Internal Assessment Test 2 – November 2016

Sub:	**Principles Of User Interface Design**						Code:	13MCA355
Date:	03/11/2016	*Duration:*	*90 mins*	*Max Marks:*	*50*	*Sem:*	III 3A	*Branch:*	*MCA*

Answer any five of the following.   5 x 10=50M

1. What is single menu? Explain in detail about various types of single menus 10M

Ans Single menus may require users to choose between two or more items, or may allow multiple selections. Single menus may pop up on the current work area or may remain permanently available (on a frame, in a separate window, or on a data table) while the main display is changed. The simplest case is a *binary menu* with, for example, true-false, male-female, or yes-no choices.

Pull-down, pop-up, and **toolbar menus**

The two-dimensional layout in graphical user interfaces offered new opportunities for menu designers. The positioning of menus became more open, as did their invocation, selection, and visual presentation.

Menus for long lists

Sometimes the list of menu items may be longer than the 30 to 40 lines that can reasonably fit on a display One solution is to create a tree-structured menu. The principles of menu-list sequencing apply Scrolling menus, combo boxes, and fisheye menus.

Scrolling menus display the first portion of the menu and an additional menu item, typically an arrow that leads to the next set of items in the menu sequence. The scrolling (or paging) menu might continue with dozens or thousands of items, using the list box capabilities found in most graphical user interfaces. Keyboard shortcuts might allow users to type the letter *"M"* to scroll directly to the first word starting with the letter *"M,"* but this feature is seldom discovered and remembered by novice users.

Combo boxes make this option more evident by combining a scrolling menu with a text-entry field. Users can type in leading characters to scroll through the list.

Fisheye menu, which displays all of the menu items on the screen at once but shows only items near the cursor at full size; items further away are displayed at a smaller size. Fisheye menus have the potential to improve speed, but wide differences in users' preferences exist, making fisheye menus a useful option but not a recommended choice as a default menu style.

Sliders and alpha sliders. When items consist of ranges of numerical values, a slider is a natural choice to allow the selection of a value. Ranges of values can also be selected with double-sided (range) sliders. Users select values by using a pointing device to drag the slider thumb (scroll box) along the scale. When greater precision is needed, the slider thumb can be adjusted incrementally by clicking on arrows located at each end of the slider.

A similar tool that can be useful for presenting menus with a vast number of selection options is an alphas/slider. The alpha slider uses multiple levels of granularity in moving the slider thumb and therefore can support tens or hundreds of thousands of items. The index at the bottom of the alpha slider gives users an idea of where to jump to start a new search. Because of their compactness, sliders, range sliders, and alpha sliders are often used in the control panels of interactive visualization systems

Two-dimensional menus. Alternatively, a multiple-column menu might be used. These "fast and vast" two-dimensional menus give users a good overview of the choices, reduce the number of required actions, and allow rapid selection. Multiple-column menus are especially useful in web-page design, to minimize the scrolling needed to see a long list and to give users a single-screen overview of the

full set of choices
Embedded menus and hotlinks

All the menus discussed thus far might be characterized as *explicit menus,* in that there is an orderly enumeration of the menu items with little extraneous information. In many situations, however, the menu items might be *embedded* in text or graphics and still be selectable. Embedded links , are popularized in the Hyperties system, which was used for two early commercial hypertext projects.

2. **Write in detail about how expert review involve in evaluating interface design 10M**

There are a variety of expert-review methods from which to choose:

• *Heuristic evaluation.* The expert reviewers critique an interface to determine conformance with a short list of design heuristics, such as the eight golden rules. It makes an enormous difference if the experts are familiar with the rules and are able to interpret and apply them.

• *Guidelines review.* The interface is checked for conformance with the organizational or other guidelines document. Because guidelines documents may contain a thousand items, it may take the expert reviewers some time to master the guidelines and days or weeks to review a large interface.

• *Consistency inspection.* The experts verify consistency across a family of interfaces, checking for consistency of terminology, fonts, colour schemes, layout, input and output formats, and so on within the interface as well as in the training materials and online help. Software tools can help automate the process, as well as produce concordances of words and abbreviations.

