**COURSE FILE**

**Human Computer Interaction**

R13 REGULATION

IV.YEAR-II Semester



**Department of Computer Science and Engineering**

[GAYATRI VIDYA PARISHAD COLLEGE OF ENGINEERING FOR WOMEN](https://www.shiksha.com/college/gayatri-vidya-parishad-college-of-engineering-for-women-visakhapatnam-46521)

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**1.Course Objectives & Outcomes**

**Course Objectives:**

The main objective is to get student to think constructively and analytically about how to design and evaluate interactive technologies.

**Course Outcomes:**

|  |
| --- |
| **Course Name : C410 (HUMAN COMPUTER INTERACTION) Year of Study : 2017-18** |
| **C410.1** | Explain the capabilities of both humans and computers from the viewpoint of human information processing. |
| **C410.2** | Demonstrate typical Human Computer Interaction (HCI) models , styles and various historic HCI paradigms. |
| **C410.3** | Apply an interactive design process and universal design principles to designing HCI systems. |
| **C410.4** | Illustrate and utilise HCI design principles, standards and guidelines. |
| **C410.5** | Analyze and identify user models, user support, socio-organizational issues and stakeholder requirements of HCI systems. |
| **C410.6** | Discuss tasks and dialogs of relevant HCI systems based on task analysis and dialog design. |

**1.Syllabus**

UNIT I:

Introduction: Usability of Interactive Systems- introduction, usability goals and measures, usability motivations, universal usability, goals for our profession

Managing Design Processes: Introduction, Organizational design to support usability, Four pillars of design, development methodologies, Ethnographic observation, Participatory design, Scenario Development, Social impact statement for early design review, legal issues, Usability Testing and Laboratories

UNIT II:

Menu Selection, Form Fill-In and Dialog Boxes: Introduction, Task- Related Menu Organization, Single menus, Combinations of Multiple Menus, Content Organization, Fast Movement Through Menus, Data entry with Menus: Form Fill-in, dialog Boxes, and alternatives, Audio Menus and menus for Small Displays

UNIT III:

Command and Natural Languages: Introduction, Command organization Functionality, Strategies and Structure, Naming and Abbreviations, Natural Language in Computing

Interaction Devices: Introduction, Keyboards and Keypads, Pointing Devices, Speech and Auditory Interfaces, Displays- Small and large

UNIT IV:

Quality of Service: Introduction, Models of Response-Time impacts, Expectations and attitudes, User Productivity, Variability in Response Time, Frustrating Experiences

Balancing Function and Fashion: Introduction, Error Messages, Nonanthropomorphic Design, Display Design, Web Page Design, Window Design, Color

UNIT V:

User Documentation and Online Help: Introduction, Online Vs Paper Documentation, Reading from paper Vs from Displays, Shaping the content of the Documentation, Accessing the Documentation, Online tutorials and animated documentation, Online communities for User Assistance, The Development Process

UNIT VI:

Information Search: Introduction, Searching in Textual Documents and Database Querying, Multimedia Document Searches, Advanced Filtering and Searching Interfaces

Information Visualization: Introduction, Data Type by Task Taxonomy, Challenges for Information Visualization

1. **Lecture Plan**

|  |  |  |
| --- | --- | --- |
| Lecture no. | Unit Number | Topic |
| 1 | UNIT 1 | Usability of Interactive Systems- introduction |
| 2 | usability goals and measures |
| 3 | usability motivations |
| 4 | universal usability |
| 5 | goals for our profession |
| 6 | Managing Design Processes: Introduction |
| 7 | legal issues, Usability Testing and Laboratories |
| 8 | Organizational design to support usability |
| 9 | Four pillars of design, |
| 10 | development methodologies |
| 11 | Ethnographic observation |
| 12 | Scenario Development |
| 13 | Social impact statement for early design review |
| 14 | legal issues, Usability Testing and Laboratories |
| 15 | UNIT-2 | Menu Selection, Form Fill-In and Dialog Boxes: Introduction |
| 16 | Task- Related Menu Organization, Single menus |
| 17 | Combinations of Multiple Menus |
| 18 | Content Organization |
| 19 | Fast Movement Through Menus |
| 20 | Data entry with Menus: Form Fill-in, dialog Boxes and alternatives, |
| 21 | Audio Menus and menus for Small Displays |
| 22 | UNIT-3 | Command and Natural Languages: Introduction, Command organization Functionality |
| 23 | Strategies and Structure |
| 24 | Naming and Abbreviations |
| 25 |  : Introduction, Keyboards and Keypads |
| 26 | Pointing Devices |
| 27 | Speech and Auditory Interfaces |
| 28 | Displays- Small and large |
| 29 | UNIT-.4 | Quality of Service: Introduction, Models of Response-Time impacts  |
| 30 | Expectations and attitudes, |
| 31 | User Productivity, Variability in Response Time, Frustrating Experiences |
| 32 | Balancing Function and Fashion: Introduction, Error Messages,  |
| 33 | Non anthropomorphic Design |
| 34 | Display Design, Web Page Design, Window Design, Color |
| 35 | UNIT -5 | User Documentation and Online Help: Introduction, Online Vs Paper Documentation |
| 36 | Reading from paper Vs from Displays |
| 37 | Shaping the content of the Documentation |
| 38 | Online tutorials and animated documentation, |
| 39 | Online communities for User Assistance |
| 40 | Accessing the Documentation |
| 41 | The Development Process |
| 42 | UNIT-6 | Information Search: Introduction  |
| 43 | Searching in Textual Documents and Database Querying |
| 44 | Multimedia Document Searches |
| 45 | Advanced Filtering and Searching Interfaces |
| 46 | Information Visualization: Introduction |
| 47 |  Data Type by Task Taxonomy, |
| 48 | Challenges for Information Visualization |

1. **Unit-wise course material**

**UNIT- I**

* 1. **Unit – I Usability of Interactive Systems- Introduction**
		1. Unit Objectives:

The main objective is to get student to think constructively and analytically about how to design and evaluate interactive technologies.

* + 1. Unit Outcomes:
1. Explain the capabilities of both humans and computers from the viewpoint of human information processing.
2. Describe typical human–computer interaction (HCI) models, styles, and various historic HCI paradigms.
3. Apply an interactive design process and universal design principles to designing HCI systems.
4. Describe and use HCI design principles, standards and guidelines.
5. Analyze and identify user models, user support, socio-organizational issues, and stakeholder requirements of HCI systems.
6. Discuss tasks and dialogs of relevant HCI systems based on task analysis and dialog design.
	* + 1. **Unit Lecture Plan**

|  |  |  |  |
| --- | --- | --- | --- |
| Lecture no. | Topic | Methodology | Quick reference |
| 1 | Usability of Interactive Systems- introduction | Chalk &Board | Text book |
| 2 | usability goals and measures | Chalk & Board | Text book |
| 3 | usability motivations | Chalk & Board | Text book |
| 4 | universal usability | Chalk & Board | Text book |
| 5 | goals for our profession | Chalk & Board | Text book |
| 6 | Managing Design Processes: Introduction | Chalk & Board | Text book |
| 7 | legal issues, Usability Testing and Laboratories | Chalk & Board | Text book |
| 8 | Organizational design to support usability | Chalk & Board | Text book |
| 9 | Four pillars of design, | Chalk & Board | Text book |
| 10 | development methodologies | Chalk & Board | Text book |
| 11 | Ethnographic observation | Chalk & Board | Text book |
| 12 | Scenario Development | Chalk & Board | Text book |
| 13 | Social impact statement for early design review | Chalk & Board | Text book |
| 14 | legal issues, Usability Testing and Laboratories | Chalk & Board | Text book |

* + 1. Material / Teaching Aids as per above lecture plan.

