Practical Assignments - 2

Q. Add Matrices

```
import java.util.Scanner;
public class MatrixAddition {
    public static void main(String[] args){
        Scanner scan = new Scanner(System.in);
        System.out.print("Enter Number Of Rows : ");
        byte row = scan.nextByte();
        System.out.print("Enter Number Of Columns : ");
        byte col = scan.nextByte();
        int[][] matrixOne = new int[row][col];
        int[][] matrixTwo = new int[row][col];

        System.out.println("Matrix 1");
        getMatrix(matrixOne,row,col);
        System.out.println("Matrix 2");
        getMatrix(matrixTwo,row,col);
        addAndDisplayMatrix(matrixOne, matrixTwo, row, col);
    }

    private static void getMatrix(int[][] matrix,byte row,byte col) {
        Scanner scan = new Scanner(System.in);
        for (int i = 0; i < row; i++) {
            for (int j = 0; j < col; j++) {
                System.out.print("Enter Number for Matrix [" + i + "][" + j +
"] : ");
                matrix[i][j] = scan.nextInt();
            }
        }
    }

    private static void addAndDisplayMatrix(int[][] matrix1,int[][] matrix2,by
te row,byte col) {
        System.out.println("Final Matrix");
        for (int i = 0; i < row; i++) {
            for (int j = 0; j < col; j++) {
                System.out.print(matrix1[i][j]+matrix2[i][j] + " ");
            }
            System.out.println();
        }
    }
}
```

Output :

PS D:\MCA\MCA SEM 3\JAVA\Assignment 2> java .\MatrixAddition.java

Enter Number Of Rows : 3

Enter Number Of Columns : 3

Matrix 1

Enter Number for Matrix [0][0] : 5

Enter Number for Matrix [0][1] : 4

Enter Number for Matrix [0][2] : 3

Enter Number for Matrix [1][0] : 6

Enter Number for Matrix [1][1] : 3

Enter Number for Matrix [1][2] : 8

Enter Number for Matrix [2][0] : 1

Enter Number for Matrix [2][1] : 3

Enter Number for Matrix [2][2] : 5

Matrix 2

Enter Number for Matrix [0][0] : 3

Enter Number for Matrix [0][1] : 2

Enter Number for Matrix [0][2] : 5

Enter Number for Matrix [1][0] : 6

Enter Number for Matrix [1][1] : 4

Enter Number for Matrix [1][2] : 7

Enter Number for Matrix [2][0] : 1

Enter Number for Matrix [2][1] : 0

Enter Number for Matrix [2][2] : 2

Final Matrix

8 6 8

12 7 15

2 3 7

Q. Get Environment Variables

```java
import java.lang.*;
public class GetEnvironmentVariable {
    public static void main(String[] args)
    {
        System.out.println("\nEnvironment variable USERNAME: ");
        System.out.println(System.getenv("USERNAME"));

        System.out.println("\nEnvironment variable TEMP: ");
        System.out.println(System.getenv("TEMP"));

        System.out.println("\nEnvironment variable PATH: ");
        System.out.println(System.getenv("PATH"));

    }
}
```

Output:

PS D:\MCA\MCA SEM 3\JAVA\Assignment 2> java .\GetEnvironmentVariable.java

Environment variable USERNAME:

Xtrem

Environment variable TEMP:

C:\Users\Xtrem\AppData\Local\Temp

Environment variable PATH:

C:\Windows\system32;C:\Windows;C:\Windows\System32\Wbem;C:\Windows\System32\WindowsPowerShell\v1.0\;C:\Windows\System32\OpenSSH\;C:\Program Files (x86)\NVIDIA Corporation\PhysX\Common;C:\Program Files\NVIDIA Corporation\NVIDIA NvDLISR;C:\Program Files\Java\jdk-13.0.1\bin;C:\Program Files\Git\cmd;C:\Users\Xtrem\AppData\Local\Microsoft\WindowsApps;C:\Users\Xtrem\AppData\Local\Programs\Microsoft VS Code\bin;C:\Program Files\Java\jdk-13.0.1\bin;

