41549 – Human-Computer Interaction
2024-2025
2nd semester

Illustrative Questions regarding HCI Topics

Please note that these questions are just meant as pointers for the different topics that were addressed along the course. They provide you some illustrative examples for the kind of knowledge you should bring to the exam. The exam questions will be multiple choice and true/false. Refer to the materials in Teams for the detailed exam information.

The User

1. Why is it fundamental to know the target user profile of any interactive system at the onset of its development?
2. Which are the most relevant aspects of the user profile to the design of an interactive system?
3. The HIPS is a relevant aspect of the user profile for the design of interactive systems and it includes several types of memory; which do you know? Briefly define each of them.
4. One of those memories is considered the bottleneck of the HIPS; which and why?
5. The long-term memory is considered a strong point of the HIPS; why?
6. What is the capacity and for are long are memories stored in the short term (working) memory?
7. What is chunking? Why should it be considered in the design of user interfaces?
8. What are the main characteristics of the pattern recognition process that are relevant for interactive systems design?
9. What human senses, besides vision and hearing, may be relevant in Virtual Reality systems? Why?
10. Why is short term memory or working memory a limitation that must be considered in user interface design? Give an example of a situation that does not comply with this limitation and mention how this could be corrected.
11. Give an example illustrating how the involuntary selective attention process may be used to improve the usability of a user interface.
12. What kind of help (syntactic or semantic) do users having much task experience but low system experience need more? (E.g. a very experienced bank clerk using a new system)
13. One of Jakob Nielson's usability heuristics is “Recognition rather than recall”. Explain what it means and give an illustrative example of how it can be used when choosing interaction styles to use in a user interface.
14. What users’ physical characteristics should be considered during the development of an interactive computer system? Give some examples of the impact they may have on the system UX.
15. How can a User Interface promote a good user mental model?

Human Centered Design of Interactive Systems and Methods

1. What is the subject of the ISO standard 13407 (1999)?
2. What are the benefits of using a Human-Centered Design approach in developing interactive systems?
3. Personas are a method that can be used in the design of interactive systems; explain what are personas and their benefits.
4. How should personas be developed?
5. There are several types of personas; explain the main difference between fictional personas and the other types of personas.
6. Describe a minimal set of characteristics that can be used to define a persona
7. What is a scenario? And why are they useful in the design of interactive systems?
8. Scenarios may also be used in usability evaluation; give an example.
9. How are personas related to scenarios?
10. What should be considered when writing a scenario?
11. What is the difference among scenarios, user stories and use cases?
12. What do scenarios, user stories and use cases have in common?
13. After defining scenarios, it is necessary to analyze the main tasks to be performed in the context of the scenario. This analysis can be done informally by asking questions; indicate a minimum set of questions.
14. Task analysis is a very useful and may be done using Hierarchical task Analysis (HTA); what are its main characteristics?
15. What for may task analysis be used?
16. Think of some everyday task and perform HTA using its graphical form.
17. What type of plans may an HTA include?
18. What are the main information sources for a task analysis?
19. Are task analysis methods objective? Why?
20. When to stop decomposition is an important issue in applying HTA. State a rule that can be used to make that decision.
21. What is the Wizard of Oz method? Give an example of a situation in which it can be useful.
22. What are the main characteristics of participatory design?
23. What techniques may be used in the scope of participatory design to get information from the users?
24. What is the Fitts law? Why is it useful in the design of User Interfaces?

Interaction Styles

1. Why is it common to combine several interaction styles in the same user interface?
2. Give an example of a common situation of combining two different interaction styles to better support users' tasks.
3. What are the main potential advantages of menus? What is needed for these advantages to manifest in a user interface?
4. Card sorting is an interesting method to use in menu design; describe how to use it in this context and what kind of information may provide.
5. What are the characteristics defining direct manipulation?

6. What are semantic and articulatory distances in direct manipulation user interfaces?
7. Give examples illustrating user interfaces with different articulatory distance to delete a file.
8. What are the disadvantages of direct manipulation as interaction style?
9. State three guidelines to function key usage in an interactive system.
10. Compare the advantages of menu and fill-in-form user interfaces.
11. What are the main disadvantages of fill-in-form based user interfaces?
12. What techniques can be used to improve the usability of a command language?
13. What are the advantages and disadvantages of command languages concerning usability?
14. To what type of users are command languages more adequate?
15. Give examples of CUIs (Conversational user interfaces).
16. What kind of input/output devices can be used in CUIs?

