University of Ruhuna - Faculty of Technology

Bachelor of Information & Communication Technology Degree

Level 2 (Semester 1) Examination

October 2018

Course Unit: ICT2123, Object Oriented Development

Time Allowed: 02 hours

This question paper contains **06 pages** including this instruction page

IMPORTANT INSTRUCTIONS:

1. The medium of this examination is **English**.
2. This is a **Closed Book** examination.
3. This Examination consists of **four (04)** questions that are given equal marks.
4. You must **answer all four (04) questions** in this examination.

1. a. i. What is an **Object** in object-oriented programing in java. Briefly describe **Three(03) main characteristics** of an object in java.

ii. What is the **difference** between a **class** and an **object** in object-oriented programing in java?

iii. List down and briefly describe the **four(04)** types of **access modifiers** in Java programming language.

b. Briefly explain the following Object-Oriented Programming Concepts by using suitable java code examples.

i. **Abstract class**

ii. **Tag(Maker) Interface**

c. i. Write **one key role of a constructor** method in a class in Java programming language.

ii. List down **two unique features of default constructor** in java programming language.

d. Investigate the following java code and answer the questions given below.

```
public class Student {
        String name = "Perera";
        int age;

        Public void setName(String name){
                name = name;
        }
        public void printName(){
                System.out.println(name);
        }
        public static void main(String[] args){
                //your code
        }
}
```

i. Write down the java code **segment** which is needed to call **"setName(String name)"** using **reference** variable inside the main method.

ii. Write down the java code **statement** which is needed to call **"setName(String name)"** using **anonymous object** inside the main method.

iii. What will be the **output** of the program if you insert the following code segment inside the main method? Explain the reason?

```
Student stu = new Student();
stu.setName("Nimal");
stu.printName();
```

iv. After including the above code segment what are the **other code changes** to be done in order to get **"Priyantha"** as the output.

v. Write down a **parameterized constructor** using java for the above class to assign values to each of its attributes.

2. a.

```
class Calculation{
        void printData(string name, int age){
                System.out.println("Name : "+name+" Age : "+age );
        }
        void printData(int age, string name){
                System.out.println("Name : "+name+" Age : "+age );
        }
}
```

i. What is the **OOP concept** used in above given code segment?

ii. Can we achieve the same thing identified in (a) (i.) by changing the number of arguments or by changing the data type of arguments?
If yes briefly explain it with examples.

iii. Write down **an advantage** using **Method Overriding** in java programming language.

b. i. Define the terms **accessors** and **mutators** in object-oriented programming in java?

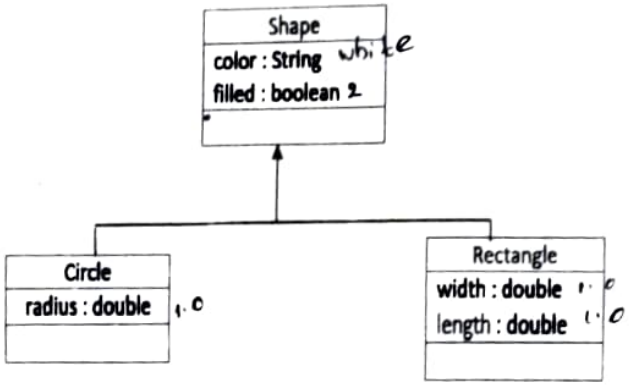
ii. Write a simple java program to create a class called **Account** according to the following specifications.

- There are **two properties as name** and **balance** that are **inaccessible from the outside** the class
- There should be **accessor** and **mutator methods** for the above properties in the Account class.

Create **another class containing a main method** and create an object from

the **Account** class. Invoke the accessor and mutator methods from the object you created.

c. Consider the following class diagram and answer the questions.



i. What is the **object-oriented principle** used in the above class diagram?

ii. Briefly explain **two advantages** of using the principle mentioned in part (c) (i) in object-oriented programming.

iii. Write **Java code segments for each class** in the above class diagram. (Consider Shape and Rectangle are Interfaces and No need to consider about access modifiers)

iv. Using **examples from the above class diagram** briefly **describe "Implicit" and "Explicit" casting** in java.

3. a. i. List down **three (03) different situations** where an **exception** can occur in java programming.

ii. Consider the below given code segment.

```
class MyArray {
        public static void main(String[] args) {
                int arr[] ={1,2,3,4,5};
                System.out.println(arr[7]);
        }
}
```

What will happen when you **compile and run** the above java class.

Using your knowledge in exceptions write down the **complete java program** which will ensure the **smooth flow of the program**.

iii. Assume that there is a method called **checkEligibility()** to check the student eligibility, which **takes a double type "marks"** as the **input parameter**.

If (marks >= 80.00)

prints "Eligible"

If (marks < 80.00)

generate a checked exception of "NotEligible"

The **NotEligible** exception class has only a **single argument parameterized constructor** which takes a **String** value. Considering these requirements, **write a java code segment for checkEligibility () method**.

(Hint : Use custom exceptions knowledge)

b. i. List down **two (02) reasons** why we use **threads** in java programming.

ii. Briefly describe the following methods in thread class.

a. Yield()

b. Sleep()

c. Join()

c. Consider the below given java program

```
public class HelloThread extends Thread{
        public void run(){
                System.out.println("Hello Threads...!!!");
        }

        public static void main(String[] args) {
                HelloThread myThread = new HelloThread();
                myThread.start();
        }
}
```

i. What is the **output** of the above program?

ii. **Rewrite** the above given **code using** a **Runnable interface** to get the same output.

d. i. Explain **an advantage** of **Distributed Computing over Centralized Computing**.

ii. Write a java **program** to **create a Server Socket** that uses the port **8547** and **waits for a Client** Socket connection.

4. a. i. Name **four (04) types of JDBC drivers** that can be used in a Java application.

ii. Write the **code segment** to create a connection **to the database** using below given details.

Host Name: localhost Port No: 3306

Database Name: ruhtec

User Name : admin Password : Admintec1

iii. Assume that there is a table called "**info**" in the "**ruhtec**" database. It has **three columns regno(char), name(varchar) and age(int)**.

Write a **java program to display all the data in info table** in the **given column order**.

Your program should **show an appropriate message if the connection is successful**.

Note : You have to close all the connections used in your program inside the **finally block**.

b. i. Provide **two (02) real-world examples** where **Singleton** design patterns applies.

ii. Using a java coding sample briefly explain how you are going to **implement "Singleton design pattern"** in java programming language.

c. i. Briefly describe **init()** and **destroy()** in applet class methods.

Ii. Briefly describe **three (03) main components** in **GUI event handling** in Java programming language.