Q. Circle

```
public class Circle{
    public static void main(String[] args)
    {
        double x,y,r;
        int origin;
        CircleObj[] c= new CircleObj[10];

        for(int i=0;i<10;i++)
        {
            origin=(int) (2*  Math.random());
            r= (double) (10* Math.random())+1;

            if(origin==1)
                c[i]=new CircleObj(r);
            else
            {
                x= (double) (100* Math.random())+1;
                y= (double) (100* Math.random())+1;
                c[i] = new CircleObj(x,y,r);
            }

        }
        for(int i=0;i<10;i++)
        {
            c[i].display();
        }
    }
}
public class CircleObj
{
    double radius,cntx,cnty;

    CircleObj(double radius)
    {
        this.cntx=0;
        this.cnty=0;
        this.radius=radius;
    }

    CircleObj(double cntx,double cnty,double radius)
    {
        this.cntx=cntx;
        this.cnty=cnty;
        this.radius=radius;
    }
```

```
    private double area()
    {
        return (3.14*this.radius*this.radius);
    }

    public void display()
    {
         System.out.println("-------");
        System.out.println("Center: ("+this.cntx+", "+this.cnty+")");
        System.out.println("Radius: "+this.radius);
        System.out.println("Area: "+ this.area());
    }
}
```

Output :

PS D:\MCA\MCA SEM 3\JAVA\Assignment 2> java .\Circle.java

Center: (71.78505496544743, 17.213464081660057)

Radius: 10.101627819491677

Area: 320.4146576550785

Center: (0.0, 0.0)

Radius: 5.0617069059482045

Area: 80.44955315741257

Center: (0.0, 0.0)

Radius: 10.362498572521107

Area: 337.1775227296762

Center: (89.67442172582656, 67.80023035725446)

Radius: 4.762193006142564

Area: 71.21043419514488

Center: (47.914239717727405, 25.360860928995752)

Radius: 5.406426040616273

Area: 91.78044955253277

Center: (0.0, 0.0)

Radius: 10.088821343762639

Area: 319.6027525739722

Center: (0.0, 0.0)

Radius: 10.6691310947075

Area: 357.4273251124111

Center: (0.0, 0.0)

Radius: 1.1219839322884109

Area: 3.9527825451439673

Center: (0.0, 0.0)

Radius: 3.6632745450908812

Area: 42.13748243311192

Center: (0.0, 0.0)

Radius: 3.817459601092299

Area: 45.759213110751375

Q. Remove duplicate characters from the string.

```java
import java.util.Arrays;
public class RemoveDuplicate {
    public static void main(String[] args) {
        char[] myString = "Pradip Karmakar".toCharArray();
        System.out.println(StringSlash(myString));
    }

    private static String StringSlash(char[] myString) {
        int index = 0;
        int j;
        for (int i = 0; i < myString.length; i++) {

            for (j = 0; j < i; j++) {
                if (myString[i] == myString[j])
                {
                    break;
                }
            }

            if(j == i){
                myString[index++] = myString[i];
            }
        }
        return String.valueOf(Arrays.copyOf(myString, index));
    }
}
```

Output :

PS D:\MCA\MCA SEM 3\JAVA\Assignment 2> java .\RemoveDuplicate.java

Pradip Kmk

Q. Write a program to print the pattern using for loop

1 1 1

2 4 8

.....

10 100 1000

```
public class SquareCube {
    public static void main(String[] args){
        for (int i = 1; i < 11; i++) {
            for (int j = 1; j < 4; j++) {
                System.out.print((int)Math.pow(i, j) + "   ");
            }
            System.out.println();
        }
    }
}
```

Output:

