

Name: _____

Student ID Number: _____

Signature: _____

CPSC 344, 2007-08 Winter Term 1 Midterm Exam
90 minutes

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University of British Columbia
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Exam Instructions (read carefully):

1. Sign this page in the space provided to indicate your agreement with these instructions. (You **must** sign to write the exam.)
2. Continue reading these instructions, but **do not open the exam booklet** until you are told to do so by a proctor.
3. Print your **initials** at the top of each page in the booklet **before you start working**.
4. **Cheating is an academic offense.** Your signature on the exam indicates that you **understand** and **agree to** the University's policies regarding cheating on exams.
5. The exam is **closed book**. There are **no aids permitted** (this includes calculators).
6. **Interpret the exam questions as written.** When in doubt, take a strict, literal interpretation of the question and write down any necessary assumptions.
7. You have **90 minutes** in which to work (~1 min/mark). **Budget your time wisely.**
8. When **continuing your work** on a blank page at the end, please **indicate this clearly** at the initial location and on the blank page.
9. No one will be permitted to leave the exam room during the **last ten minutes** of the exam.

Question	Points	Received
1	18	
2	12	
3	15	
4	14	
5	6	
6	8	
7	7	
Total	80	

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Question #1 [18 points total]: True/False

For each of the 6 statements below, indicate whether the statement is true or false by **circling** either **True** or **False**. Briefly **explain** your T/F response in one or two sentences, and illustrate with an example where appropriate. [3 pts each, 1 pt for T/F + 2 pts for explanation]

- (a) **Statement:** Because they emphasize natural mappings, mapping models are the most appropriate type of mental model to aim for in interface design.

True False

Explain:

- (b) **Statement:** When designing a graphical user interface, the primary purpose of a low-fidelity paper prototype is typically to capture and assess the interface's appearance.

True False

Explain:

- (c) **Statement:** Seven is a reasonable number of items to expect interface users to hold in short-term memory because the average number of chunks people can hold in short-term memory is 7.

True False

Explain:

- (d) **Statement:** The CS344/444/543/544 ethics protocol submitted to the Behavioral Research Ethics Board at UBC allows 344 students to use people they know personally as subjects.

True False

Explain:

- (e) **Statement:** A password entry system that shows a warning when CAPS LOCK appears to be unintentionally active is an example of a “visible constraint”.

True False

Explain:

- (f) **Statement:** Contextual inquiry is generally a better choice over plain ethnography when gathering information for UI design because contextual inquiry is structured specifically with the needs of UI design in mind.

True False

Explain:

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Question #2 [12 points total]: Design Concepts

This question describes four flawed vending machine designs. Assume all vended items cost the same amount, and that cost is known to the user (so only selection is a stake). Match each of the design concepts **affordance**, **feedback**, **mapping**, and **visibility** with the *single* design that best illustrates a violation of the concept and explain why the design violates the concept. [3 pts each: 1 for matching term and 2 for explanation]

(a) The vending machine is a large, glass-fronted case with multiple trays of snack items. Each item has a label beneath it that lists a letter and number combination like “B7”. Users must insert their payment and then type the letter and number combination of the item they want on a keypad divided into a set of 10 letter keys and 10 number keys (sufficient to type every possible label in the case).

Design concept violated:

Explanation:

(b) The vending machine looks like the one from (a) — a large, glass-fronted case with multiple trays of snack items — except the items are unlabeled. The glass face of the case doubles as a touch screen. Users enter appropriate change and then press the glass over the item they want.

Design concept violated:

Explanation:

(c) The vending machine is a large, opaque case. Below the payment slot on the right is a column of buttons, each one flanked by an image of the item vended. The user enters payment and then presses the button next to the image of the item they want. If the user selects an item that is sold out, the machine returns the user's change and shows a message saying that the item is out and to please select another.

Design concept violated:

Explanation:

(d) The vending machine looks like the one from (c) — a large, opaque case with a column of buttons and images— except there is also a “SOLD OUT” light next to each button. The light turns on for items that are out. Users enter their payment and press the button of the item they want. If they press the button of an item that is sold out, the machine simply waits for them to press a different button instead.

Design concept violated:

Explanation:

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Question #3 [15 points total]: Discussion Questions

(a) In a few sentences, describe Heuristic Evaluation: **what it consists of**, and (briefly) its **goals**, its **limitations**, and **when** in the design process it is most useful. [6 pts]

(b) List and justify 3 important characteristics of a good task example or set of task examples. [9 pts]

(1)

(2)

(3)

Questions 4-6 are based on the following design brief.

You've been hired by a company that produces bicycling products to design a "ride muse": a device that record ideas cyclists have during their rides. The device is inspired by the company CEO's habit of thinking deep thoughts during his rides and frustration with having no easy way to jot these ideas down.

On his own time, the CEO put together four physical form-factor prototypes of "ride muses" based on different recording formats (voice-activated audio, lever-activated audio using an extra "gear" lever, always-on audio with continuous compression for silent stretches, and one-handed "chorded" handlebar keypad input). After trial runs with each one, he much preferred the voice-activated audio system and has decided to go with it.

