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AIM:	Programs on Polymorphism: Implement a Program to demonstrate method overloading and constructor overloading.

Program 1

PROBLEM STATEMENT:

Create a Date class with data int year, int month, int date, int hrs, int min, int sec. Create a default, no-argument constructor which sets the default date to January 1, 2000, 00:00:00 Create 3 overloaded setter methods

void setDate(int year, int month, int date)

void setDate(int year, int month, int date, int hrs, int min)

void setDate(int year, int month, int date, int hrs, int min, int sec)

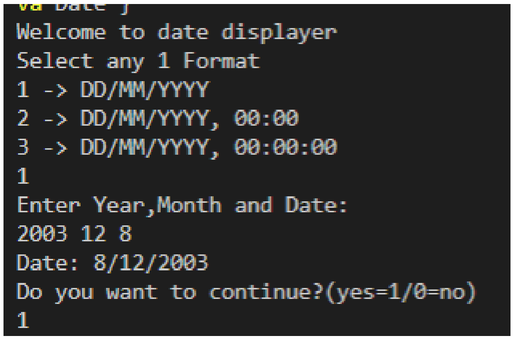
Also write a displayDate() method which will display the date depending on the type of date object created

PROGRAM:

```
import java.util.*;
class Date {
    int year;
    int month;
    int date;
    int hrs;
    int min;
    int sec;

    Date() {
        year = 2000;
        month = 01;
        date = 01;
        hrs = 00;
        min = 00;
        sec = 00;
    }
    void setDate(int y,int m,int d) {
        year = y;month = m;date = d;
    }
    void setDate(int y,int m,int d,int h,int mi) {
        year = y;month = m;date = d;hrs = h;min = mi;
    }
    void setDate(int y,int m,int d,int h,int mi,int s) {
        year = y;month = m;date = d;hrs = h;min = mi;sec = s;
    }

    void displayDate(int n) {
        if(n==1) {
            System.out.printf("Date: %d/%d/%d\n",date,month,year);
        }
        else if(n==2) {
            System.out.printf("Date: %d/%d/%d, %d:%d\n",date,month,year,hrs,min);
        }
        else if(n==3) {

System.out.printf("Date: %d/%d/%d, %d:%d:%d\n",date,month,year,hrs,min,sec);
        }
    }
    public static void main( String[] args){
        Scanner sc= new Scanner(System.in);
        Date d1= new Date();
        Date d2= new Date();
        Date d3= new Date();
        int choice,flag;
        int year,month,date,hrs,min,sec;
        while(true) {
            System.out.println("Welcome to date displayer");
            System.out.println("Select any 1 Format\n1 -> DD/MM/YYYY\n2 ->
DD/MM/YYYY, 00:00\n3 -> DD/MM/YYYY, 00:00:00");
            choice = sc.nextInt();
            System.out.println("Enter Year,Month and Date: ");
            year = sc.nextInt();
            month = sc.nextInt();
            date = sc.nextInt();
            switch(choice) {
                case 1:
                    d1.setDate(year, month, date);
                    d1.displayDate(choice);
                    break;
                case 2:
                    System.out.println("Enter Hours and Minutes: ");
                    hrs = sc.nextInt();
                    min = sc.nextInt();
                    d2.setDate(year, month, date, hrs, min);
                    d2.displayDate(choice);
                    break;
                case 3:
                    System.out.println("Enter Hours,Minutes and Seconds: ");
                    hrs = sc.nextInt();
                    min = sc.nextInt();
                    sec = sc.nextInt();
                    d3.setDate(year, month, date, hrs, min, sec);
                    d3.displayDate(choice);
                    break;
                default:
                    System.out.println("Invalid Choice!");
                    break;
            }
            System.out.println("Do you want to continue?(yes=1/0=no)");
            flag = sc.nextInt();
            if(flag==0) {
                break;
            }
        }
    }
}
```

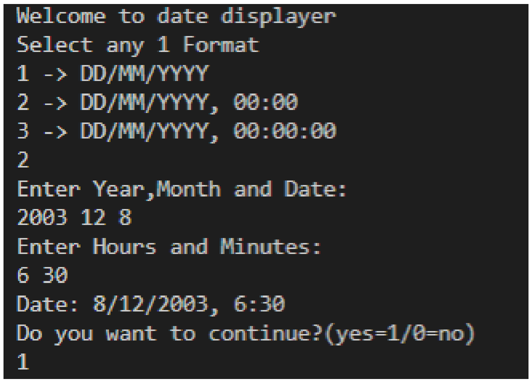
RESULT:

1) DD/MM/YY



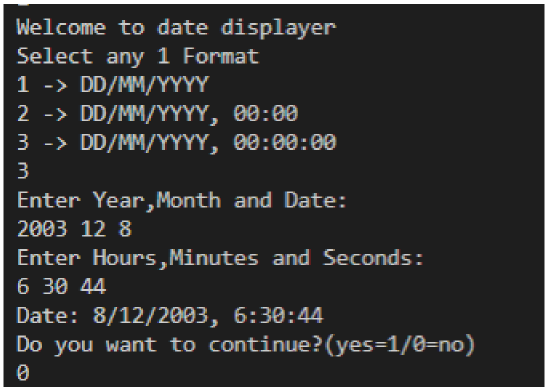
```
Welcome to date displayer
Select any 1 Format
1 -> DD/MM/YYYY
2 -> DD/MM/YYYY, 00:00
3 -> DD/MM/YYYY, 00:00:00
1
Enter Year,Month and Date:
2003 12 8
Date: 8/12/2003
Do you want to continue?(yes=1/0=no)
1
```

