service of a goal. A method is a sequence of operations that accomplish a goal. Selection rules specify which method should be used to satisfy a given goal, based on the context.

Distinguish between the following Cognitive models: (i) Parallel Design, (ii) Human Processor and (iii) Keystroke level

Answer

Parallel Design

With parallel design, several people create an initial design from the same set of requirements. Each person works independently, and when finished, shares his/her concepts with the group.

Human Processor Model

Sometimes it is useful to break a task down and analyze each individual aspect separately. This allows the tester to locate specific areas for improvement.

Keystroke level modeling

Keystroke level modeling is essentially a less comprehensive version of GOMS that makes simplifying assumptions in order to reduce calculation time and complexity.

Mention 8 of the interaction styles available in HCI

ANSWER

Command line interface
Menus
Natural language
Question and answer, and query dialogue
Form-fills and Spreadsheets
WIMP (Widows, Icons, Menus, Pointers) Interface Point and Click
Three—dimensional interfaces

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Differentiate between the following types of widgets
Widgets by appearance, (ii) Widgets by behavior, (iii) Widgets by semantics

ANSWER

By appearance:
Appearance includes words that are verbs that represent some action such as qu it, exit, embolden, and italicize
By semantics
Semantics are menus, buttons, etc th at do things as desired by the user
BY BEHAVIOUR
This describes the action the toolkit arries out on your behalf and this can be co ntrolled. Examples are drawing and such interactions betwe en the widgets

Mention any 6 of the Shneiderman's 8 Golden rules that govern interactive designs

ANSWER

1. Strive for consistency
2. Enable frequent users to use shortcuts
3. Offer informative feedback
4. Design dialogs to yield closure
5. Offer error prevention and simple error handling
6. Permit easy reversal of actions
7. Support internal locus of control
8. Reduce short-term memory load

What are those design principles formulated to support usability?

answer

Principle of Learnability : This is the ease with which new users can begin effective interaction and achieve maximal performance
Principle of Flexibility: These are the multiplicity of ways the user and system exchange information **Principle of Robustness**: This is the level of support provided the user in determining successful achievement and assessment of goal-directed behavior

Describe the 4 experimental factors to consider while carrying out an experimental evaluation

ANSWER

Subjects: This identifies who the representative is, and the measure of the sufficient sample for the experiment.
Variables: These are the things to modify and measure Hypothesis:
This considers what you would like to show Experimental design:
This looks at how you are going to do it

Describe 3 types of tests that can be carried out for analyzing data

ANSWER

Parametric test:This assumes a normal distribution and it is robust and powerful.
Non-parametric test: This does not assume a normal distribution. It is less powerful but more reliable

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Contingency table test: This classifies data by discrete attributes. It counts number of data items in each group.

Explain the two ways by which evaluation is carried out through user participation

ANSWER

laboratory studies and field studies

What is the objective of the "Cognitive walkthrough" and how is it carried out?

ANSWER

It evaluates design on how well it supports user in learning task and is usually performed by expert in cognitive psychology.
The design expert 'walks through' the design to identify potential problems using psychological principles with forms used to guide the analysis
For each task, the walkthrough considers what impact the interaction will have on the user, the cognitive processes required and the learning problems that may occur.
The analysis focuses on goals and knowledge to establish whether the design leads the user to generate the correct goals.

What are the advantages of stories and story telling in participatory design?

ANSWER

First, they may be used as triggers for
conversation, analysis, or feedback. Second, they may be told by end users as part of their contribution to the knowledge required for understanding product or service, opportunities, and for specifying what products or services should do. Third, they may be used by design teams to present their concept of what a designed service or product will do, how it will be used, and what changes will occur as a result Hypermedia technologies can be utilized to enable communities tell their own stories with the intention that "plurality, dissent, and moral space can be preserved.

Briefly describe the characteristics of the Participatory design

ANSWER

(a) site-selection of PD work;
(b) workshops
(c) story collecting and story telling through text, photography, and drama
(d) games for analysis and design
(e) the correlation of descriptive and functional prototypes
(f) brainstorming,
pencil and paper exercises

What do you understand as the "Third Space Concept" and "Hybridism" in participatory design?

