DEPARTMENT OF COMPUTER SCIENCE
University of Toronto

CSC 318S
THE DESIGN OF INTERACTIVE COMPUTATIONAL MEDIA

FINAL EXAM

10 December 2002, 2:00-4:00 p.m

OPEN TEXBOOK, READINGS PACKAGE, LECTURE NOTES, WRITTEN NOTES

Write all your work in this booklet (18 pages in total).

Score _____ *out of 100 points*

Name _____

Student Number _____

Project Team Name _____

Carefully read and answer the following questions, while thinking about the course notes, readings, guest lectures, and your work on the term project.

Your answers should be as brief as possible. Excess verbiage won't help, and may hurt. If you do need extra space to write, pages 17 and 18 have been left intentionally blank for this purpose. If you use any of this extra space, please note this fact beside any question that overflows to one of those pages.

There are 9 (nine) questions. The value of each question is indicated.

You may want to skim the entire exam right away. **Do not spend too much time on any one question.**

Good luck.

1. (12 points, 1.5 points for each part)

We have discussed interactive computational media that illustrate important concepts from this class. For each system or concept listed below, circle **all** answers that are correct, but **only** these answers. Thus, you may circle anywhere **between zero (0) and four (4)** answers for each part. **Do not guess if you have no idea.**

a) Metaphors used in the design of the virtual science fair included:

1) Lab journal
2) Trip into outer space
3) Threaded discussion
4) Slide show

b) The Movie Authoring and Design System illustrates the following kinds of design:

1) Participatory design
2) Iterative design
3) Design using the waterfall method
4) Design making frequent use of claims analysis

c) The original design and development process of Quicken by Intuit illustrates the following key concepts:

1) Careful understanding of user needs
2) Appropriate choice of visual metaphor
3) Consideration of computer-supported cooperative work issues
4) Design of technology for use on mobile devices

d) The research project seeking to improve the presentation of computer program source code employed the following kinds of information display methods:

1) Animated displays
2) Digital typography
3) Use of the principles of graphic design
4) Three-dimensional displays

e) Carroll and Mack's discussion of Learning to Use a Word Processor illustrates the following key concepts:

1) Users' tendencies to prefer exploring to reading as a means for learning
2) Users' tendencies to employ metaphors to aid their understanding
3) Users' tendencies to have difficulties following detailed procedural sequences
4) Users' tendencies to try to make sense of their experiences.

f) The Arkola bottling plant shown via video employs the following interaction techniques

1) Voice menus
2) Two-handed input
3) Eye tracking
4) Non-speech audio

g) Newell's discussion of Extra-ordinary Human-Computer Interaction makes the following points:

1) The only reason for designing for those with disabilities is to achieve social justice.
2) There are two classes of people, those with disabilities and those without.
3) Disabilities are purely attributes of individuals, and never caused by environments.
4) There is not yet any legislation designed to guarantee rights for people with disabilities.

h) Minimalism is a technique that has been applied to the design of:

1) Microsoft Word
2) Software manuals
3) An eight-volume reference manual on IBM's web applications development technology
4) Menus controlling access to the functionality of applications

2. (12 points, 2 points each)

In not more than 10-40 words each, finish each of the following incomplete statements about interactive computational media and their design. In some cases, you may want to express your answer as two or three short sentences.

a) You are the leader of a design team and one member consistently fails to do what he or she promises. After this happens twice, you should …..

b) In choosing an appropriate **interaction technique** that a user could employ to carry out a **task**, it is important to consider the **affordances** of the technique because ….

c) Considering the production of messages, **voice mail is typically easier than email** because …..

Considering the reception and processing of messages, **email is typically easier than voice mail** because …..

d) A colleague has designed a system with an interface that employs three different typefaces, four point sizes, and roman, italic, and boldface styles. These are rendered in four different colours. Tufte would likely judge this system as …

e) Done properly, one advantage interviews have over questionnaires is that …..

f) McKerlie described “shop culture” as one of the impediments to achieving sufficient user involvement in some of the design projects in which she participated. By “shop culture”, she included both …..

3. (6 points)

We have discussed in class a number of prototyping methods and media. Two lists appear below. First, there appears a list of systems to be designed, labeled a, b, c, d, and e. Next, there appears a list of prototyping methods and media, labeled 1, 2, 3, 4, and 5. For each system, select the **one best prototyping method**, such that **each method is used once and only once**. Do this by writing the number corresponding to the prototyping method next to the system for which it should be used. For example, if the two lists corresponded perfectly in the order in which they appear, the answer would be a1, b2, c3, d4, and e5. **Do not guess parts of this if you have no idea.**

a) A collaborative multi-party game to be played over the Internet

b) An immersive virtual reality system for visualizing astronomical phenomena

c) A mobile navigational aid for mountain climbers

d) An interactive digital diary for use by psychiatrists

e) An electronic newspaper page layout system

1) Macromedia Flash

2) A physical model

3) A sequence of screen shots with annotations

4) A one-act play with a small number of characters

5) A scenario expressed in English text

4. (12 points, 2 points for each answer a-b, 3 points for answer c, 5 points for answer d)