The company expects to design, market, and sell the product itself, but the actual production will be handled by another firm with the necessary expertise (e.g., a firm that produces dictation devices). Successful marketing in the cycling world requires word-of-mouth from influential users; fortunately, the company has a well-established partnership with a local bike club and a national bicycling magazine.

Your team is about to begin. While you are excited about the product idea, you are also concerned about the state of the design process as it was "handed" to you.

Question #4 [14 points total]: Pre-Design Activities

- (a) The company CEO has already made some key errors in user-centred design, but it's touchy to give that kind of feedback to your boss. **Briefly** explain two things that he did **very well** from a user-centred design perspective and two things that he did **very poorly**. [4 pts]

Good job, boss:

But maybe we shouldn't have...

(continued on next page)

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- (b) Now that your boss is convinced of the need for more **early stage user-centred design** work, list two useful and **experimentally valid** activities which you, as a trained HCI designer, could do to learn more to about how this product should work (or even if it's a good idea). In each case, describe the **goal** of the activity, the **subject group's makeup**, how you'd **contact** them and **what/how you'd ask them**. [5 pts each]

***Example response:** To explore typical enthusiastic cyclists' willingness to add an extra device to the set of devices they already use on rides, team up with the local bike club to solicit a series of focus group sessions (divided into commuters, hobbyists, and racers). Contact the users by the most standard mass distribution means the bike club uses, e.g., an e-mail newsletter if they have one.*

Questions might centre on the equipment that riders currently own and use and their fears, tolerance, and demand for new devices, but the focus group facilitator would allow discussion to roam freely as long as the topic continued to be ride "accessories".

(1)

(2)

Question #5 [6 points total]: Stakeholders

List what you consider to be the 3 most important stakeholders, given the constraints and resources from the design brief. (Many relevant stakeholders exist!) Be specific in your answer: e.g. if describing an end-user stakeholder, clearly identify demographic characteristics.

For each stakeholder, say in 1 sentence **what makes this role important**. You do not need to identify their potential needs and concerns. [2 pts each]

Example: Enthusiastic but non-professional cyclists (i.e., amateurs who join bike clubs and ride groups), who constitute the largest pool of likely purchasers for the product.

(1)

(2)

(3)

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Question #6 [8 points total]: Threats to Validity

Following pre-design evaluation, the UI group builds a functional prototype of a proposed UI. The prototype is tethered, requiring power and data connections to a computer that runs the system back-end. The interface for downloading, viewing, and organizing ride notes has not yet been prototyped.

You set up a testing lab in a wind-tunnel. A bicycle frame — minus the wheels but with freely spinning pedals — is bolted to the centre of the tunnel. Before an experiment, the subject receives a list of topics to think about and has the frame adjusted to their own normal riding configuration. They then put on the prototype, mount the frame, and begin pedaling. A “natural cycling sound-track” recorded from a ride in the area plays as background. They pedal for 20 minutes, recording ideas they have on the chosen topics.

Through use of the lab setup and an off-site retroactive interview, you plan to learn whether potential users *feel comfortable with the physical prototype while in riding position*, and *how much use (in “muses” per unit time) the device receives*.

Your recruiters solicit randomly selected passing riders as participants at a stop sign along a well-used commuter bike path. You offer modest compensation in exchange for taking part in the two-session experiment. You end up with 25 participants from a range of backgrounds.

This example, *if the sole source of user input at this stage*, violates multiple kinds of experiment validity as discussed in 344. For each of the validity types listed below, describe **a way in which it is violated** and **a way in which it is respected**.
[4 pts each]

(a) External OR face validity.

VIOLATED:

RESPECTED:

(b) Construct validity:

VIOLATED:

RESPECTED:

Question #7 [7 points total]: Matching Exercise

The terms listed immediately below are possible answers for the definitions listed lower on the page. Use the number corresponding to a term in the first list as an answer in the space provided next to the following questions if you think it is the **best** match for that concept or definition. Each term in the first list is used either once or not at all.

- | | |
|-------------------------------------|--|
| (1) Affinity diagram | (10) Likert scale responses on a questionnaire |
| (2) Camera | (11) Sensory buffers |
| (3) System image | (12) Videotaped, semi-structured interview |
| (4) Modular input processing | (13) Cognitive Walkthrough |
| (5) Negative transfer | (14) Cultural idiom |
| (6) Stimulus/response compatibility | (15) Exploratory vs. confirmatory research |
| (7) Recognition vs. recall | (16) Keyboard logs |
| (8) Norman's "Gulfs" | (17) Affordance |
| (9) Task examples | (18) Perceptual fusion |

For each statement below, write the number of the term from the list above that **best** fits into the missing space. [1 pt each]

- _____ (a) What the users sees of an interface
- _____ (b) Numeric ratings of agreement/disagreement
- _____ (c) A way to turn unprocessed qualitative data into coherent arguments
- _____ (d) A poor model of how human vision works
- _____ (e) An overall metaphor for what makes understanding an interface challenging for users
- _____ (f) A "discount" usability method
- _____ (g) One way of comparing qualitative and quantitative methods

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Extra page to continue work.

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