User Interface Design

Syllabus

Unit	Contents	Lectures
7.	• **User Interface Design** • Introduction to user interface. • Dimensions of User Interface Design. • Types of User Interface. • Reports. • User Interface Analysis and Design.	5

Introduction to User Interface

- User interface is the part of the system that allows the user(s)
  - To Input Data
  - To Command the Operation
  - To Receive Outputs from the System

Introduction to User Interface ...

- The computer system model includes
  - User Interface
  - Input
  - Process and Control
  - Output and Maintenance
  - Testing

Role(s) That User Interface Play

- To communicate ,to interact and control the other components of the computer system.

- Bridges the gap between the user and the computer system.

- Meant for the user to get or acquire support in order to use the computer system.

- The user is the driver of the user interface.

Role(s) That User Interface Play

- The user interface addresses the following communication and interaction requirements
    - Between one software component and the other.
    - Between a software component and the other human users or non human users like device, utilities and the system.
    - Between the user and the computer system.

  of the computer system.

Design Dimensions of User Interface

- Technology
- User
- Roles and tasks

Types of User Interface

- Command Line user Interface
- Graphical user Interface

Command

- Command refers to an instruction given to the computer(system).

- In context of computing, command is termed as a directive to a computer(system) to perform a specific task.

- The command can be given through command line interfaces like
  - Shell
  - Keyboard
  - Network protocol
  - An event if Graphical User Interface

Command Line Interface

- Text based user interface to view and manage files.

- Console Interface

- Character Interface

- CLI processes commands in the form of lines of texts.

- The program that handles the interface is termed as command line interpreter or processor.

Command Line Interface …

- The term CLI is applied to computer programs designed to interpret a sequence of lines of texts that may be entered by a user, read from a file or keyboard.

- CLI allows the user to issue commands in effective manner.

Graphical User Interface

- A visual way of interacting with a computer using items like
  - Windows
  - Icons
  - Menus
  - Controls

Graphical User Interface …

- GUI heralds a new era in user interaction with machine or computer(system).

- New way for people to interact with systems in such a way that they need not require to learn the coding principles.

- GUI was designed to make use of keyboards and mouse,

Benefits of Graphical User Interface

- Users do not require extensive level of knowledge to user the computer(system).

- Absolute beginner as well as advanced developer can use the computer(system) with same ease.

- Makes it simple to open the menus, moves files, launch programs, search etc.

- GUI provide instant feedback against an action to the user.

Disadvantages of Graphical User Interface

- As the elements of GUI are graphics rather than the texts, GUI can use a lot more processing power as compared to the CLI.

- Sometimes you may find that the GUI is a bit of frustrating due to the chain of actions tht may follow.

Elements of Graphical User Interface

- Structural Elements
- Interaction Elements

Structural Elements of Graphical User Interface

- Window
- Menu
- Icons
- Controls or Widgets
- Tabs

Interaction Elements of Graphical User Interface

- Cursor

- Pointer

- Insertion Point

- Selection

- Adjustment Handler

Window

- An area on the screen that displays information with its contents being displayed independently from the rest of the screen.
- A window can be of following types of following types
  - Container Window
  - Browser Window
  - Text Terminal
  - Child Window
  - Message Window or Dialog Box

Menu

- Allows the user to execute commands by selecting from a list of choices.

- Options are selected with a mouse or other pointing device within a GUI.

- Menus are convenient because they show what commands are within the software and helps to limit the amount of documentation the user requires to read to understand the software(system).

Elements of Menu

- Menu has following elements
  - Menu Bar
  - Title
  - Context Menu
  - Menu Extras

Icon

- Small picture that represents the object like file, program etc.

- They are a quick way to execute commands, open documents, run programs etc.

- Very useful when searching for an object in a browser list.

Control or Widget

- Interface Elements

- Software Components that computer user interacts with through direct manipulation to read or edit information about an application.

- Facilitates specific user – computer interaction.

- Structuring

Control or Widget

- Interface Elements

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Cursor

- An indicator used to show the position on a computer monitor or other display device that will respond to input from a text input or pointing device.

Pointer

- The pointer echoes movements of the pointing device like mouse or touchpad.

