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1)

- a) **A rapid interface response time** – Since this system may potentially be responsible for others' lives, it needs to ensure a rapid response time for high speed and low error rate.

Shortcuts and macros to speed up the usage performance – Since the medical professionals are familiar with the task and interface, to increase efficiency and to ensure a good user experience the interactive system must have shortcuts and macros.

b)

- i) **Correct actions-** in order to reduce the rate of errors, we can prevent the wrong input by the user by allowing only the correct actions. For example, choosing date from a visual calendar instead of having to type it in to prevent errors in entering the date format, elevator doors cannot open until the it stops moving and spell checkers.

Complete sequences – one action can perform a sequence of events. Study usage, error patterns and user preferences via user groups, studies and log errors. For example, left turn signal (front and rear light flashing)

Universal usability – helps lower the rate of errors. For example, large buttons help with readability thus reducing chances of error

[Editor's note: Only need to pick 2 of the 3]

- ii) When designing dialogs to yield closure it is important that the sequence of actions is organized into groups with a beginning, middle and end.

The screenshot shows a checkout process with a progress bar at the top: "cart >> checkout >> receipt". Below the progress bar, there are three icons: a shield for "safe", a checkmark for "easy", and a clock for "fast".

The main content is divided into two columns. The left column is titled "Cancel and Continue Shopping" and shows "step 1: your email". It contains an email input field with "jochen@polytropia.com", a message stating "That email address doesn't belong to any previously saved accounts. Please select 'create an account' below if you'd like to save your details for your next visit.", and two radio buttons: "Checkout as a Guest" (unselected) and "Create an Account" (selected). Below these are "Password" and "Retype Password" input fields.

The right column shows a summary table:

item	quantity	price
AKG Q460 Quincy Jones -Black Code: 002-012-0461 Weight: 1.1 LBS	1	\$109.00
Subtotal:		\$109.00
Shipping & Handling:		\$6.00
Order Total:		\$115.00

Below the table, "step 2: your billing address" is visible.

In the above example, actions are grouped into cart, checkout and receipt, hence this dialog provides a clear step-by-step process.

- c) After an interface is established there is still room for mock-up. The purpose of a high-fidelity prototype is to provide a fully interactive version with the look and feel of the final product. It can be paper-based or made using code and software such that it provides a clear navigational scheme.
- d)
 - 1. Delivery date is given as a fill-in input box which can increase the chances of error especially formatting issues. This can be corrected by providing a virtual calendar to click and choose the date.
 - 2. The name of the form is given as 'Form1' which can confuse the user. To correct this the form must be given a more meaningful name which tells the user the purpose of filling the details.
 - 3. Author, Publisher and Retailer have been allocated only a single input box each, which can confuse the user on what format the names must be entered in. This can be solved by splitting the input boxes for last name and first name with clear labels.
 - 4. Quantity is given as a fill-in input box causing an inconvenience. To correct this the quantity can be a scroll down menu bar allowing the user to click on a number to choose quantity. This is also useful to restrict the quantity that can be ordered at a time.

2)

- a)
 - i) **Speed of performance** would be the most important usability measure in this condition because for a fire dispatch system, it is a life critical system and for such situations it is important that the interface is speedy and efficient. The way to measure this would be to record the time it takes for the interface to respond between the time when the alarm is raised to when the dispatch system sends a response to know the speed of performance. This speed must be as high as possible for an ideal system.
 - ii) To measure the usability measure with respect to the kiosk:
Subjective satisfaction – After the user has used the kiosk interface to view the weather a simple survey at the end of the user experience can be used to analyze how satisfied the user is with the experience.
Retention over time – The task here is to use the kiosk to check the weather in a city of the user's choice. Once the user has learnt to do the task, the user's retention can be checked by asking them to perform the same task after a few days.
 - iii) For large implementation projects, the customer or manager usually sets objective and measurable goals for hardware and software performance. If the completed product fails to meet these acceptance criteria, the system must be reworked until success is demonstrated. Rather than using than using vague and misleading criterion of "user friendly", it is better to use the five human factors of usability to measure. In a large system, there maybe 8 or 10 such tests to carry out different components of the interface and with different user

communities, hence to ensure standardized testing its best to use the five human factors of usability to measure.

- b) A) Interviews and focus group discussions – 2) Can pursue specific issues of concern
B) Continuous user-performance data logging - 4) Collect data, e.g., user performance, rate of errors, etc.
C) Online or telephone consultations – 5) Users could feel reassured if they know that there is a human assistance
D) Online suggestion box or e-mail trouble reporting – 3) User bug reports, e.g., web-based tools such as Bugzilla
E) Discussion groups and newsgroups – 1) Give a sense of community based on user-generated contents
- c) **Gulf of execution** – Mismatch between the user's intention and the allowable actions
Example – User wants to paint the cat's head stripped. There is no corresponding action to perform this. The user is lost, confused and makes errors. This is a mismatch between the user's intention and allowable action thus leading to a gulf of execution.