ANSWER

This is concerned with participatory methods that occur in the hybrid space between software professionals and end users.

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Mention and explain briefly, the four syntactical/lexical phases of interaction design.

ANSWER

METAPHOR AND VISUALIZATION DESIGN

Metaphor and visualization design helps the user develop a mental model of the system. It is concerned with finding or inventing metaphors or analogies that are appropriate for users to understand the entire system or part of it.

MEDIA DESIGN

Media design is concerned with selecting appropriate media types for meeting the specific information presentation needs and human experience needs.

DIALOGUE DESIGN

Dialogue design focuses on how information is provided to and captured by users during specific task.

PRESENTATION DESIGN

Presentation design concerns the decision on information architecture display layout incorporating metaphors,media,dialogue design with the rest of the displays

Differentiate between information systems and user interface

Answer

Users of information systems interact with a computer in order to accomplish information handling tasks necessary to get their jobs done. They differ in ability, training and job experience. They may be keenly concerned with task performance, but may have little knowledge of (or interest in) the computers themselves. Design of the user-system interface must take account of those human factors

What do you understand as the design formative evaluation?

Answer

FORMATIVE EVALUATION

Formative evaluations identify defects in designs thus inform design iterations an d refinements. A variety of different formative evalua ions can occur several times during the desi
final design decisions.

What do you understand as the user- system interface?

Answer

User-system interface includes all aspects of system design that affect system use particularly on those design features of the user interface that are implemented via software.

Special attention must be given to software supporting the user interface and other physical and human factors influencing user performance.

The users' view of a system is conditioned chiefly by experience with its interface.

User interface design is best practiced by experts, by specialists experienced in the human engineering of computer systems.

The interaction design phase is made up of Metaphor and Visualization Design, Media Design, Dialogue Design, Presentation Design, and the Formative Evaluation of the designs.

What are the characteristics of the psychological design rationale?

answer

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To support task-artefact cycle in which user tasks are affected by the systems they use It aims to make explicit consequences of design for users
Designers identify tasks the system will support
Various scenarios are suggested to test task Users are observed while using the system
The psychological claims of the system are made explicit
The negative aspects of the design can be used to improve next iteration of design

Mention the five benefits of design rationale

answer

Communication exists throughout the life cycle Reuse of design knowledge is made a cross products Design rationale enforces design discipline
It presents arguments for design trade-offs It organizes potentially large design space It is used to capture contextual information

Mention any two principle under each of the following categories (i)perceptual (ii)mental(iii)those based on attention(iv)memory

answer

Perceptual Principles

1. Make displays legible (or audible)

A display's legibility is critical and necessary for designing a usable display. If the characters or objects being displayed cannot be discernible, then the operator cannot effectively make use of them.

2. Avoid absolute judgment limits

Do not ask the user to determine the level of a variable on the basis of a single sensory variable (e.g. color, size, loudness). These sensory variables can contain many possible levels

Mental Model Principles

1. Principle of pictorial realism

A display should look like the variable that it represents (e.g. high temperature on a thermometer shown as a higher vertical level). If there are multiple elements, they can be configured in a manner that looks like it would in the represented environment.

2. Principle of the moving part

Moving elements should move in a pattern and direction compatible with the user's mental model of how it actually moves in the system. For example, the moving element on an altimeter should move upward with increasing altitude

Principles Based on Attention

1. Minimizing information access cost

When the user's attention is averted from one location to another to access necessary information, there is an associated cost in time or effort. A display design should minimize this cost by allowing for frequently accessed sources to be located at the nearest possible position. However, adequate legibility should not be sacrificed to reduce this cost.

2. Proximity compatibility principle

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Divided attention between two information sources may be necessary for the completion of one task. These sources must be mentally integrated and are defined to have close mental proximity. Information access costs should be low, which can be achieved in many ways (e.g. close proximity, linkage by common colors, patterns, shapes, etc.). However, close display proximity can be harmful by causing too much clutter.

Memory Principles

1. Replace memory with visual information: knowledge in the world

A user should not need to retain important information solely in working memory or to retrieve it from long-term memory. A menu, checklist, or another display can aid the user by easing the use of their memory.

