Scheme of Evaluation
Internal Assessment Test 2 – December 2023

Sub:	User Interface Design							**Code:**	18CS734
Date**:**	05/12/2023	Duration:	90mins	Max Marks:	50	**Sem:**	VII	**Branch:**	ISE

Note: Answer Any five full questions.

Question #		**Description**	**Marks Distribution**		**Max Marks**
1	a)	What are the models for determining basic business function? Definition	2M	2M	10M
	b)	Discuss the models with suitable explanation. Mental Model Conceptual Model User's New Mental model	3*2M	8M	
2	a)	What is a conceptual model? Definition	2M	2M	10M
	b)	Explain the guidelines for designing the conceptual models Any 8 guideline	1*1M	8M	
3	a)	What are the different types of menus? Single Menus Sequential Linear Menus Simultaneous Menus Hierarchical Menus Connected Menus Event-Trapping Menus	2M	2M	10M
	b)	Briefly explain the structure of menus Explanation for all the types of menus(any four)	4*2M	8M	

4	a)	Draw the structure of pull down menu and explain with its parameters. Diagram Explanation Display, Location, Size, Title, Item Description, Organization, Layout, Grouping, Toggles	3M 7M	10M	10M
5	a)	What is web navigation? Definition	2M	2M	10M
	b)	Using illustrations, describe the components of web navigation system. Diagram Browser command buttons Web site Navigation Bars Textual Phrases Graphical Images Guidelines Links Historical tails	4*2M	8M	
6	a)	An organization is implementing a menu based application that simulates the operation of core processes and procedures. Briefly explain the different types of menu that is required in the application and their usage for the execution of the processes. Diagram Explanation Student specific answer	4M 6M	10M	10M

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Q. 1 (a) What are the models for determining basic business function?
(b) Discuss the models with suitable explanation.

major functions is developed. The process the developer will use is summarized as follows:

- Gain a complete understanding of the user's mental model based upon
  - The user's needs and the user's profile.
  - A user task analysis.
- Develop a conceptual model of the system based upon the user's mental model. This includes
  - Defining objects.
  - Developing metaphors.

The user interface activities described in Steps 1 and 3 are usually performed concurrently with these steps.

Understanding the User's Work

The next phase in interface design is to thoroughly describe the aims and goals of people who will be using the system. Also to be determined is what the system will be used for so that the necessary system functionality can be provided to permit people to achieve their goals. The technique used to gain an understanding of what the computer system must do is called *task analysis*. Another object of task analysis is to gain a picture of the user's *mental model*.

Mental Models

A mental model is an internal representation of a person's current conceptualization and understanding of something: themselves, other people, the environment, and the thing with which they interact. Mental models are gradually developed through experience, training, and instruction. They enable a person to understand, explain, and do something. Mental models enable a person to predict the actions necessary to do things if the actions have been forgotten or have not yet been encountered.

Performing a Task Analysis

User activities, the way in which people perform tasks, are precisely described in a task analysis. Task analysis involves breaking down the user's activities to the individual task level. The goal is to obtain an understanding of why and how people currently do the things that will be automated. Knowing why establishes the major work goals; knowing how provides details of actions performed to accomplish these goals. Task analysis also provides information concerning workflows; the interrelationships between people, objects, and actions; and the user's conceptual frameworks. The out-

Scenarios should be well documented and maintained. Changes in task requirements can then be easily incorporated as design iteration occurs. Another result is a list of objects the users see as important to what they do. The objects can be sorted into the following categories:

- Concrete objects — things that can be touched.
- People who are the object of sentences — normally organization employees (customers, for example).
- Forms or journals — things that keep track of information.
- People who are the subject of sentences — normally the users of a system.
- Abstract objects — anything not included above.

Developing Conceptual Models

The output of the task analysis is the creation, by the designer, of a conceptual model for the user interface. A conceptual model is the general conceptual framework through which the system's functions are presented. Such a model describes how the interface will present objects, the relationships between objects, the properties of objects, and the actions that will be performed. A conceptual model is based on the user's mental model. Because the term mental model refers to a person's current level of knowledge about something, people will always have them. Because mental models are influenced by a person's experiences, and people have different experiences, no two user mental models are likely to be exactly the same. Each person looks at the interface from a slightly different perspective.