• *Cognitive walkthrough.* The experts simulate users walking through the interface to carry out typical tasks. High-frequency tasks are a starting point, but rare critical tasks, such as error recovery, also should be walked through. Some form of simulating the day in the life of the user should be part of the expert-review process. Cognitive walkthroughs were developed for interfaces that can be learned by exploratory browsing, but they are useful even for interfaces that require substantial training. An expert might try the walkthrough privately and explore the system, but there also should be a group meeting with designers, users, or managers to conduct the walkthrough and provoke discussion. Extensions to cover web-site navigation incorporate richer descriptions of users and their goals plus linguistic analysis programs to estimate the similarity of link labels and destinations.

• *Formal usability inspection.* The experts hold a courtroom-style meeting, with a moderator or judge, to present the interface and to discuss its merits and weaknesses. Design-team members may rebut the evidence about problems in an adversarial format. Formal usability inspections can be educational experiences for novice designers and managers, but they may take longer to prepare and more personnel to carry out than do other types of review. Expert reviews can be scheduled at several points in the development process, "when experts are available and when the design team is ready for feedback. The number of expert reviews will depend on the magnitude of the project and on the amount of resources allocated.

3. **What are the four pillars of User Interface Design? Explain in detail. 10M**

Ans The four pillars can help user interface architects to turn good ideas into successful systems. They are not guaranteed to work, but experience has shown that each pillar can produce an order of magnitude speedup in the process and can facilitate the creation of excellent systems.

1./User Interface requirements
●Soliciting and clearly specifying user requirements is a major key to success in any
 development activity
●Laying out the user-interface requirements is part of the overall requirements development
 and management process
●User interface requirements describe system behaviour

1.Guidelines documents and processes

Each project has different needs, but guidelines should be considered for:
Words and icons

- Terminology (objects and actions), abbreviations, and capitalization
- Character set, fonts, font sizes, and styles (bold, italic, underline)
- Icons, graphics, line thickness, and
- Use of color, backgrounds, highlighting, and blinking

Screen-layout issues

- Menu selection, form fill-in, and dialog-box formats
- Wording of prompts, feedback, and error messages
- Justification, white space, and margins
- Data entry and display formats for items and lists
- Use and contents of headers and footers

Input and output devices

- Keyboard, display, cursor control, and pointing devices
- Audible sounds, voice feedback, touch input, and other special devices
- Response time for a variety of tasks

Action sequences

- Direct-manipulation clicking, dragging, dropping, and gestures
- Command syntax, semantics, and sequences
- Programmed function keys
- Error handling and recovery procedures

Training

- Online help and tutorials
- Training and reference materials

2.User-interface software tools

As the interactive systems are novel in many situations, users may not realize the implications of design decisions. Unfortunately, it is difficult, costly, and time consuming

to make major changes to systems once those systems have been implemented. At an early stage, the customers and users can be given a realistic impression of what the final system will look like The prototype of a menu system may have only one or two paths active, instead of the thousands of paths envisioned for the final system. For a form-fillin system, the prototype may simply show the fields but not actually process them.

Prototypes have been developed with simple drawing or word-processing tools, but graphical design environments such as Macromedia's Director and Flash are widely used.

3. Expert reviews and usability testing

Web-site designers now recognize that they must carry out many small and some large pilot tests of components before release to customers. In addition to a variety of expert review methods, tests with the

intended users, surveys, and automated analysis tools are proving to be valuable. Procedures vary greatly depending on the goals of the usability study, the number of expected users, the dangers of errors, and the level of investment.

4. Explain any five methods used in the evaluation during active use 10M

Evaluation During Active Use

- A carefully designed and thoroughly tested system is a wonderful asset, but successful active use requires constant attention from dedicated managers, user-services personnel, and maintenance staff.
- Perfection is not attainable, but percentage improvements are possible and are worth pursuing.
- Interviews and focus group discussions
  - Interviews with individual users can be productive because the interviewer can pursue specific issues of concern.
  - After a series of individual discussions, group discussions are valuable to ascertain the universality of comments.
- Continuous user-performance data logging
  - The software architecture should make it easy for system managers to collect data about the patterns of system usage, speed of user performance, rate of errors, or frequency of request for online assistance.
  - A major benefit of usage-frequency data is the guidance they provide to system maintainers in optimizing performance and reducing costs for all participants.
- Online or telephone consultants
  - Online or telephone consultants are an extremely effective and personal way to provide assistance to users who are experiencing difficulties.
  - Many users feel reassured if they know there is a human being to whom they can turn when problems arise.
  - On some network systems, the consultants can monitor the user's computer and see the same displays that the user sees while maintaining telephone voice contact.
  - This service can be extremely reassuring; the users know that someone can walk them through the correct sequence of screens to complete their tasks.
- Online suggestion box or trouble reporting
  - Electronic mail can be employed to allow users to send messages to the maintainers or designers.
  - Such an online suggestion box encourages some users to make productive comments, since writing a letter may be seen as requiring too much effort.
- Online bulletin board or newsgroup
  - Many interface designers offer users an electronic bulletin board or newsgroups to permit posting of open messages and questions.
  - Bulletin-board software systems usually offer a list of item headlines, allowing users the opportunity to select items for display.
  - New items can be added by anyone, but usually someone monitors the bulletin board to ensure that offensive, useless, or repetitive items are removed.
- User newsletters and conferences
  - Newsletters that provide information about novel interface facilities, suggestions for improved productivity, requests for assistance, case studies of successful applications, or stories about individual users can promote user satisfaction and greater knowledge.
  - Printed newsletters are more traditional and have the advantage that they can be carried away from the workstation.
  - Online newsletters are less expensive and more rapidly disseminated

