Name: _____ **Student ID Number:** _____

Signature: _____

CPSC 344 2006-07 (T1) Final Exam
[PARTIAL] SOLUTIONS

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Exam Instructions (read carefully):

1. **Immediately** sign the first page of the exam with your **signature** in the space provided on the upper left.
2. Continue reading the instructions on this page and complete the **peer review**, which is on a separate sheet not attached to the exam booklet. **Do not open the exam booklet** until you are told to do so by a proctor.
3. 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.
4. The exam is **closed book**. There are **no aids permitted**.
5. You will have **150 minutes** in which to work. This is ~1 min/mark, plus 30 additional minutes. **Budget your time wisely**.
6. No one will be permitted to leave the exam room during the **last ten minutes** of the exam.

Question	Points Possible	*Class Mean*
1	10	
2	12	
3	11	
4	9	*removed*
5	11	*removed*
6	19	
7	6	
8	9	*removed*
9	18	*removed*
10	15	
extra credit	*5*	
Total	120 *(+5)*	

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Question #1 [10 pts]: Warmup

For each of the following questions, circle True or False. [1 pt each]

(a) When we say "Attention is the gateway to memory", we are referring to how information moves from working to long-term memory.

True **False**

(b) Task examples are design-independent. This makes them useful for debugging specific designs.

True **False**

(c) A designer imagining what a user will do or how a user will feel when interacting with a system embodies an attitude of user-centered design.

True **False**

(d) A novel 'ubicomp' interface allows a cell phone user to share control of a large shared display at a bar. A practical and effective approach to designing this system's user interface is to focus on one key element - usability - hile the hardware design team handles functionality, information privacy and security.

True **False**

(e) Cognitive walkthroughs are a good evaluation choice when the question is to assess how novice users will interact with a system.

True **False**

(f) Once formed, a mental model is very difficult to change.

True **False**

(g) A stakeholder is defined as anyone who will eventually use the interface being designed.

True **False**

(h) Sending designers to interview workers in an office setting is an example of contextual inquiry.

True **False**

(i) Affective reactions are what allow us to make decisions.

True **False**

(j) Douglas Engelbart demonstrated the first prototype of a computer mouse and chorded key input devices, the first use of a GUI "desktop metaphor", and networked multi-user collaboration with shared control of a cursor, all at the same time, live, at a conference in San Jose – long before technology had even made the idea of a personal computer feasible, and when San Jose was a dusty little agricultural town.

True **False**

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Question #2 [12 pts]: Short Answer

(a) Early in 344, you saw a sketch of Moore's Law and "Darwin's Law" superimposed; this was offered as a justification for why HCI is important. Reproduce the key elements of this sketch (i.e. **draw** a diagram which contrasts these two laws, giving some attention to labeling of the time axis), and explain in 1 sentence how this relates to HCI [4 pts]

The sketch should be a graph with time (50 years or so at least) on the x-axis and capabilities on the vertical axis. It should have 2 curves: a rising exponential for Moore's Law – starting at a plausible first date for computation devices - and a flat line for Darwin's Law. Explanation should capture that (a) computer abilities are evolving rapidly while human abilities are not; and (b) some time in the past, computer abilities have passed human abilities.

(b) Explain the difference between *prescriptive* and *descriptive* HCI design models and identify their respective primary target users, in 2-3 sentences. [4 pts].

A prescriptive design model instructs a designer in how to do something, and is intended for practicing designers – especially those who are learning how.

A descriptive model generalizes and encapsulates observed processes, is used by those who study and talk about the process of interface design, and are often used to advocate certain key points or features of a process – for example, the central role of user evaluation.

(c) "Triangulation" refers to the need to use multiple faulty methods in the effort to get reliable information about a question.

What needs to be true, as a group, about those faulty methods in order for this scheme to actually work? Give an example of 2 methods you could use together to triangulate as you get information from users, and explain why. [4 pts]

The faults must be complementary, i.e. categorically different; they cannot all have the same weakness, or else the bias / noise in your data will be compounded rather than cancelled out. The most obvious example is to combine a self-report –type evaluation with some kind of non-intrusive observation. Self reports are unreliable in many ways, but they let you hear thoughts. Observation, if uncorrupted by the evaluator's presence, is accurate but superficial – you often don't have access to why.

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Question #3 [11 pts]: Design Concepts and Mental Models

SCENARIO: You are on vacation in Japan. You don't know Japanese. You want to buy a Coke from a vending machine, which is of a kind you have never seen before and seems to be able to do a lot of things that vending machines in North America don't do. You'd rather not use your credit card for this small purchase. You have a handful of local coins, but aren't sure how much they're worth.

