University of Ottawa
SEG 2100 Midterm

Professor: Timothy C. Lethbridge

October 22, 1998

Family Name: _____

Given Name: _____

Student number: _____

DO NOT START UNTIL YOU ARE TOLD.

Closed book.

You have 75 minutes.

This marks on this test sum to 100, but the test is worth 17% of your final course mark.

Write all your answers in the space provided.

Good luck!

Multiple Choice Questions (3 marks each for a total of 15 marks)

Circle the BEST answer to each of the following questions

1. Which of the following statements is *false*?

   a) The number of bugs found in a program is a good indicator of the number of bugs remaining in the program.
   b) The more one fixes a large software system, the more frequently it will fail.
   c) It is always easy to fix a flexible software system.
   d) If one begins coding too soon, the project will take longer to complete.
   e) The work of the developer continues even after the software is delivered to the client.

2. It has been found that adding people to a project that is behind schedule will generally:

   a) Help it to get back on schedule
   b) Not make any difference, and therefore be a waste of money.
   c) Make it even more behind schedule.
   d) Enable it to actually get ahead of schedule.

3. Which of the following should be our top-level objective when we perform software engineering tasks?

   a) Handling complexity.
   b) Developing software.
   c) Solving the customer's problem.
   d) Pleasing the customer.
   e) Pleasing our boss.

4. In the SCSS project, which of the following classes is observable.

   a) ServerPhasen
   b) ServerUIPhasen
   c) ConnectionToClient
   d) a and b
   e) b and c
   f) a and c

5. What does class ConnectionListener do in the SCSS?

   a) After a client has connected, it waits for messages coming from that client.
   b) After a client has connected, it waits for messages coming from the server.
   c) It handles the UI of the Client.
   d) It handles the UI of the Server.
   e) It handles attempts by a new client to connect to the server.

Short Answer Questions. Answer only 4 of the following 5 questions. 10 marks each for a total of 40 marks.

6. (10 marks) What is software deterioration? Describe several factors that contribute to this deterioration. How can we handle deterioration?

7. (10 marks) Why are the major risks inherent in the requirements definition process? What can we do to reduce the impact of these risks?

8. (10 marks) What is the purpose of the validation and verification steps in the waterfall model?

9. (10 marks) Explain the advantage of encapsulation in an object-oriented program.

10. (10 marks) Outline the Java mechanism that allows me to have two or more concurrent threads running at once. What are the essential things I must do in a program to start several threads?

Use Case Question. 20 Marks

11. You wish to design a program that permits a person to have a voice-mail capability on his or her personal computer. The program must function like an answering machine that listens to the telephone line via a modem and takes messages when a person does not pick up a telephone on the same line. Identify the actors and at least three use cases. Give a brief description of each use case.

Programming and Design Question. 25 Marks

12 Write a small reusable class in Java whose instances represent North American telephone numbers. This should work very much like the postal code class. A telephone number should have the following format:

(<area-code>) <prefix>-<number> x<extension>

For example :

(613) 562-5800 x6707

The class should have two contructors, one with three integers, one with four, the fourth one being the (optional) extension.

The class should have a toString() method to output the entire number according to the above format. The class should have another method that just returns the area code.

I am not looking for perfect Java syntax and perfect knowledge of the library. To obtain good marks the most important thing to do is to convince me that you understand the general structure of a simple Java class. If you get stuck, and can't remember some aspect of Java, use pseudocode for that part of your program.