UNIVERSITY OF RUHUNA

Faculty of Engineering

End-Semester 7 Examination in Engineering: October 2019

Module Number: EE7205 **Module Name: Object Oriented Design Patterns and Principles**

[Three Hours]

[Answer **all questions**, each question carries **10 marks**]

Q1. a) What are the benefits of following SOLID principals?

[2.0 Marks]

b) Explain Open/Close principal using a suitable example.

[2.0 Marks]

c) Identify the problems in the following code segment in terms of best practices. Rewrite with the fixes.

```
public class Person {

        public static Person create(String gender) {
                Person p = new Person();
                If("male".equals(gender)){
                        p.setTitle("Mr");
                        p.setGender("M");
                }
                else{
                        p.setTitle("Ms");
                        p.setGender("F");
                }
                return p;
        }
}
```

[6.0 Marks]

Q2. A programmer was assigned to write a program to build an ERP system. Answer following questions based on the given requirement.

You have been assigned to develop an employee query facility for one of a highly changeable system. The Employee class will have many properties like age, gender, city, country, noOfKids etc. The following "Selector" class should be designed in order to select all the male employees having more than two kids or all the female employees who have at least one kid. The selection logic should be frequently changeable.

```
public class Selector{
  // <Any code>

  Public List<Employee> selectedEmployees(List<Employee> all){
    // <Any code>
  }
}
```

a) What is the design pattern which can be used to implement the above requir [2.0

b) Draw a class diagram for the above requirement implementation by follow specified design pattern in part a. [8.0

Q3. a) Explain the benefits of Decorator pattern using a suitable example. [4.0 M

b) Draw the class diagram for the example in part a. Clearly state any assumpti [3.0 M

c) Write only the main class to demonstrate the example in part a. You may use some hardcoded inputs to make this code simple. [3.0 M

Q4. a) What is the difference between GRASP and SOLID? [3.0 M

b) "A class 'B' should be responsible for creating instances of class 'A' if instance 'B' record instances of 'A'"

i) What is the GRASP pattern discussing about these kind of classes?

ii) What are the other three scenarios which class 'B' is responsible for creati instances of class 'A'? [7.0 M

Q5.
```
public class RelocateCommand {

        private LocationRespository repository;
        private LocationValidator validator;

        public RelocateCommand (LocationRepository repository, LocationValidator
validator){
                this.LocationRepository = repository;
                this.LocationValidator = validator;
        }

        public void execute(Location prev, location next) {
                if(repository.exists(prev){
                        if(validator.validate(next)) {
                                repository.save(next);
                        } else {
                                throw new ArgumentInvalidException(next);
                        }
                } else {
                        throw new ArgumentInvalidException(prev);
                }
        }
}
```

a) Identify the list of unit tests you should perform on the above class.

[4.0 Marks]

b) Implement one of the happy path tests.

[4.0 Marks]

c) Implement a test to cover an Error scenario.

[2.0 Marks]