2.Principle of predictive aiding

Proactive actions are usually more effective than reactive actions. A display should attempt to eliminate resource-demanding cognitive tasks and replace them with simpler perceptual tasks to reduce the use of the user's mental resources

Explain the two elements of the windowing systems

answer

Device independence

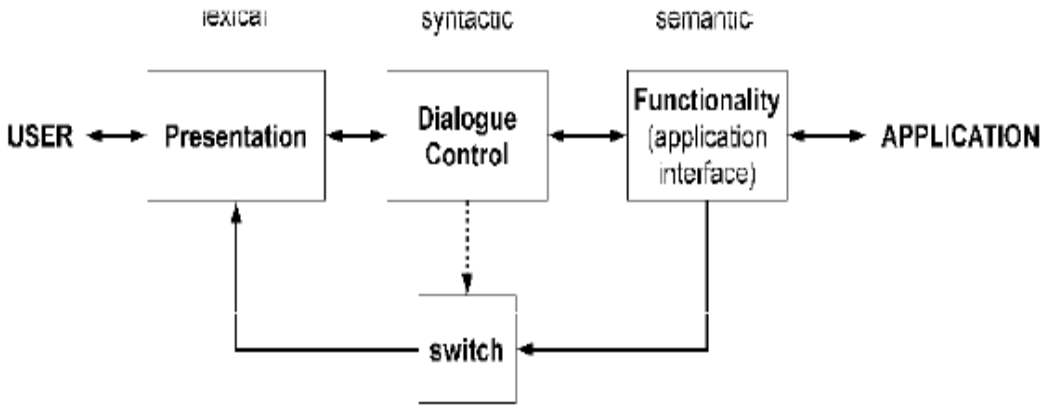
Programming the abstract terminal device drivers using the image models for output and input is device independent. Also device independence is the creation of the image models for output and the input, partially. These image models are the pixels, the PostScript

Resource sharing

Another element of the windowing system is resource sharing. This is the act of achieving simultaneity of user tasks. Resource sharing enables the use of the window system to support independent processes by the isolation of individual applications.

Using a suitable pictorial representation, describe the concept and implementation of the Seeheim Model

Answer



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State the main goal of Human Computer Interaction (HCI)

− Methodologies and processes for designing interfaces in their related styles (i.e., given a task and a class of users, design the best possible interface within given constraints, optimizing for a desired property such as learn ability or efficiency of use)
− Methods or techniques for implementing interfaces (e.g. software toolkits and libraries; efficient algorithms)
− Techniques for evaluating and comparing interfaces
− Developing new interfaces and interaction techniques
− Developing descriptive and predictive models and theories of interaction
− Design systems that minimize the barrier between the human's cognitive model of what they want to accomplish and the computer's understanding of the user's task.

Give four scientific methods that are used to compare techniques in HCI

1. Designing graphical user interfaces and web interfaces.
2. Developing new design methodologies,
3. Experimenting with new hardware devices,
4. Prototyping new software systems,
5. Exploring new paradigms for interaction, and
6. Developing models and theories of interaction.

Enumerate the full meaning of the acronym "CATWOE"?

Clients: those who receive output or benefit from the system
Actors: those who perform activities within the system
Transformations: the changes that are affected by the system
World View - how the system is perceived in a particular root definition
Owner: those to whom the system belongs, to whom it is answerable and who can authorize changes to it
Environment: the world in which the system operates and by which it is influenced

Participatory design is one of the design models in HCI. State its characteristics and ethics

Characteristics

- Participatory design is context and work oriented rather than system oriented.
- It is collaborative and iterative
- Methods involved are: brain-storming, storyboarding, workshops, pencil and paper exercises.

Ethics

- The ethics involved the participatory socio-technical approach devised by Mumford.
- It states that the system development is about managing change and that non-participants are more likely to be dissatisfied.
- There are three levels of participation: consultative, representative, and consensus.
- Design groups including stakeholder representatives make design decisions and job satisfaction is the key to solution

Enumerate any two key benefits of usability test

- Increased user efficiency
- Reduced development costs

Highlight five characteristics of design patterns in HCI.