**Lecture-1**

**Usability of Interactive Systems- Introduction**

New technologies provide extraordinary-almost supernatural-powers to those people who master them. Networked computers with advanced interfaces are compelling new technologies that are being rapidly disseminated. Great excitement spreads as designers provide remarkable functions in carefully crafted interactive devices and interfaces.

The opportunities for rule-breaking innovators and business-focused entrepreneurs are substantial, and the impacts on individuals, organizations, and cultures are profound.

Like early photography equipment or automobiles, early computers were usable only by people who devoted effort to mastering the technology. Harnessing the computer's power is a task for designers who combine an understanding of technology with a sensitivity to human capacities and needs.

User interfaces help produce business success stories and Wall Street sensations. They also produce intense competition, copyright-infringement suits,intellectual-property battles, mega-mergers, and international partnerships. Crusading Internet visionaries promote a world with free access to music,while equally devoted protectors of creative artists argue for fair payments.

User interfaces are also controversial because of their central role in national identification schemes, homeland defense, crime fighting, medical records management, and so on. In the aftermath of the September 11, 2001 terrorist attacks, some members of the U.s. Congress blamed the inadequacies of user interfaces for the failure to detect the terrorists.

At an individual level, user interfaces change many people's lives: effective user interfaces for professionals mean that doctors can make more accurate diagnoses and pilots can fly airplanes more safely; at the same time, children can learn more effectively and graphic artists can explore creative possibilities more fluidly.

Some changes, however, are disruptive. Too often, users must cope with frustration, fear, and failure when they encounter excessively complex menus, incomprehensible terminology, or chaotic navigation paths. What user wouldn't be disturbed by receiving a message such as "Illegal Memory Exception: Severe Failure" with no guidance about what to do next?

## 4.1.4.2 Lecture-2

## Usability goals and measures

**Usability goals:**

 1. Ascertain the users' needs.

 2. Ensure proper reliability.

3. Promote appropriate standardization, integration, consistency

 and portability.

 4. Complete projects on schedule and within budget.

##  Standardization refers to common user-interface features across multiple applications. Apple Computers 0992, 2002) successfully developed an early standard that was widely applied by thousands of developers, enabling users to learn multiple applications quickly.

## When the Microsoft Windows 0999, 2001) interface became standardized, it became a powerful force. Similarly, the standards provided by the World Wide Web Consortium have done much to accelerate adoption of the Web.

Integration across application packages and software tools was one of the key design principles of Unix. (Portability across hardware platforms was another.) If file formats are used consistently, users can apply multiple applications to transform, refine, or validate their data.

Consistency primarily refers to common action sequences, terms, units, layouts, colors, typography, and so on within an application program. Consistency is a strong determinant of success of interfaces. It is naturally extended to include compatibility across application programs and compatibility with paper or non-computer-based systems.

Portability refers to the potential to convert data and to share user interfaces across multiple software and hardware environments.

The fourth goal for interface designers is to complete projects on schedule and within budget.

Proper attention to usability principles and rigorous testing often lead to reduced cost and rapid development

**Usability Measures:**

If adequate requirements are chosen, reliability is ensured, standardization is addressed, and scheduling and budgetary planning are complete, developer can focus their attention on the design and testing process. Multiple design alternatives must be evaluated for specific user communities and for specific benchmark tasks. A clever design for one community of users may be inappropriate for another community. An efficient design for one class of tasks may be inefficient for another class.

1. Time to learn.

How long does it take for typical members of the user community to learn how to use the actions relevant to a set of tasks?

1. Speed of performance.

 How long does it take to carry out the benchmark tasks?

1. Rate of errors by users.

How many and what kinds of errors do people make in carrying out the benchmark tasks? Although time to make and correct errors might be incorporated into the speed of performance, error handling is such a critical component of interface usage that it deserves extensive study

 4. Retention over time. How well do users maintain their knowledge after an hour, a day, or a week? Retention may be linked closely to time to learn, and frequency of use plays an important role.

 5. Subjective satisfaction. How much did users like using various aspects of the interface? The answer can be ascertained by interview or by written

**4.1.4.3 Lecture-3 (Usability motivations)**

The enormous interest in interface usability arises from the growing recognition of how poorly designed many current interfaces are and of the benefits elegant interfaces bring to users. This increased motivation emanates from developers of life-critical systems; industrial and commercial systems; office, home, and entertainment applications; exploratory, creative, and collaborative interfaces; and socio technical systems.

**Life-critical systems**

Life-critical systems include those that control air traffic, nuclear reactors, power utilities, police or fire dispatch, military operations, and medical instruments. In these applications high costs are expected, but they should yield high reliability and effectiveness.

**Industrial and commercial uses**

Typical industrial and commercial uses include banking, insurance, order entry, inventory management, airline and hotel reservations (Fig. 1.8), car rentals, utility billing, credit-card management, and point-of-sales terminals. In these cases, costs shape many judgments. Operator training time is expensive, so ease of learning is important. Since many businesses are international, translation to multiple languages and adaptations to local cultures are necessary.

**Office, home, and entertainment applications**

The rapid expansion of office, home, and entertainment applications is the third source of interest in usability. Personal-computing applications include e-mail, bank machines, games (Fig. 1.9), educational packages, search engines, cell phones, and mobile devices. For these interfaces, ease of learning, low error rates, and subjective satisfaction are paramount because use is frequently discretionary and competition is fierce. If the users cannot succeed quickly, they will abandon the use of a computer or try a competing package. In cases where use is intermittent, clear, easy-to-remember procedures are important, and if retention is still faulty, comprehensible online help becomes important.

**Exploratory, creative, and collaborative interfaces**

An increasing fraction of computer use is dedicated to supporting human intellectual and creative enterprises. Exploratory applications include World Wide Web browsing search engines, scientific simulation, and business decision making. Creative environments include writing work benches, architectural design systems

**Sociotechnical systems**

A growing domain for usability is in complex systems that involve many people over long time periods, such as systems for voting, health support, identity verification, and crime reporting.

 **4.1.4.4 Lecture-4(Universal usability)**

Universal usability refers to the design of information and communications products and services that are usable for every citizen. The concept has been advocated by Professor Ben Shneiderman, a computer scientist at the Human-Computer Interaction Lab at the University of Maryland, College Park.

**Variations in physical abilities and physical workplaces**

These physical abilities influence elements of the interactive-system design. They also play a prominent role in the design of the workplace or workstation (or play station). The draft standard Human Factors Engineering of Computer Workstations (2002) lists these concerns:

* work-surface and display-support height
	+ Clearance under work surface for legs
	+ Work-surface -width and depth
	+ Adjustability of heights and angles for chairs and work surfaces
	+ Posture-seating depth and angle; back-rest height and lumbar support
	+ Availability of armrests, footrests, and palm rests
	+ use of characteristic.

 Diverse cognitive and perceptual abilities

•Short-term and working memory

•Long-term and semantic memory

•Problem solving and reasoning

•Decision making and risk assessment

•Language communication and comprehension

•Search, imagery, and sensory memory

•Learning, skill development, knowledge acquisition, and concept attainment.

•Arousal and vigilance

•Fatigue and sleep deprivation

•Perceptual (mental) load

•Knowledge of results and feedback

•Monotony and boredom

•Sensory deprivation

•Nutrition and diet

•Fear, anxiety, mood, and emotion

•Drugs, smoking, and alcohol

•Physiological rhythms

Personality differences

Extroversion versus introversion. Extroverts focus on external stimuli and like variety and action, whereas introverts prefer familiar patterns, rely on their inner ideas, and work alone contentedly.