PS D:\MCA\MCA SEM 3\JAVA\Assignment 2> java .\SquareCube.java

1 1 1

2 4 8

3 9 27

4 16 64

5 25 125

6 36 216

7 49 343

8 64 512

9 81 729

10 100 1000

Q. Write a java program to accept distance in meters, time in hours ,minutes and seconds .Calculate the speed in m/sec ,km/hr and miles/hr .(1 mile=1609 m).

```java
import java.util.Scanner;
public class Speed {
    public static void main(String[] args) {
        Scanner scan = new Scanner(System.in);

        float seconds;
        float minutePerSecond;
        float kiloMeterPerHour;
        float milePerHour;

        System.out.print("Enter distance in meters : ");
        float distance = scan.nextFloat();

        System.out.print("Enter hour: ");
        float hr = scan.nextFloat();

        System.out.print("Enter minutes: ");
        float min = scan.nextFloat();

        System.out.print("Enter seconds: ");
        float sec = scan.nextFloat();

        seconds = (hr*3600) + (min*60) + sec;
        minutePerSecond = distance / seconds;
        kiloMeterPerHour = ( distance/1000.0f ) / ( seconds/3600.0f );
        milePerHour = kiloMeterPerHour / 1.609f;

        System.out.println("Meter/Seconds : " + minutePerSecond);
        System.out.println("KM/H : " + kiloMeterPerHour);
        System.out.println("Miles / Hour : " + milePerHour);

    }
}
```

Output :

PS D:\MCA\MCA SEM 3\JAVA\Assignment 2> java .\Speed.java

Enter distance in meters : 80000

Enter hour: 1

Enter minutes: 30

Enter seconds: 45

Meter/Seconds : 14.692378

KM/H : 52.89256

Miles / Hour : 32.87294

Q. Display Java detail

```
public class JavaInfo {
    public static void main(String[] args){
        System.out.println("Java Version : " + System.getProperty("java.versio
n"));
        System.out.println("Runtime Version : " + System.getProperty("java.run
time.version"));
        System.out.println("Java Vendor Name : " + System.getProperty("java.ve
ndor"));
        System.out.println("Java Vendor URL : " + System.getProperty("java.ven
dor.url"));
    }
}
```

Output :

PS D:\MCA\MCA SEM 3\JAVA\Assignment 2> java .\JavaInfo.java

Java Version : 13.0.1

Runtime Version : 13.0.1+9

Java Vendor Name : Oracle Corporation

Java Vendor URL : https://java.oracle.com/

Q. Create an abstract class “Monster” which is extended by three classes “Ware wolf “,”Zombie” and “Vampire” .Create 6 types of Monsters in single dimension array and print them.

```
public class MonstersObject
{
    public static void main(String[] args)
    {
        int key;
        Monster[] m= new Monster[6];

        for(int i=0;i<6;i++)    //to create
        {
            key=(int) (3 * Math.random()) +1;   //to create random Monsters

            switch(key)
            {
                case 1: //For Wolf
                    m[i]= new WareWolf(i);
                    break;
                case 2: //for Zombie
                    m[i]= new Zombie(i);
                    break;
                case 3: //for Vampire
                    m[i]= new Vampire(i);
            }
        }

        for(int i=0;i<6;i++)
        {
            m[i].display();
        }
    }
}
public class MonsterObject {

}
abstract class Monster
{
    String type;
    int id;

    Monster(String type)
    {
        this.type=type;
    }
    public void display()
    {
```

```
        System.out.println("-----");
        System.out.println("Monster id: "+ this.id);
        System.out.println("Monster type: "+ this.type);
    }
}

class WareWolf extends Monster
{
    WareWolf(int id)
    {
        super("WareWolf");
        this.id=id;
    }
}

class Zombie extends Monster
{
    Zombie(int id)
    {
        super("Zombie");
        this.id=id;
    }
}
class Vampire extends Monster
{
    Vampire(int id)
    {
        super("Vampire");
        this.id=id;
    }
}
```

Output :

PS D:\MCA\MCA SEM 3\JAVA\Assignment 2> java .\MonsterObject.java

-----

Monster id: 0

Monster type: Vampire

Monster id: 1

Monster type: WareWolf

Monster id: 2

Monster type: Vampire

Monster id: 3

Monster type: Zombie

Monster id: 4

Monster type: Vampire

Monster id: 5

Monster type: Vampire

Q. Write a program to accept a string from user and a point from where you want to print next three

words. Print the old and the new string.