• Capturing the design practice and not the theory
• Capturing the essential common properties of good examples of design
• Representing design knowledge at varying levels of social, organisational, and conceptual framework
• Embodying values and expressing what is humane in interface design
• Patterns are intuitive and readable and can therefore be used for communication between all stakeholders
• A pattern language should be generative and assist in the development of complete designs.

Briefly explain the terms “Slips” as it relates to HCI.

Slips may include lack of understanding the system and goal, incorrect formulation of action, incorrect action and mistake of not even having the right goal! To fix slips, better interface design should be carried out while to avoid mistakes, one should better understand the system

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What are the design principles formulated to support usability?

Principle of Learnability : This is the ease with which new users can begin effective interaction and achieve maximal performance
Principle of Flexibility: These are the multiplicity of ways the user and system exchange information
Principle of Robustness: This is the level of support provided the user in determining successful achievement and assessment of goal-directed behaviour

Enumerate the three terms of Interaction

Domain: This is the area of work under study e.g. a graphic design
Goal : This is what you want to achieve e.g. to create a solid red triangle
Task : Concerns how you go about doing it, ultimately in terms of operations or actions e.g select the fill tool, click over the triangle

Outline three unresolved issues in participatory design

• Participation by non-organized workforce. The field of PD has long been concerned about how to engage in meaningful participative activities with workers or others who are not organized into a group with collective bargaining power or other collective representation.
• Evaluation and metrics. One of the weaknesses of the literature on participatory practices is the dearth of formal evaluations.

Describe the following storage text formats:
i) ASCII
ii) UTF-8
iii) RTF
iv) SGML
v) XML

answer

ASCII : This is a 7-bit binary code that represents each letter and character
UTF-8 : This is an 8-bit encoding of 16 bit character set
RTF (rich text format): This is a text plus formatting and layout information
SGML (standardized generalised mark-up language): These are documents regarded as structured objects
XML (extended mark-up language): This is a simpler version of SGML for web applications

Outline the stages of Eight Stage Task Analysis(ESTA).

This is an eight stage model that focuses on task
The primary task is identified in terms of users' goals
Secondly, task inputs to the system are identified
Thirdly, the external environment into which the system will be introduced is described, including physical, economic and political aspects
Fourthly, the transformation processes within the system are described in terms of actions performed on or with objects
In the fifth stage, the social system is analyzed by considering existing internal and external work-groups and relationships
At the sixth stage, the technical system is described in terms of configuration and integration with other systems
At the seventh stage, the performance satisfaction criteria are established, indicating social and technical requirements of the system.
The last stage specifies the new technical system.

Mention four of the paradigm shifts that precede the innovation of HCI

Time-sharing:
1940s and 1950s witnessed explosive technological growth in computing and in 1960s , there was the need to channel the power.
Hence J.C.R. Licklider at ARPA introduced the single computer that supported multiple users.
Video Display Units:
Video Display Units provided more suitable medium than paper and so in 1962, Sutherland introduced the Sketchpad computers for visualizing and manipulating data. So, one person's contribution drastically changed the history of computing.

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Programming toolkits
Engelbart at Stanford Research Institute in 1968 augmented man's intellect by demonstrating the NLS Augment system. This became the right programming toolkit that provided the building blocks to produce complex interactive systems.

Personal computing:
The era of personal computing came on board in 1970s with the introduction of the Papert's LOGO language for simple graphics programming by children. This system became popular as it became easier to use.
The era of computing in small but powerful machines dedicated to the individual was witnessed such as was demonstrated by Kay at Xerox PARC with the Dyna-book as the ultimate personal computer.
The Window systems and the WIMP interface: The Window systems and the WIMP interface enabled humans to pursue more than one task at a time such as in the windows used for dialogue partitioning, to "change a topic". This became a reality in 1981 with the Xerox Star as the first commercial windowing system comprising windows, icons, menus and pointers (WIMPs) as familiar interaction mechanisms.

