UNIVERSITY OF EDINBURGH

COLLEGE OF SCIENCE AND ENGINEERING

SCHOOL OF INFORMATICS

Informatics 2C – Software Engineering

Degree Examination

Date: 7th December 2010

Time: 9:30 - 10:30 (1 hour)

Convener: J Bradfield
External Examiner: A Preece

INSTRUCTIONS TO CANDIDATES

1. Check that the question paper contains pages 1–6. If it does not, inform the invigilator.
2. You should attempt as many questions as possible.
3. The questions in this paper may vary widely in difficulty. During your first pass through the paper, you are advised not to dwell on questions to which the answer is not readily apparent.
4. Write your answer to each question in the box or table provided. If you wish to write more in answer to a question, continue on the blank page opposite, indicating that you have done so.
5. Please write *legible* and *concise* answers.
6. The marks allocated to each part of a question are indicated in the margin. There are 100 marks in total.

Question 1

1. In a use case diagram, what is an actor? [4 marks]

2. And what is a use case? [4 marks]

3. Consider an application that allows a user to edit a Java program, compile and run it. It also provides check in and check out access to an existing version control system via the internet. Draw a use case diagram for this system. [12 marks]

Question 2

1. Give an example of a version control system that uses a Copy-Modify-Merge model. [4 marks]

2. Give an example of a version control system that uses a Lock-Modify-Unlock model. [4 marks]

3. List, with brief explanations, three advantages that distributed version control systems have, compared to the systems mentioned above. [12 marks]

Question 3

Consider the following code fragment.

```
public Object visit(ParameterDeclarationAS host, Object data) {
  FunctionParameter functionParameter = q.
  createFunctionParameter();
  this.putAst(host, functionParameter);
  functionParameter.SetName(host.getName());
  return functionParameter;
}
```

1. Annotate the code fragment to show three ways in which the readability of the code could be improved. [6 marks]

2. Either below or on the blank page facing this one, draw a sequence diagram demonstrating what happens when an actor sends message `visit(h,d)` to an object `o`, invoking the code shown above. Show as much detail as you can. [14 marks]

Question 4

1. Explain, as generally as you can, when a module `A` is said to *depend* on a module `B`. [4 marks]

2. Give two specific examples of ways in which a Java class `A` may depend on a Java class `B`. [4 marks]

3. Draw a fragment of UML to show that class `A` depends on class `B`, without showing what kind of dependency it is. Show also that `A` has a private attribute `a` of class `String`, and a public operation `toString` that takes no arguments and returns a `String`. [12 marks]

Question 5

1. Draw a diagram to illustrate the waterfall model of software development. [8 marks]

2. What is wrong with the waterfall model? (You are not expected to discuss alternative models.) [4 marks]

CONTINUED OVERLEAF

3. You are the project manager with overall responsibility for the development of the software in a new autonomous car (that is, a car which drives itself, given only the coordinates of the destination). *Briefly* describe the considerations that will guide your choice of development methodology, in the light of the characteristics of this project. You are not expected to choose a named methodology, or to give an exhaustive description. [8 marks]