DIGITAL ASSIGNMENT 2

JAVA CSE1007

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PROGRAMS BASED ON CLASSES AND OBJECTS

1. Design a class named **Rectangle** to represent a rectangle. The class contains:
   Two **double** data fields named **width** and **height** that specify the width and height of the rectangle. The default values are **1** for both **width** and **height**.

   (i)A default constructor that creates a default rectangle.

   (ii)A constructor that creates a rectangle with the specified **width** and **height**.

   (iii)A method named **getArea()** that returns the area of this rectangle.

   (iv)A method named **getPerimeter()** that returns the perimeter.

   Implement the class. Write a test program that creates two **Rectangle** objects—one with width **5** and height **50** and the other with width **2.5** and height **45.7**. Display the width, height, area, and perimeter of each rectangle in this order.

2. Write a Java program to create a class called Student having data members Regno, Name, Course being studied and current CGPA. Include constructor to initialize objects. Create array of objects with at least 10 students and find 9-pointers.

3. Write a Java program that displays that displays the time in different formats in the form of HH,MM,SS using constructor Overloading.

Question no 1:

Code:

```java
import java.util.*;

class Rect {
    double height, width;

    Rect() {
        height = 1;
        width = 1;
    }

    Rect(double h, double w) {
        height = h;
        width = w;
    }

    void dispHW() {
        System.out.println("The height and width of rectange is:" + height + ","
+ width);
    }

    void getArea() {
        System.out.println("The area of rectangle is: " + height * width);
    }

    void getPerimenter() {
        System.out.println("The Perimeter of rectangle is: " + 2 * (height + widt
h));
    }
}

public class Rectangle {
    public static void main(String[] args) {
        Rect R1 = new Rect();
        R1.dispHW();
        R1.getArea();
        R1.getPerimenter();
        Scanner val = new Scanner(System.in);
        for (int i = 0; i < 2; i++) {
            System.out.println("Enter height and width of rectangle");
            double H = val.nextDouble();
```

```java
        double W = val.nextDouble();
        Rect R2 = new Rect(H, W);

        // printing area and perimeter
        R2.dispHW();
        R2.getArea();
        R2.getPerimenter();
    }


  }
}
```

Output:

```
r\workspaceStorage\c363414633ee34fc008725f5ed612dfd\redhat.j
The height and width of rectange is: 1.0,1.0
The area of rectangle is: 1.0
The Perimeter of rectangle is: 4.0

Enter height and width of rectangle
50 5
The height and width of rectange is: 50.0,5.0
The area of rectangle is: 250.0
The Perimeter of rectangle is: 110.0

Enter height and width of rectangle
45.7 2.5
The height and width of rectange is: 45.7,2.5
The area of rectangle is: 114.25
The Perimeter of rectangle is: 96.4

PS D:\VIT\class room\3rd Sem\JAVA\lab>
```

QUESTION 2:

Code:

```java
import java.util.*;

class Student {
    String name;
    String regno;
    String course;
    float cgpa;

    Student() {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter Details ");
        this.name = sc.next();
        this.regno = sc.next();
        this.course = sc.next();
        this.cgpa = sc.nextFloat();
    }

}

public class Demo {

    public static void main(String args[]) {
        Student[] m = new Student[10];
        for (int i = 0; i < 10; i++) {
            m[i] = new Student();
        }
        ninepointer(m);

    }

    static void ninepointer(Student[] m) {
        for (int i = 0; i < 10; ++i) {
            if (m[i].cgpa > 9)
                System.out.println("ninepointers:" + m[i].regno + m[i].name);

        }

    }
}
```

OUTPUT:

```
7119ee97720fc84d5b\redhat.java\jdt_ws\lab_5b1b4174\bin' 'Demo'
Enter Details
anish 20b
cse 9.2
Enter Details
she
70b
dbs
8
Enter Details
he
30b
fff
9.2
Enter Details
koi
90b
tei
8
ninepointers 20b nameanish
ninepointers 30b namehe
PS D:\VIT\class room\3rd Sem\JAVA\lab>  d:; cd 'd:\VIT\class room\3r
hat' 'C:\Program Files\Java\jdk 16 0 2\bin\java exe'   enable prev
```