Old String = “The quick brown fox jumps over the lazy dog”

New String = “brown fox jumps”

```
import java.util.Scanner;

public class StringSplit {
    public static void main(String[] args)
    {
    int index;
    int tmp;
    int count=0;
    String old;
    String New;
    String token;
    Scanner s = new Scanner(System.in);

    System.out.print("Enter String: ");
    old=s.nextLine();

    System.out.print("Enter from which word you want to split: ");
    token=s.nextLine();

    index= old.indexOf(token);
    tmp=index;

    while(count<3 && tmp != -1)
    {
        tmp=old.indexOf(" ",tmp+1);
        count++;
    }

    New=old.substring(index,tmp);

    System.out.println("Old string= " + old);
    System.out.println("New string= " + New);

    }
}
```

Output:

PS D:\MCA\MCA SEM 3\JAVA\Assignment 2> java .\StringSplit.java

Enter String: Pradip Karmakar Study in Rollwala Computer Center

Enter from which word you want to split: Karmakar

Old string= Pradip Karmakar Study in Rollwala Computer Center

New string= Karmakar Study in

Q. Convert Minutes into years and days

For Eg. Input => 3456789

Output => 6 Years and 210 days

```java
import java.util.Scanner;

public class MinuteToYearDay {
    final static int HOUR = 24;
    final static int DAYSINYEAR = 365;
    final static int MINUTES = 60;
    public static void main(String[] args){
        Scanner scan = new Scanner(System.in);
        System.out.print("Enter Values as Minutes : ");
        long minute = scan.nextLong();
        int year = (int) (minute / ((MINUTES*HOUR)*DAYSINYEAR));
        int remainingminute = (int) (minute % ((MINUTES*HOUR)*DAYSINYEAR));
        int days = remainingminute / (MINUTES * HOUR);

        System.out.println(year + " Years and " + days + " Days.");
    }
}
```

Output :

PS D:\MCA\MCA SEM 3\JAVA\Assignment 2> java .\MinuteToYearDay.java

Enter Values as Minutes : 12000000

22 Years and 303 Days.

Q. Generate Invoice

```
public class Invoice {
    public static void main(String[] args) {
        Inventory items[] = { new Inventory(101, "Part 1", 2000), new Inventor
y(102, "Part 2", 200),
                new Inventory(103, "Part 3", 1300), new Inventory(104, "Part 4
", 3200), new Inventory(105, "Part 5", 5000) };

        Bill_Item bitem = new Bill_Item(items.length);
        for (int i = 0; i < items.length; i++) {
            bitem.add(items[i], 1);
        }
        bitem.display();
    }
}

class Inventory {
    long itemId;
    String description;
    double price;
    int qty;

    Inventory() {
        itemId = 0;
        description = "";
        price = 0;
    }

    Inventory(long itemId, String description, double price) {
        this.itemId = itemId;
        this. description = description;
        this.price = price;
    }

    public void display() {
        System.out.println("Item id : " + itemId);
        System.out.println("\t Description : " + description);
        System.out.println("\t Price " + price);
        System.out.println("\t qty " + qty);
        System.out.println("_____________");
    }
}

class Bill_Item {

    int qty;
    double amount;
```

```
    Inventory items[];

    int index = 0;

    Bill_Item(int length) {
        items = new Inventory[length];
        index = 0;
    }

    public void add(Inventory it, int qty) {
        this.amount = it.price * qty;
        it.qty += qty;
        items[index] = it;
        index++;
    }

    public void display() {
        int total = 0;
        for (int i = 0; i < items.length; i++) {
            items[i].display();
            total += items[i].qty * items[i].price;
            System.out.println();
        }

        System.out.print("Amount : " + total);
    }
}
```

Output :

PS D:\MCA\MCA SEM 3\JAVA\Assignment 2> java .\Invoice.java

Item id : 101

Description : Part 1

Price 2000.0

qty 1

Item id : 102

Description : Part 2

Price 200.0

qty 1

Item id : 103

Description : Part 3

Price 1300.0

qty 1

Item id : 104

Description : Part 4

Price 3200.0

qty 1

Item id : 105

Description : Part 5

Price 5000.0

qty 1

Amount : 11700

Q. Count Words and Print in Reverse

```java
import java.util.Scanner;

public class WordReverse {
    public static void main(String[] args) {
        String input;
        Scanner scan = new Scanner(System.in);

        System.out.println("Enter String : ");
        input = scan.nextLine();

        String token[] = input.split(" ");
        System.out.println("Count of words in String : " + token.length);

        for (int i = token.length - 1; i >= 0; i--) {
            System.out.print(token[i] + " ");
        }
    }
}
```

