Analysis, Design and Implementation

December 2015

Sample Examination Paper

Answer ALL questions.

Clearly cross out surplus answers.

Time: 3 hours

The maximum mark for this paper is 100.

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) 'Software Development Techniques are first and foremost about communication'. Discuss this statement **and** say whether you think it is valid or misleading. **6**

b) Explain what is meant by the term *scope* in relation to software engineering **and** provide ONE (1) example of a scenario in which scope would be relevant. **4**

Total: 10 Marks

Question 2

a) Explain the term *problem domain* **and** briefly explain the relevance of a problem domain to the design phase of object-orientated analysis and design. **4**

b) Briefly explain the SSADM and UML techniques and **state** ONE (1) diagram that belongs to **each** technique. **6**

Total: 10 Marks

Question 3

a) Object-orientation is sometimes seen as a solution to monolithic software design. Briefly discuss what is meant by the term *monolithic* **and** explain how object-orientation can resolve the problems with monolithic software. **6**

b) Briefly explain the term *iterative* in relation to modern software analysis and design **and** explain how iterative processes contrasts to traditional systems such as the Waterfall Model. **4**

Total: 10 Marks

Question 4

a) Explain how Natural Language Analysis (NLA) might be used in the construction of a class diagram **and** outline how it is possible to evaluate potential attributes for inclusion. **6**

b) Define the term *prototyping* **and** briefly describe TWO (2) different techniques associated with the term. **4**

Total: 10 Marks

Questions continue on next page

Marks

Question 5

a) Outline the role of the use-case diagram **and** provide ONE (1) example of this diagram for interacting with a simple on-off light-switch. **4**

b) Explain the role fulfilled by a UML activity diagram **and** describe how it is used in the construction of object oriented computer code. **6**

Total: 10 Marks

Question 6

a) Explain the relationship between the factory and abstract factory design patterns. Outline ONE (1) scenario in which the combination of these patterns might be an appropriate solution. **6**

b) Explain the role of the three parts of the Model View Controller (MVC) design pattern **and** provide ONE (1) advantage of using the pattern in software development. **4**

Total: 10 Marks

Question 7

a) Provide TWO (2) advantages and TWO (2) disadvantages of using design patterns within object-oriented programs. **4**

b) Briefly explain what is meant by an architecture system measure **and** provide FOUR examples of traits that would fall into this category. **6**

Total: 10 Marks

Question 8

a) Briefly discuss what is meant by a benchmarking harness **and** explain why such a system would be used in assessing the quality of a software system. **6**

b) Define the terms *content coupling* and *callback coupling*. You should say which term is worse in relation to software development **and** justify your answer. **4**

Total: 10 Marks

Marks

Question 9

a) Consider the class definition below. Ignoring the potential impact of change, outline three possible refactorings that could be sensibly performed: **6**

```
public class Person {
  public int gender;
  public String n;

  public Person(String name, int g) {
      n = name;
      gender = g;
   }

   public boolean isMale() {
      return gender == 1;
   }

   public Boolean isFemale() {
      Return gender == 2;
   }
}
```

b) 'Refactoring must be respectful of other developers'. **4**

Discuss this statement **and** say whether you think it is valid or misleading with reference to the concept of *impact of change*.

Total: 10 Marks

Question 10

a) Explain how *Test Driven Development* works **and** outline its importance in iterative maintenance. You should also the main benefit that accrues from its use. **6**

b) Provide the code required to implement the following class diagram: **4**

Book
+ Title: String + ISBN: String # year: String
+ setupBook (t: String, I : String, y: String) : void

Total: 10 Marks

End of Examination Paper