2) DD/MM/YY, Hrs: Min



```
Welcome to date displayer
Select any 1 Format
1 -> DD/MM/YYYY
2 -> DD/MM/YYYY, 00:00
3 -> DD/MM/YYYY, 00:00:00
2
Enter Year,Month and Date:
2003 12 8
Enter Hours and Minutes:
6 30
Date: 8/12/2003, 6:30
Do you want to continue?(yes=1/0=no)
1
```

3)) DD/MM/YY, Hrs: Min: Sec



```
Welcome to date displayer
Select any 1 Format
1 -> DD/MM/YYYY
2 -> DD/MM/YYYY, 00:00
3 -> DD/MM/YYYY, 00:00:00
3
Enter Year,Month and Date:
2003 12 8
Enter Hours,Minutes and Seconds:
6 30 44
Date: 8/12/2003, 6:30:44
Do you want to continue?(yes=1/0=no)
0
```

Program 2

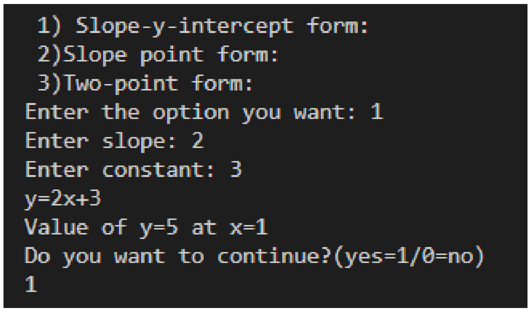
PROBLEM STATEMENT:	**Given a class Line with slope, y-intercept, x1, y1, x2, y2 as attributes, write 3 constructors for equations for the line given Slope-y-intercept, Slope Point and two Point forms** **Slope-y-intercept:** **y = mx + c** **Slope point form:** **y - y1 = m(x - x1)** **Two Point form:** **(y - y1) / (y1 - y2) = m(x - x1) / (x1 - x2)** **Also, m = (y2 - y1) / (x2 - x1)** **Each constructor should display the appropriate Line equation and appropriate value of y for given x.**

PROGRAM:

```
import java.util.*;
class line{
    double x=1,x1,y1,x2,y2;
    double m,c;
    line(double m, double c){
       this.m=m;
       this.c=c;
       System.out.printf("y=%.0fx+%.0f",m,c);
       System.out.println("");
       System.out.printf("Value of y=%.0f at x=%.0f",m*x+c,x);

    }
     line(double m, double x1, double y1){
       this.m=m;
       this.x1=x1;
       this.y1=y1;
       System.out.printf("Line eq: y-%.0f=%.0f(x - %.0f)\n",y1,m,x1);
       System.out.printf("Value of y=%.0f at x=%.0f", (m*(x-x1))-y1, x);
    }
     line(double x1, double y1, double x2, double y2){
        this.x1=x1;
        this.y1=y1;
        this.x2=x2;
        this.y2=y2;
        System.out.printf("Line eq: y - %.0f/(%.0f-%.0f)=
(x- %.0f)/( %.0f- %.0f)\n" ,y1,y1,y2,x1,x1,x2);
         System.out.printf("Value of y = %.0f at x=%.0f", ((m*(x-x1)*(y1-y2))/(x1-
x2))+y1,x);
    }
    public static void main( String[] args){
        Scanner scan= new Scanner(System.in);
        int option,flag;
        double x1,y1,x2,y2,m,c;
        while(true) {
            System.out.println("\n 1) Slope-y-intercept form:  \n 2)Slope point form: \n
3)Two-point form: ");
            System.out.print("Enter the option you want: ");
            option = scan.nextInt();
            switch(option) {
                case 1:
                    System.out.print("Enter slope: ");
                    m= scan.nextDouble();
                    System.out.print("Enter constant: ");
                    c= scan.nextDouble();
                    line l1= new line(m,c);
                break;

                case 2:
                     System.out.print("Enter slope: ");
                     m= scan.nextDouble();
                    System.out.print("Enter X1& Y1 Co-ordinate: ");
                    x1= scan.nextDouble();
                    y1= scan.nextDouble();
                    line l2= new line(m,x1,y1);
                    break;

                case 3:
                    System.out.print("Enter X1& Y1 Co-ordinate: ");
                    x1= scan.nextDouble();
                    y1= scan.nextDouble();
                    System.out.print("Enter X2& Y2 Co-ordinate: ");
                    x2= scan.nextDouble();
                    y2= scan.nextDouble();
                    line l3= new line(x1,y1,x2,y2);
                    break;

                    default:
                            System.out.println("Invalid choice ");
                            break;

            }
                System.out.println("");
             System.out.println("Do you want to continue?(yes=1/0=no)");
            flag = scan.nextInt();
            if(flag==0) {
                break;
            }
        }
    }
}
```