Output :

PS D:\MCA\MCA SEM 3\JAVA\Assignment 2> java .\WordReverse.java

Enter String :

Pradip Karmakar Study at Rollwala

Count of words in String : 5

Rollwala at Study Karmakar Pradip

Q. Binary Addition

```java
import java.util.Scanner;
public class BinaryAdd {
   public static void main(String[] args) {
        long b1, b2;
        int i = 0, carry = 0;

        int[] sum = new int[10];

        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter first binary number: ");
        b1 = scanner.nextLong();
        System.out.print("Enter second binary number: ");
        b2 = scanner.nextLong();

        scanner.close();
        while (b1 != 0 || b2 != 0)
        {
            sum[i++] = (int)((b1 % 10 + b2 % 10 + carry) % 2);
            carry = (int)((b1 % 10 + b2 % 10 + carry) / 2);
            b1 = b1 / 10;
            b2 = b2 / 10;
        }
        if (carry != 0) {
            sum[i++] = carry;
        }
        --i;
        System.out.print("Output: ");
        while (i >= 0) {
            System.out.print(sum[i--]);
        }
        System.out.print("\n");
   }
}
```

Output :

PS D:\MCA\MCA SEM 3\JAVA\Assignment 2> java .\BinaryAdd.java

Enter first binary number: 1010

Enter second binary number: 1100

Output: 10110

Q. Print Java

```
public class PrintJava {
    public static void main(String[] args) {
        System.out.println("    JJ       A     V       V     A");
        System.out.println("    JJ      A A     V     V     A A");
        System.out.println("    JJ     A   A     V   V     A   A");
        System.out.println("    JJ    AAAAAAA     V V     AAAAAAA");
        System.out.println(" JJJJJ   A       A     v     A       A");
    }
}
```

Output :

PS D:\MCA\MCA SEM 3\JAVA\Assignment 2> java .\PrintJava.java

```
   JJ       A    V          V    A
   JJ      A   A   V        V   A   A
   JJ     A     A   V      V   A     A
   JJ   AAAAAAA    V   V   AAAAAAA
 JJJJJ A         A     v    A         A
```

Q. Print Face

```java
public class PrintFace {
    public static void main(String[] args) {
        System.out.println(" +\"\"\"\"\"\"\"+ ");
        System.out.println("[| 0   0 |]");
        System.out.println(" |   ^   | ");
        System.out.println(" |  '_'  | ");
        System.out.println(" +-------+ ");
    }
}
```

Output :

PS D:\MCA\MCA SEM 3\JAVA\Assignment 2> java .\PrintFace.java

```
 +"""""""+
[| 0 0 |]
 |  ^  |
 | '_' |
 +-------+
```

Q. Print Pattern

```java
public class OneZeroPattern {
    public static void main(String[] args) {
        int setter = 1;
        int numberOflines = 9;
        for (int i = 0; i < numberOflines; i++) {
            for (int j = 0; j <= i; j++) {
                System.out.print(setter);
                if(setter == 1) setter = 0;
                else setter = 1;
            }
            System.out.println("");
        }
    }
}
```

Output :