- The pointer is the place where actions take place that are initiated through direct manipulation gestures like click, touch or drag.

Insertion Point

- The caret, text cursor, insertion point represents the point of the user interface where the focus is located.

- Represents the object that will be used as the default subject of user initiated commands like writing text, starting a selection or a copy or paste operation through the keyboard.

Selection

- List of items on which user operations will take place.

- The user typically adds items to the list manually but the computer creates a selection automatically.

Adjustment Handler

- An indicator of a starting point for a drag and drop operation.

- In general, the shape of the pointer changes when placed on the handle, showing the icon that represents the supporting drag operation.

Form

- Form is defined as "the section of a document" which contains controls like
  - text field(s)
  - password field(s)
  - checkbox(es)
  - radio button(s)
  - submit button
  - menus

Form Controls

- Text Input Controls
- Checkboxes Controls
- Radio Box Controls
- Select Box Controls
- File Select boxes
- Hidden Controls
- Clickable Buttons
- Submit and Reset Button

User Interface Elements

- While designing the interface, we try to be consistent and predictable in your choice of interface elements.

- Whether users are aware of it or not, they have become familiar with elements acting in a certain way, so choosing to adopt those elements when appropriate will help with task completion, efficiency, and satisfaction. The Interface elements are:

  - Input Controls
  - Navigational Components
  - Informational Components
  - Containers

User Interface Elements …

Input Controls	
Element	**Description**
Checkboxes	• Checkboxes allow the user to select one or more options from a set. • It is usually best to present checkboxes in a vertical list. • More than one column is acceptable as well if the list is long enough that it might require scrolling or if comparison of terms might be necessary.
Radio buttons	• Radio buttons are used to allow users to select one item at a time.
Drop down List	• Dropdown lists allow users to select one item at a time, similarly to radio buttons, but are more compact allowing you to save space. • Consider adding text to the field, such as 'Select one' to help the user recognize the necessary action.
List Boxes	• List boxes, like checkboxes, allow users to select a multiple items at a time, but are more compact and can support a longer list of options if needed.

User Interface Elements …

Input Controls …	
Element	**Description**
Button	• A button indicates an action upon touch and is typically labeled using text, an icon, or both.
Drop Down Button	• The dropdown button consists of a button that when clicked displays a drop-down list of mutually exclusive items.
Toggle	• A toggle button allows the user to change a setting between two states. • They are most effective when the on/off states are visually distinct.
Text Fields	• Text fields allow users to enter text. • It can allow either a single line or multiple lines of text.
Date and Time Picker	• A date picker allows users to select a date and/or time. • By using the picker, the information is consistently formatted and input into the system.

User Interface Elements …

Navigational Components	
Element	**Description**
Search Field	• A search box allows users to enter a keyword or phrase (query) and submit it to search the index with the intention of getting back the most relevant results. • Usually search fields are single-line text boxes and are often accompanied by a search button.
Breadcrumb	• Breadcrumbs allow users to identify their current location within the system by providing a clickable trail of proceeding pages to navigate by.
Pagination	• Pagination divides content up between pages, and allows users to skip between pages or go in order through the content.
Tags	• Tags allow users to find content in the same category. • Some tagging systems also allow users to apply their own tags to content by entering them into the system.

User Interface Elements …

Navigational Components …	
Element	**Description**
Sliders	• A slider, also known as a track bar, allows users to set or adjust a value. • When the user changes the value, it does not change the format of the interface or other info on the screen.
Icons	• An icon is a simplified image serving as an intuitive symbol that is used to help users to navigate the system. • Usually, icons are hyperlinked.
Image Carousel	• Image carousels allow users to browse through a set of items and make a selection of one if they so choose. • Usually, the images are hyperlinked.

User Interface Elements …

Information Components	
Element	**Description**
Notification	• A notification is an update message that announces something new for the user to see. • Notifications are generally used to indicate items such as, the successful completion of a task, or an error or warning message.
Progress Bar	• A progress bar indicates where a user is as they advance through a series of steps in a process. • Generally, progress bars are non clickable.
Tooltips	• A tooltip allows a user to see hints when they hover over an item indicating the name or purpose of the item.
Message Box	• A message box is a small window that provides information to users and requires them to take an action before they can move forward.
Pop – up Window	• A modal or pop – up window requires users to interact with it in some way before they can return to the system.