Defining Objects

- Determine all objects that have to be manipulated to get work done. Describe
  - The objects used in tasks.
  - Object behavior and characteristics that differentiate each kind of object.
  - The relationship of objects to each other and the people using them.
  - The actions performed.

Developing Metaphors

- Choose the analogy that works best for each object and its actions.
- Use real-world metaphors.
- Use simple metaphors.
- Use common metaphors.
- Multiple metaphors may coexist.
- Use major metaphors, even if you can't exactly replicate them visually.
- Test the selected metaphors.

Q. 2 (a) What is a conceptual model?
(b) Explain the guidelines for designing the conceptual models.

Developing Conceptual Models

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Guidelines for Designing Conceptual Models

- Reflect the user's mental model, not the designer's.
- Draw physical analogies or present metaphors.
- Comply with expectancies, habits, routines, and stereotypes.
- Provide action-response compatibility.
- Make invisible parts and processes of a system visible.
- Provide proper and correct feedback.
- Avoid anything unnecessary or irrelevant.
- Provide design consistency.
- Provide documentation and a help system that will reinforce the conceptual model.
- Promote the development of both novice and expert mental models.

Reflect the user's mental model, not the designer's. A user will have different expectations and levels of knowledge than the designer. So, the mental models of the user and designer will be different. The user is concerned with the task to be performed, and the business objectives that must be fulfilled. The designer's model is focused on the design of the interface, the kinds of objects, the interaction methods, and the visual representations on the screen. Objects must be defined, along with their relationships, behaviors, and properties. Interaction methods must also be defined, such as input mechanisms, interaction techniques, and the contents of menus. Visual screen representations must also be created, including functionality and appearance.

Draw physical analogies or present metaphors. Replicate what is familiar and well known. Duplicate actions that are already well learned. The success of graphical

systems can be attributed, in part, to their employing the desktop metaphor. A metaphor, to be effective, must be widely applicable within an interface. Metaphors that are only partially or occasionally applicable should not be used. In the event that a metaphor cannot be explicitly employed in a new interface, structure the new interface in terms of familiar aspects from the manual world.

Comply with expectancies, habits, routines, and stereotypes. Create a system that builds on knowledge, habits, routines, and expectancies that already exist. Use familiar associations, avoiding the new and unfamiliar. With color, for example, accepted meanings for red, yellow, and green are already well established. Use words and symbols in their customary ways. Replicate the language of the user, and create icons reflecting already known images.

Provide action-response compatibility. All system responses should be compatible with the actions that elicit them. Names of commands, for example, should reflect the actions that will occur. The organization of keys in documentation or help screens should reflect the ordering that actually exists on the keyboard.

Make invisible parts of the system visible. Systems are composed of parts and processes, many of which are invisible to the user. In creating a mental model, a person must make a hypothesis about what is invisible and how it relates to what is visible. New users of a system often make erroneous or incomplete assumptions about what is invisible and develop a faulty mental model. As more experience is gained, their mental models evolve to become more accurate and complete. Making invisible parts of a system visible will speed up the process of developing correct mental models. An example of a process being made visible can be illustrated by moving a document between files. In a command language interface, the document must be moved through a series of typed commands. The file is moved invisibly, and the user assumes correctly, unless an error message is received. In a graphical direct-manipulation system, the entire process is visible, with the user literally picking up the file in one folder by clicking on it, and dragging it to another folder.

Provide Proper and Correct Feedback. Be generous in providing feedback. Keep a person informed of what is happening, and what has happened, at all times, including the following:

- *Provide a continuous indication of status.* Mental models are difficult to develop if things happen, or are completed, unknown to the user. During long processing sequences, for example, interim status messages such as "loading . . .," "opening . . .," or "searching . . ." reassure the user and enable him or her to understand internal processes and more accurately predict how long something will take. Such messages also permit the pinpointing of problems if they occur.

Q. 3(a) What are the different types of menus?
(b) Briefly explain the structure of menus.

Structures of Menus

Menus vary in form from very simple to very complex. They may range from small dialog boxes requesting the user to choose between one of two alternatives, to hierarchicaltree schemes with many branches and level of depth. A menu's structure defines theamount of control given to the user in performing a task. The most common structuresare the following.

Single Menus

In this simplest form of menu, a single screen or window is presented to seek the user'sinput or request an action to be performed, as illustrated in Figure 4.1.