Consider the design of an information and display system to be placed in the shelter at every bus stop along a route that is heavily traveled. We want this system to be both *useful* and *useable*, that is, we need to consider both its *functionality* and its *interface*. Assume that each bus will have an appropriate computer and communications system to enable it to broadcast useful information that could be displayed at the bus stops. Answer parts a-c below in no more than 10-20 words each.

a) What is the single most important piece of information that should be presented on the bus stop display and why?

b) What is the second most important piece of information that should be presented on the bus stop display and why?

c) What information display technique must you want to use to present the information, and why would you choose this technique?

d) Imagine that you are the director of personnel trying to hire the lead professional who will direct a team of three usability and interface design people for this project, i.e., who will do the kind of work that we have learned about in this course. Write a 50-75 word job advertisement for this position.

5. (16 points, 10 points for part a, 6 points for part b)

a) Imagine that you are designing wristbands with embedded computing and communications capabilities for use by parents and children in environments such as amusement parks and zoos where children could easily get lost. You have just finished the requirements analysis phase of this project. Write a 100-200 word Executive Summary of a report reporting on the results of the requirements analysis. Make whatever reasonable assumptions you need to make in order to carry out this task.

b) *Metaphors* are powerful because they give us a language for describing and thinking about interfaces in relation to concepts, objects, activities, and properties with which we are already familiar. Thus, in using the *desktop metaphor*, we can anticipate with assurance the use of *objects* such as *files*, *folders*, and *garbage cans*, *activities* such as *throwing something away*, and *properties* such as the *number of files in a folder*. Consider the design of the system to avoid children getting lost discussed on page 9. Suggest **two (2)** substantially different metaphors that might be appropriate for such a system. In each case (and in no more than 5-10 words each) propose **three (3)** associated objects or activities or properties that could appear in the functionality and/or the interface of the system.

b) Metaphor b

b1) Object or activity or property b1

b2) Object or activity or property b2

b3) Object or activity or property b3

c) Metaphor c

c1) Object or activity or property c1

c2) Object or activity or property c2

c3) Object or activity or property c3

6. (10 points, 2 points each part)

Imagine that you are the supervisor of a usability professional and that you receive the following report on the results of the user testing of a software package called Mumble:

“Subjects tried out Mumble, experienced few difficulties, and reported happiness and satisfaction.”

Using 5-10 words each, list the top 4 likely problems with either the work that was done and/or the way in which it was reported.

a) Problem #1

b) Problem #2

c) Problem #3

d) Problem #4

e) In a later interview with the usability professional, you learn that there were numerous cases in which subjects got so confused during the user testing that they were not able to continue in a productive manner. How should the professional have handled this? (10-30 words)

7. (14 points, 2 points each for parts a, c. d. and e, 6 points for part b)

Consider the design of a heads-up vehicle display for police work, in other words, technology and a system that displays information in the field of view of police in their vehicles. Except where noted differently, answer each question below in no more than 20 to 30 words.

a) How would you go about doing *requirements analysis* for such an interactive computational medium?

b) In no more than 75 to 100 words, write a plausible *activity design* scenario for the envisioned system.

c) In a few words, list one feature that needs to be considered in such a design.

d) In a few words each, list one positive claim and one negative claim with respect to one of the workplace themes.

e) In no more than 10 to 20 words, would you recommend the use of voice recognition and synthesis in such an application? If so, why? If not, why not?

8. (12 points, 4 points for each part)

The following ad appeared The Globe and Mail of 21 November 2002. Assume you are the owner of a computer store trying to decide whether or not to sell the Acer TravelMate C100 Convertible TabletPC.
You wish to carry out research to help you in this decision, or, better yet, to access the results of research that others have done.

Recall McGrath's taxonomy of research methods. In not more than 20-40 words each, answer each of the questions on the following page. **Note: You must be very specific in your answers.**

a) Describe one very specific research study that McGrath would describe as a **field strategy** that could help you better understand the strengths and weaknesses of this device.

b) Describe one very specific research study that McGrath would describe as a **experimental strategy** that could help you better understand the strengths and weaknesses of this device.

c) Describe one very specific research study that McGrath would describe as a **respondent strategy** that could help you better understand the strengths and weaknesses of this device.

9. (6 points, 2 points for each answer)

List, in no more than 10-30 words each, the top three **specific ways** in which, if you could do the semester's work over again, **you would change what you did in your team's project work and how you did it. In other words, how and why would you do things differently?** You may want to include both things dealing with **the work you did** and also with **the way you did it as a team**.

a) Most important change

b) Second most important change

c) Third most important change

OVERFLOW SPACE

If you use this space, and you continue writing from an earlier page, make sure you indicate so at the appropriate place on that earlier page.

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THIS IS THE END OF THE FINAL EXAM. PLEASE CHECK YOUR WORK.

WE HOPE THAT YOU HAVE ENJOYED AND PROFITED FROM THIS COURSE.