



THE UNIVERSITY OF WESTERN AUSTRALIA  
*Achieving International Excellence*

**Computer Science and Software Engineering**

SEMESTER 2, 2008 EXAMINATIONS

**SAMPLE ONLY**  
**CITS1220**  
**SOFTWARE ENGINEERING**

FAMILY NAME: \_\_\_\_\_ GIVEN NAMES: \_\_\_\_\_

STUDENT ID:         SIGNATURE: \_\_\_\_\_

This Paper Contains: **7 pages (including title page)**  
Time allowed: **2 hours 10 minutes**

**INSTRUCTIONS:**

<b>Section A:</b> 10 short answer questions	50 marks
<b>Section B:</b> 4 questions	50 marks
<b>TOTAL MARKS:</b>	<b>100 marks</b>

- All questions are to be answered.
- The questions in Section A are to be answered on the exam paper in the spaces provided
- The questions in Section B can be answered in any order.
- Start each question in Section B on a separate page in the examination answer booklet..
- Exam papers are to be collected with the examination answer booklets.

**PLEASE NOTE**

*Examination candidates may only bring authorised materials into the examination room. If a supervisor finds, during the examination, that you have unauthorised material, in whatever form, in the vicinity of your desk or on your person, whether in the examination room or the toilets or en route to/from the toilets, the matter will be reported to the head of school and disciplinary action will normally be taken against you. This action may result in your being deprived of any credit for this examination or even, in some cases, for the whole unit. This will apply regardless of whether the material has been used at the time it is found.*

*Therefore, any candidate who has brought any unauthorised material whatsoever into the examination room should declare it to the supervisor immediately. Candidates who are uncertain whether any material is authorised should ask the supervisor for clarification.*

**THIS PAPER CONTAINS 2 SECTIONS, 14 QUESTIONS**

**CANDIDATES SHOULD ANSWER ALL QUESTIONS**

**THERE ARE 100 MARKS IN TOTAL FOR THE PAPER**

**SECTION A**

*Answers for Section A are to be written in the spaces provided on the exam paper.*

**QUESTION 1**

[5 marks]

Give a brief definition for each of the following terms of object-oriented design:

a) class

b) object

c) attribute

d) method

**QUESTION 2**

[5 marks]

Complete Javadoc documentation for the following Java method from a `MobilePhone` class:

```
public void topUp(int amount) {  
    if (amount<=0) {  
        throw new IllegalArgumentException(  
            "topUp amount must be greater than 0 cents");  
    } else {  
        Credit = Credit + amount;  
    }  
}
```

**QUESTION 3**

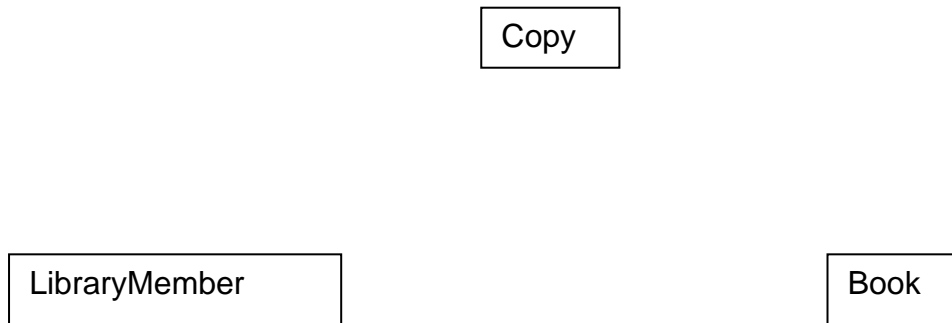
[5 marks]

What is a *polymorphic* method in a Java class? Give an example to illustrate your answer.

**QUESTION 4**

[5 marks]

Add associations to link the classes in the UML class diagram below, representing a public library for borrowing books. Take care to specify the appropriate multiplicity as well as labels for each association. Give reasons for your choices.



**QUESTION 5**

[5 marks]

The Agile Alliance group for software project management recommend software developers to value “*Customer collaboration over contract negotiation*”. List some advantages and disadvantages of this approach to customer involvement in software development.

**QUESTION 6**

[5 marks]

Explain the difference between *functional* and *non-functional* requirements in a software project.

**QUESTION 7**

[5 marks]

Sketch the code for a JUnit4 unit test for a Java method

```
public int checkOutItems(ArrayList<int> trolley)
```

that returns the total price of a shopping `trolley` containing a list of items, where the cost of each item `i` in the list is given in cents by the (positive) integer value in `items.get(i)`

Your test should include normal, boundary and exceptional cases for the method.

**QUESTION 8**

[5 marks]

Define the terms *task*, *milestone* and *deliverable*.

**QUESTION 9**

[5 marks]

What is an *acceptance test* ? Who is it for ?

**QUESTION 10**

[5 marks]

List three techniques or tools that are necessary for building large software systems with millions of lines of code, as opposed to small projects of a few hundred lines of code.

## **SECTION B**

*Answers for Section B are to be written in the examination answer booklets.*

### **QUESTION 11**

[10 marks]

Compare and contrast three different techniques for ensuring the *quality* of a software product.

### **QUESTION 12**

[15 marks]

Develop a class model, using UML notation, for an election management system for Australian Federal government elections.

Each elected body (Senate and House of Representatives) has a number of seats to be filled. An election is scheduled for a specific date, and usually several (or all) positions are voted on together. However, sometimes there is a need for a by-election to elect a particular member. The system will keep track of candidates for each seat. The system will also record who is the incumbent for a seat, and record the name of each candidate and incumbent.

The system will keep track of the list of eligible voters. Each voter can only vote for certain positions (eg the candidates for their area). Each voter is assigned to vote at a specific polling place. The system records the name and address of each voter.

Finally, the system will keep track of the number of votes for each candidate at each polling place. However, under no circumstances will it record which voter voted for which candidate, nor whether a voter voted at all.

### **QUESTION 13**

[15 marks]

Write a tutorial introduction for constructing a graphical user interface (GUI) using the Java Swing library. Your tutorial should be aimed at a fellow student who has some experience with Java, but not previously used any of Java's GUI libraries (for example, a new CITS1200 Java graduate). Explain how to translate a paper design into a GUI display, how to make the GUI respond to user input, and note any problems that the student should look out for.

### **QUESTION 14**

[10 marks]

List four skills that you believe are necessary for a successful career in software engineering. Mention why each skill is important, and comment on how you plan to improve your own performance of these skills in the coming years.

**END OF EXAMINATION PAPER**