(a) List and describe/justify in 1-2 sentences **three general, basic concepts** (many more are possible) of **good user interface design** that a designer might employ when creating the interface for the vending machine scenario above; and **why that concept is important and particularly relevant to the design task at hand**. [3 pts each]

For example (don't use this one!), "Provide a clear visual affordance, so that the user understands which actions are possible. This is important for a walk-up-and-use interface like a vending machine."

(i)

(ii)

(iii)

1 pt per principle + 1 pt for being relevant + 1 pt per explanation that clarifies relevence. Other reasonable responses accepted.

- *Causality/understandable action*
- *Visible constraints*
- *Mapping*
- *Make positive use of transfer effects (e.g. through metaphor) – but be careful in cultural situations*
- *Be aware of population stereotypes*

Also acceptable answer (these aren't from the basic heuristic list, but are also good principles)

- *understand range of users & their limitations*
- *communicate functionality (what it does)*
- *provide model of how to make it work*
- *foresee possible contexts of use.*

(b) Your answers to part (a) are characteristics of (circle one): [2 pts]

Designer's model System image User's mental model System model

Evaluation. Following the manual's instructions, Sally hits Record, then specifies recording time and channel. After this there is the machine clicks, but there is no change on the unit's LCD display. Sally is not sure whether the machine is processing her instructions or her instructions have failed, or in fact the unit has begun recording.

[the example here needs to illustrate that the user can't ascertain whether her action produced the desired result or not.]

Question #4 [9 pts]: Goal Oriented Action - REMOVED

Question #5 [11 pts]: Planning and Executing Evaluations and Prototypes - REMOVED

Question #6 [19 pts]: Initiating a Design Project

The voice mail system used by many universities across the country (a product made by a company called VoiceBin Inc.) has received a lot of complaints from end-users. The universities have communicated to VoiceBin that there are problems (without being very specific about them), and threatened to switch to another vendor if VoiceBin doesn't improve things. Therefore VoiceBin has retained you, as an interface consultant, to investigate the problem and work with their in-house design team to solve these problems.

(a) Who are the stakeholders you need to consider throughout this design process? **List four,** ordered by **decreasing importance**. *Be specific.* [4 pts]

(i)
(ii)
(iii)
(iv)

For example,

1. *customer decision makers (i.e., university management)*
2. *end-users*
3. *VoiceBin management*
4. *VoiceBin customer support staff*

(b) You are planning your strategy for your first step. In **general terms**, list **5 items** which MUST be done at this stage for each iteration step in any design process (**not just for this one**). [5 pts]

(i)
(ii)
(iii)
(iv)
(v)

Consider other reasonable answers, but these are all important. In particular, I am looking for 1 and 4, which are crucial but hard to get across.

1. *your reason for doing this activity (experiment question).*
2. *the type of activity*
3. *who will be involved*
4. *how you will contact these individuals*
5. *who you need to get permission from in order to do so.*

(c) Describe the first step you will take, by **thoughtfully and thoroughly** addressing each of your 5 points above, **relative to this design scenario** in 1-2 sentences each. [10 pts]

(i)
(ii)
(iii)
(iv)
(v)

Answers should be thoughtful and thorough, and correspond to previous answer.

1. *Better understand the problems that end-users are having. Seeing the product used in a real-world environment will help me identify problems that the end-users encounter, even if they are not able to accurately describe them to me.*
2. *Observation and contextual inquiry of the system in use by end-users, carried out to begin within in one university setting (assume similar problems at other sites)*
3. *End-users, taken from a selection of representative roles (office staff, faculty, grad students, etc).*
4. *Contact by soliciting the community for people interested in participating. Should bet response from most affected individuals.*
5. *Get permission from the customer's management to observe end-users at work.*

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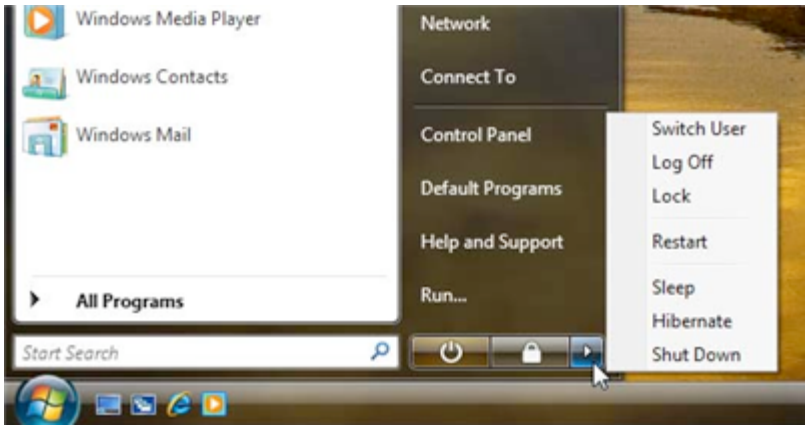
Question #7 [6 pts]: Interface Design Critique



The image above shows the **shutdown menu** (located in the right side of the image) of the new Windows Vista operating system.