QUESTION 3:

Code:

```java
import java.util.*;
import java.time.format.DateTimeFormatter;
import java.time.LocalDateTime;

public class Timeformat {
    LocalDateTime date = LocalDateTime.now();
    DateTimeFormatter t1 = DateTimeFormatter.ofPattern("HH");
    DateTimeFormatter t2 = DateTimeFormatter.ofPattern("mm");
    DateTimeFormatter t3 = DateTimeFormatter.ofPattern("ss");
    String hrs = date.format(t1);
```

```java
    String mins = date.format(t2);
    String sec = date.format(t3);

    Timeformat(int n) {
        System.out.println("HH:mm:ss = " + hrs + ":" + mins + "
:" + sec);
    }

    Timeformat() {
        int Hour = Integer.parseInt(hrs);
        int Minute = Integer.parseInt(mins);
        int Second = Integer.parseInt(sec);
        if (Hour > 12) {
            Hour = Hour - 12;
        }
        System.out.println("HH:mm:ss = " + Hour + ":" + Minute
+ ":" + Second);
    }

    public static void main(String args[]) {
        System.out.print("Time in 24 hour format: ");
        Timeformat hrs = new Timeformat(1);
        System.out.print("Time in 12 hour format: ");
        Timeformat completetime = new Timeformat();
    }

}
```

OUTPUT:

```
ing\Code\User\workspaceStorage\3a75bd45c9267e7119ee977:
Time in 24 hour format: HH:mm:ss = 22:45:05
Time in 12 hour format: HH:mm:ss = 10:45:5
PS D:\VIT\class room\3rd Sem\JAVA\lab> []
```

Write a program to demonstrate the knowledge of students in multidimensional arrays and looping constructs. Eg., If there are 4 batches in BTech - "CSE1007" course, read the count of the slow learners (who have scored <25) in each batch. Tutors should be assigned in the ratio of 1:4 (For every 4 slow learners, there should be one tutor). Determine the number of tutors for each batch. Create a 2-D jagged array with 4 rows to store the count of slow learners in the 4 batches. The number of columns in each row should be equal to the number of groups formed for that particular batch (Eg., If there are 23 slow learners in a batch, then there should be 6 tutors and in the jagged array, the corresponding row should store 4, 4, 4, 4, 4,3). Use for-each loop to traverse the array and print the details. Also print the number of batches in which all tutors have exactly 4 students.

JAGGED ARRAY:

CODE:

```java
import java.util.Scanner;

public class Btechbatch {

    public static void main(String[] args) {

        int i, j;
        double t;

        // Declaring 2-D array with 4 rows
        int arr[][] = new int[4][];

        // input for each batch
        Scanner sc = new Scanner(System.in);
        for (i = 0; i < arr.length; i++) {
            System.out.print("Enter number of students for batch " + (i + 1) + ":
");
            t = sc.nextDouble();
            arr[i] = new int[(int) Math.ceil(t / 4)];
            for (j = 0; j < arr[i].length; j++) {
                if (t >= 4)
                    arr[i][j] = 4;
```

```java
                else
                    arr[i][j] = (int) t;
                t = t - 4;
            }
        }
        sc.close();

        // Displaying the values of 2D Jagged array
        int cfour = 0;
        System.out.println("Contents of 2D Jagged Array");
        for (i = 0; i < arr.length; i++) {
            for (j = 0; j < arr[i].length; j++) {
                System.out.print(arr[i][j] + " ");
                if (arr[i][j] == 4)
                    cfour++;
            }
            System.out.println();
        }

        System.out.println("Number of tutors with 4 students are: " + cfour);
    }
}
```

