Usability Design of S/W Applications

System S/W : Managing H/W eg : OS / Firmware

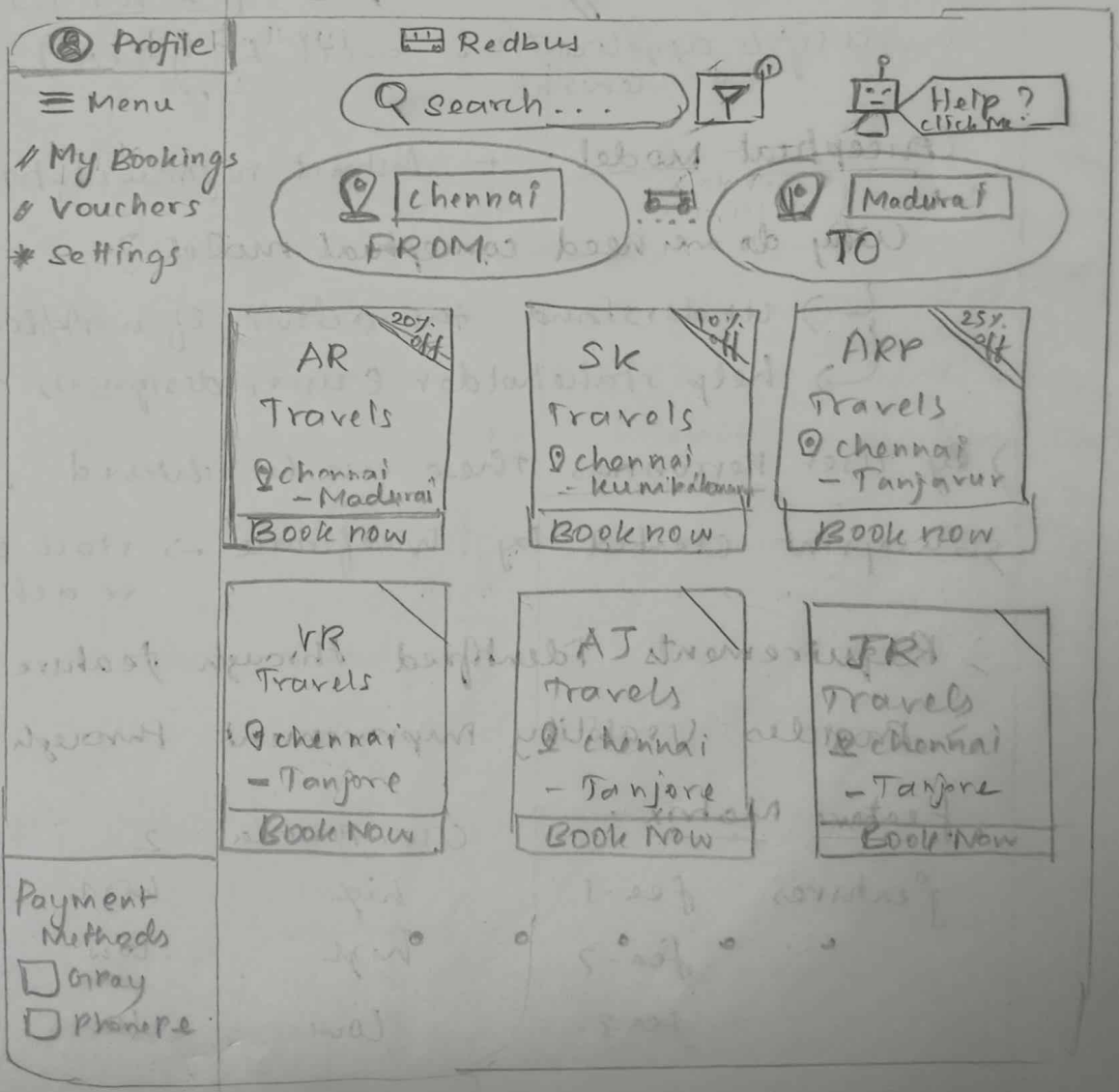
S/W applications : → User specific applications eg : MS word / excel / powerpoint / VLC
→ some specific task

Usability Design : understandable by Users

User Interface (UI)
↳ Visual elements
↳ button, icons, typography, layout

User Experience (UX)
↳ Aligned with requirements
↳ Personas, Prototypes

[Interfaces - GUI, Natural Interfaces, Command line Interfaces]



Process of Interactive design : (5m) 2m

Apply the 4 steps in given scenario

The Goals of Interaction design (10m)

(Question will be with some scenarios)

→ Usability goals → List the meaning, questions & justify of each goals

→ User experience goals

Design & Usability Principles (10m)

Common design principles (some scenario of specific application or general will be given)

Conceptual Model : - abstract representation / blueprint

Why do we need conceptual model ?