User Interface Elements …

Container	
Element	**Description**
Accordion	• An accordion is a vertically stacked list of items that utilizes show/ hide functionality. • When a label is clicked, it expands the section showing the content within. • There can have one or more items showing at a time and may have default states that reveal one or more sections without the user clicking

User Interface Elements …

- Input Controls
    - Checkboxes
    - radio buttons
    - dropdown lists
    - list boxes
    - Buttons
    - Toggles
    - text fields
    - date field

User Interface Elements ...

- Navigational Components
  - Breadcrumb
  - Slider
  - search field
  - Pagination
  - Slider
  - Tags
  - icons

User Interface Elements …

- Informational Components
  - Tooltips
  - Icons
  - progress bar
  - Notifications
  - message boxes
  - Pop – Up Windows i.e. modal windows
- Containers
  - accordion

User Interface Elements …

User Interface Elements …

Number	User Interface Element Name
1	Application Banner
1.1	Application Name
1.2	Welcome Message
1.3	Application Menu
1.4	Application Search
2	Application Sections
3	Application tab
4	Tab Title Bar

User Interface Elements …

Number	User Interface Element Name
5	Tab Actions Menu
6	Tab Context Panel
7	Section Shortcut Panel
7.1	Section Shortcut Category
7.1.1	Section Shortcut Menu Item
8	Content Area Navigation Bar
9	Page Title
10	Page Action Control

User Interface Elements …

Number	User Interface Element Name
11	Refresh Button
12	Print Button
13	Help Button
14	In page Navigation Tabs
15	Page Content Area
16	Page Group Navigation Bar
17	Fields
18	Clusters

User Interface Elements …

Number	User Interface Element Name
19	Action Controls
20	Smart Panel
21	List
21.1	List Action Menu

Java GUI Components

- GUI is defined as the interface having user – friendly components like button, textfield, etc. to make the user interact with the software easily.

- In a Graphical User Interface, the actions to be performed are denoted by using small graphics or pictures.

- The focus is on user actions.

- The user can interact by using the mouse to select the action to be performed by clicking on a particular graphic.

- If the user wants to print a file, all he needs to do is to click on a small graphic depicting a printer.

Java GUI Components …

- Container
  - Container is a class that contains all the components such as button, textfield, titlebar, menubar, etc.

- Components
  - Components are the GUI objects such as buttons, labels, text fields, checklist.

Java GUI Components ...

- Panel
    - Panel is a container class.
    - It creates a space for an application where all the components can be fit in.
    - It inherits the container class.
    - The panel does not contain menubar or titlebar in it but can contain other components like textfield, buttons.

Java GUI Components …

- Frame
  - Frame is a container class.
  - It contains a menu bar and title bar and can contain other components as well.

Java Swing Components

- Jbutton

- Jlabel

- JTextField

- JTextArea

- JPasswordField

- JCheckBox

- JRadioButton

- JComboBox

Java Swing Components …

- Jtable

- Jlist

- JOptionPane

- JScrollBar

- JMenuItem & Jmenu

- JPopupMenu

- JCheckBoxMenuItem

- Jseparator

Java Swing Components ...

- JProgressBar

- Jtree

- JColorChooser

- JTabbedPane

- Jslider

- Jspinner

- Jdialog

- Jpanel

Java Swing Components ...

- JFileChooser

- JToggleButton

- JToolBar

- Jviewport

- Jframe

- Jcomponent

- JLayeredPane

- JDesktopPane

Java Swing Components ...

- JEditorPane
- JScrollPane
- JSplitPane
- JTextPane
- JRootPane

Android UI Components

- Android provides a variety of pre-built UI components such as structured layout objects and UI controls that allow you to build the graphical user interface for your app.

- Android also provides other UI modules for special interfaces such as dialogs, notifications, and menus.