❍Choice 1
❍Choice 2
❍Choice 3

Figure 4.1

A single menu may be iterative if it requires data to be entered into it and this datainput is subject to a validity check that fails. The menu will then be represented to theuser with a message requesting reentry of valid data.

Sequential Linear Menus

Sequential linear menus are presented on a series of screens possessing only one path.The menu screens are presented in a preset order, and, generally, their objective is forspecifying parameters or for entering data. The length of the path may be short, or long,depending upon the nature of the information being collected. All the menus are importantto the process at hand and must be answered in some manner by the user.

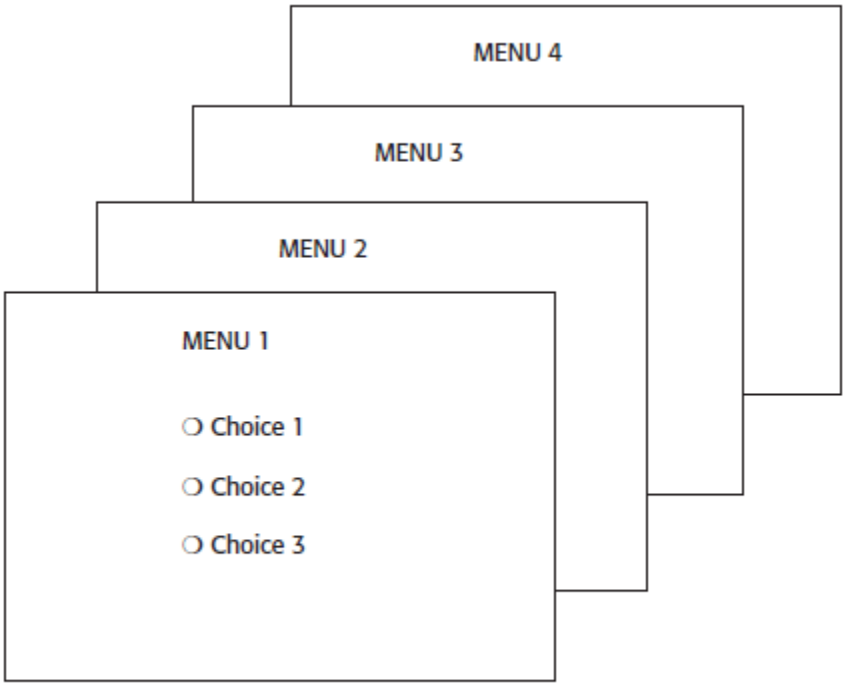

Figure 4.2 Sequential linear menus.

Simultaneous Menus

Instead of being presented on separate screens, all menu options are available simultaneously,as illustrated in Figure 4.3. The menu may be completed in the order desiredby the user, choices being skipped and returned to later. All

alternatives are visible forreminding of choices, comparing choices, and changing answers.

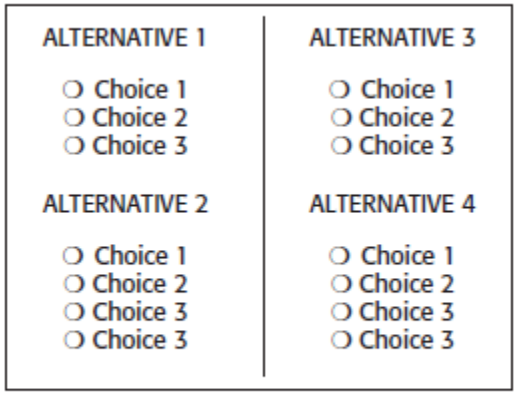

Figure 4.3 Simultaneous menus.

Hierarchical Menus

A hierarchical structure results in an increasing refinement ofchoice as menus are stepped through, for example, from options, to suboptions, fromcategories to subcategories, from pages to sections to subsections, and so on. A hierarchicalstructure can best be represented as an inverse tree, leading to more and morebranches as one moves downward through it. Hierarchical structures are characterizedby depth and breadth, depth being the number of choice levels one must traverse toreach the destination, breadth being the number of alternatives found at each level.

A hierarchical menu is illustrated in Figure 4.4. Note that the top level of the tree isconsidered level 0 with subsequent levels numbered sequentially beginning with number1. Starting at the top, level 0, two selections, or mouse clicks, are required to reachlevel 2.