OUTPUT:

```
bat' 'C:\Program Files\Java\jdk-16.0.2\bin\java.exe' '--enable-prev
ing\Code\User\workspaceStorage\3a75bd45c9267e7119ee97720fc84d5b\red
Enter number of students for batch 1: 5
Enter number of students for batch 2: 7
Enter number of students for batch 3: 9
Enter number of students for batch 4: 23
Contents of 2D Jagged Array
4 1
4 3
4 4 1
4 4 4 4 4 3
Number of tutors with 4 students are: 9
PS D:\VIT\class room\3rd Sem\JAVA\lab> []
```

Programs Based on Strings

1. Write a java Program to check whether given string is palindrome or not.
2. Write a Java program to sort a string array in ascending order.

   Input the string: hello world welcome to vit

   Expected Output: cdeeehillllmoooorttvww

3. Write a java program to sort the names in descending order.
4. Write a java Program to check whether the given two strings are anagram or not.
   Example: Listen silent

Write a java Program to check whether given string is palindrome or not.

CODE:

```java
import java.util.*;

public class Palindrome {
    public static void main(String[] args) {
        String a, b = "";
        Scanner s = new Scanner(System.in);
        System.out.println("Enter the string");
        a = s.nextLine();
        a = a.toLowerCase();
        int n = a.length();
        for (int i = n - 1; i >= 0; i--) {
            b = b + a.charAt(i);
        }

        if (a.equals(b)) {
            System.out.println("Palindrome");
```

```
        } else {
            System.out.println("Not a Palindrome");
        }
    }
}
```

OUTPUT:

```
PS D:\VIT\class room\3rd Sem\JAVA\lab>  d:; cd  d:\VIT\class room\3r
ing\Code\User\workspaceStorage\3a75bd45c9267e7119ee97720fc84d5b\redh
Enter the string
malayalam
Palindrome
PS D:\VIT\class room\3rd Sem\JAVA\lab>  d:; cd 'd:\VIT\class room\3r
bat' 'C:\Program Files\Java\jdk-16.0.2\bin\java.exe' '--enable-previ
ing\Code\User\workspaceStorage\3a75bd45c9267e7119ee97720fc84d5b\redh
Enter the string
vellore
Not a Palindrome
PS D:\VIT\class room\3rd Sem\JAVA\lab> 
```

Write a Java program to sort a string array in ascending order. Input the string: hello world welcome to vit Expected Output: cdeeehillllmoooorttvww

CODE:

```java
import java.util.*;

class Arrange {

    public static void main(String[] args) {
        String str;
        Scanner s = new Scanner(System.in);
        System.out.println("Enter the string");
        str = s.nextLine();
```

```java
        // Converting string into an array for computationanish
        char arr[] = str.toCharArray();

        char temp;

        int i = 0;
        while (i <= arr.length) {
            int j = i + 1;
            while (j <= arr.length - 1) {
                if (arr[j] < arr[i]) {      (LESS THAN ASCEND THE VALUE)
                    temp = arr[i];
                    arr[i] = arr[j];
                    arr[j] = temp;
                }
                j += 1;
            }
            i += 1;
        }

        System.out.println(arr);
    }
}
```

OUTPUT:

```
Enter the string
anish shrestha haha
    aaaaehhhhhinrssst
PS D:\VIT\class room\3rd Sem\JAVA\lab> []
```

Write a java program to sort the names in descending order.