• Sensing versus intuition. Sensing types are attracted to established routines, are good at precise work, and enjoy applying known skills, whereas intuitive types like solving new problems and discovering new relations but dislike taking time for precision.

• Perceptive versus judging. Perceptive types like to learn about new situations but may have trouble making decisions, whereas judging types like to make a careful plan and will seek to carry through the plan even if new facts change the goal.

• Feeling versus thinking. Feeling types are aware of other people's feelings, seek to please others, and relate well to most people, whereas thinking types are unemotional, may treat people impersonally, and like to put things in logical order.

**4.1.4.5 Lecture-5(Goals for our profession)**

Clear goals are useful not only for interface development but also for educational and professional enterprises. Three broad goals seem attainable: (1) influencing academic and industrial researchers; (2) providing tools, techniques, and knowledge for commercial developers; and (3) raising the computer consciousness of the general public.

Influencing academic and industrial researchers:

* Understanding of a practical problem and related theory
* Lucid statement of a testable hypothesis
* Manipulation of a small number of independent variables
* Measurement of specific dependent variables
* Careful selection and assignment of subjects
* Control for bias in subjects, procedures, and materials
* Application of statistical tests
* Interpretation of results, refinement of theory, and guidance for experimenters

Providing tools, techniques, and knowledge for commercial developers

Raising the computer consciousness of the general public.

**4.1.4.6 Lecture-6(Managing Design Processes: Introduction)**

In the first decades of computer-software development, technically oriented programmers designed text editors, programming languages, and applications for themselves and their peers. The substantial experience and motivation of these users meant that complex interfaces v,Tere accepted and even appreciated.

Now, the user population for mobile devices, instant messaging, e-business, and digital libraries is so vastly different from the original that programmers' intuitions may be inappropriate.

 Current users are not dedicated to the technology; their background is more tied to their work needs, while their use of computers for entertainment is discretionary. Designs should be based on careful observation of current users, refined by thoughtful analysis of task frequencies and sequences, and validated through early usability and thorough acceptance tests.

**4.1.4.7 Lecture-7(Organizational design to support usability)**

Usability engineers and user-interface architects are gaining experience in managing organizational change. As attention shifts from software-engineering or management-information systems, battles for control and power manifest themselves in budget and personnel allocations.

 Well-prepared managers who have a concrete organizational plan, defensible cost/benefit analyses, and practical development methodologies are most likely to be winners. Design is inherently creative and unpredictable. Interactive system designers must blend a thorough knowledge of technical feasibility with a mystical esthetic sense of what attracts users. Carroll and Rosson (1985) characterize design in this way:

• Design is a process; it is not a state and it cannot be adequately represented statically.

• The design process is nonhierarchical; it is neither strictly bottom-up nor strictly top-down.

• The process is radically transformational; it involves the development of partial and interim solutions that may ultimately play no role in the final design.

• Design intrinsically involves the discovery of new goals.

**4.1.4.8 Lecture-8(Four pillars of design,)**



Used to help user interface architects to turn ideas into successful systems, though not guaranteed to work flawlessly.
A set of fundamentals to assist interface designers optimize usability. These are benefits that are derived from **Academic Research** and if used properly will assist the designer in creating a **Successful Interface**.

* **Ethnographic Observation** provides **User-interface Requirements**
* **Theories and Models** provide a means of developing **Guidelines Documents & Process**
* **Algorithms and Prototypes** assist the development of **User-interface Software Tools** which can be used for Rapid-Prototyping.
* **Controlled Experimentation** provides **Expert Reviews & Usability Testing**

**User Interface requirements**
Soliciting and clearly specifying user requirements is major key to success in any development activity for a successful end result. System Requirements, whether it be hardware, software, system performance, or reliability, must be clearly stated and agreed upon. Team must have clear understanding of requirements.

Tools which construct interactive user interfaces must support rapid development and component and modular development through ethnographic observation. The ability to rapidly prototype the look-and-feel leads to early and immediate feedback.

**Guidelines Documents and Processes**

* **Elicit user requirements and mutually agree to them**
	+ System requirements and user requirements are aligned through interface design
* **The more thorough and complete these are, the better chance of success**
	+ Incomplete and vague requirements create an interface adrift
* **Examples**
	+ Performance requirements
	+ Functional requirements
	+ Interface requirements.

**User interface Software Tools**
\*Use simple and handy tools for early prototyping:\*

* Word, PowerPoint, Visio, etc.
* PageMaker, Illustrator, Photoshop.
* Flash, Javascript, Processing, Ajax

**Powerful IDEs**

* Visual Studio
* C#, VisualBasic.NET, Expression Designer, etc.
* Java SDK
* Java Look and Feel Design Guidelines, Swing/JFC, LWUIT

**4.1.4.9 Lecture-9(Development methodologies)**

Many software development projects fail to achieve their goals due to poor communication between Developers and their business clients/users.

* Successful developers
	+ work careful to understand the business's needs and refine their skills in eliciting accurate requirements
	+ also know that careful attention to user centered design issues during software development dramatically reduces development time and cost.
	+ Design methodologies include: GUIDE, STUDIO, OVID
* Rapid contextual design Examples
	+ Contextual Inquiry
		- Field interviews and observation
	+ Interpretation sessions and working modeling
		- Team discussions on workflow and organizational issues
	+ Model consolidation and affinity diagram building
		- Synthesize observations and share with target population
	+ Persona development
		- Develop fictitious characters and enact scenarios
	+ Visioning
		- Walk through scenarios using the developed personal
	+ Storyboarding
		- Design users tasks with visuals and sequencing
	+ User environment design
		- Comprehensive and coherent representation, built from the storyboards
	+ Paper prototypes and mock-up interviews
		- Testing on paper

**4.1.4.10 Lecture-10( Ethnographic observation)**

* Early stages of most methodologies include observation of users. A user group constitutes a unique culture so,
	+ Ethnographic methods are appropriate as they are used to observe people within their own culture
	+ Ethnographic methods allow for immersion by listening, observing and asking questions
* Non-traditional ethnography
	+ User-interface designers observe and listen in order to create designs which improve and otherwise change the users’ lives
	+ User-interface designers do not have weeks and/months to observe, they must keep it short
* Intentions for observation
	+ Influence design
	+ Follow a valid process

**Guidelines for an Ethnographic Study**

* Preparation
	+ Understand policies in work environments and family values in homes.
	+ Familiarize yourself with the existing interface and its history.
	+ Set initial goals and prepare questions
	+ Gain access and permission to observe or interview.
* Field Study
	+ Establish a rapport with all users
	+ Observe and collect (objective/subjective, qualitative/quantitative) data
	+ Follow any leads that emerge from the visits and record you visits.
* Analysis
	+ Compile and organize (databases)
	+ Quantify and summarize (statistics)
	+ Reduce and interpret data
	+ Refine and revisit goals
* Report
* Consider multiple audiences and goals
* Prepare a report and present findings

4.1.4.11 Lecture-11(Scenario Development)

When a current interface is being redesigned, reliable data about the distribution of task frequencies and sequences is an enormous asset. If current data do not exist, usage logs can quickly provide insight.

* How is the interface used?
	+ What is the frequency wit which each user performs each task

**Scenarios**

* “Day-in-the-life” helpful to characterize what happens when users perform typical tasks.
* Analogs and metaphors
* Describes novel systems
* Write scenarios of usage and then if possible, act them out as a form of theater, effective with multiple user cooperation.

