

Family Name: \_\_\_\_\_ (As you are sorted in the university registration system)

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Université d'Ottawa  
Faculté de génie

École de science informatique  
et de génie électrique



uOttawa

L'Université canadienne  
Canada's university

University of Ottawa  
Faculty of Engineering

School of Electrical Engineering  
and Computer Science

SEG 2105  
Introduction to Software Engineering

**FINAL EXAMINATION –Sample**

**Time Allowed for Examination: Three hours**

**Professor: Timothy C. Lethbridge**

**Open book. (you may use books, personal notes etc., but no electronic devices)**

**Good luck!**

For the multiple choice questions, **Circle the single best answer**. There is **only one best answer** for each multiple choice question. Part marks *may* be given for answers which are good but not the best.

Questions 1-5 are by default worth 2 marks each (total of 10 marks)

If you are unsure about an answer, mark it with '??'. **In question 6 you will be asked to indicate which of your answers you think you are most likely to have got wrong.**

1. Which of the following patterns describes a precise way to write code?
  - a) Abstraction-occurrence
  - b) Delegation
  - c) Pipe-and-filter
  - d) Singleton
  - e) More than one of the above
  
2. In user interface design, the word 'affordance' means?
  - a) The set of tasks the user knows how to do
  - b) The set of features the customer has the money to pay for
  - c) The set of capabilities that a particular screen or dialog allows the user to do
  - d) The set of guidelines the user interface designer should follow in user-centered design
  - e) None of the above
  
3. Which of the following is true?
  - a) Most testing is done top-down
  - b) Big-bang testing is best because it gives results faster.
  - c) Most testing is done using a hybrid between top-down and bottom-up.
  - d) It is not worth doing bottom-up testing because it requires writing a lot of drivers.
  - e) Bottom-up testing means testing the user interface first.
  
4. Common coupling is named from:
  - a) The term used in Cobol for calling a procedure
  - b) Organizing all similar entities into one common location
  - c) The fact that it is the most frequent type of coupling
  - d) The term used in Fortran for global variables
  - e) An approach where the code is owned by everybody (i.e. 'in common')
  
5. Which of the following is not part of the software engineering code of ethics?
  - a) Participate in lifelong learning
  - b) Act consistently with the public interest
  - c) Maintain integrity and independence
  - d) Do what your management tells you to do
  - e) Be fair and supportive of colleagues
  
6. Indicate below the number of the single question from 1 to 5 that you think you are most likely to have got wrong. If you did indeed get it wrong, you will not lose marks for that question. If you indicate more than one number, then what you indicate will be ignored.

The single number of the question from 1-5 you think you are most likely got wrong is: \_\_\_\_\_

**Short answer:**

7. (5 marks) Describe the reasons why it would not be a good idea to modify the code in a framework like OCSF when you are using the framework in your application?
8. (5 marks) You are creating a method in Java that takes the string for a University of Ottawa course taught in English (such as “SEG2105”) and returns the equivalent course taught in French (“SEG2505” in this case). (4 is added to the second digit). The method throws an exception if the input isn’t a code for a course taught in English. Describe a set of equivalence classes to test this system.
9. (5 marks) Draw a state machine that has the following States A, B, C and D. D is a superstate, where B and C are its substates. A and C are default start states. Event e1 causes a transition from any state to A. Event e2 causes a transition from C to D and vice-versa, and event e3 causes a transition from A to D.
10. (4 marks) In what kind of diagrams can a generalization triangle appear?
11. (3 marks) What techniques that we discussed in this course involve a moderator?

**The following system description forms the basis for the remaining questions:**

You are starting an outdoors services business. In the summer your employees will be mowing lawns and in the winter they will be clearing snow. All year round they will be trimming trees.

Some employees can do all three tasks; however since trimming trees requires specialized training, not all employees will be able to do it.

Customers will be signing contracts with your company for each of the tasks. For snow clearing you will be charging \$1 per square meter of snow cleared per visit, and for lawn mowing you will charge 5 cents per square meter. You give a 50% discount for people willing to sign up for regular snow clearing or lawn mowing for an entire season.

Each day you dispatch crews to do the required work. Employees have to sign out snow plow trucks, snow blowers, shovels, lawn mowers and tree trimming kits. Tree trimming is always done in crews of two people; snow clearing is always done individually.

**ANSWER ALL OF THE FOLLOWING IN YOUR EXAM BOOKLET.**

12. (14 marks) Create a class diagram for the above system
13. (4 marks) Write in OCL a constraint to say that if the work is tree trimming, then the crew size must be at least 2.