CODE:

```java
import java.util.*;

class Arrange {

    public static void main(String[] args) {
        String str;
        Scanner s = new Scanner(System.in);
        System.out.println("Enter the string");
        str = s.nextLine();

        // Converting string into an array for computationanish
        char arr[] = str.toCharArray();

        char temp;

        int i = 0;
        while (i <= arr.length) {
            int j = i + 1;
            while (j <= arr.length - 1) {
                if (arr[j] > arr[i]) {          (GREATER THAN DESCEND THE VALUE)
                    temp = arr[i];
                    arr[i] = arr[j];
                    arr[j] = temp;
                }
                j += 1;
            }
            i += 1;
        }

        System.out.println(arr);
    }
}
```

OUTPUT:

```
Enter the string
ANISH
SNIHA
PS D:\VIT\class room\3rd Sem\JAVA\lab>
bat' 'C:\Program Files\Java\jdk-16.0.2\
ing\Code\User\workspaceStorage\3a75bd45
Enter the string
ANISH SHRESTHA HAHA
TSSSRNIHHHHHEAAAA
PS D:\VIT\class room\3rd Sem\JAVA\lab>
```

4. Write a java Program to check whether the given two strings are anagram or not.

```java
import java.util.*;

public class Anagram {
    static void isAnagram(String str1, String str2) {

        String s1 = str1.replaceAll("\\s", "");
        String s2 = str2.replaceAll("\\s", "");
        boolean status = true;

        if (s1.length() != s2.length()) {
            status = false;
        } else {
            char[] ArrayS1 = s1.toLowerCase().toCharArray();
            char[] ArrayS2 = s2.toLowerCase().toCharArray();
            Arrays.sort(ArrayS1);
            Arrays.sort(ArrayS2);
            status = Arrays.equals(ArrayS1, ArrayS2);
        }

        if (status) {
            System.out.println(s1 + " and " + s2 + " are anagrams");
        } else {
            System.out.println(s1 + " and " + s2 + " are not anagrams");
```

```java
        }
    }

    public static void main(String[] args) {
        String str1, str2;
        Scanner s = new Scanner(System.in);
        System.out.println("Enter two strings");
        str1 = s.nextLine();
        str2 = s.nextLine();
        isAnagram(str1, str2);
    }

}
```

OUTPUT:

```
out    c.\Program Files\Java\jdk-10.0.2\bin\java.exe
ing\Code\User\workspaceStorage\3a75bd45c9267e7119ee97720
Enter two strings
silent
listen
silent and listen are anagrams
PS D:\VIT\class room\3rd Sem\JAVA\lab> []
```

METHOD OVERLOADING:

PROGRAMS BASED ON METHOD OVEROADING

1. Write a Java program that displays area of different Figures (Rectangle, Square, Triangle) using the method overloading.

2. In a school, students of all classes from std I to X appear for the MathPremierLeague examination. Define a class MPL which stores the details of the marks scored by each class. It should contain the following 4 data members: Standard, number of students, marks[] array to store the scores of all the students of the class in MPL exam. Define a parameterized constructor which receives the values for the first two data members from the main() method. Create a Form within the constructor, read the marks of all students and hence find the first mark. Define a method findBestClass() to display the standard which has secured the highest mark. Overload this method to display the standard with the highest class average. The marks array should be declared dynamically based on the strength of the class.

3. Read the following details of 'n' students using Scanner class methods and display the same.

- Registration number (String)

- Name (String that may contain first name, middle name and last name)

- CGPA (Floating point number)

- Programme Name(String)

- School Name (String with multiple words)

- Proctor Name (String that may contain first, middle and last names)

CODE:

```java
import java.lang.Math;

class OverloadArea {
    void area(float s) {
        System.out.println("the area of the square is " + Math.pow(s, 2) + " sq u
nits");
    }

    void area(float h, float b) {
        System.out.println("the area of the rectangle is " + h * b + " sq units")
;
    }

    void area(double a, double b, double c) {
        double s = (a + b + c) / 2;
        double ar = s * (s - a) * (s - b) * (s - c);
        double Z = Math.sqrt(ar);
        System.out.println("the area of the triagle with 3 sides is " + Z + " sq
units");
    }
}

public class AreaOfShapes {

    public static void main(String[] args) {
        OverloadArea ob = new OverloadArea();
        ob.area(5);
        ob.area(11, 12);
        ob.area(3, 6, 7);
    }
}
```