→ understand the activity of workflow

→ help stakeholder (user, designers, developers)

> By user Personnas these can be achieved.

> blueprint created by wireframe → stack of layouts or activities

> Requirements identified through feature matrix

> Provides usability improvement through user flow model

Feature Matrix :

features		User Persona	Σ	
	fea-1	high	high	
	fea-2	high	low	so no need for fea-3
	fea-3	low	low	

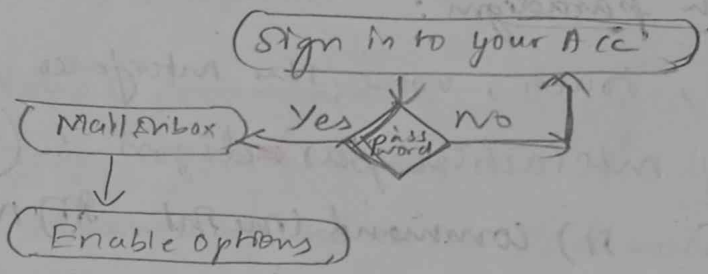
Key elements of Conceptual Model :

> Entities → concepts
> Relationships
> Attributes → properties of entities
> Operations → performed by users
> work flow → complete set of operations

Low-fidelity sketches :→ some basic rons or design
High-fidelity sketches :→ interactive design

conceptual Models → Activity based
→ object based

Activity based :



[1om]
> Usability design & Principles for E-commerce
> Usability & User experience for online shopping application
> Conceptual Model for flight booking Application

[2ms] previous CIA-Is
→ Interface Metaphor
Interaction Paradigms

Interface Metaphors : , Digital entity mapped for real time entity
> Alternative way for conceptual model
> Used for representation using real world objects

2m (4) What is interface metaphor & give some eg ? (4)

eg : Folders (digital) , shopping cart → In super markets grab the items needed then go to counter for purchase
↓
In real world paper folders arranged in sections by the labels

composite → combined objs eg : scroll bar, tool bar

Interaction paradigm :

GUIs, touch, voice like interfaces for interaction

Types of interaction paradigm : (X) 2m

I) GUI II) command line int III) Natural lang int - voice
IV) Touchscreen int V) Gesture - Based Interface
VI) VR & AR VII) Wearable computing VIII) Ubiquitous/ Pervasive computing (IOT)
IX) Multimodal interfaces (combining 2 or more interfaces)

Conceptual Models to physical design :

UNIT-2 for collaboration & communication

Social Mechanisms for communicate & collaborate

i) Conversation → exchange of info
key aspects:
> Feedback
> Clarification
> turn-taking

ii) Coordination
key aspects:
> scheduling
> task mgmt
> Resource allocation

iii) Awareness
key aspects:
> status checking
> availability
>

Collaborative systems: eg: google Docs
> Groupware > Social Media platforms > collaborative learning systems
> virtual Meeting tools > Collaborative development environment
> Crowdsourcing platforms

Synchronous communication:
Asynchronous communication:
Computer Mediated collaborative technology:

what is Sync & Async comm? why shd we use computer mediated collaborative tech? 10m

Collaborative mechanisms in conversation:

Synchronous Adv & Disadv → bandwidth high req

Asyn Adv → Attachments Disadv → flaming ...

why coordination used for usability design? 2m verbal & non-verbal

2m Tools for collaborative mechanism eg: Google docs

2m Awareness mechanism

Ethnographic study :

(22) Its use in communication 2M (IX)

Conceptual Frameworks for Interactive Design
for communication

- > Language / Action Framework
- > Distributed cognition Framework

(IX) 3M or 8M (Scenario based)

UNIT-3

Process of Interaction Design :

Basic activities of Interaction design

- > Identify the requirements
- > determine the alternate solutions
- > design the prototype
- > evaluate design

(IX) Interaction design
- > Lifecycle 10M
- > Chars & Activities 2M or 4M

Degrees of Involvement : > Consultative > User driven

4 approaches : User-centered design, activity-centred design (workflow), System design (eg: vending machines), generic design (Less user involvement) (eg: AI based products)

(IX) 3 chars of Interaction design (IX) 2M

User centered approach is based on :

- Early focus on users & tasks
- Empirical measurements
- Iterative design

MODELS

For 10 M

Lifecycle Models (X) 10 ms with lifecycle diagrams, features, diff, adv, disadv

> Explain basic activities of interaction design also

s/w engineering lifecycle models

1. Traditional waterfall model:
   > Linear, sequential
   > No Risk assessing mechanisms
2. Spiral model:
   > Risk analysis
   > Iterations with risk & vulnerabilities analysis
3. RAD (Rapid Application Development) or JAD (Joint App dev):
   > User involvement
4. Microsoft Model:
   > Only for large scale
   > 1st phase envisioning
   > Highlights iterative planning phase execution other than phases RAD or JAD.