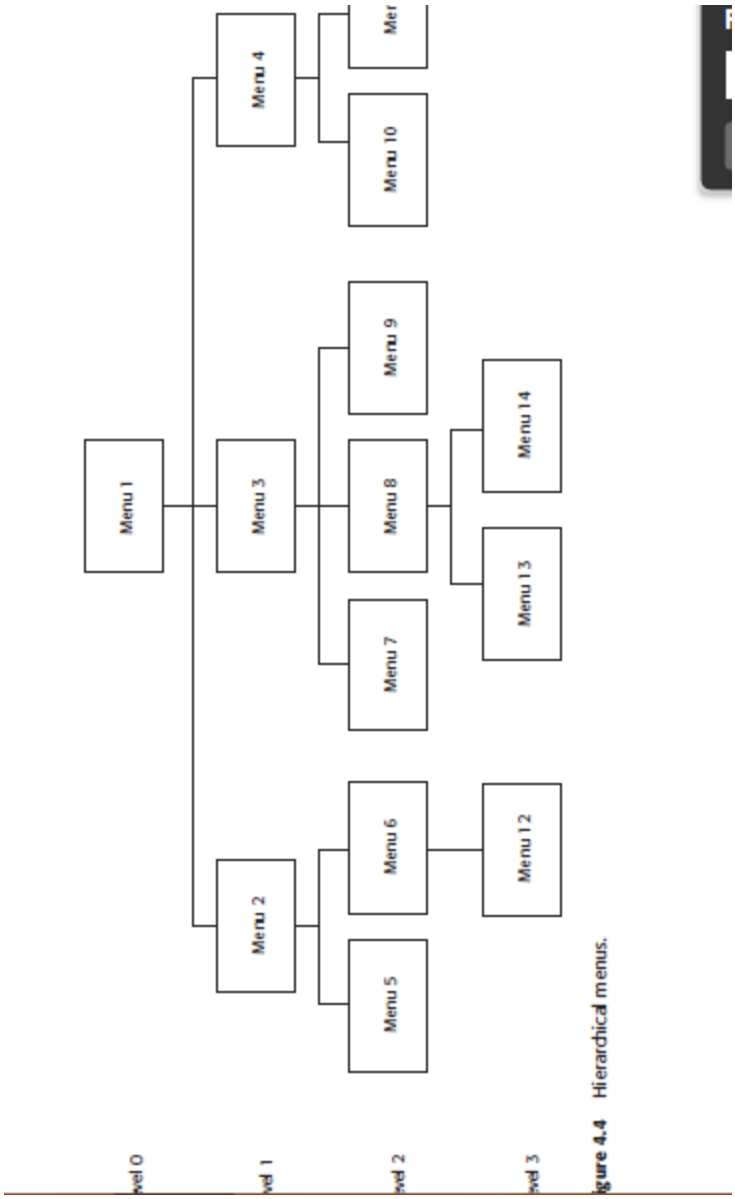

Figure 4.4 Hierarchical menus.

Connected Menus

Connected menus are networks of menus all interconnected in some manner. Movementthrough a structure of menus is not restricted to a hierarchical tree, but is permittedbetween most or all menus in the network. From the user's perspective there isno top-down traversal of the menu system but an almost unhindered wandering betweenany two menus of interest. A connected menu system may be cyclical, withmovement permitted in either direction between menus, or acyclical, with movementpermitted in only one direction. These menus also vary in connectivity, the extent to

which menus are linked by multiple paths. (In a hierarchical menu system, the abilityto go back to a previous menu or to return to the top-level menu are also examples, althoughrestricted, of connected menus.)
The biggest advantage of a connected menu network is that it gives the user full controlover the navigation flow. Its disadvantage is its complexity, and its navigation,may be daunting for an inexperienced user. An example connected menu structure isrepresented in Figure 4.5.