OUTPUT:

```
ing\Code\User\workspaceStorage\3a75bd45c9267e7119ee9
the area of the square is 25.0 sq units
the area of the rectangle is 132.0 sq units
the area of the triagle with 3 sides is 8.9442719099
PS D:\VIT\class room\3rd Sem\JAVA\lab>
```

2ND QUESTION

CODE:

```java
import java.util.*;

class MPL {
    int numberOfStudents;
    Integer[] marks = new Integer[10];
    int standard;
    int firstMark = -1;

    MPL(int standard, int numberOfStudents) {
        this.standard = standard;
        this.numberOfStudents = numberOfStudents;
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter marks for " + numberOfStudents + "students of c
lass" + standard);
        for (int i = 0; i < numberOfStudents; ++i) {
            marks[i] = sc.nextInt();
            if (marks[i] > firstMark)
                firstMark = marks[i];
        }
    }

    float getAverage() {
        int sum = 0;
        for (int i = 0; i < numberOfStudents; ++i)
            sum += marks[i];
        return sum / numberOfStudents;
    }

}

public class ClassTest {

    public static void main(String args[]) {
```

```java
        MPL[] m = new MPL[4];
        m[0] = new MPL(5, 6);
        m[1] = new MPL(10, 5);
        m[2] = new MPL(8, 4);
        m[3] = new MPL(7, 6);
        findBestClass(m);
        findBestClass(m, 1);
    }

    static void findBestClass(MPL[] m) {
        int max = 0;
        for (int i = 0; i < 4; ++i) {
            if (m[i].firstMark > m[max].firstMark)
                max = i;
        }
        System.out.println("Best Class = " + m[max].standard + " Mark = " + m[max
].firstMark);
    }

    static void findBestClass(MPL[] m, int avg) {
        int max = 0;
        for (int i = 0; i < 4; ++i) {
            if (m[i].getAverage() > m[max].getAverage())
                max = i;
        }
        System.out.println("Best Average Class = " + m[max].standard + " Mark = "
 + m[max].getAverage());
    }
}
```

Output:

```
Enter marks for 6students of class5
34 56 23 45 77 88
Enter marks for 5students of class10
90 80 87 76 56 44
Enter marks for 4students of class8
45
7 89 78 60 33
Enter marks for 6students of class7
22
33
44
55
66
77
Best Class = 10 Mark = 90
Best Average Class = 10 Mark = 77.0
PS D:\VIT\class room\3rd Sem\JAVA\lab> 8
```

3rd question:

Code:

```java
import java.util.*;

class Details {
    Scanner sc = new Scanner(System.in);
    String regno = new String();
    String name = new String();
    float cgpa;
    String pname = new String();
    String sname = new String();
    String proctorname = new String();

    void input() {
        System.out.println("Enter Student Details:");
        System.out.println("Enter Registration Number:");
        regno = sc.next();
        sc.nextLine();
        System.out.println("Enter Name:");
```

```java
        name = sc.nextLine();
        System.out.println("Enter CGPA:");
        cgpa = sc.nextFloat();
        System.out.println("Enter Programme Name:");
        pname = sc.next();
        sc.nextLine();
        System.out.println("Enter School Name:");
        sname = sc.nextLine();
        System.out.println("Enter Proctor Name:");
        proctorname = sc.nextLine();
    }

    void display() {
        System.out.println("Student Details::");
        System.out.println(regno + " " + name + " " + cgpa + " " + pname + " " +
sname + " " + proctorname + " ");
    }

}

public class CGPA {
    public static void main(String[] args) {
        Details s1 = new Details();
        s1.input();
        s1.display();
```

Output:

```
Enter Student Details:
Enter Registration Number:
20BCE2893
Enter Name:
anish
Enter CGPA:
9.1
Enter Programme Name:
CSE
Enter School Name:
VIT
Enter Proctor Name:
santhi v
Student Details::
20BCE2893 anish 9.1 CSE VIT santhi v
PS D:\VIT\class room\3rd Sem\JAVA\lab> []
```