SERIAL

University of Bahrain
College of Information Technology
Department of Computer Science
Second Semester, 2021-2022
ITCS 113
Computer Programming I

A

FINAL EXAM

Date: 2nd June 2022 Duration: 2 Hours

STUDENT NAME	

STUDENT ID #										**SECTION #**	

NOTE: THERE ARE (9) PAGES IN THIS TEST
WRITE ONLY ONE SOLUTION FOR EACH QUESTION

Question #	MARKS	SCORES
1	12	
2	20	
3	20	
4	28	
TOTAL	80	

Question 1 (12 Points) – Form A - Please choose only one answer

1. What is the output for the following java code?
   a. 113
   b. 114
   c. Compilation error
   d. code

```
class Person {
    private int code = 113;
    public Person() {
        code = 114;
    }
}

public class Test {
    public static void main(String[] args){
        Person obj = new Person();
        System.out.println(obj.code);
    }
}
```

2. What is the output for the following java code?
   a. 8 30
   b. 8 100
   c. 22 30
   d. 22 100

```
public static void chgMe(int[] x, int y){
    x[1]=22;
    y=100;
}
public static void main(String[] args) {
    int[] n1={5,8};
    int n2=30;
    chgMe(n1,n2);
    System.out.println(n1[1]+" "+n2);
}
```

3. What is the output for the following java code?
   a. BC
   b. ABC
   c. A
   d. AB

```
int x=17;
if (x%2==1)
    System.out.print("A");
if (x%4==1)
    System.out.print("B");
else
    System.out.print("C");
```

4. What is the output for the following java code?
   a. X=BD
   b. X=CF
   c. X=AD
   d. Compilation Error

```
char[][] LTR={
        {'A','B'},
        {'C','D'},
        {'E','F'} };
System.out.println("X="+LTR[1][0]+LTR[2][1])
```

5. What is the output for the following java code?
   a. AAB
      AAB
   b. ABAB
      ABAB
   c. AABAAB
   d. AB
      AB
      AB
      AB

```
for(int x=1;x<=2;++x)
{
    for(int y=1;y<=2;++y)
        System.out.print("A");
    System.out.println("B");
}
```

6. What is the output for the following java code?
   a. 7 3
   b. 5 1 9
   c. 9 1
   d. 9 1 5

```
int[] x={5,3,1,7,9};
for(int i=x.length-1;i>0;i-=2){
    System.out.print(x[i]+" ");
}
```

Question 2 (20 Points)

Write a Java program that asks the user to input the number of new inventories he bought. Your program should then ask user to input the details for each inventory: inventory's name (String), number of new units (int) and the unit price (double) for buying new inventory unit and **store them into three parallel arrays**. Your program should:

(a) Calculate and display the total cost for all inventories. Total cost can be calculated as follows:

Total Cost** for ALL = **SUM OF ALL (number of units X unit price)

(b) Display the inventory's name, number of new units, unit price and cost for each inventory. The cost can be calculated as follows:

Cost** for each inventory = **number of units X unit price

The output of the program should look like the following sample:

SAMPLE INPUT/OUTPUT

```
Enter number of new inventories: 4
Enter 4 inventory details (name,units,price):
Desk 3 125.5
Table 2 75.5
Chair 6 39.55
Fridge 2 236.4
Total cost for all inventories = BD 1237.6
Name    New Units   Unit Price  Cost
Desk        3       125.5       376.5
Table       2       75.5        151.0
Chair       6       39.55       237.299999999
Fridge      2       236.4       472.8
```

```java
import java.util.Scanner;

public class Main {

    public static void main(String[] args) {

        Scanner sc = new Scanner(System.in);
        System.out.println("Enter number of new inventories:");
        int noProducts = sc.nextInt();

        String[] names = new String[noProducts];
        int[] units = new int[noProducts];
        double[] prices = new double[noProducts];

        double totalCost = 0;

        System.out.println("Enter" +noProducts+ "inventory details (name,units,prices):");

        for (int i = 0; i < names.length; i++) {
            names[i] = sc.next();
            units[i] = sc.nextInt();
            prices[i] = sc.nextDouble();
```

```
            totalCost += units[i] * prices[i];
        }

        System.out.println("Total cost for all inventories = BD " + totalCost);

        System.out.println("Name, New Units, Unit Price, Cost");

        for (int i = 0; i < names.length; i++) {
            System.out.println( names[i]+" "+units[i]+" "+prices[i]+
            " "+(units[i]*prices[i]));
        }

    }

}
```