**Useful applications**

* Control rooms, cockpits, financial trading rooms and other places where people must coordinate

**Notable uses of Scenarios**(page 118 of text book)

## 4.1.4.12 Lecture-12( Social Impacts)

Interactive systems often have a dramatic impact on large numbers of users. To minimize risks, a thoughtful statement of anticipated impacts circulated among stakeholders can be a useful process for eliciting productive suggestions early in development.

\* Inspired by the environmental impact statement
\* Encourages early and wide discussion

**Examples of a social impact statement**

* **Describe the new system and it's benefits**
	+ Convey the high-level goals of the new system
	+ identify the stakeholders.
	+ Identify specific benefits
* **Address concerns and potential barriers**
	+ Anticipate changes in job functions.
	+ address security and privacy issues
	+ Describe accountability and responsibility for system misuse and failure.
	+ Avoid potential biases.
	+ weigh individual rights
	+ assess trade-offs between centralization and decentralization
	+ Preserve democratic principles
	+ ensure divers access
	+ promote simplicity.
* **Outline the development process**
	+ Present an estimated project schedule
	+ propose a process for making decisions discuss expectations of how stake holders will be involved.
	+ recognize needs for staff,training and hardware.
	+ propose a plan for backups of data
	+ outline a plan for migrating to the new system.
	+ Describe a plan for measuring the success of the new system.

## 4.1.4.13 Lecture-13(Legal Issues)

As user interfaces have become more prominent, serious legal issues have emerged.

* Privacy
	+ Medical,legal, financial, an data that can be used for unapproved access illegal tampering. .
* Safety and reliability
	+ User interfaces for aircraft, automobiles, medical equipment, military systems, utility control rooms anything that can effect a life or death situation.
* Paten protection for software
	+ developers who patent software who attempt to recover time and money spent on the project and make a profit.
* Piracy, P2P, file-sharing, etc.
	+ Do customers have the right to store the information electronically for later use, can they share this copy, do you own the contents of an email.
* Freedom of Speech
	+ Do users have the right to make controversial or potential offensive statements through e-mail or list servers?
* Localization:
	+ International, Federal, State, Municipality, etc.
		1. **Test Questions**

A .Fill in the blank types of Question

1.[What is iconic menu](http://www.UandIStar.org/)?

 [**To designate special functions within an application.**](http://www.UandIStar.org/)

 **2.**[\_ \_ \_ \_ \_ \_ \_ \_ \_functions as a menu choice that, when selected, results in the Connected information being displayed.](http://www.UandIStar.org/)

[**links**](http://www.UandIStar.org/)

 3.[Which of the following is the advantage of menu bars.](http://www.UandIStar.org/)

 [**easy to browse through.**](http://www.UandIStar.org/)

4.[What is the proper usage of pull- down menu](http://www.UandIStar.org/)

 [**best items represented textually.**](http://www.UandIStar.org/)

 **5.**[What are the components of a web navigation system.](http://www.UandIStar.org/)

 [**hyper media, links, pages.**](http://www.UandIStar.org/)

6.[The following are the elements of the menu bar \_ \_](http://www.UandIStar.org/)

 [**file, edit, view, help.**](http://www.UandIStar.org/)

 7.[What are the commands present in the "view" of the](http://www.UandIStar.org/) [menu bar](http://www.UandIStar.org/)

 [**Tool bar, status bar, zoom In, zoom Out.**](http://www.UandIStar.org/)

 8.[In which menu the command 'Grid points' is present.](http://www.UandIStar.org/)

 [**view**](http://www.UandIStar.org/)

9.[A cascading menu is a submenu derived from a \_](http://www.UandIStar.org/) **[\_](http://www.UandIStar.org/)**

 [**high- level menu.**](http://www.UandIStar.org/)

10.[What are the examples of graphical menus](http://www.UandIStar.org/)

 [**tear- off and cascading menus.**](http://www.UandIStar.org/)

B. Multiple choice questions

1.**[A window is presented to seek the users input or request an action to be performed is called as \_ \_ \_ \_ \_](http://www.UandIStar.org/)**

* 1. [**Single menus.**](http://www.UandIStar.org/)
	2. [Simultaneous menus.](http://www.UandIStar.org/)
	3. [Sequential linear menus.](http://www.UandIStar.org/)
	4. [Hierarchical menus.](http://www.UandIStar.org/)
1. [**\_ \_ \_ \_ \_ \_ provides, on the current menu screen, a listing of choices made on Previous menus.**](http://www.UandIStar.org/)
	1. [**verbal linkage.**](http://www.UandIStar.org/)
	2. [Spatial linkage.](http://www.UandIStar.org/)
	3. [Verbal and spatial linkage.](http://www.UandIStar.org/)
	4. [Temporal linkage](http://www.UandIStar.org/)
2. [**The advantage of greater depth is:**](http://www.UandIStar.org/)
	1. [fewer steps and shorter time to reach one's objective](http://www.UandIStar.org/)
	2. [fewer opportunities to wonder down wrong paths.](http://www.UandIStar.org/)
	3. [**fewer choices to be scanned.**](http://www.UandIStar.org/)
	4. [higher error rate.](http://www.UandIStar.org/)
3. [**Command buttons may appeared as \_ \_ \_ \_ \_ \_ \_ \_**](http://www.UandIStar.org/)
	1. [**navigation bar**](http://www.UandIStar.org/)
	2. [moving cursor.](http://www.UandIStar.org/)
	3. [hot keys.](http://www.UandIStar.org/)
	4. [pointer](http://www.UandIStar.org/)
4. [**What are the common structures of menus**](http://www.UandIStar.org/)
	1. [**Single menus and hierarchical menus.**](http://www.UandIStar.org/)
	2. [Context menus and title menus.](http://www.UandIStar.org/)
	3. [Simultaneous menus and context menus.](http://www.UandIStar.org/)
	4. [Connected menus and title menus.](http://www.UandIStar.org/)
5. [**What are the elements present in a menu?**](http://www.UandIStar.org/)
	1. [Name, data, navigation.](http://www.UandIStar.org/)
	2. [**Context, title, choice description and completion instruction**](http://www.UandIStar.org/)
	3. [Only context and title.](http://www.UandIStar.org/)
	4. [Parameter input and procedure.](http://www.UandIStar.org/)
6. [**The good examples of the menus are:**](http://www.UandIStar.org/)
	1. [A computer graphical systems.](http://www.UandIStar.org/)
	2. [TV and web systems.](http://www.UandIStar.org/)
	3. [Internet and computer](http://www.UandIStar.org/)
	4. [**Graphical and web systems.**](http://www.UandIStar.org/)
7. [**What is the function of menus**](http://www.UandIStar.org/)
	1. [Completion instructions.](http://www.UandIStar.org/)
	2. [Choice descriptions.](http://www.UandIStar.org/)
	3. [**Displaying information.**](http://www.UandIStar.org/)
	4. [Choice selection.](http://www.UandIStar.org/)
8. [**What is accelerator**](http://www.UandIStar.org/)
	1. [keyboard.](http://www.UandIStar.org/)
	2. [cursor](http://www.UandIStar.org/)
	3. [pointer](http://www.UandIStar.org/)
	4. [**combination of keys**](http://www.UandIStar.org/)
9. [**What do you mean by Boomerge link**](http://www.UandIStar.org/)
10. [useful links.](http://www.UandIStar.org/)
11. [A link to another sites to return a favor.](http://www.UandIStar.org/)
12. [A link that leads to little or no content.](http://www.UandIStar.org/)
13. [**A link that returns to the exact same sport.**](http://www.UandIStar.org/)

* + 1. **Review Questions**
1. **(very short notes**)

1.Explain usability goals and measures

2.Discuss usability motivations and universal usability.

