DESIGNING AND DEVELOPING OBJECT-ORIENTED COMPUTER PROGRAMS

11TH MARCH 2012

Examination Paper

Answer ALL questions.

Clearly cross out surplus answers.

Time: 2 hours

Any reference material brought into the examination room must be handed to the invigilator before the start of the examination.

ANSWER ALL QUESTIONS

Marks

QUESTION 1

a) Explain what purpose the **main** method in a Java program serves, and provide the code for a main method that creates an instance of the class in which it is contained. **6**

b) Explain what is meant by 'primitive' data type and 'reference' data type, and give an example of each. **4**

Total 10 Marks

QUESTION 2

a) Define the words 'Class' and 'Object', and explain the relationship between them. **4**

b) Explain what is meant by an **event,** and outline what is required for a Java program to make use of them. **6**

Total 10 Marks

QUESTION 3

a) Define the term 'encapsulation' and give an example of its use. **5**

b) Define the term 'inheritance' in the context of object oriented programming and give an example where it could profitably be used. **5**

Total 10 Marks

QUESTION 4

a) Define what is meant by a **strongly typed language** and explain what benefits strong typing provides for software developers. **4**

b) Assume you are given an array of the numbers 30, 50, 20 and 10. Outline the process by which you could generate a bar chart from this data. **6**

Total 10 Marks

QUESTIONS CONTINUE ON NEXT PAGE

Marks

QUESTION 5

a) Give TWO (2) examples of Swing components, and explain for what purposes they might be used. **4**

b) Explain the role of a layout manager in setting up a user interface in Java, and why they are preferable to manual positioning. **6**

Total 10 Marks

QUESTION 6

a) Explain the purpose of UML, and what benefits accrue from adopting it in software engineering. **4**

b) Define two kinds of UML diagram, and explain what role they fulfil. Provide examples of the diagrammatic notation of each. **6**

Total 10 Marks

QUESTION 7

a) Explain what is meant by 'defensive programming'. **4**

b) Explain what is meant by an **exception.** **2**

c) Provide a code example of a try-catch-finally block, explaining the responsibilities of each part of the structure. **4**

Total 10 Marks

QUESTION 8

a) Provide code examples of the getter and setter for an integer variable called 'value', and explain why getters and setters are used in OO programming. **6**

b) Explain what is meant by the term 'visibility' and give TWO (2) examples of visibility modifiers in Java. **4**

Total 10 Marks

QUESTIONS CONTINUE ON NEXT PAGE

Marks

QUESTION 9

a) Explain what is meant by a two dimensional array, and give an example of where one might be appropriate. **4**

b) One of the limitations of a standard array is that its length is fixed. State a data structure that can be used to give the benefits of an array without this limitation, and provide a code example in which an array and your suggested data structure perform the same duty. **6**

Total 10 Marks

QUESTION 10

a) Explain what is meant by a 'stream' in terms of input/output, and give an example where you have previously used streams in the module. **4**

b) Explain the phrase 'buffering', and why we should ensure we use BufferedReaders and BufferedWriters when constructing our file access routines. **6**

Total 10 Marks

END OF EXAM