Question 3 (20 Points)

Assume that charges for cleaning flats of a building is as follow:

Area in Square Meters	Charge in BD
Less or equal to 60	20
Greater than 60 and Less or equal to 110	25 plus 10% of area
Greater than 110	30 plus 15% of area

A company has six flats. Each flat has five rooms of different sizes (including kitchens and bathrooms). **Write a Java method only**, namely **computeCleaningCharges**(), that takes as input parameter a **two-dimensional array** named **areas** that contains rooms' areas (int) in square meter in which each row represents a flat and each column represents a room. The method should compute and display the total area and the cleaning charge for each flat according to the table above as shown below:

```
Flat#   TotalArea   CleaningCharges
1       106         35.6
2       111         46.65
3       64          31.4
4       84          33.4
5       114         47.099999999999994
6       75          32.5
```

***You must use nested-loops to process the 2-dimensionals array**

The main method is given as follows:

```java
public static void main(String[] args) {
    int[][] roomsAreas = {
            {6,12,19,29,40},
            {5,14,20,30,42},
            {6,6,16,16,20},
            {4,12,14,24,30},
            {10,9,23,29,43},
            {8,10,25,20,12}
    };
    computeCleaningCharges(roomsAreas);
}
```

```java
public static void computeCleaningCharges(int[][] areas){

    System.out.println("Flat#, TotalArea, CleaningCharges");

    for (int i = 0; i < areas.length; i++) {

        int totalArea=0;

        for (int j = 0; j < areas[i].length; j++) {
            totalArea+=areas[i][j];
        }

        double totalCost = 0;
        if (totalArea<=60)
        { totalCost = 20; }
        else if (totalArea>60 && totalArea<=110)
        { totalCost = 20 + (0.10 * totalArea); }
        else
        { totalCost = 20 + (0.15 * totalArea); }

        System.out.println(i+1+" "+totalArea+" "+totalCost);
    }

}
```

Question 4 (23+5 Points)

Part (1) Define a class with the following specifications:

a. The class name is **Book** with three private data members: **title** (String), **price** (double), and **discountVoucherNo** (int).

b. Write a constructor that accepts **title**, **price** and **discountVoucherNo** as input parameters to initializes the private data members.

c. Provide an accessor (**get**) method and a mutator (**set**) method only for the **discountVoucherNo** data member.
d. Define a **private method** called **isVoucherMatched( )** that returns true if an integer voucher number passed to the method matches the object's **discountVoucherNo**, otherwise, it should returns false.
e. Define a **public method** called **show( )** that requests the user to input a discount voucher and calls the **isVoucherMatched( )** method. The method should display the book title and price (with discount if applicable). If the call to **isVoucherMatched( )** method returned true, it should display the price as a discounted value (15% less) else the price should be displayed as it is. See Sample Below

```
Enter a discount voucher:
123456
Title: Java Programming
Price: 8.924999999999999
```

```java
import java.util.Scanner;

public class Book{

    private String title;
    private double price;
    private int discountVoucherNo;

    Book(String title,double price,int discountVoucherNo){
        this.title = title;
        this.price = price;
        this.discountVoucherNo = discountVoucherNo;
    }

    public void setDiscountVoucherNo(int discountVoucherNo) {
        this.discountVoucherNo = discountVoucherNo;
    }
    public int getDiscountVoucherNo() {
        return discountVoucherNo;
    }

    private boolean isVoucherMatched(int voucher)
    { if(voucher==discountVoucherNo){return true;} else{return false;} }

    public void show(){
        System.out.println("Enter discount voucher: ");
        Scanner sc = new Scanner(System.in);
        int voucher = sc.nextInt();

        System.out.println("Title: " + this.title);
        if (isVoucherMatched(voucher)) {
            System.out.println("Price: " + ( this.price - (this.price * 0.15)) );
        } else {
            System.out.println("Price: " + this.price);
        }

    }

}
```

Part (2) Write a Java application to do the following:

a. Create an object called **book1** from the class **Book** and initialize its private members with **title** "Java Programming", **price** 10.5 BD, and **discountVoucherNo** as 123456.
b. Call the method **show** for the created object.

```
public class Main {


    public static void main(String[] args) {

        Book book1 = new Book("Java Programming", 10.5, 123456);

        book1.show();

    }

  }
```