3)

a)

- i) **Bottom-Up Attention Control** – Pre-attentive processing in the brain determines what stimuli is relevant to the conscious mind. Attention is drawn to changes and outliers in the stimuli and this process is carried out subconsciously fast and with low effort, neurons carrying out this processing in parallel. Bottom Up Attention control to visual features depends on: type of features, how much variation there are in the common features and how different is the outlier feature.

Top-down Attention Control – Requires conscious effort where focused subtasks are carried out sequentially. During top-down attention focus, other bottom-up attention mechanisms will be diminished (selective attention)

BOTTOM UP ATTENTION CONTROL	TOP DOWN ATTENTION CONTROL
Stimuli-driven attention grabbing	Goal-driven focus of attention
Carried out subconsciously, fast, low effort	Carried out consciously, slow, cost of effort is felt
Processing subtasks is done parallelly	Subtasks are carried out sequentially
For UI design: visual features where important features stand out pre-attentively	For UI design: want to minimize need for top-down attention for secondary tasks, e.g. navigating long menus

- ii) A. Checking a restaurant bill to see if the charges are correct - TD
B. Noticing the appearance of a bird by the window – BU
C. Receiving notification of an incoming chat message – BU
D. Activating the correct function in a drop-down menu – TD
E. Hearing your number called out in a lucky draw – TD

F. Looking out for a friend arriving at a busy airport – BU

b)

- i) **Procedural memory** – Relates to procedures and skills, “remembering how”, e.g. how to move around in a first-person shooter game, or how to ride a bike.

Semantic memory – Type of declarative memory. Structured memory of concepts, attributes, inter-concept relationships and conditional rules. E.g. facts like URL of your favorite website, rules like what to do if you hear the fire alarm. Various models for semantic memory – e.g. semantic networks

Episodic memory – Type of declarative memory. Serial memory of events and experiences. E.g. events from your first trip to Universal Studios.

- ii) An expert gamer is more tuned to the performance and selection of rules and can do this process fast. This is because the knowledge is compiled into domain specific rules and hardcoded into the **procedural memory**. Since this knowledge related to the procedure and skills related to playing the game, and it involves “remembering how” to play, this knowledge takes the form of procedural memory.

- c) Linguistic communication uses a language with Lexicon and syntax or grammar, but gestural communication is simply based on physical action. These physical actions can be universal (e.g. nods), cultural dependent (e.g. an-ok sign) or tactile (e.g. handshake). Gestural communication differs from sign language as there is usually no grammar in normal use of gestures. Hence sign language is a linguistic and not a gestural form of communication.

4)

a)

- i) **Relative pointing** – Velocity of device is mapped to digital velocity on screen. This form of pointing is non-linear since scale factor increases with speed. Example) Mouse: pointing plus clicking, Trackball: inverted ball mouse, no space issue, used in some laptops.

Absolute pointing – Direct pointing to actual position on screen. Example) Stylus-based displays: great accuracy, but requires stylus, Touch-based displays: more intuitive, but less accuracy and you cannot rest arm on display

Steering – Steering-based devices map displacement of device with digital velocity. Example) Pointing stick: mini joystick, Gaming input devices: joystick, gamepads.

- ii) Scenario for absolute pointing where you cannot touch the screen is an example of **Aimed pointing**. Aimed pointing is for large displays and interaction at a distance. Scenarios which are device based such as playing the Wii, involves pointing with the Wii remote. Scenarios involving natural pointing with arm/ finger to the screen (e.g. during a presentation).

- iii) *Explain a scenario in which pointing method-steering is less ambiguous (preference over relative pointing), staying steady is not an issue with steering (preference over aimed pointing), less tiring and more accurate (preference over absolute pointing). Explain how in steering displacement of device translates to digital velocity which is preferred to actual*

pointing and movement (preference over actual pointing) and preferred to velocity of device translating to digital velocity on screen (relative pointing).

b)

- i) **Ego manipulation** – Form of interaction where the users move their mental selves around. Simple: following hyperlinks, complex: virtually moving 3D avatars. Example) exploring Wikipedia via hyperlinks, 3D games/ virtual worlds, flight and car simulators and ground view navigation e.g.: Google Street View.
- ii) **A. Moving the scroll-bar to view different parts of the document – Object manipulation.** Moving the scroll bar is to manipulate the virtual object to move up/down. Using the scroll-bar is characterized by continuous, immediate feedback to indicate the changing state of the document to view the different parts.
B. Executing a command in command line interface – Instruction. Command line interface is where the user gives instructions to the computer and the computer takes action with terse feedback. Command line interface is often multiple steps leading to the instruction and the action may not be instantaneous.
C. Virtually flying in a flight simulator – Ego Manipulation. Users move their mental selves around by virtually moving the avatars on the flight simulator.
D. Purchasing an item in an online store – Conversation. Purchasing an item is a conversation since it involves turn taking like in a dialogue. When purchasing an item, the online store's system also requests clarification, confirms orders, counter-proposes by suggesting similar items and promises to deliver the item soon, hence this interaction is a conversation.

--End of Answers--