Design and Evaluation of User Interfaces - E17

19 January 2018

Lecturer: Anders Bruun

Written Examination for:
DAT3/SW3/IDA7

Time allowed: 3 hours

Two Sections: A and B (TOTAL 100 points)

Materials allowed:

Pens, pencils, rulers, erasers, notes, books, slides, computer (no internet access), printer Language Dictionary

Instructions:

Answer questions by writing directly in the provided fields on this examination paper (or create an equivalent on your computer that you print at the end). If you need additional space, ask for extra pages of paper and put them inside this paper when you hand in. Write your name, ID and question number **clearly** on additional sheets of paper that you use.

You **must** complete the following details before handing in this paper, when you have finished the examination:

Full Name:	
Study-number:	
E-mail [@student.aau.dk]:	

Section A: Multiple Choice Questions (30 Questions)

Each question will gain 2 points for the **MOST correct** answer, as per the content of the course. Incorrect answers will gain 0 points. There is no negative penalty for incorrect answers. Only the correct answer will gain 2 points – MAXIMUM of **60 points** this section.

To answer a question you must **clearly** write, in pen, the letter of the answer that you believe is the **correct** one, (A, B or C), in the box on the left hand side of the question answer alternatives.

A1. What does the letter "C" in the PACT analysis method stand for?:

A. communication
B B. context
C. concept

A2. Each requirement should be well formulated, which is characterized by:

A. Covering a broad set of functionality
C B. Being described at an overall level
C. Being testable

A3. There are four (4) main activities in designing interactive systems:

A. scenario design, conceptual design, interface design, interaction design,
B B. design, evaluation, understanding, envisionment,
C. usability, conceptual design, physical design, evaluation

A4. There are three main types of usability tests that can be used in the software development cycle:

A. exploratory, assessment, overview
B B. validation, exploratory, comparison
C. summative, formative, subjective

A5. Protoyping is a technique used in interactive systems design:

A. throughout all stages of system design
A B. in the design and evaluation phases only
C. in the evaluation phase only

A6. Which term best defines a semi-structured interview?:

A. an interview with no plan
B B. an interview with a planned set of questions
C. an interview that does not include ad-hoc questions

A7. To get requirements information from people in a given time frame, questionnaires are useful because:

A. they are easy to create
B B. you can reach a larger number of people than interviews
C. they provide better qualitative information than interviews

A8. Contextual inquiry is primarily used to:

A. gather demographic data about users within the context
C B. generate quantitative within the context
C. understand how users work within the context

A9. When considering activities to be supported by an interactive system, designers need to consider:

A. physical, psychological and social aspects
B B. temporal, collaborative and safety-critical aspects
C. input technologies and output technologies

A10. What is a benefit of using a cascading menu in interface design?:

A. takes up less screen space
A B. it is always visible to the users
C. it automatically pops up when needed

A11. The following are important roles in the Instant Data Analysis technique:

A. test monitor, video operator, interviewer
B B. test monitor, data logger, facilitator
C. facilitator, test evaluator, time recorder

A12. In human working memory, there is a component called the articulatory loop, which is involved in the following function:

A. holding auditory information
A B. decision making
C. holding visual information

A13. Sketches should be:

A. high in detail and use lots of colors
B B. quick to make and disposable
C. always showing the user in the interaction

A14. "We tend to perceive smooth, continuous patterns rather than disjoint, interrupted ones" describes the Gestalt law of perception of:

A. continuity
A B. similarity
C. closure

A15. "Perceptual set" refers to:

A. Factors affecting human perception
A B. A subset of the Gestalt laws
C. The set of design elements visible within a user interface

A16. To support human limitations in working memory, graphical user interfaces should be designed using the principle of:

A. User control and freedom
B B. Recognition rather than recall
C. Cowan (free recall of 4±1 items) or Miller (free recall of 7±2 items)

A17. Metaphors in design are used to:

A. design images for an interactive system
C B. show paths and maps through the navigation of systems
C. describe a new idea in terms of something that is more familiar

A18. In a usability test, the test monitor (or moderator) should:

A. control how users solve tasks
B B. support users when they get stuck in solving tasks
C. keep quiet as much as possible

A19. How long should the evaluation of a system take, using Instant Data Analysis?:

A. one week
B B. one day
C. one hour

A20. When considering the term "user experience", key dimensions are:

A. narrative, ethics, activity
B B. aesthetics, emotion and engagement
C. efficiency, effectiveness and satisfaction

A21. Physical design is characterized by:

A. being concrete
A B. bodily ergonomics
C. being abstract

A22. During interaction users create a mental model of the system image, and:

A. System images always reflect what the system actually does
C B. Users always perceive the system image the way it is conceived by the designer
C. Users may not perceive the system image the way it is conceived by the designer

A23. What is the term for designing for "learnability", "safety" and "effectiveness" in interactive design:

A. accessibility
B B. usability
C. acceptability

A24. The visual design of a user interface element makes users anticipate its functionality, this is referred to as:

A. Similarity
C B. Attention
C. Affordance

A25. In a usability evaluation, the problem described as “the subject was delayed for several minutes while finding the exit button ” should be classified as:

A. cosmetic
C B. serious
C. critical

A26. An alert message should be always designed by:

A. Using upper-case letters
C B. Being obtrusive
C. Avoiding double negations

A27. Non-functional requirements describe:

A. Qualities that a system must have
A B. What the system must do
C. Requirements of less importance

A28. In human depth perception, the secondary depth cues include:

A. light intensity, retinal disparity, flow of optic array
B B. light and shade, linear perspective, overlap
C. proximity, continuity, similarity

A29. What are the Gestalt laws?:

A. laws for envisioning an interface
C B. laws for designing with colour
C. laws for understanding visual perception

A30. We tend to perceive objects that spatially appear close together as being related, this describes the Gestalt law of perception of:

A. proximity
A B. symmetry
C. order

Section B: Written Answer Questions (4 Questions)

Each question will gain 10 points for a **full** and **correct** answer – but part points can be gained for part answers, so you should attempt all questions to the best of your ability - MAXIMUM of **40 points** this section.

Answers are to be written in the answer box provided on this exam sheet, and will generally require a page answer per question (for 10 significant points). Note form is acceptable as long as key arguments of the answer are expressed. There is no penalty for spelling or grammatical errors, but the meaning must be clear.

B1. When using "scenarios" in the overall design process:
a) Which activity are they created during, and how are they created? (4 marks)
b) When are they used in the design process? (4 marks)
c) Why should designers use them? (2 marks)

a) Understanding when doing PACT analysis. Created through data collection and envisionment techniques, e.g. interviews, oberservations, prototyping and sketching)

b) Throughout the whole process (understanding, envisionment, design and evaluation)

c) To gain an understanding of activities in contexts, informing design:

- Understanding what people do (actitivties in contexts)
- Understanding what people want
- Generating ideas
- Specifying requirements
- Envisioning ideas

B2. How should human limitations in Memory and Attention be factored in when designing interactive products for humans?
a) What are the human limitations in these areas? (3 marks)
b) How can we design an interface that takes account of memory limitations? (3 marks)
c) How can we design an interface that takes account of attention limitations? (3 marks)
d) Why bother to design for these? (1 mark)

a)

- Memory limitations (short term):
  - Lasts 30 seconds
  - Free recall of a limited amount of elements (4±1 or 7±2)

- Attention limitations:
  - Stroop effect (discrepancy between what is shown and the meaning leads to increased mental workload and slower performance)
  - No (true) multitasking (selective and divided attention)
  - Stress affects attention (Yerkes-Dodson law)
  - No general visual search pattern

b) Designing for memory limitations:
  - Recognition rather than recall (show users what they need)
  - Match between system and real world (metaphors, terminology)
  - Chunking

c) Designing for attention limitations:
  - Attention is drawn to elements that are larger, brighter and changing
  - Alerts and error messages
    - Consider need for obtrusive/unobtrusive alerts
    - Get users attention
    - Do not distract from main task
    - Do not overwhelm user with information

d) Why bother?
  - To increase usability (efficiency, effectiveness, satisfaction)

B3. What are good techniques for understanding your target user group?
a) What are the different techniques that you can use? (3 marks)
b) What are the strengths and weaknesses of each of the techniques? (6 marks)
c) Why do we want to understand the target user group? (1 mark)

a) Different techniques:
   - Interview
   - Survey
   - Contextual inquiry
   - Cultural probes
   - Observation

b) Strengths/weaknesses:

c) Why understand the target user group?

B4. When in the process of designing interactive systems would you use sketching and when would you use prototyping?
a) When would you use sketching, and why? (4 marks)
b) When would you use prototyping, and why? (4 marks)
c) What is the difference between a sketch and a prototype? (2 marks)

a) Sketching when: Understanding, early stage
Sketching why: Exploration, throw-away, understanding users and requirements

b) Prototyping when: Understanding, early stage (lo-fi) and physical design (hi-fi)
Prototyping why: Exploration, throw-away (lo-fi), accuracy (hi-fi)

c) Sketch is not interactive, prototype is interactive (simulated in case of lo-fi)