The Open University of Sri Lanka Faculty of Engineering Technology

Department of Electrical & Computer Engineering

0440

Study Programme	: Bachelor of Software Engineering Honours
Name of the Examination	: Final Examination
Course Code and Title	**: EEI3262 Introduction to Object Oriented Programming**
Academic Year	: 2021/2022
Date	: 18th June 2022
Time	: 1000-1300hrs
Duration	: **3 hours**

General Instructions

1. Read all instructions carefully before answering the questions.
2. This question paper contains four (04) questions. **ALL FOUR (4) questions are compulsory.**
3. Answer all questions.
4. Answers should be in clear handwriting.

Q1 [40 Marks]

A software solution is needed to be designed for a private company. One main entity/object is **employees**. The below common information is needed to be stored for an "**Employee".**

- Name
- Age
- Gender (using a single character 'M' or 'F')
- Salary
- Permanent Address (as a reference variable created from a separate class call "Address")

An **abstract method** to calculate and return the final salary, as a decimal value is also needed to be in the class.

Permanent Employees separately store

- Annual Bonus
- Year of Becoming a Permanent Employee

Temporary Employees separately store

- Number of years of the contract
- Whether married or not (as true or false)

a) Create the **Address** class to store **House name/number, Street, and City** as separate variables with a **constructor** to assign those values and a **method** to return the whole combined address as a string. This class need to be **encapsulated.** [15 Marks]

b) Create the **Employee** class as an **abstract class** with the above mentioned variables and methods. [8 Marks]

PermanentEmployee and **TemporaryEmployee** classes are created as **subclasses** of **Employee** class.

c) Create the **PermanentEmployee** class with the above mentioned variables. Final salary is calculated as below. **If the "Year of Becoming a Permanent Employee" to year 2022 is greater than 5, then the "final salary" is twice the "Salary". Otherwise, 1.5 times of the "Salary".** [10 Marks]

d) Create the **TemporaryEmployee** class also similarly. Here final salary is calculated as follows. **If the "number of years of the contract" is greater than 2, then Rs.7500.00 is added to the "Salary". Otherwise, no addition.** [7 Marks]

Q2 [20 Marks]

a) Briefly define the following terms in your words.

I. Class
II. Java Development Kit (JDK)
III. Getter method
IV. Access Modifiers
V. Inheritance

[2x5=10 Marks]

(Question continued on next page)

b) Identify the syntax errors and write the corrections that need to be made in the following Java program.

```
Class Object {
        public void static main (String arguments[]) {
                boolean yesOrNo = yes;
                float num1 = 1.25;
                char num2 = 50;
                System.out.print(num1+num2);
        }
        boolean isTrue (boolean x, boolean y) {
                return x==y;
        }
        String name;
        Object (int r){
                this.name=r;
        }
}
```

[10 Marks]

Q3 [20 Marks]

a) Write the output of the following Java code.

```
class Main {
  public static void main (String[] args) {
    int a=1;
    do{     switch(a){
                case 1:
                        System.out.println(a);
                        break;
                case 2:
                        for (int x=0;x<1;x++) {
                                System.out.println(a);
                        }
                        break;
                case 3:
                        while(a<=3){
                                System.out.println(a);
                                a=a+1;
                        }
                        break;
            }
            a = a+1;
    }while(a<5);
  }
}
```

[10 Marks]

b) Write the correct answer that should come in the blank. *(Write the answers in your answer script – not on the paper itself)*

I. A programming ..... is a pattern, basic discipline or a way of thinking of programming a computer.
II. The ..... statement can be used to jump out of a loop.
III. A ..... in Java is a block of code which only runs when it is called.
IV. Attributes and methods with the access modifier ..... can be accessed within the same class, by all classes within the same package, and by all subclasses in the same or other packages.
V. ..... OOP concept means displaying only the relevant aspect to the user while hiding unnecessary details and complexity. [2x5 = 10 Marks]

Q4 [20 Marks]

a) Describe the usage of the "**final**" keyword with respect to a *variable*, a *method,* and a *class*. [10 Marks]

b) Rewrite this Java code snippet with the **exception** handled and to print a suitable error message.

```
int a = 10;
int b = 0;
double div = a/b;
System.out.println("Answer of the division is:"+div);
```

[10 Marks]

-END-