

# 2011 Mock Midterm

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- 1. The human hearing system can identify the location of a source of sound with reasonable accuracy, subject to certain limitations.**

**List four factors that influence judgements of the location of a source of sound, and briefly discuss the significance of each.**

- Stereo hearing allows us to locate the source of a sound by comparing the sound arriving at each ear and noting differences in:
  - Amplitude
  - Time of arrival
- Head movement allows us to improve the localization accuracy of stereo hearing
- Analysis of reflected vs direct sound allows us to localize both the horizontal and vertical planes - to a limited extent
- Familiarity affects localization accuracy

- 2. The retina of the eye can be divided into several regions, of which the two main ones are the *fovea* and the *periphery*.**

**Explain how these regions differ in terms of their visual characteristics (visual acuity, light-sensitivity, etc.).**

**Discuss the implications of these differences for designers of visual/graphical interfaces.**

- Periphery – high sensitivity to light, see's black and white colours, low resolution
- Fovea – low sensitivity to light, see's colour (red, green, black), high resolution

- 3. The Optacon is a device that displays images in tactile form, using a grid of pins. It is used by blind people to explore images, scanned text, etc...**

**It has been found that the Optacon gives best results when used with dynamic rather than static material (e.g., scanning smoothly along a line of text rather than displaying static characters one after the other). Using your knowledge of human haptic perception, explain why this might be.**

- This is because blind people have a reasonably high level of sensory acuity, meaning that they can feel pressure points that are reasonably close to each other. Thus it is much more efficient if the pins on an Optacon are placed along a line rather than placed statically one after the other.

- 4. Using Natural Language Processing (NLP) techniques it is possible to extract meaning from passages of written text with reasonable accuracy. However, it is much harder to extract meaning from passages of spoken language, even when the speech is accurately converted to text.**

**List four factors that make speech harder to analyse than written text, and**

**briefly discuss the importance of each in the design of speech-based interfaces.**

- Speech relies heavily on non-grammatical sentence forms( minor sentences )
- There is no punctuation
- Repetition and re-phrasing are common.
- Efficient speech communication relies heavily on other communication channels - gesture, facial expression, etc...

**5. Briefly explain the meaning of the following pairs of terms:**

- **Semantic and Episodic memory**
- **Recognition versus Recall**
- **Proactive Inhibition and Retroactive Interference**

- Episodic Memory represents our memory of events and experiences - It stores items in serial form, allowing us to reconstruct sequences of events and experiences from earlier points in our lives.
- Semantic Memory is structured so that it represents relationships between information - it stores information without regard to the order in which it was acquired or the sense through which it was acquired.
  
- Recall: the recovery of information as a result of a conscious search.
- Recognition: the automatic recovery of information as a result of an external stimulus.
  - Recognition is around twice as fast and three times as accurate as recall.
  
- Changing your telephone number may cause you to forget your old number. This is known as retroactive interference.
- However, there may also be times when older information 'resurfaces' and becomes confused with newer information. For example, you may suddenly recall an old telephone number and confuse it with your new one. This is known as proactive inhibition.

**6. Briefly explain the meaning of the following terms:**

- **Primary and Secondary Users**
- **Normative, Expressed and Felt needs**
- **Personas**

- The primary users might be travel agents
- The secondary users might be customers who book flights through travel agents
  
- Needs identified by professional designers/developers.
  - These are often referred to as normative needs
- The needs of the end-user. These can be difficult to determine. It often helps to think in terms of:
  - Expressed needs - what end-users SAY they want
  - Felt needs - what end-users ACTUALLY want( or would like

) from the system

- It is important to know who the system is being designed for.
- Therefore the designer should start by identifying the target users.
- One approach is to draw-up a 'profile' which includes factors such as:
  - Age
  - Sex
  - Culture
  - Physical abilities and disabilities
  - Computing/IT knowledge experience
- However, it's very difficult to design for a large, loosely-defined group.
- A better approach is to segment the users into a number of smaller, tightly-defined groups.
- Each group can be represented by a profile of an imaginary user. These profiles are called personas.
- A persona:
  - Should cover all the factors listed above, but should also include other details, such as likes and dislikes, habits, etc...
  - Can be a composite, combining characteristics from a number of real people, but should be consistent and realistic.
  - Should read as the description of a real person.