Human Computer Interaction Life cycle models:

1. Star Model:
   > Non linear
   > each separately or combinedly done
   > Iterative design approach
2. Usability Model:
   > Iterative testing

CIA - II

1. Types of communication
   > Synchronous
   > Asynchronous
   > Collaborative Technologies
2. Life cycle model any 1 type (s/w or Human)
3. Identify any requirement & how to establish req
   ↳ What is user needs, how to transform, how to transform user expectations into clear objectives, functional & non functional requirements, how to collect req, what is req, Task Description
4. Hierarchical task descriptions (Control) (X) 10 ms (1)

Identifying Needs & Establishing Requirements : 10m

> What (Requirement Analysis) ? How ? Why ?

Why requirement activities are iterative & why we need Requirement activity ? 2m

> Types of

Given some scenario, which is functional & Non-functional 2m
- functional → User Usability
- Non-functional → Data, Environment → Technical, Physical, ...

Iterative steps : 10m

Data Gathering techniques, key issues, Data interpretation, visualization, Task Description (only 2 lines) 10m

What are iterative steps to transform User expectations to clear objectives ? 10m

2m
> Life cycle model diff b/w star & waterfall model
> Functional Req & Non-Fr → Data, environment (case study)
> Importance of Req analysis over the design phase
> Activities & process of interactive design
> User centred approach
> Categories of Users → Primary, secondary, tertiary
→ What is their degree of involvement

10m

Data Gathering

Data interpretation & analysis

Task description & analysis

(HTA) Hierarchical task Analysis : (10 M)

> What is HTA ? What is Goals task plans ?
> Scenario : task & subtask
> Draw the hierarchy

(4) Design framework (1) (2) Scen (3)

Lab

1. Create a quiz app, an android based apps that enables registered users under take series of apt. based ques in C & C++ languages. The app shall be user friendly and the user shall find it extremely easy to answer the multiple choice based ques. At end of quiz, the result report shd be generated which states the score in a ~~text~~ view.
   > Ques set 5 or 6 ques
   > Radio button ans
   > If else to check ans => increase counter
   > DO show how many wrt ans
   > No need for database (needed only when multi users)

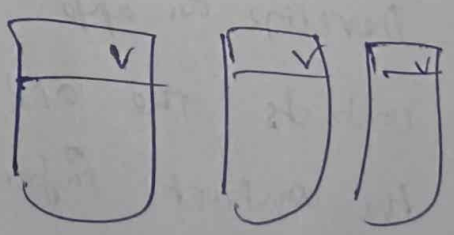
exp 9
2. Develop an app "Yellow Page" for the effective Mgmt of user contacts. The app shall store, delete, modify, view & view all the contact information of users such as name, mobile no, phone no (office), email id, address & blood grp. View option can be optimized & customized with name & mobile no. The app shd also facilitate the user to search for people based on given blood grp & shall list their contact details in a message box.

Message box → seperate pop-up alert window box.

3. A) construct an android app with 2 layouts, where each layout converts a given decimal values into its equivalent binary & octal values. The layouts shall be presented in menus to the user. B) construct android main activity that takes input of sales details of furniture like bed, chair desk & table in rupees & show the data using bar chart.

4. Create a spinner with list of product names, when a product from the spinner is selected, the product id, price & manufacturer info shall be displayed in text view by obtaining information from the sql table 'product'. when, the quantity of the product is entered in an edit text & a button 'ADD' is clicked, the quantity is multiplied by price of product & the result is stored in 'amount' in a sql table called 'purchase' along with product names. Finally, when a button 'Compute BILL' is clicked the sum of 'amount' in the purchase table shall be displayed as a bill to the user in a message box.

spinner → drop down eg



1. i) Create spinner with contestant names. selet contestant-info like degree, age shd be displayed. User clicks 'vote' button, counter increased by one for that contestant. Finally user clicks 'Result' button, display who is the winner.

ii) Create menu with 2 layouts, 1st display pie chart 2nd bar chart.

2. i) Create android app adds, deletes, modifies, displays train name, train id, station for arrival, departure, no. of seats available in db. User can reserve no. of seats by specifying train name & no. of seats. The no. of seats shd be deducted, based on seats reserved & shd display the train name & remaining seats available in message box.

ii) Create 2 layouts, 1st layout i/ps from user & display highest in toast msg & 2nd i/p integer whether palindrome or not.

3. i) Create user persona & visualize based on careers & hobbies using bar & pie chart.

ii) Create 2 fragments, where the 1st fragment displays 'Good morning' blue background & 2nd 'welcome' green bg

4. i) App deletes, modifies, adds, views organ donors info like name, age, phoneno, city (spinner). An organ donor is info can be searched based on age & city. Thus, create 2 search options by age & by city.

ii) Create menu with 2 layouts, where 1st → given no is prime or not, 2nd → shows palindrome or not.