3.what are the legal issues, Usability Testing and Laboratories

4.what is the Organizational design to support usability

5.Explain Four pillars of design and development methodologies

6.what are the Ethnographic observation and Scenario Development

7. Explain Social impact statement for early design review

8.what are the legal issues and Usability Testing and Laboratories

**B. Essay type questions**

1.a)Explain usability goals and measures

b)Discuss usability motivations and universal usability.

2 a)what are the legal issues, Usability Testing and Laboratories

b) what is the Organizational design to support usability

3 a) Explain Four pillars of design and development methodologies

b) what are the Ethnographic observation and Scenario Development

4 a) Explain Social impact statement for early design review

b) what are the legal issues and Usability Testing and Laboratories

* + 1. **Previous Questions (Asked by JNTUK from the concerned Unit)**

1 a)what are the legal issues, Usability Testing and Laboratories

b) what is the Organizational design to support usability

2 a) Explain Four pillars of design and development methodologies

b) what are the Ethnographic observation and Scenario Development

3 a) Explain Social impact statement for early design review

b) what are the legal issues and Usability Testing and Laboratories

TEXT BOOKS:

1.Designing the User Interface, Strategies for Effective Human Computer Interaction, 5ed, Ben Shneiderman, Catherine Plaisant, Maxine Cohen, Steven M Jacobs, Pearson

 2.The Essential guide to user interface design,2/e, Wilbert O Galitz, Wiley DreamaTech.

REFERENCE BOOK:

1. Human Computer, Interaction Dan R.Olsan, Cengage ,2010.
2. Designing the user interface. 4/e, Ben Shneidermann , PEA.
3. User Interface Design, Soren Lauesen , PEA.

**UNIT-2**

**4.2 Unit-II:**

 Unit II: (**Menu Selection, Form Fill-In and Dialog Boxes:** Introduction, Task- Related Menu Organization, Single menus,Combinations of Multiple Menus, Content Organization, Fast Movement Through Menus, Data entry with Menus: Form Fill-in, dialog Boxes, and alternatives, Audio Menus and menus for Small Displays)

 4.2.1 Unit Objectives: The Objectives of this unit are

* + Student know about the Menu Selection Form Fill-in and Dialog Box
	+ Student know about the Task- Related Menu
	+ Student know about Data entry with Menus

 4.2.2 Unit Outcomes:

* + Student know about the Menu Selection Form Fill-in and Dialog Box
	+ Student know about the Task- Related Menu
	+ Student know about Data entry with Menus
		1. Unit Lecture plan:

|  |  |  |  |
| --- | --- | --- | --- |
| Lecture No. | Topic | Methodology | Quick Reference |
| 1 | Menu Selection, Form Fill-In and Dialog Boxes: Introduction | Chalk & Board | Text book |
| 2 | Task- Related Menu Organization,  | Chalk & Board | Text book |
| 3 | Single menus ,Combinations of Multiple Menus | Chalk & Board | Text book |
| 4 | Content Organization | Chalk & Board | Text book |
| 5 | Fast Movement Through Menus | Chalk & Board | Text book |
| 6 | Data entry with Menus: Form Fill-in, dialog Boxes and alternatives, | Chalk & Board | Text book |

 4.2.4 Teaching Material / Teaching Aids as per above lecture plan.

 4.2.4.1 Lecture -1

 **Menu Selection, Form Fill-In and Dialog Boxes: Introduction:**

When designers cannot create appropriate direct-manipulation strategies, menu selection and form fill in are attractive alternatives. Whereas early systems used full-screen menus with numbered items, modern menus are usually pull downs, check boxes or radio buttons in dialog boxes, or embedded links on World Wide Web pages, all selectable by mouse clicks or a tap of the pen. When the menu items are written with familiar terminology and are organized in a convenient structure and sequence, users can select an item easily.

Menus are effective because they offer the cues to elicit recognition, rather than forcing users to recall the syntax of a command from memory. Users indicate their choices with a pointing device or keystroke and get feedback indicating what they have done. Simple menu selection is especially effective when users have little training, use the interface intermittently, are unfamiliar with the terminology, or need help in structuring their decision-making processes. With careful design of complex menus and high-speed interaction, menu selection can be made appealing even to expert frequent users.

4.2.4.2 Lecture -2

Task- Related Menu Organization:

* Single Menus
* Multiple menu
* Tree structured menu

Single Menus:

– No other menus will follow necessitating additional user choices



***Linear Menus:***



**4.2.4.3 Lecture -3**



**Content of menu:**

• ***Menu Context***

– Provides information to keep the user oriented

• ***Menu Title***

– Provides the context for the current set of choices

• ***Choice Descriptions***:

– Descriptions can range from a mnemonic, numeric or alphabetized listing

***Completion Instructions***

– Tell users how to indicate their choices

**Fast Movement through Menus**

Keyboard shortcuts

* + Supports expert use
	+ Can make translation to a foreign language more difficult
	+ Bookmarks in browsers
	+ User configured toolbars

**4.2.4.4 Lecture -4**

**Data entry with Menus: Form Fill-in, dialog Boxes and alternatives**:

* **Form Fill-in**
	+ Appropriate when many fields of data must be entered:
		- Full complement of information is visible to user.
		- Display resembles familiar paper forms.
		- Few instructions are required for many types of entries.
	+ Users must be familiar with:
		- Keyboards
		- Use of TAB key or mouse to move the cursor
		- Error correction methods
		- Field-label meanings
		- Permissible field contents
		- Use of the ENTER and/or RETURN key.
* **Format-specific field**
	+ **Coded fields**
		- Telephone numbers
		- Social-security numbers
		- Times
		- Dates
		- Dollar amounts (or other currency)
* **Dialog Boxes**
	+ Combination of menu and form fill-in techniques.
	+ Internal layout guidelines:
		- Meaningful title, consistent style
		- Top-left to bottom-right sequencing
		- Clustering and emphasis
		- Consistent layouts (margins, grid, white space, lines, boxes)
		- Consistent terminology, fonts, capitalization, justification
		- Standard buttons (OK, Cancel)
		- Error prevention by direct manipulation
	+ External Relationship
		- Smooth appearance and disappearance
		- Distinguishable but small boundary
		- Size small enough to reduce overlap problems
		- Display close to appropriate items
		- No overlap of required items
		- Easy to make disappear
		- Clear how to complete/cancel

**4.2.4.5 Lecture -:5**

Audio Menus and Menus for Small Displays:

* Menu systems in small displays and situations where hands and eyes are busy are a challenge.
* **Audio menus**
	+ Verbal prompts and option descriptions
	+ Input is normally verbal or keypad
	+ Not persistent, like a visual display, so memorization is required.
	+ Request users can avoid listening to options
* **Menu for small displays**
	+ E.g., entertainment, communication services
	+ Learnability is a key issue
	+ Hardware buttons
		- Navigation, select
	+ Expect interactions
	+ Tap interface
	+ GPS and radio frequency identification provides same automatic input





 4.2.5 Test Questions

a) Fill in the blank type questions:

 1.Toolbars are also called as \_ \_ \_ \_ \_ \_ \_ \_ \_ \_

**command bars.**

2What is the use of dialog boxes.

**presenting brief messages**.

3.A menu bar is used to \_ \_ \_ \_ \_ \_ \_ \_ \_ \_

**organize access to actions.**

4.Tiled windows used for \_ \_ \_ \_ \_ \_ \_ \_

**single task activities.**

5.How does the Microsoft define size and location of user- interface elements

**DLU's**

6.Multiple web screen boxes that permit the displaying of multiple documents on a Page are called as \_ \_

**frames.**

7.What are characteristics of window.

