DESIGNING AND DEVELOPING OBJECT-ORIENTED COMPUTER PROGRAMS

2ND DECEMBER 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.

CANDIDATES MUST ATTEMPT ALL QUESTIONS

QUESTION 1

Marks

a) Describe the difference between an **interpreter** and a **compiler** and give one benefit of each. **6**

b) Describe the difference between **primitive** and **reference** data types and give an example of each. **4**

Total 10 Marks

QUESTION 2

a) Explain what is meant by the term **string concatenation**, and describe the process. Include a diagram in your description. **6**

b) Explain what is meant by **implicit conversion** with regards to converting primitive data types to Strings in Java, and provide an example of how to do this in Java. **4**

Total 10 Marks

QUESTION 3

a) Define the terms **Class** and **Object**, explaining how they are connected. **4**

b) When an object is instantiated, the Constructor method is called. Give an example of a Constructor method for a Book class which contains the attributes 'title' and 'author'. The Constructor method should take in the values for these attributes. **4**

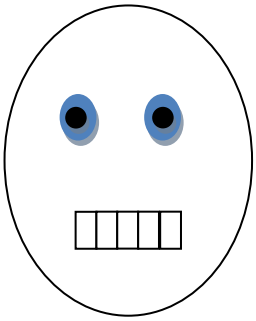
c) Describe two ways in which **Constructor methods** differ from other methods. **2**

Total 10 Marks

QUESTION 4

a) Describe the set of parameters which must be passed to the drawRect method of the graphics class. **3**

b) Assuming use of the graphics class, provide code samples of how you could draw a cartoon face such as the one below. **7**



Total 10 Marks

QUESTION 5

Marks

a) Provide the code for a pair of **nested loops** that will print out every element in a 5 by 5 2D array called *grid* so that it retains its rows and columns structure. **6**

b) We know in advance how many times a for loop will execute. When you need a loop that will execute an indeterminate number of times, another type of loop is required. Describe the two other loops you could use in such a situation, and explain the similarity **and** difference between them. **4**

Total 10 Marks

QUESTION 6

a) Using code to illustrate your answer, outline how you can use **Swing components** to create a series of ten JButtons in a java user interface. **4**

b) Describe how the ActionListener interface can be used to handle events in Java, and provide details of the steps that must be taken in a Java class to set up an event listener. **6**

Total 10 Marks

QUESTION 7

a) Explain what is meant by an **exception**, and give an example of behaviour in Java that would throw one. **4**

b) Explain how a **catch block** can differentiate between different kinds of exception. **6**

Total 10 Marks

QUESTION 8

a) Explain what is meant by the term **encapsulation**. **2**

b) Describe THREE (3) benefits of **encapsulation**. **3**

c) Explain what is meant by the term '**visibility'**, and describe the THREE (3) visibility modifiers, ranking them in order from highest to lowest level of visibility. **5**

Total 10 Marks

QUESTION 9 **Marks**

a) Provide a comparison of arrays and ArrayLists, giving an example of when each might be preferred over the other. **4**

b) Provide the code to create an ArrayList of Strings, add three string variables to the ArrayList, and then loop over the ArrayList to print out the contents. **6**

Total 10 Marks

QUESTION 10

a) Explain how a Java program can be used to write to a file. **6**

b) Outline how a Java program could convert a string such as "10,22,6,3,9" into an array ({10, 22, 6, 3, 9}) and then provide the maximum. Give code examples to support your answer. **4**

Total 10 Marks

END OF PAPER