Input and Output

1. The QWERTY keyboard layout was developed to overcome a technological problem; briefly explain the problem.
2. The mouse and the joystick are direct or indirect control input devices? Why?
3. What are the advantages and disadvantages concerning usability of the mouse as an input device?
4. Touchscreens are direct or indirect control input devices? Why?
5. What are the advantages and disadvantages concerning usability of the touchscreen as an input device? Give examples and mention design guidelines that should be followed.
6. In what situations beyond mobile devices might a touchscreen be an adequate input device? Give a few examples.
7. Pointing devices may be used by users to perform many different tasks. Give examples of these tasks.
8. Why is it important to minimize users´ eye and hand movements while they use an interactive system?
9. Voice recognition as an input device will always have usability issues, even when they are technologically perfect; mention some of these usability issues.
10. Taking into consideration the previous question, mention two usage scenarios where voice should not be considered as input.
11. Voice should be considered as a possible input to an interactive system in what type of usage scenarios?
12. Taking into consideration the previous question, mention two usage scenarios where voice should be considered as input.
13. What are haptic interaction devices?
14. Give some examples of haptic devices.
15. In 3D user interfaces (e.g. virtual environments) trackers are often used; what kind of information do they send to the system?
16. Gesture-based interfaces are more and more used; which kind of devices can be used to detect gestures?
17. There are various guidelines to guide the selection of an interactive device; mention some essential guidelines.

18. What is a stereoscopic display?
19. How do stereoscopic displays provide the notion of depth?
20. Identify two usage scenarios where voice output might be particularly interesting from the usability point of view.

Usability Evaluation

1. Why is UX and usability evaluation pivotal in the development of any interactive system?
2. Is Heuristic evaluation an analytical or empirical method? Why?
3. What is the outcome of a heuristic evaluation to be given to the project team?
4. Is heuristic evaluation an objective or subjective evaluation method?
5. Is it possible to use different lists of heuristics?
6. Why is it useful to classify potential usability problems using the heuristic (or heuristics) not complied with?
7. Why is it important to provide a severity grade to each problem?
8. What should be taken into account to assign the severity grade of a problem?
9. Why should analysts work independently in a first phase?
10. How to choose the n. of evaluators that should be doing the heuristic evaluation?
11. When in the UI development process should heuristic evaluation be used?
12. Can you point out an important limitation of heuristic evaluation?
13. How is it possible to overcome the fact that heuristic evaluation is subjective?
14. Heuristic evaluation should not be used as the only usability evaluation method. Why?
15. Can you point out another empirical method of evaluating usability?
16. Cognitive Walkthrough (CW) is an analytical method of evaluating usability? Why?
17. What is the main goal of Cognitive Walkthrough?
18. Can you point out two important rules to apply in a usability test concerning ethics?
19. What usability evaluation methods are involved in a usability test?
20. Query methods may be questionnaires and interviews; what are the advantages and disadvantages of each of them?
21. What are the dependent variables in a controlled experiment?
22. What are the independent variables in a controlled experiment?
23. Think-aloud is a type of observation; why it is called think-aloud?
24. Can you mention a disadvantage of the think-aloud observation?
25. And an advantage?
26. What are the advantages of using low fidelity prototypes (e.g. paper) in usability evaluation?
27. What is the protocol of a controlled experiment?
28. What is the difference between within- and between-groups experimental design of a controlled experiment?
29. What is the hypothesis in a controlled experiment?
30. What are model-based usability evaluation methods?
31. What is the difference between a field evaluation and a laboratory evaluation?
32. What advantages and disadvantages have field evaluations as compared to laboratory evaluations?

33. What is the difference between analytical and empirical usability evaluation methods?
34. The Streamlined Cognitive Walkthrough is a simplified version of the original method. Which questions should be asked in each step?
35. Describe how you would perform a heuristic evaluation.
36. When, along the interactive systems development process, should the Cognitive Walkthrough be used? Why?
37. Describe how you would perform a Streamlined Cognitive Walkthrough.
38. Observation is a usability evaluation method used in usability testing and it may be direct or indirect; what are the advantages and disadvantages of each of these variants of observation?

Voice, Conversational, and Gesture and 3D User Interfaces

1. What are the differences between command-based voice user interfaces and natural language voice user interfaces?
2. What are the key advantages and disadvantages of voice user interfaces?
3. What is the purpose of onboarding in conversational user interfaces and when should it be considered?
4. What are the different types of confirmation that can be considered in a conversational interface?
5. How can we prototype and test voice/conversational user interfaces?
6. What are key scenarios where gestures can be a viable alternative for interaction?
7. In the context of gestural interfaces, what is discoverability and what is its importance?
8. When designing a new gestural interface, what aspects need to be considered when choosing gestures?
9. Can you identify different approaches to document gestures? Why is gesture documentation important?
10. One trend in gestural interfaces concerns gesture standardization. What is it about and how it might impact memorability?
11. What is the impact of cultural differences in how gestural interfaces are designed?
12. What are the characteristics of a 3D User Interface (3DUI)?
13. What technologies allow 3DUIs?
14. Why are human-factors consideration fundamental in the development of Virtual Reality applications?
15. What kind of methodologies should be used to develop these applications?
16. What are the main adverse health effects that VR applications may have on users?
17. Navigation is a fundamental task in Virtual Environments (VE); what is the difference between the travel and way-finding components of navigation?
18. Give examples of interaction techniques that may be used for travel and way-finding in a VE.
19. Selection and manipulation are also fundamental tasks in VEs; give examples of interaction techniques used to select and manipulate objects in a VE.