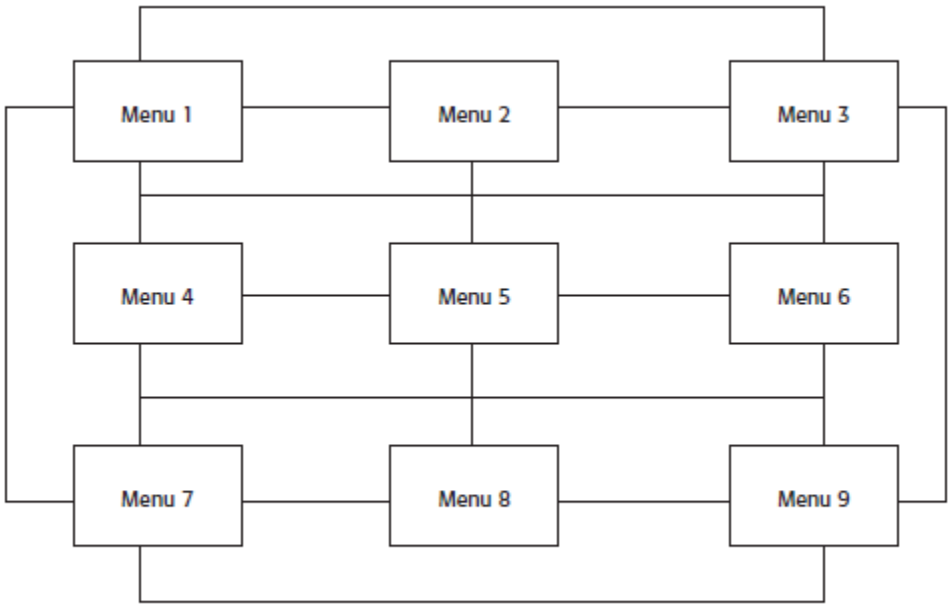

Figure 4.5 Connected menus.

Event-Trapping Menus

Event Trapping menus provide an ever-present background of control over the system'sstate and parameters while the user is working on a foreground task. They are,in essence, a set of simultaneous menus imposed on hierarchical menus. In a graphicalsystem, for example, existing together are a simultaneous menu, the menu bar, and ahierarchy—the menu bar and its pull-downs. Event-trapping menus generally serveone of three functions. (1) They may immediately change some parameter in the currentenvironment (bold a piece of text), (2) they may take the user out of the current environment
to perform a function without leaving the current environment (perform aspell check), or (3) they may exit the current environment and allow the user to moveto a totally new environment (Exit).

Q. 4 Draw the structure of pull down menu and explain with its parameters.

Pull-Down Menu

■ Proper usage:
— To initiate frequently used application actions that take place on a wide variety of
different windows.
— A small number of items.
— Items best represented textually.
— Items whose content rarely changes.

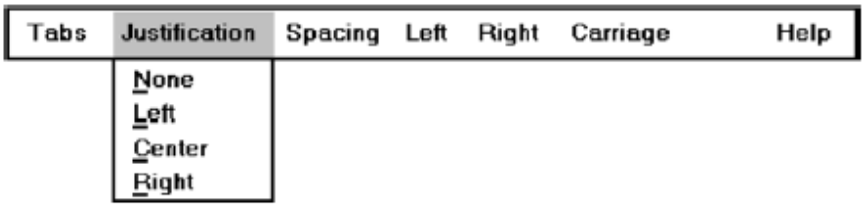

Figure 4.24 Menu bar pull-down.

Display
■ Display all possible alternatives.
■ Gray-out or dim items that cannot be chosen due to the current state of an application.
Location
■ Position the pull-down directly below the selected menu bar choice.
Size
■ Must contain a minimum of two choices.
■ Restrict to no more than 5 to 10 choices, preferably 8 or less.
Title
■ Not necessary on a pull-down menu. The title will be the name of the menu bar item
chosen.
Item Descriptions
■ Use mixed-case, headline-style words to describe choices.
— If the choices can be displayed graphically, for example, as fill-in patterns, shades, or colors, textual descriptions are not necessary.
■ Do not:
— Identify a menu item by the same wording as its menu title.
— Change the meaning of menu items through use of the Shift key.
— Use scrolling in pull-downs.
— Place instructions in pull-downs.
Organization
■ Follow standard platform ordering schemes when they exist.
— Place application-specific choices where they fit best.

■ Place frequent or critical items at the top.
■ Separate destructive choices from other choices.
■ Align choices into columns, with:
— Most frequent choices toward the top.
— Related choices grouped together.
— Choices found on more than one pull-down consistently positioned.
■ Left-align choice descriptions.
■ Multicolumn menus are not desirable. If necessary, organize top-to-bottom, then left-to-right.

