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Assignment # 2

Q-1: What is keystroke level modeling? When and how would you use keystroke level modeling in the user interface design process? Provide an example illustrating the use of keystroke level modeling.

What is Keystroke Level Modeling (KLM)?

Keystroke Level Modeling is a technique used to predict how long an expert user will take to perform a task using an interface.
It breaks a task into small physical actions such as:

K – Keystroke/button press

P – Pointing

H – Hand movement between keyboard/mouse

M – Mental preparation

R – System response time

When to use it?

Use KLM when the design is almost ready to:

- Compare two designs
- Find slow steps
- Make the interface faster for expert users

How to use it?

- Break the task into small steps (click, type, move).
- Give each step a time.
- Add the times to find how long the task takes.
- Compare designs and choose the faster one.

Example

Task: Save a document

1. Move hand to mouse (H)

2. Point to File menu (P)
3. Click (K)
4. Point to Save (P)
5. Click (K)

Q-2: Consider the following statement: In order to improve an interface design, it is necessary to consult with the primary users of the system. Is this statement true or false? Explain your answer.

Statement: "To improve an interface design, it is necessary to consult with the primary users."

True.

Why?

- Users know their needs better than designers.
- Designers can make wrong guesses.
- Talking to users shows real problems and preferences.
- Without user input, the design may not work well for them.

So, consulting users helps create a better, more usable interface.

Q-3: In the context of user interface design, what is meant by the learnability of a software system?
What is meant by the effectiveness of a software system?

Learnability

Learnability is how easily new users can learn to use the software.
A system has high learnability if:

- Users understand functions quickly
- They make fewer mistakes while learning
- Menus, icons, and workflows are predictable and simple

Effectiveness

Effectiveness is the accuracy and completeness with which users can achieve their goals.
A system is effective if:

- Tasks can be completed correctly
- The correct functions are available
- Users produce correct results

Q-4: Human memory places important limitations on how users interact with computers. Errors and mistakes are often attributed to human memory.

(a) Briefly outline the main components of human memory as described by information processing models.

Information-processing models divide memory into:

Sensory Memory

- Very short storage (milliseconds)
- Holds visual and sound information briefly

Short-Term / Working Memory

- Holds **7 ± 2 items**
- Active processing area
- Limited capacity → causes many interface-related errors

Long-Term Memory

- Large/possibly unlimited capacity
- Stores knowledge, experiences, procedures (like typing)

(b) In this context of human memory limitations and human computer interaction, describe what is meant by "CHUNKING".

Chunking means grouping information into meaningful units to reduce memory load.
Examples:

- Breaking phone number: 0345-678-912 → easier than remembering 11 separate digits
- Chunking helps because working memory can hold only a few pieces of information.

Q-5: Sketch an interface design for an alarm clock. You must be able to set the current time, set the alarm time, turn the alarm on or off, and snooze (temporarily turn an active alarm oto rest a few more minutes). [There are NO other functions or features.]

In point form, explain the four most important or interesting features of your design. For each feature, list a design principle (or user need), then explain how the feature implements the principle

Key Features	Principle	Reason
Large Digital Time Display	Visibility	Users immediately see the current time without searching.
Separate "Set Time" and "Set Alarm" Buttons	Recognition over recall	Clear labels reduce memory load—users don't need to remember how to set the clock.

Alarm On/Off Toggle Button	Feedback	When pressed, display instantly updates to show ON/OFF status.
Dedicated Snooze Button	Constraints	Only one function—prevents mistakes during sleepy or rushed interactions.

Q-6: Figure Q-3 shows a kids phone manufactured by Firefly Company in 2005. The phone shall be used by children to help them communicate with their parents when out of home.

Given Information:1. As buttons are pressed, a special sound is played. 2.The phone receives only calls from known numbers. 3.The phone can dial some preprogrammed numbers from the address book. 4. The phone vibrates and is making a sound when someone is calling. Also it says so on the screen.

a. Which age group do you think this phone targets?
b. How do you think it is used? Do you think it is easy for children to use?
c. What design, interaction, cognition principles (out of Visibility, Feedback, Recognition, Recall, Retain-ability, Metaphor, Consistency, Constraints, etc.) did its designers take into account when designing it? Explain your choices.
d. Do you have any suggestions to improve the usability as well as the functionality of this phone?

a. Target Age Group

Likely **4 to 10 years old**.

b. Ease of Use

Yes, because:

- Very few buttons
- Only known callers
- Sound + vibration feedback
- Simple screen messages

Figure Q3

c. Design Principles Used

- **Visibility** – Big bright buttons
- **Feedback** – Sound + vibration when buttons pressed or call received
- **Constraints** – Limited features prevent wrong actions
- **Consistency** – Same feedback sound every button

d. Suggestions for Improvement

- Add large emojis for emotional status (happy/sad/help
- Make buttons bigger for tiny fingers
- Add waterproofing

Q-7: As a GUI Design expert you have been asked to design the user interface for a new mobileapp which monitors and records in real time exercise activities such as walking,running and cycling.

- **a- In this context:Explain usability evaluation. Also discuss briefly at least two usability evaluation methods that you would prefer to use in this case.(5)**
- **b- Define perceived ease of use and perceived usefulness in terms of interface design. Explain both with the help of this case.(5)**
- **c- How much important fits law will be in case of designing this interface for Elderly people? (5)**
- **d- Compare the interfaces below. Which one do you think is better? Why?(5)**

a. Usability Evaluation (5 Marks)

Usability evaluation means assessing how easy and efficient an interface is for users.

Two methods for this case

User Testing: Test with real users and see problems.
Heuristic Evaluation: Experts check design using usability rules.

b. Perceived Ease of Use & Perceived Usefulness (5 Marks)

Perceived Ease of Use:
App feels easy to use — simple icons, one-tap buttons.

Perceived Usefulness:
App helps improve exercise — shows distance, calories, speed, and daily stats.

c. Importance of Fitts's Law for Elderly Users (5 Marks)

Fitts's Law: **Bigger buttons + closer = faster actions**.

For elderly users:

- ❖ Small buttons cause mistakes
- ❖ They need large touch targets, big spacing, and reduced movement

d. Compare the two interfaces (5 Marks)

The better interface is the one with:

1. Larger buttons
2. Better spacing
3. Clearer icons
4. Less clutter
5. Stronger contrast

This is because it improves speed, accuracy, visibility, and reduces cognitive load.

Q-8: Giving examples, explain:

a. Double Duty

A design element that performs two functions at once.
Example:

A button that works as Play and Pause depending on the state

b. Bimodal Perception

Using two sensory modes together (e.g., sight + hearing) improves understanding.
Example:

- Phone ringing (sound) + vibration (touch)

c. Space Perception

User's ability to understand distance, position, and layout in the interface.
Examples:

- Icons grouped together because they belong to same function
- Maps showing GPS position