



# **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.**

<b>Answer ALL questions</b>
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**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**

**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**

**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

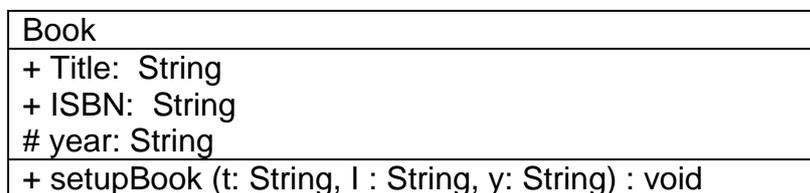
Discuss this statement **and** say whether you think it is valid or misleading with reference to the concept of *impact of change*.

**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



**Total: 10 Marks**

**End of Examination Paper**