UNDERLINE UNIVERSITY OF BOLTON

SCHOOL OF CREATIVE TECHNOLOGIES

MSC SOFTWARE ENGINEERING

SEMESTER TWO EXAMINATIONS 2021/2022

ADVANCED SOFTWARE DEVELOPMENT

MODULE NO: SWE7102

Date: **Tuesday 17th May 2022**   **Time: 14:00 – 16:00**

INSTRUCTIONS TO CANDIDATES: There are **EIGHT** questions on this paper.

Answer **ALL EIGHT** questions.

All questions carry equal marks.

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Question 1

Describe the benefits of using a JPA implementation (such as Hibernate) over standard JDBC. (Your explanation does not need to be specific to Hibernate.)

(5 marks)

Question 2

Illustrate the lifecycle of a request within Spring MVC. Explain how requests and responses occur in Spring MVC Architecture. **(5 marks)**

Question 3

Explain design patterns. Identify three types of design patterns and name at least two design patterns from each category. **(5 marks)**

Question 4

Read the following code. Identify and explain the design pattern it represents. Explain the advantages and disadvantages of that design pattern.

```java
public class Student {

  private static Student instance = new Student ();

  private Student(){}

  public static Student getInstance(){
    return instance;
  }
  public void showMessage () {
    System.out.println("Hello World!");
  }
}
```

(5 marks)

Question 5

Describe Adapter design pattern. Explain when and why it should be used and provide UML to show how it can be implemented. **(5 marks)**

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Question 6

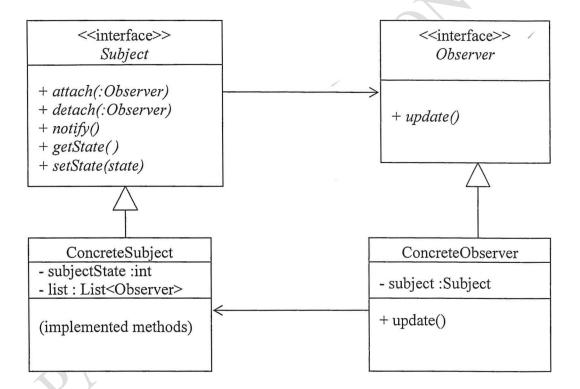Explain the difference between dependency push and dependency pull, which is preferable to use, and why? **(5 marks)**

Question 7

a)   The Java API provides a concrete class java.util.Observable .
        What is the disadvantage of using this concrete class?

(1 mark)

b)   The Observer design pattern has been implemented as shown below.
        State the responsibilities of each class.

(1 mark)

c)   Explain the role of 'loose coupling' in this pattern.

(1 mark)

d)   Write code for the main method to instantiate a ConcreteSubject object with two ConcreteObserver objects attached. Then change the state of the subject and notify the observers. **(2 marks)**

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Question 8

What is the Model View Controller (MVC) design pattern? Explain MVC design pattern with appropriate diagram and code example. Identify the advantages and disadvantages of MVC. **(5 marks)**

END OF QUESTIONS