(a) Comment on the shortcomings **of this menu**, focusing on functional rather than visual aspects. [3 pts]

Expected answer deals with the complexity of the menu: many options are available for what are essentially 2 possible

Ther good answer are acceptable.

(b) Describe two changes you would make to the menu to improve it as an interface. Your answer may involve changing the options available. [3 pts]

The best answer will involve removing options, not adding or simply rewording them.

Some possible answers:

- *Combine hibernate and sleep into one option.*
- *Combine shutdown and restart into one option which shuts down.*
- *Combine log off, lock, and switch user into one option which logs out.*

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Question #8 [9 pts]: Prototyping Methods - REMOVED

Question #9 [18 points total]: Following Through with the Design Process - REMOVED

Question #10 [15 pts]: Collaborative Interfaces

You have been asked to help select collaboration tools for a development team working together on a large software project. **For each of the three scenarios below and on the following page**, pick out a ***different*** CSCW technology from the list provided. For each scenario there are multiple good answers, depending upon your assumptions.

Your answer should include

(i) **Type of technology** you would use to support the scenario's collaboration. If necessary, you may **pair 2 technologies together** to achieve the needed functionality. [1 pt each]

(ii) Whether the usage of this technology will be **co-located** or **distributed** [0.5 pts each]

(iii) Whether the usage of this technology will be **synchronous** or **asynchronous** [0.5 pts each]

(iv) **One** reason *why* it is a good solution [3 pts]. **Explain any assumptions you are making.**

List of CSCW technologies to use in part (i)

- E-mail
- Electronic whiteboard
- Regular whiteboard
- Instant messaging
- "Tracking changes" in an Office document
- CVS (Concurrent Versioning System) repository - allows version control and change integration of plain text documents
- Pen, paper and scotch tape
- Multiple PDAs (bluetooth or wifi equipped)
- Videoconferencing
- Telephone (1 to 1)
- Voice mail (1 to 1)
- Telephone (conference call, i.e. 3+ parties)
- Projector driven by a pen-input tablet laptop

(a) Scenario: During a weekly status meeting in the company board room, the team leader wants to display some statistics on the project's progress, and allow his team members to annotate them.

(i) Technology:

(ii) Co-located / Distrib (circle one)

(iii) Synch / Asynch (circle one)

(iv) Justification:

(i) Electronic whiteboard + wireless PDA's
(ii) Co-located + Distrib
(iii) Synch
(iv) I assume team leader can easily display her statistics on the electronic whiteboard. This technology allows others to annotate the information – but they need a mechanism to do so, which is provided by the wireless PDA's.

Question #10, continued: Collaborative Interfaces

(b) Scenario: A software developer located in Vancouver wants to ask his co-worker in Toronto a question about some of her code. He does not need an immediate answer, but would like one within 24 hours.

(i) Technology:

(ii) Co-located / Distrib (circle one)

(iii) Synch / Asynch (circle one)

(iv) Justification:

(i) Email + CVS is best answer from list. (voice mail + CVS might also be okay, but needs to be justified from email)
(ii) Distrib
(iii) Asynch
(iv) Email allows the question to be answered, and CVS the code to be viewed – and meanwhile, both developers can continue to work. This is not an ideal solution, since it might be klunky to use either email or voice mail to point to the specific code sequence. Probably other technologies out there!

(c) Scenario: An instructor is holding a review session in preparation for an exam in a class of 15 students. As students ask questions, the instructor needs to informally illustrate points so all can see them, while students take notes.

(i) Technology:

(ii) Co-located / Distrib (circle one)

(iii) Synch / Asynch (circle one)

(iv) Justification:

(i) Plain whiteboard
(ii) Co-located
(iii) Synch
(iv) Plain whiteboard is best answer because no artifact needs to be captured afterwards (in which case an e-whiteboard would probably be desirable). Also, most would prefer a plain whiteboard to a tablet-driven projector simply because the setup is simpler, and the tablet allows no particular benefit in this instance.

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EXTRA CREDIT: Physical Interfaces [1-5 pts] [used in all KM finals]

Suggest an example (other than those shown in class) of a useful **physical metaphor** that could be implemented in a haptic interface. For example, mentioned in class was the debit card whose "weight" you could feel when you swiped it, representing the amount of money in the account; and the "clutched film reel" metaphor for browsing streaming media such as video.

Partial credit will be given according to the quality and innovativeness of the idea.

This is a shameless ploy to use your brains for fresh new research ideas. If you come up with something I would like to use and have not thought of or seen elsewhere, I'll contact you to discuss using your idea.