Enumerate four characteristics of the *eye gaze interaction.*

- **This controls interface by eye gaze direction such as looking at a menu item to select it.**
- **It uses laser beam reflected off retina at a very low power laser!**
- **It is mainly used for evaluation and has potential for hands-free control.**
- **Its high accuracy requires headset. The cheaper and lower accuracy devices are available under the screen like a small web cam.**

What is physiological measurement? Outline three of such methods

In physiological measurement, the emotional response is linked to physical changes which may help determine a user's reaction to an interface.
The measurements include:
Heart activity, including blood pressure, volume and pulse.
Activity of sweat glands such as in Galvanic Skin Response (GSR)
Electrical activity in muscle called electromyogram (EMG)
Electrical activity in brain called electroencephalogram (EEG)
However, some difficulties are always experienced in interpreting these physiological responses; therefore, more research is required in this area.

What is cognitive walkthrough?

Cognitive walkthrough is a method of evaluating the user interaction of a working prototype or final product. It is used to evaluate the system's ease of learning. Cognitive walkthrough is useful to understand the user's thought processes and decision making when interacting with a system, specially for first-time or infrequent users

How is it carried out?

This technique was proposed by Polson et al It evaluates design on how well it supports user in learning task and is usually performed by expert in cognitive psychology. The design expert 'walks through' the design to identify potential problems using psychological principles with forms used to guide the analysis For each task, the walkthrough considers what impact the interaction will have on the user, the cognitive processes required and the learning problems that may occur. The analysis focuses on goals and knowledge to establish whether the design leads the user to generate the correct goals.

Discuss the stakeholder focus model

This comprises six stage processes that focus on stakeholders
The first describes the organizational context, including primary goals, physical characteristics, political and economic background
The second identifies and describes the stakeholders including personal issues, role in the organization and their job.
The third identifies and describes the work-groups whether formally constituted or not
The fourth identifies and describe task—object pairs; these are tasks to be performed and objects used
The fifth identifies the stakeholder needs: Stages 2—4 described above are in terms of both current and proposed system, the stakeholder needs are identified from the differences between the two.
Lastly, we consolidate and check the stakeholder requirements against earlier criteria.

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Give two (2) advantages and one (1) challenge arising from the application of video and audio effects in web browsing and hypertext

The current technology on improved Tools are now available to edit sound.

They are easy to embed in web page The memory occupied could be man It can however affect the download t and sometimes frustrating. It may be hard to add 'links' in hypertext

Challenges

Excess data consumption

Describe five (5) ways in which interactions between users and computers can be improved.

− Methodologies and processes for designing interfaces in their related styles (i.e., given a task and a class of users, design the best possible interface within given constraints, optimizing for a desired property such as learn ability or efficiency of use)
− Methods or techniques for implementing interfaces (e.g. software toolkits and libraries; efficient algorithms)
− Techniques for evaluating and comparing interfaces
− Developing new interfaces and interaction techniques
− Developing descriptive and predictive models and theories of interaction
− Design systems that minimize the barrier between the human's cognitive model of what they want to accomplish and the computer's understanding of the user's task.

Define mental models

A mental model is an explanation of someone's thought process about how something works in the real world. It is a representation of the surrounding world, the relationships between its various parts and a person's intuitive perception about his or her own acts and their consequences

Enumerate the characteristics of mental models.

. Principle of pictorial realism

A display should look like the variable that it represents (e.g. high temperature on a thermometer shown as a higher vertical level). If there are multiple elements, they can be configured in a manner that looks like it would in the represented environment.

Principle of the moving part

Moving elements should move in a pattern and direction compatible with the user's mental model of how it actually moves in the system. For example, the moving element on an altimeter should move upward with increasing altitude.

Enumerate factors governing the choice of an appropriate evaluation method for different interactive systems?

The following eexperimental factors are given consideration:

Subjects: This identifies who the representative is, and the measure of the sufficient sample for the experiment.

Variables: These are the things to modify and measure

Hypothesis: This considers what you would like to show

Experimental design: This looks at how you are going to do it

Write short notes on the following interaction styles:

WIMP

Three-dimensional interfaces

answer

WIMP

This interface comprises Windows, Icons, Menus, and Pointers or Windows, Icons, Mice, and Pull-down menus!