Q. 5 (a) What is web navigation?
(b) Using illustrations, describe the components of web navigation system.

Components of a Web Navigation System

To move between Web site information fragments necessitates the creation of many navigation *links*. They are contained within a framework of tools or controls, including the browser's command buttons, textual phrases, Web site navigation bars, and Web site command buttons. Collectively, these are all referred to as links. Links are one of the most discussed issues in Web site design.

A link functions as a menu choice that, when selected, results in the connected information being displayed, or results in a file being opened or downloaded. A movement

- All navigation elements must
  - Make sense in the absence of site context.
  - Be continually available.
  - Be obvious and distinctive.
  - Be consistent in appearance, function, and ordering.
  - Possess a textual label or description.
  - Offer multiple navigation paths.

Previous, to move sequentially.

Navigation Elements

- Differentiate and group navigation elements.
  - Provide a global navigation bar at the top of each page.
  - Provide a local category or topical links navigation bar on the left side of a page.
    - For long lists, consider placing within a frame.
  - Optionally, provide a secondary navigation column on the right side of the page.
  - Provide explicit or embedded textual links within the contents area.
    - Consider duplicating embedded links in the left side navigation bar.
  - Place minor illustrative, parenthetical, or footnote links at the end of the page.
  - For long pages provide
    - "List of Content" Links.
    - Important global or local links in a navigation bar repeated at the page bottom.
- Create a common and consistent theme.
- Never create pages without navigational options.

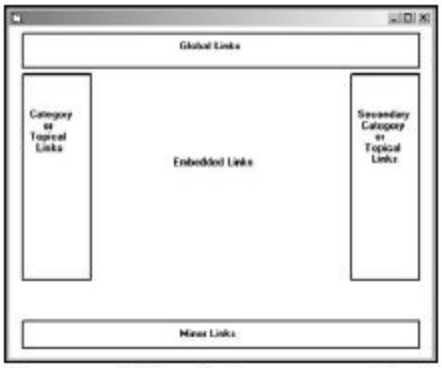

Figure 4.17: Web navigation component locations.

Global. Global or site-wide navigation elements provide access to the site's total scope or categories of available information. An evolving standard in design is to locate the global navigation elements horizontally at a page's top. Locating the global links at the page top makes sense if one considers the logical flow of information through a screen. A selection from this global area eventually results in display of a page and its content, a top-to-bottom sequential eye flow. In the eye-tracking study reported by Nielsen (2006) in Step 3, a user's first search of a Web page horizontally across the page top (top bar in the F) may reflect an expectancy that important navigational elements are across the page top.

Category or topical. Local, specific and contextual navigation elements within the category or topical area being presented are typically displayed in a columnar array down the left page side. For long lists consider placing the links within a frame navigation panel. A study found users preferred non-scrollable frames rather than having the links move off as a page is scrolled (Bernard et al. 2001d). A second listing of links can also be presented in a column on the right side. Again, in the eye-tracking study reported by Nielsen (2006) in Step 3, a user's early vertical search of a Web page's left side (vertical bar in the F) may reflect an expectancy that important navigational elements are also along the left side of the page.

Embedded links. Phrases or embedded links will be provided within the contents area of a Web page. An *embedded* link is one found in the middle of prose or continuous text. Embedded links are frequently used to lead to supporting information or provide definitions of terms. They are designate by an underline and a unique color. Because users preferred redundant links, consider duplicating embedded links in the left side navigation bar (Bernard et al., 2001d).

Minor. Minor illustrative, parenthetical, or footnote links can be arrayed horizontally at the page bottom.

List of Content. For long pages with sections that are not visible without page scrolling include a set of links to each page section at the top of the page. These "anchor" or "within page" links provide a reminder of the page's contents, a page outline that can easily be reviewed, and a quick way to navigate to desired sections. These links also assist people in getting to a specific section if they arrive from a different page.

Important links. For long scrolling pages, repeat important global or local links at the page bottom. When finishing a page, the user, then, will not have to scroll upward to locate important navigation links.

Common theme. A common and consistent Web site navigation theme will enable people to more easily understand and learn its structure. Incorporate different

Q. 6 An organization is implementing a menu based application that simulates the operation of core processes and procedures. Briefly explain the different types of menu that is required in the application and their usage for the execution of the processes

Student specific answer covering all the types of menus.