PS D:\MCA\MCA SEM 3\JAVA\Assignment 2> java .\OneZeroPattern.java 5

1

01

010

1010

10101

010101

0101010

10101010

101010101

Q. 14)Create an employee class which has attributes : empid , fname , lname, salary, designation, bonus. It has all the necessary constructors (at least 2) and methods.It must have one abstract method calculate_bonus().

```
public class Data {
    public static void main(String[] args) {
        Employee emp1 = new Manager(101, "Pradip", "Karmakar", 30_00_0F, "Prod
uct Manager", 6);
        Employee emp2 = new Clerk(201, "Sudip", "Karmakar", 10_00_0F, "Product
ion", 300);
        Employee emp3 = new Manager(102, "Sandip", "Karmakar", 23_00_0F, "Sale
s Manager", 2);
        Employee emp4 = new Clerk(202, "Jeet", "Karmakar", 30_00_0F, "Sales",
240);
        Employee emp5 = new Manager(103, "Samar", "Karmakar", 40_00_0F, "Human
 Resource Manager", 12);
        emp1.CalculateBonus();
        emp1.PrintDetail();
        emp2.CalculateBonus();
        emp2.PrintDetail();
        emp3.CalculateBonus();
        emp3.PrintDetail();
        emp4.CalculateBonus();
        emp4.PrintDetail();
        emp5.CalculateBonus();
        emp5.PrintDetail();
    }
}

abstract class Employee {
    int empid;
    String fname;
    String lname;
    float salary;
    String designation;
    float bonus;

    public Employee() {
        empid = 0;
        fname = "Not Specified";
        lname = "Not Specified";
        salary = 0.0F;
        designation = "Not Specified";
```

```
        bonus = 0.0F;
    }

    public Employee(int empid, String fname, String lname, float salary, Strin
g designation) {
        this.empid = empid;
        this.fname = fname;
        this.lname = lname;
        this.salary = salary;
        this.designation = designation;
    }

    public abstract void CalculateBonus();
    public abstract void PrintDetail();
}

class Manager extends Employee {
    int noOfProjectsHandled;

    Manager() {
        super();
    }
    Manager(int empid, String fname, String lname, float salary, String design
ation, int noOfProjectsHandled) {
        super(empid, fname, lname, salary, designation);
        this.noOfProjectsHandled = noOfProjectsHandled;
    }

    public void CalculateBonus() {
            this.bonus = (noOfProjectsHandled * 1000);
    }

    public void PrintDetail() {
        System.out.println("Employee Id : " + this.empid);
        System.out.println("Name : " + this.fname + " " + this.lname);
        System.out.println("Salary : "+ this.salary);
        System.out.println("Designation : " + this.designation);
        System.out.println("Total Projects Handeled : " + this.noOfProjectsHan
dled);
        System.out.println("Bonus : " + this.bonus);
        System.out.println("++++++++++++++++++++++++");
    }
}

class Clerk extends Employee {
    int noOfHoursworked;

    Clerk() {
```

```
        super();
    }
    Clerk(int empid, String fname, String lname, float salary, String designat
ion, int noOfHoursworked) {
        super(empid, fname, lname, salary, designation);
        this.noOfHoursworked = noOfHoursworked;
    }

    public void CalculateBonus() {
        if(this.noOfHoursworked > 250) {
            this.bonus = (noOfHoursworked - 250) * 200;
        }
    }

    public void PrintDetail() {
        System.out.println("Employee Id : " + this.empid);
        System.out.println("Name : " + this.fname + " " + this.lname);
        System.out.println("Salary : "+ this.salary);
        System.out.println("Designation : " + this.designation);
        System.out.println("Total Hours Worked : " + this.noOfHoursworked);
        System.out.println("Bonus : " + this.bonus);
        System.out.println("++++++++++++++++++++++++");
    }
}
```

Output :

PS D:\MCA\MCA SEM 3\JAVA\Assignment 2> java .\Data.java

Employee Id : 101

Name : Pradip Karmakar

Salary : 30000.0

Designation : Product Manager

Total Projects Handeled : 6

Bonus : 6000.0

++++++++++++++++++++++++

Employee Id : 201

Name : Sudip Karmakar

Salary : 10000.0

Designation : Production

Total Hours Worked : 300

Bonus : 10000.0

++++++++++++++++++++++++

Employee Id : 102

Name : Sandip Karmakar

Salary : 23000.0

Designation : Sales Manager

Total Projects Handeled : 2

Bonus : 2000.0

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Employee Id : 202

Name : Jeet Karmakar

Salary : 30000.0

Designation : Sales

Total Hours Worked : 240

Bonus : 0.0

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Employee Id : 103

Name : Samar Karmakar

Salary : 40000.0

Designation : Human Resource Manager

Total Projects Handeled : 12

Bonus : 12000.0

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