The interface is the default style for majority of interactive computer systems, especially PCs and desktop machines.

Elements of the WIMP interface

The elements include windows, icons, menus, and pointers. In some other cases they may be buttons, toolbars, palettes, and dialog boxes.

Understanding the concept of 'Look and feel'

WIMP systems have the same elements: as windows, icons., menus, pointers, buttons, etc. but have different window systems that behave differently . For example, Macintosh Operating System (MacOS)

compared with Windows menus.
The combination of the appearance and the behaviour is the 'look and feel'

Three-dimensional interfaces

These are virtual reality 'ordinary' window systems highlighting visual affordance. The indiscriminate use can however be confusing! There are also three dimensional (3D) workspaces used for extra virtual space with light and occlusion that give deep distance effects. For typical computer displays, three-dimensional images are projected on them in two dimensions. Three-dimensional graphics are currently mostly used in computer games, art and computer-aided design (CAD). There have been several attempts at making three-dimensional desktop environments like Sun's Project Looking Glass. A three-dimensional computing environment could be used for collaborative work. For example, scientists could study three-dimensional models of molecules in a virtual reality environment, or engineers could work on assembling a three-dimensional model of an airplane.] The Technologies The use of three-dimensional graphics has become increasingly common in mainstream operating systems, but mainly been confined to creating attractive interfaces—eye candy—rather than for functional purposes only possible using three dimensions. For example, user switching is represented by rotating a cube whose faces are each user's workspace, and window management is represented in the form of Exposé on Mac OS X. In both cases, the operating system transforms windows on-the-fly while continuing to update the content of those windows. Interfaces for the X Window System have also implemented advanced three-dimensional user interfaces through compositing window managers such as Beryl and Compiz using the AIGLX or XGL architectures, allowing for the usage of OpenGL to animate the user's interactions with the desktop. Another branch in the three-dimensional desktop environment is the three-dimensional GUIs that take the desktop metaphor a step further, like the BumpTop, where a user can manipulate documents and windows as if they were "real world" documents, with realistic movement and physics. The Zooming User Interface (ZUI) is a related technology that promises to deliver the representation benefits of 3D environments without their usability drawbacks of orientation problems and hidden objects. It is a logical advancement on the GUI, blending some three-dimensional movement with two-dimensional or "2.5D" vector objects.

Extensively discuss Context Analysis.

Context analysis includes understanding the technical, environmental and social settings where the information systems will be used. It examines whether and how the interaction between physical and social environment and the physiological and psychological characteristics of the user would impact users interacting with the system. There are four aspects in Context Analysis: physical context, technical context, organizational context, and social and cultural context. Overall, context analysis can provide ideas for design factors such as metaphor creation, selection and patterns of communications between users and the system.

