Department of Computer Science & Engineering
University of Asia Pacific (UAP)

Final Examination **Spring 2022** **2nd Year 1st Semester**

Course Code: CSE 203 **Course Title: Object-Oriented Programming I: Java** **Credits: 3**

Full Marks: 150 **Duration: 3 Hours**

Instructions:

1. There are **Six (6)** Questions. Answer all of them. All questions are of equal value. Part marks are shown in the margins.
2. Non-programmable calculators are allowed.

1. Write short notes on the following topics. **[8+ 8+ 9]** **CO1**
   a) Object Oriented Programming
   b) Inheritance
   c) Thread Life Cycle

2. Write a java program that will take 2 integer inputs from the user and do the following. **[25]** **CO2**
   - If the first number is even, take 10 inputs from user and sum up only the even numbers and print the result.
   - If 2nd number is greater than the first number, print the first 5 prime numbers.

3. Answer (a, b) or (c)

   a) Define a class and name it as "**Alligator**". Add the following inside the class. **[13]** **CO3**
      i. Declare 3 instance variables ***length, weight, color***
      ii. Add a parameterized **constructor** which will take 3 parameters. Inside the constructor initializes the attributes with the parameters passed to the constructor.
      iii. Add the following methods.
         - public void ***incubateEgg***(int ***temp***)- Inside the method, show different output depending on the ***temp*** parameter. If ***temp*** is 34 degree and above, print "mostly male baby alligator"; if 30 or less, print "mostly female baby alligator"; for the other cases, print "could be male or female baby alligator".
         - Override the ***toString***() method
           – inside the method, return the concatenated value of all three attributes.

   b) Define a class and name it as "**Zoo**". Declare the **main** method inside the class. Inside the main method, do the following. **[12]** **CO3**
      i. Create an object of **Alligator** class with ***length***=11.6, ***weight*** = first 2 digits of your id, and ***color*** ="Black". Store the reference of the object to ***alligtr*** variable.
      ii. Call the incubateEgg(...) method using the ***alligtr*** variable and pass the last 2 digits of your id as the parameter of the method.
      iii. Print the ***alligtr*** variable on console.
         - What will be printed here?

OR

9) Assume there is an interface ***CustomerCare*** which has the following 2 methods. **[25]** **CO3**

```
public abstract void welcomeMsg();
void sayBye();
```

Now create 2 concrete classes, ***BanglaLinkCare*** and ***ICPCVolunteer***, implementing the above ***CustomerCare*** interface. Develop the classes in such a way so that the code below produces the expected output shown below.

Main Method	Your code should display the following output when this main method is run:

1 public class TestCustomerCare {
2
3 public static void main(String[] args) {
4 System.out.println("Bangla Link:");
5 CustomerCare bCare = new BanglaLinkCare();
6 bCare.welcomeMsg();
7 bCare.sayBye();
8
9 System.out.println("\nICPC World Final:");
10 CustomerCare iCare = new ICPCVolunteer();
11 iCare.welcomeMsg();
12 iCare.sayBye();
13 }
14 }
	Bangla Link:
	Welcome to Bangla Link customer care.
	Have a nice day.
	
	ICPC World Final:
	Welcome to ICPC World Final 2021.
	Hope you enjoyed the final.

4. a) Find out if the following JAVA programs have any error. **List the errors** if any. Fix the code and **rewrite** after the errors list. You cannot delete any line of code. However, you are allowed to edit existing line or add new code.

[8] **CO4**

i)
```
public class Calculator {
      public void sum(int a, int b) {
            System.out.println(a+b);
      }

      public int sum(int a, int b) {
            return a+b;
      }
}
```

[8] **CO4**

ii)
```
public class FindError {
      int a = 5;
      int b = 7;

      public static void main(String[] args) {
            int sum = a+b;
            System.out.println(sum);
      }
}
```

b) What will be the output of the code below? Show the detailed steps for output [9] CO4

ThreadTest.java

```
1  public class ThreadTest {
2
3      public static void main(String[] args) {
4          Thread t = new Thread("My Thread") {
5              public void run() {
6                  for(int i=1; i<5; i++) {
7                      System.out.println(Thread.currentThread().getName()+":"+i);
8                  }
9              }
10         };
11
12         t.run();
13     }
14 }
```

5. a) Complete the **outerMethod()** and **main** method as per the comment inside the methods. [15] CO3

Outerclass.java

```
1  public class Outerclass {
2      public int outerVar;
3
4      public Outerclass(int outerVar) {
5          this.outerVar = outerVar;
6      }
7
8      public void outerMethod() {
9          // print the inner class's attribute innerVar
10         // call innerMethod
11     }
12
13     class InnerClass{
14         private int innerVar;
15
16         public InnerClass(int innerVar) {
17             this.innerVar = innerVar;
18         }
19
20         public void innerMethod() {
21             System.out.println(innerVar);
22         }
23     }
24
25     public static void main(String[] args) {
26         // Call innerMethod of InnerClass
27     }
28 }
```

b) The following program might throw 2 different exceptions **FileNotFoundException** and **IOException** (here **FileNotFoundException** is the subclass of **IOException**). Update the program such that both excpetions are handled **separately**. [10] CO5

```
import java.io.FileReader;

public class TestThread {
	public static void main(String[] args) {
		new FileReader("test.txt").read();
	}
}
```

6. a) Create a User defined exception **LowAttendanceException** which will take an integer as parameter ***minAtt*** and set the exception message to "Need a minimum attendance of ***minAtt*** days to attend the final exam" where ***minAtt*** is the parameter. **[10] CO5**

OR

Consider the following program, which was written to sort a list of Devices according to their price (from lower to higher). But the code below is showing error at line 13. Write the changes needed to fix the error and sort the list by price. However, **you are only allowed to edit the Device class to solve the problem.** **[10] CO5**

Device.java

```
1
2 public class Device {
3     String name, category;
4     int price;
5
6     public Device(String name, String category, int price) {
7         this.name = name;
8         this.category = category;
9         this.price = price;
10    }
11
12    public void display() {
13        System.out.printf("%s:%s:%d\n", name, category, price);
14    }
15 }
16
```

MyCollection.java

```
1  import java.util.*;
2
3  public class MyCollection {
4      public static void main(String[] args) {
5          ArrayList<Device> myDevices = new ArrayList<>();
6          myDevices.add(new Device("Samsung Galaxy Tab", "Tablet", 10600));
7          myDevices.add(new Device("HUAWEI Mate 40 Pro", "Smart Phone", 80000));
8          myDevices.add(new Device("HP 250 G8 Core i3 11th Gen","Laptop",54000));
9
10         for(Device d: myDevices)
11             d.display();
12
13         Collections.sort(myDevices); // Sort by Price
14
15         for(Device d: myDevices)
16             d.display();
17     }
18 }
```

b) Create a multi-threaded program with 3 threads where each thread will take 2 integer numbers **min** and **max** and print 10 random numbers between **min** and **max**. The first thread will print between 10 to 20, 2nd thread between 50 to 60, and the 3rd thread between 100 to 120. **[15] CO5**

OR

Assume the information about each person of your neighborhood/area are stored in a file named **voters.txt**. Develop a java application which will read the data from the file and only print information about **those people who are eligible to vote**. Any person who is 1) 18 and older and 2) 90 or younger is eligible to vote. **[15] CO5**

Sample voters.txt file	Expected output for the sample input file
voters.txt - Notepad File Edit View Asad 25 Shahed 18 Nasima 15 Shamsun 44 Maliha 33 Hashem 95	Asad 25 Shahed 18 Shamsun 44 Maliha 33