

# Final Exam

Instructor: Kenny Wong

CMPUT 301 : User Interfaces and Software Design

A2

December 18, 2000

## Identification

Last Name: \_\_\_\_\_

First Name: \_\_\_\_\_

Student ID: \_\_\_\_\_

## Instructions

Duration: 180 min

Weight: 35%

Read all the instructions.

The exam consists of 9 pages, including this cover page, and contains 8 questions worth a total of 70 points. The number of points assigned to each question is shown in square brackets. Please check that you have received a complete exam.

All questions are to be answered in this exam. This is an open-book, open-notes, but closed-neighbor :) exam.

Use the backs of pages if necessary for additional working or answering space.

Start only when instructed. The time remaining will be indicated and updated at about 10 min intervals.

Good luck!

## Scoring

Question	Mark	Value	Question	Mark	Value
1		/12	5		/8
2		/6	6		/8
3		/4	7		/8
4		/8	8		/16
			Total	_____	/70



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## Questions

1 Experimental design

Design a controlled user study or experiment to evaluate the learnability of the personal information manager you developed for the course project.

(a) [2] What kind of users and about how many would you need for the study? Why?

(b) [8] Suppose each experimental session with a user is planned to take a maximum of 2 hours.

Describe the major activities and combination of evaluation techniques you would employ to assess learnability. What tasks are being tested? Indicate, where relevant, the time duration allotted for each part of the session.

(c) [2] Would you need to conduct a pilot study? Why or why not?

2 Diagrammatic notations

For the following types of "box and arrow" diagrams, what do the boxes represent and what do the lines represent?

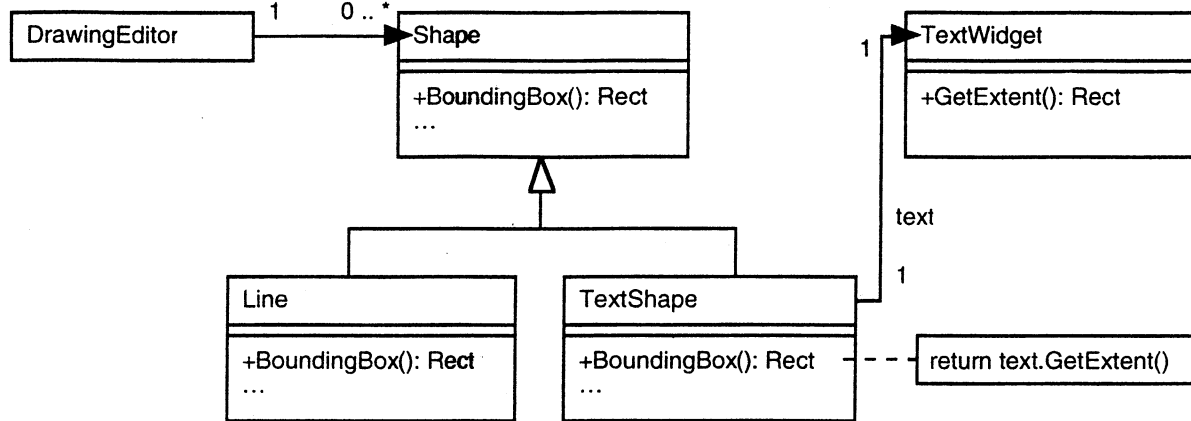
(a) [2] UML state diagram

(b) [2] task hierarchy diagram

(c) [2] flowchart

3 [4] UML notation

Study the following UML class diagram carefully. This is an instance of a common design pattern that is being used in a drawing editor.



Explain what the intent or purpose of this pattern apparently is. You do not need to name the pattern.

4 [8] Models of the user

Describe how you would try to predict the relative speed of the following two ways of deleting a file in a desktop user interface:

- drag and drop the file icon onto the trash can icon
- pop-up menu over the file icon and choose delete

State your assumptions.

5 [8] Task analysis

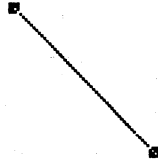
Use the task analysis for knowledge description technique to create a task descriptive hierarchy over the following objects:

flatbed scanner, game pad, hard drive, inkjet printer, joystick, keyboard, laser printer, microphone, modem, monitor, mouse, speakers.

Make sure your taxonomy satisfies the uniqueness rule. Label categories with AND, XOR, or OR as appropriate.

6 [8] Dialog notations

Consider the interaction of selecting a line in a drawing program and adjusting its position or endpoints.



The whole line can be moved by dragging the line. For this, the line does not need to be selected first, but it will become selected afterwards.

A line is selected by clicking the line. Either endpoint can *then* be moved by dragging the endpoint.

Draw a UML state diagram for this interaction. Label the elements of the diagram clearly. State your assumptions.

7 [8] Design strategies

In your own words, write a short essay describing the composition and generalization design strategies for constructing object-oriented software. What advice would you give for the proper application of these strategies? Assume your audience is a 3rd year computing science student who has not taken CMPUT 301.

8 User interface design

Suppose you are designing a new search tool.

When you provide a directory, the tool displays a list of all the files in that directory and its subdirectories. You can specify a wildcard expression to limit this listing. For example, the wildcard expression `*.txt` would list only files ending in `.txt`. Moreover, you can specify an optional regular expression to display the matching lines in the actual file content of this (sub)set of files.

- (a) [6] Provide an EBNF grammar to describe the syntax of a plausible command-line version of such a search tool. You can leave the regular expression part (only) as an undefined non-terminal. State any assumptions.
- (b) [10] Sketch the layout of a graphical user interface of such a search tool. Label your layout clearly.