Briefly describe the following cognitive models
Parallel design
Human processor

Answer

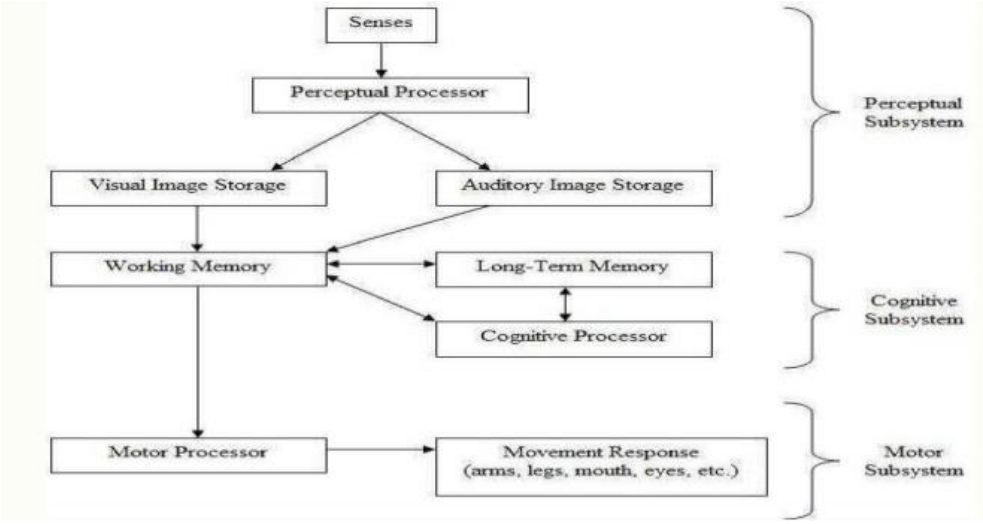
Parallel design

With parallel design, several people create an initial design from the same set of requirements. Each person works independently, and when finished, shares his/her concepts with the group. The design team considers each solution, and each designer uses the best ideas to further improve their own solution. This process helps to generate many different, diverse ideas and ensures that the best ideas from each design are integrated into the final concept. This process can be repeated several times until the team is satisfied with the final concept

Human processor

Sometimes it is useful to break a task down and analyze each individual aspect separately. This allows the tester to locate specific areas for improvement. To do this, it is necessary to understand how the human brain processes information. A model of the human processor is shown below.

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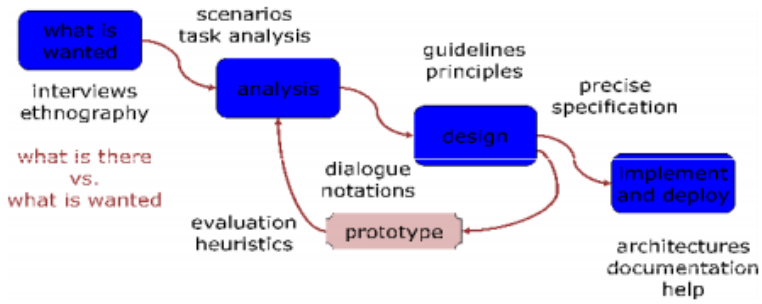
Enumerate the basic components of Human Computer Interaction

The components of Human Computer Interaction comprise the Interaction models that concern translation between the user and the computer system, Ergonomics that describe the physical characteristics of interaction, the Interaction styles that express the nature of user and system dialog and finally the context of the social, organizational and the motivational aspect of interaction**.**

State the stages involved in the Donald Normans model

- The user establishes the goal
- The user formulates intention
- The user specifies actions at i nterface
- The user executes the action
- The user perceives the syste state
- The user interprets the syste state
- The user evaluates the syste state with respect to goal

With the aid of illustrative diagram, explain the process involved in the design lifecycle of a typical design pattern



Briefly describe the principles to be considered while designing a user system interface. Give relevant examples.

METAPHOR AND VISUALIZATION DESIGN

Metaphor and visualization design helps the user develop a mental model of the system. It is concerned with finding or inventing metaphors or analogies that are appropriate for users to understand the entire system or part of it. Well accepted metaphors include a shopping cart for holding items before checking out in E-Commerce context, and light bulbs for online helps or daily tips in productivity software packages.

MEDIA DESIGN

Media design is concerned with selecting appropriate media types for meeting the specific information presentation needs and human experience needs. Popular media types include text, static images (e.g., painting, drawing or photos), dynamic images (e.g., video clips and animations), and sound. The bandwidth needed for transmitting information depends on the media type. In addition, some media types contain affective qualities that can make presentations more interesting and stimulating, or annoying and distasteful.

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DIALOGUE DESIGN

Dialogue design focuses on how information is provided to and captured from users during a specific task. Dialogues are analogous to a conversation between two people. Many existing interaction styles can be used such as menus, forms, natural languages, dialog boxes, and direct manipulation.

PRESENTATION DESIGN

Presentation design concerns the decisions on information architecture and display layout incorporating metaphors, media, and dialogue designs with the rest of the displays.

Commonly established user interface design principles and guidelines may be applied during the design stage.

For example, the following presentation design principles were suggested by Sutcliffe 1997:

1.Maximize visibility —this means all necessary information should be immediately available.

2.Minimize search time with minimum keystrokes

3.Provide structure and sequence of display

4.Focus on user attention on key data — here, important information should be salient and easilycomprehended

S. Provide only relevant information and

6. No overloading of user's working memory.