**name and size.**

8.Status bar is used to display \_ \_ \_ \_ \_ \_ \_ \_ \_

**status information**.

9.A window can be split into two or more separate viewing areas called \_ \_ \_ \_ \_ \_ \_ \_ \_

**boxes.**

10.In which area user performs his task.

**work area**

b) Multiple Choice questions:

1.Toolbars are also called as \_ \_ \_ \_ \_ \_ \_ \_ \_ \_

a.action bar

b.split bar

c.message bar

**d.command bars.**

2.What is the use of dialog boxes

a.to define an object.

**b.presenting brief messages.**

c.grouping property pages.

d.to define user- accessible properties

3.A menu bar is used to \_ \_ \_ \_ \_ \_ \_ \_ \_ \_

**a.organize access to actions.**

b.give information of use to the user.

c.determine the application functionality.

d.maintain list of topics.

4.Tiled windows used for \_ \_ \_ \_ \_ \_ \_ \_

**a.single task activities.**

b.switching between tasks.

c.unpredictable display contents.

d.expert or experienced users.

5.How does the Microsoft define size and location of user- interface elements

pinels and bytes.

6.Multiple web screen boxes that permit the displaying

of multiple documents on a Page are called as \_ \_

a.pop- up window

b.tabs

**c.frames.**

d.active windows.

7.What are characteristics of window.

a.**a name and size.**

b.colour , size.

c.a name, colour.

d.colour, visibility.

8.Status bar is used to display \_ \_ \_ \_ \_ \_ \_ \_ \_

**a.status information.**

b.name of object

c.context sensitive.

d.control point.

9.A window can be split into two or more separate viewing areas called \_ \_ \_ \_ \_ \_ \_ \_ \_

a.splin box

b.splin bar

**c.boxes.**

d.action bar

10.In which area user performs his task.

a.command area.

b.message area

**c.work area**

d.action area.

4.2.6 Review Questions:

 a)Short answer type of Questions:

 1.Explain Menu Selection, Form Fill-In and Dialog Boxes

2. Explain Task- Related Menu Organization,

3.Discribe briefly about Single menus and Combinations of Multiple Menus

4. what are the Data entry with Menus

5. Discribe briefly about Audio Menus and menus for Small Displays

b) Essay type Questions as per requirements:

1.Explain Menu Selection, Form Fill-In and Dialog Boxes

2. Explain Task- Related Menu Organization,

3.Discribe briefly about Single menus and Combinations of Multiple Menus

4. what are the Data entry with Menus

5. Discribe briefly about Audio Menus and menus for Small Displays

4.2.7 Assignments:

1.Explain Menu Selection, Form Fill-In and Dialog Boxes

2. Explain Task- Related Menu Organization,

3.Discribe briefly about Single menus and Combinations of Multiple Menus

4. what are the Data entry with Menus

5. Discribe briefly about Audio Menus and menus for Small Displays

4.2.8 Reference Text Books

Text Books:

1.Designing the User Interface, Strategies for Effective Human Computer Interaction, 5ed, Ben Shneiderman, Catherine Plaisant, Maxine Cohen, Steven M Jacobs, Pearson

2.The Essential guide to user interface design,2/e, Wilbert O Galitz, Wiley DreamaTech.

Reference Books:

1. Human Computer, Interaction Dan R.Olsan, Cengage ,2010.
2. Designing the user interface. 4/e, Ben Shneidermann , PEA.

**UNIT-3**

* 1. **Unit III Command and Natural Languages:** Introduction, Command organization Functionality, Strategies and Structure, Naming and Abbreviations, Natural Language in Computing Interaction Devices: Introduction, Keyboards and Keypads, Pointing Devices, Speech and Auditory Interfaces, Displays- Small and large.

 **4.3.1 Unit Objectives:**

The unit objectives are to know about command and natural languages

Student know about the keyboard and keypads

Student know about the pointing devices

* + 1. **Unit Outcomes:**

Student know the command and natural languages

Student know about the keyboard and keypads

Student know about the pointing devices

* + 1. **Unit Lecture plan:**

|  |  |  |  |
| --- | --- | --- | --- |
| Lecture No. | Topic | Methodology | Quick Reference |
| 1 | Command and Natural Languages: Introduction, Command organization Functionality | Chalk & Board | Text book |
| 2 | Strategies and Structure | Chalk & Board | Text book |
| 3 | Naming and Abbreviations | Chalk & Board | Text book |
| 4 | Introduction, Keyboards and Keypads | Chalk & Board | Text book |
| 5 | Pointing Devices | Chalk & Board | Text book |
| 6 | Speech and Auditory Interfaces | Chalk & Board | Text book |
| 7 | Displays- Small and large | Chalk & Board | Text book |

* + 1. Teaching Material / Teaching Aids as per above lecture plan.

 4.3.4.1 Lecture-1

**Command and Natural Languages: Introduction, Command organization Functionality**

The Basic Goals of Language Design

* Precision
* Compactness
* Ease in writing and reading
* Speed in learning
* Simplicity to reduce errors
* Ease of retention over time

Higher-Level Goals of Language Design

* Close correspondence between reality and the notation
* Convenience in carrying out manipulations relevant to user's tasks
* Compatibility with existing notations
* Flexibility to accommodate novice and expert users
* Expressiveness to encourage creativity
* Visual appeal

Functionality to Support User’s Tasks

Users do wide range of work:

* text editing
* electronic mail
* financial management
* airline or hotel reservations
* inventory
* manufacturing process control
* gaming

**Designers should**

* determine functionality of the system by studying users' task domain
* create a list of task actions and objects
* abstract this list into a set of interface actions and objects
* represent low-level interface syntax
* create a table of user communities and tasks, with expected use frequency
* determine hierarchy of importance of user communities (i.e. prime users)
* evaluate destructive actions (e.g. deleting objects) to ensure reversibility
* identify error conditions and prepare error messages
* allow shortcuts for expert users, such as macros and customizing system parameters

**4.3.4.2 Lecture-2**

**Strategies and Structure:**

A unifying interface concept or metaphor aids

* + learning
	+ problem solving
	+ retention

 Designers often err by choosing a metaphor closer to machine domain than to the user's task domain.

 **Simple command set**

* + Each command is chosen to carry out a single task. The number of commands match the number of tasks.
	+ For small number of tasks, this can produce a system easy to learn and use.
	+ E.g. the vi editor of Unix.

**The Benefits of Structure**

Human learning, problem solving, and memory are greatly facilitated by meaningful structure.

* Beneficial for
	+ task concepts
	+ computer concepts
	+ syntactic details of command languages

 **Consistent Argument Ordering**

 **Inconsistent order of arguments Consistent order of arguments**

 SEARCH file no, message id SEARCH message id, file no

 TRIM message id, segment size TRIM message id, segment size

 REPLACE message id, code no REPLACE message id, code no

 INVERT group size, message id INVERT message id, group size

**4.3.4.3 Lecture-3**

**Naming and Abbreviations:**

There is often a lack of consistency or obvious strategy for construction of command abbreviations.

Specificity Versus Generality

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|

|  |  |  |
| --- | --- | --- |
| Infrequent, discriminating words  | insert  | delete  |
| Frequent, discriminating words  | add  | remove  |
| Infrequent, non discriminating words  | amble  | perceive  |
| Frequent, nondiscriminating words  | walk  | view  |
| General words (frequent, nondiscriminating)  | alter  | correct  |
| Nondiscriminating nonwords (nonsense)  | GAC  | MIK  |
| Discriminating nonwords (icons)  | abc-adbc  | abc-ab  |

 |

**Six Potential Abbreviation Strategies**

1. Simple truncation: The first, second, third, etc. letters of each command.
2. Vowel drop with simple truncation: Eliminate vowels and use some of what remains.
3. First and last letter: Since the first and last letters are highly visible, use them.
4. First letter of each word in a phrase: Use with a hierarchical design plan.
5. Standard abbreviations from other contexts: Use familiar abbreviations.
6. Phonics: Focus attention on the sound.