- The Android UI Components are: -
  - Layouts
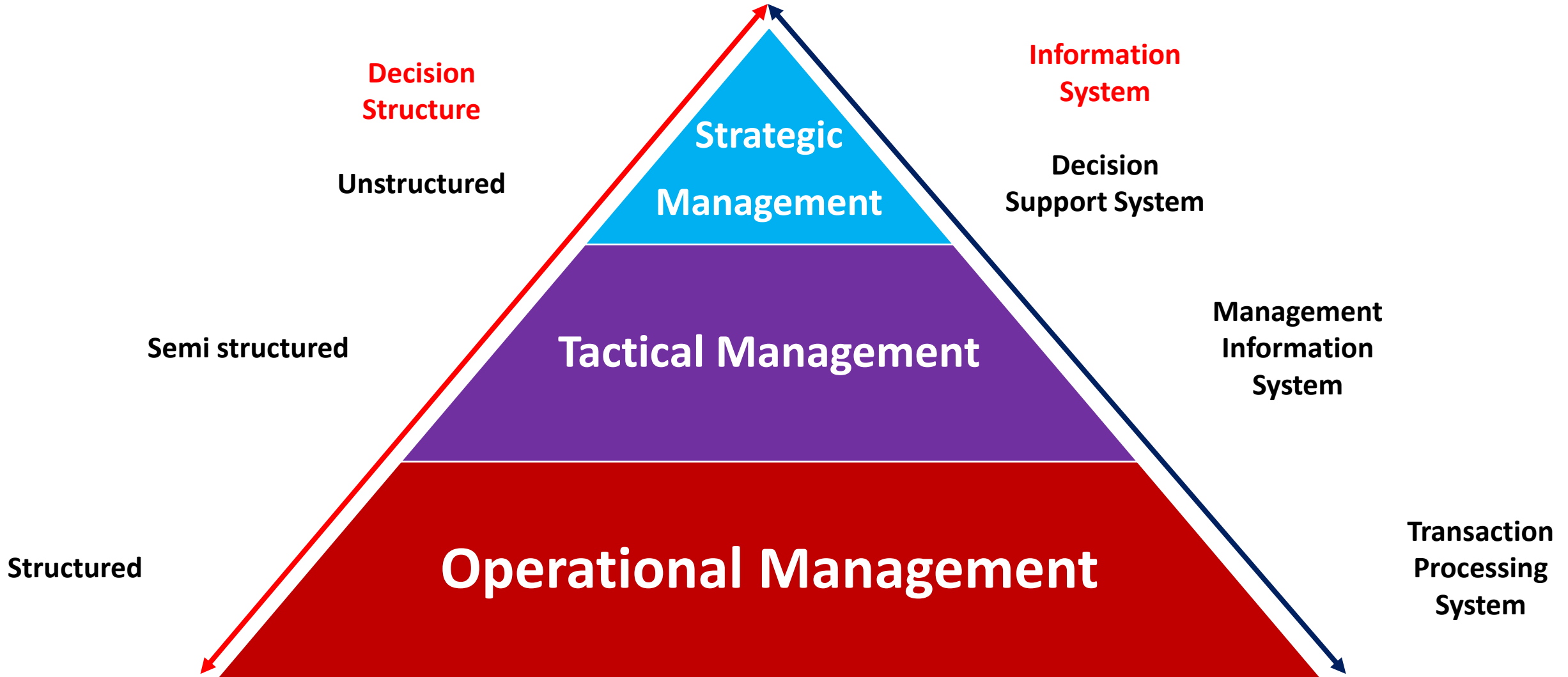 - Notifications Overview
  - Add the app bar

Android UI Components …

- Control the system UI visibility
- Designing effective navigation
- Implementing effective navigation
- Slide between fragments using ViewPager
- Supporting Swipe – to – Refresh
- Toasts overview
- Pop-up messages overview
- Dialogs
- Menus

Android UI Components …

- Search Overview
- Copy and Paste
- Drag and Drop
- Create backward-compatible UIs
- Control external devices

Structure of An Organization

Strategic Management

Tactical Management

Operational Management

Decision Structure

Unstructured

Semi structured

Structured

Information System

Decision Support System

Management Information System

Transaction Processing System

Report