Conferences allow workers to exchange experiences with colleagues, promote novel approaches, stimulate greater dedication, encourage higher productivity, and develop a deeper relationship of trust.

5. Explain any five examples of direct manipulation. 10

Command line vs. display editors and word processors

- Training times with display editors are much less than line editors
- Line editors are generally more flexible and powerful
- The advances of WYSIWYG word processors:
- Display a full page of text
- Display of the document in the form that it will appear when the final printing is done
- Show cursor action
- Control cursor motion through physically obvious and intuitively natural means
- Use of labeled icon for actions
- Display of the results of an action immediately
- Provide rapid response and display
- Offer easily reversible actions

The VISICALC spreadsheet and its descendants Spatial data management

- In some cases, spatial representations provide a better model of reality
- Successful spatial data-management systems depend on choosing appropriate:
  - Icons
  - Graphical representations
  - Natural and comprehensible data layouts

Video games
- Field of action is visual and compelling
- Commands are physical actions whose results are immediately shown on the screen
- No syntax to remember

Computer-aided design Office automation
- HyperCard
- Quicken

6. Briefly explain guidelines for menu layout and dialog box design. 10M

Guidelines for menu layout

• Use task semantics to organize menus (single, linear sequence, tree structure, acyclic and cyclic networks)
• Prefer broad-shallow to narrow-deep
• Show position by graphics, numbers, or titles
• Use items as titles for subtrees
• Group items meaningfully
• Sequence items meaningfully
• Use brief items, begin with the keyword
• Use consistent grammar, layout, terminology
• Allow type ahead, jump ahead, or other shortcuts
• Enable jumps to previous and main menu
        • Consider online help; novel selection mechanisms; and optimal response time display rate and screen size.

Guidelines for dialog box
  Internal layout: like that of menus and forms
• Meaningful title, consistent style
• Top-left to bottom-right sequencing
• Clustering and emphasis
• Consistent layouts (margins, grid, whitespace, lines, boxes)
• Consistent terminology, fonts, capitalization, justification
• Standard buttons (OK, Cancel)
• Error prevention by direct manipulation
External relationships
• 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

7. Explain abbreviation strategies and guidelines for using abbreviations. 10M

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.

Guidelines for using abbreviations

Ehrenreich and Porcu (1982) offer this set of guidelines:

1. A *simple* primary rule should be used to generate abbreviations for most items; a *simple* secondary rule should be used for those items where there is a conflict.
2. Abbreviations generated by the secondary rule should have a marker incorporated in them.
3. The number of words abbreviated by the secondary rule should be kept to a minimum.
4. Users should be familiar with the rules used to generate abbreviations.
5. Truncation should be used because it is an easy rule for users to comprehend and remember. However, when it produces a large number of identical abbreviations for different words, adjustments must be found.
6. Fixed-length abbreviations should be used in preference to variable-length ones.
7. Abbreviations should not be designed to incorporate endings (ING, ED, s).
8. Unless there is a critical space problem, abbreviations should not be used in messages generated by the computer and read by the user. Abbreviations are an important part of system design, and they are appreciated by experienced users. Users are more likely to use abbreviations if they areconfident in their knowledge of the abbreviations and if the benefit is a savings of more than one to two characters.

8. Discuss the pointing tasks involved in pointing devices. 10M

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.

Direct-control pointing devices

Touch screen, light pen, Stylus

Indirect pointing devices

Mouse, trackball, joystick, graphics tablet, touchpad