**4.3.4.4 Lecture-4**

**Introduction, Keyboards and Keypads**

**Keyboard Layouts:**

* QWERTY layout
	+ 1870 Christopher Latham Sholes
	+ good mechanical design and a clever placement of the letters that slowed down the users enough that key jamming was infrequent
	+ put frequently used letter pairs far apart, thereby increasing finger travel distances
* Dvorak layout
	+ 1920
	+ reduces finger travel distances by at least one order of magnitude
	+ Acceptance has been slow despite the dedicated efforts of some devotees
	+ it takes about 1 week of regular typing to make the switch, but most users have been unwilling to invest the effort .
* **ABCDE style**
	+ 26 letters of the alphabet laid out in alphabetical order nontypists will find it easier to locate the keys
* **Additional keyboard issues**
	+ IBM PC keyboard was widely criticized because of the placement of a few keys
		- backslash key where most typists expect SHIFT key
		- placement of several special characters near the ENTER key
	+ Number pad layout
	+ wrist and hand placement
* Keys
	+ 1/2 inch square keys
	+ 1/4 inch spacing between keys
	+ slight concave surface
	+ matte finish to reduce glare finger slippage
	+ 40- to 125-gram force to activate
	+ 3 to 5 millimeters displacement
	+ tactile and audible feedback important
	+ certain keys should be larger (e.g. ENTER, SHIFT, CTRL)
	+ some keys require state indicator, such as lowered position or light indicator (e.g. CAPS LOCK)
	+ key labels should be large, meaningful, permanent
	+ some "home" keys may have additional features, such as deeper cavity or small raised dot, to help user locate their fingers properly (caution - no standard for this)
* Function keys
	+ users must either remember each key's function, identify them from the screen's display, or use a template over the keys in order to identify them properly
	+ can reduce number of keystrokes and errors
	+ meaning of each key can change with each application
	+ placement on keyboard can affect efficient use
	+ special-purpose displays often embed function keys in monitor bezel
	+ lights next to keys used to indicate availability of the function, or on/off status
	+ typically simply labeled F1, F2, etc, though some may also have meaningful labels, such as CUT, COPY, etc.
	+ frequent movement between keyboard home position and mouse or function keys can be disruptive to use
	+ alternative is to use closer keys (e.g. ALT or CTRL) and one letter to indicate special function
* **Cursor movement keys**
	+ up, down, left, right
	+ some keyboards also provide diagonals
	+ best layout is natural positions
	+ inverted-T positioning allows users to place their middle three fingers in a way that reduces hand and finger movement
	+ cross arrangement better for novices than linear or box
	+ typically include typamatic (auto-repeat) feature
	+ important for form-fillin and direct manipulation
	+ other movements may be performed with other keys, such as TAB, ENTER, HOME, etc.
* **Keyboard and keypads for small devices**
	+ Wireless or foldable keyboards
	+ Virtual keyboards
	+ Cloth keyboards
	+ Soft keys
	+ Pens and touch screens

**4.3.4.5 Lecture-5**

 **Pointing devices**

Pointing devices are applicable in six types of interaction tasks:

* 1. Select:
	+ user chooses from a set of items.
	+ used for traditional menu selection, identification of a file in a directory, or marking of a part in an automobile design.
* 2. Position:
	+ user chooses a point in a one-, two-, three-, or higher-dimensional space
	+ used to create a drawing, to place a new window, or to drag a block of text in a figure.
* 3. Orient:
	+ user chooses a direction in a two-, three-, or higher-dimensional space.
	+ direction may simply rotate a symbol on the screen, indicate a direction of motion for a space ship, or control the operation of a robot arm.
* 4. Path:
	+ user rapidly performs a series of position and orient operations.
	+ may be realized as a curving line in a drawing program, the instructions for a cloth cutting machine, or the route on a map.
* 5. Quantify:
	+ user specifies a numeric value.
	+ usually a one-dimensional selection of integer or real values to set parameters, such as the page number in a document, the velocity of a ship, or the amplitude of a sound.
* 6. Text:
	+ user enters, moves, and edits text in a two-dimensional space. The
	+ pointing device indicates the location of an insertion, deletion, or change.
	+ more elaborate tasks, such as centering; margin setting; font sizes; highlighting, such as boldface or underscore; and page layout.

**4.3.4.6 Lecture 6**

**Speech and Auditory Interfaces**

* Speech recognition still does not match the fantasy of science fiction:
	+ demands of user's working memory
	+ background noise problematic
	+ variations in user speech performance impacts effectiveness
	+ most useful in specific applications, such as to benefit handicapped users



* **Discrete word recognition**
	+ recognize individual words spoken by a specific person; can work with 90- to 98-percent reliability for 20 to 200 word vocabularies
	+ Speaker-dependent training, in which the user repeats the full vocabulary once or twice
	+ Speaker-independent systems are beginning to be reliable enough for certain commercial applications
	+ been successful in enabling bedridden, paralyzed, or otherwise disabled people
	+ also useful in applications with at least one of the following conditions:
		- speaker's hands are occupied
		- mobility is required
		- speaker's eyes are occupied
		- harsh or cramped conditions preclude use of keyboard
	+ voice-controlled editor versus keyboard editor
		- lower task-completion rate
		- lower error rate
	+ use can disrupt problem solving
* Continuous-speech recognition
	+ Not generally available:
		- difficulty in recognizing boundaries between spoken words
		- normal speech patterns blur boundaries
		- many potentially useful applications if perfected
* Speech store and forward
	+ Voice mail users can
		- receive messages
		- replay messages
		- reply to caller
		- forward messages to other users, delete messages
		- archive messages
* Systems are low cost and reliable.
* **Voice information systems**
	+ Stored speech commonly used to provide information about tourist sites, government services, after-hours messages for organizations
	+ Low cost
	+ Voice prompts
	+ Deep and complex menus frustrating
	+ Slow pace of voice output, ephemeral nature of speech, scanning and searching problems
	+ Voice mail
	+ Handheld voice recorders
	+ Audio books
	+ Instructional systems
* **Speech** generation
	+ Michaelis and Wiggins (1982) suggest that speech generation is "frequently preferable" under these circumstances:
		- The message is simple.
		- The message is short.
		- The message will not be referred to later.
		- The message deals with events in time.
		- The message requires an immediate response.
		- The visual channels of communication are overloaded.
		- The environment is too brightly lit, too poorly lit, subject to severe vibration, or otherwise unsuitable for transmission of visual information.
		- The user must be free to move around.
		- The user is subjected to high G forces or anoxia
* **Audio tones, audiolization, and music**
	+ Sound feedback can be important:
		- to confirm actions
		- offer warning
		- for visually-impaired users
		- music used to provide mood context, e.g. in games
		- can provide unique opportunities for user, e.g. with simulating various musical instruments

**4.3.4.7 Lecture-7**

**Displays – Small and Large**

* The display has become the primary source of feedback to the user from the computer
	+ The display has many important features, including:
		- Physical dimensions (usually the diagonal dimension and depth)
		- Resolution (the number of pixels available)
		- Number of available colors, color correctness
		- Luminance, contrast, and glare
		- Power consumption
		- Refresh rates (sufficient to allow animation and video)
		- Cost
		- Reliability

Usage characteristics distinguish displays:

* Portability
* Privacy
* Saliency
* Ubiquity
* Simultaneity

**Display technology**

* Monochrome displays
	+ are adequate, and are attractive because of their lower cost
* RGB shadow-mask displays
	+ small dots of red, green, and blue phosphors packed closely
* Raster-scan cathode-ray tube (CRT)
	+ electron beam sweeping out lines of dots to form letters
	+ refresh rates 30 to 70 per second
* Liquid-crystal displays (LCDs)
	+ voltage changes influence the polarization of tiny capsules of liquid crystals
	+ flicker-free
	+ size of the capsules limits the resolution
* Plasma panel
	+ rows of horizontal wires are slightly separated from vertical wires by small glass-enclosed capsules of neon-based gases
* Light-emitting diodes (LEDs)
	+ certain diodes emit light when a voltage is applied
	+ arrays of these small diodes can be assembled to display characters
		1. **Test Questions**
1. Fill in the blank type question

1.**[\_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ is an example of direct devices](http://www.UandIStar.org/)**

[**light pen.**](http://www.UandIStar.org/)

2.**[\_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ is an example of indirect devices](http://www.UandIStar.org/)**

[**mouse**](http://www.UandIStar.org/)

3.**[What is the another name of graphic tablet](http://www.UandIStar.org/)**

[**touch**](http://www.UandIStar.org/)

4.**[Which among the following is a disadvantage of keyboard](http://www.UandIStar.org/)**

[**discrete actions to operate.**](http://www.UandIStar.org/)

5.**[Why do many skilled typists prefer a keyboard to a mouse](http://www.UandIStar.org/)**

[**speed**](http://www.UandIStar.org/)

6.**[Which devices permits direct pointing](http://www.UandIStar.org/)**

[**touch screen , light pen**](http://www.UandIStar.org/)

7.**[When multiple devices are used, eye and hand movements between them must be \_ \_ \_ \_ \_ \_ \_](http://www.UandIStar.org/)**

[**Minimized.**](http://www.UandIStar.org/)

8.**[\_ \_ \_ \_ \_ \_ \_ \_ \_yields poor performance for both pointing and dragging](http://www.UandIStar.org/)**

[**Track ball.**](http://www.UandIStar.org/)

9.[**\_ \_ \_ \_ \_ \_ \_ \_ \_ \_ are those that permit the entry, selection, changing or editing of a particular value, or cause a command to be performed.**](http://www.UandIStar.org/)

[**Operable controls**](http://www.UandIStar.org/)

10. [**What are the specialized tool bars**](http://www.UandIStar.org/)

[**Ribbons, Tool boxes, Palettes.**](http://www.UandIStar.org/)

**b) Multiple Choice questions:**

1.**[\_ \_ \_ \_ \_ \_ \_ \_ \_ \_contains text that is exclusively entered or modified through the keyboard.](http://www.UandIStar.org/)**

1. [Keyboard Equivalents.](http://www.UandIStar.org/)
2. [**A Text entry/ Read-only controls.**](http://www.UandIStar.org/)
3. [Captions.](http://www.UandIStar.org/)
4. [Fields.](http://www.UandIStar.org/)

2.**[\_ \_ \_ \_ \_ \_ \_ \_ \_ are purely informational and provide details about other screen elements or controls or assist in giving the screen structure.](http://www.UandIStar.org/)**

1. [Custom controls.](http://www.UandIStar.org/)
2. [Media controls.](http://www.UandIStar.org/)
3. [**Presentation controls.**](http://www.UandIStar.org/)
4. [Text controls.](http://www.UandIStar.org/)

3.**[\_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ provides the additional descriptive or status information about a screen element.](http://www.UandIStar.org/)**

1. [Screen tips.](http://www.UandIStar.org/)
2. [**Balloon tip.**](http://www.UandIStar.org/)
3. [Progress bar.](http://www.UandIStar.org/)
4. [Scroll bar.](http://www.UandIStar.org/)

4.**[A text entry can be permitted when the following option is yes \_ \_ \_ \_ \_ \_ \_ \_ \_ \_](http://www.UandIStar.org/)**

1. [**Is the data unlimited in size and shape?**](http://www.UandIStar.org/)
2. [Is the data conductive to typing errors?](http://www.UandIStar.org/)
3. [Will typing be slower than choice selection?](http://www.UandIStar.org/)
4. [Is the user is learning typist?](http://www.UandIStar.org/)

5.**[Buttons are used to \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_](http://www.UandIStar.org/)**

1. [**Display pop-up menu.**](http://www.UandIStar.org/)
2. [Display read only information.](http://www.UandIStar.org/)
3. [Display text files.](http://www.UandIStar.org/)
4. [Display the caption.](http://www.UandIStar.org/)

6.**[\_ \_ \_ \_ \_ \_ \_ \_ \_ \_ yields best performance during pointing.](http://www.UandIStar.org/)**

1. [Mouse.](http://www.UandIStar.org/)
2. [Joystick.](http://www.UandIStar.org/)
3. [Track ball.](http://www.UandIStar.org/)
4. [**Graphic tablet.**](http://www.UandIStar.org/)

**7.[\_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_yields best performance during dragging](http://www.UandIStar.org/)**

1. [Graphic tablet.](http://www.UandIStar.org/)
2. [**Mouse.**](http://www.UandIStar.org/)
3. [Track ball.](http://www.UandIStar.org/)
4. [Joystick.](http://www.UandIStar.org/)

8.**[\_ \_ \_ \_ \_ \_ \_ \_ \_ can also be called as button bars, control bars or access bars.](http://www.UandIStar.org/)**

1. [**Tool bars.**](http://www.UandIStar.org/)
2. [Command bars.](http://www.UandIStar.org/)
3. [Symbol bars.](http://www.UandIStar.org/)
4. [Address bars.](http://www.UandIStar.org/)

9.**[The pointer image should be used to provide feedback that concerns \_ \_ \_ \_ \_ \_ \_ \_](http://www.UandIStar.org/)**

1. [**The state of the system.**](http://www.UandIStar.org/)
2. [Restrict one's ability to interact.](http://www.UandIStar.org/)
3. [Should be visible at all times.](http://www.UandIStar.org/)
4. [Location should not warp.](http://www.UandIStar.org/)

10.**[The control commonly found in electrical or mechanical devices and is some times called as \_ \_ \_ \_](http://www.UandIStar.org/)**

1. [Button bars.](http://www.UandIStar.org/)
2. [**Command buttons.**](http://www.UandIStar.org/)
3. [Tool bars.](http://www.UandIStar.org/)
4. [Labels.](http://www.UandIStar.org/)

**4.3.6 Review Questions:**

e) Essay type Questions as per requirements:

1. Explain Interaction Devices and pointing device

2. Discribe about Speech and Auditory Interfaces

3. Briefly Explain about Display devices.

**4.3.7 Assignments:**

1. Explain Interaction Devices and pointing device

2. Discribe about Speech and Auditory Interfaces

3. Explain Briefly about Display devices.

**4.3.8 Previous Questions (Asked by JNTUK from the concerned Unit)**

1. Explain Interaction Devices and pointing device

2. Discribe about Speech and Auditory Interfaces

3. Explain Briefly about Display devices.

**Text Books:**

1.Designing the User Interface, Strategies for Effective Human Computer Interaction, 5ed, Ben Shneiderman, Catherine Plaisant, Maxine Cohen, Steven M Jacobs, Pearson

 2.The Essential guide to user interface design,2/e, Wilbert O Galitz, Wiley DreamaTech.

**Reference Books:**

1.User Interface Design, Soren Lauesen , PEA.

2.Interaction Design PRECE, ROGERS, SHARPS, Wiley.