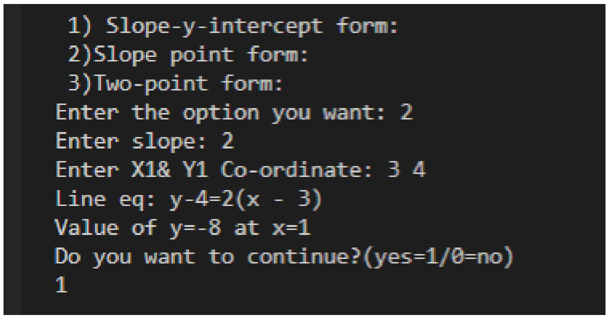
RESULT:

1) Slope-y-intercept:



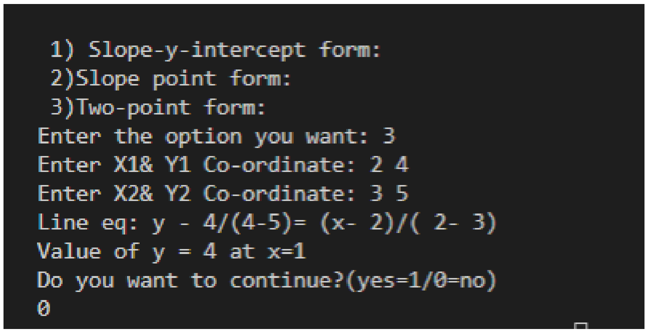
```
 1) Slope-y-intercept form:
 2)Slope point form:
 3)Two-point form:
Enter the option you want: 1
Enter slope: 2
Enter constant: 3
y=2x+3
Value of y=5 at x=1
Do you want to continue?(yes=1/0=no)
1
```

2) Slope point form:



```
 1) Slope-y-intercept form:
 2)Slope point form:
 3)Two-point form:
Enter the option you want: 2
Enter slope: 2
Enter X1& Y1 Co-ordinate: 3 4
Line eq: y-4=2(x - 3)
Value of y=-8 at x=1
Do you want to continue?(yes=1/0=no)
1
```

3) **Two Point form:**



```
 1) Slope-y-intercept form:
 2)Slope point form:
 3)Two-point form:
Enter the option you want: 3
Enter X1& Y1 Co-ordinate: 2 4
Enter X2& Y2 Co-ordinate: 3 5
Line eq: y - 4/(4-5)= (x- 2)/( 2- 3)
Value of y = 4 at x=1
Do you want to continue?(yes=1/0=no)
0
```

Program 3

PROBLEM STATEMENT:

Create a Test class with data double base, int power, int logBase, int argument.

Create a no-argument constructor which sets the default value of all variables to 2.

There are 2 overloaded functions:

1. double calculate (double base, int power)

This function returns the value when *base* is raised to *power*

For example: calculate (3.0, 2) returns the value of 3.0 raised to 2 i.e., 9.0

2. double calculate (int logBase, int argument)

This function returns the value of the log of *argument* to the base *logBase*.

For example: calculate (3, 9) returns log of 9 to the base 3 i.e., 2.0

Create a main method in a separate class to call the above functions with the following inputs:

1. calculate (2, 4)

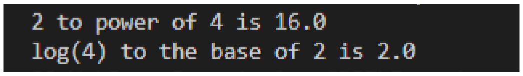
2. calculate (2.0, 4.0)

Create a display() method which displays the output based on the type of Test object created.

PROGRAM:

```
import java.util.*;
import java.lang.Math;

public class test{
        double base;
        int power,logBase, argument;

        test(){
                base = 2;
                power = 2;
                logBase = 2;
                argument = 2;
        }
        public double calculate(double base, int power)
        {
                return Math.pow(base,power);
        }
        public double calculate(int logBase, int argument)
        {
                return (Math.log(argument)/Math.log(logBase));
        }
        public static void main(String[] args)
        {
                test ob1 = new test();
                System.out.println("2 to power of 4 is "+ob1.calculate(2.0d,4));
                System.out.println("log(4) to the base of 2 is "+ob1.calculate(2,4));
        }
}
```

RESULT:



```
2 to power of 4 is 16.0
log(4) to the base of 2 is 2.0
```

Program 4

PROBLEM STATEMENT:

Write a menu-driven program to recruit an employee (depending on his performance in various rounds) in some software company using constructor overloading.

Selection Criteria for each post is given below:

i) Programmer (Minimum total of 80 marks):-

Rounds:-

(1) Course Work

(2) Aptitude Test

(3) Technical Test

(4) Interview

ii) Team Leader (Minimum total of 85 marks):-

Rounds:-

(1) Technical Test

(2) Interview

iii) Project Manager (Minimum score 90 marks)

Rounds:-

(1) Interview

Create a class Posting and write 3 constructors to initialize the object and set the parameters

and display the employee post according to selection criteria.

Data members:

- **int courseWork;**
- **int AptTest;**
- **int TechTest;**
- **int interview;**

Methods:

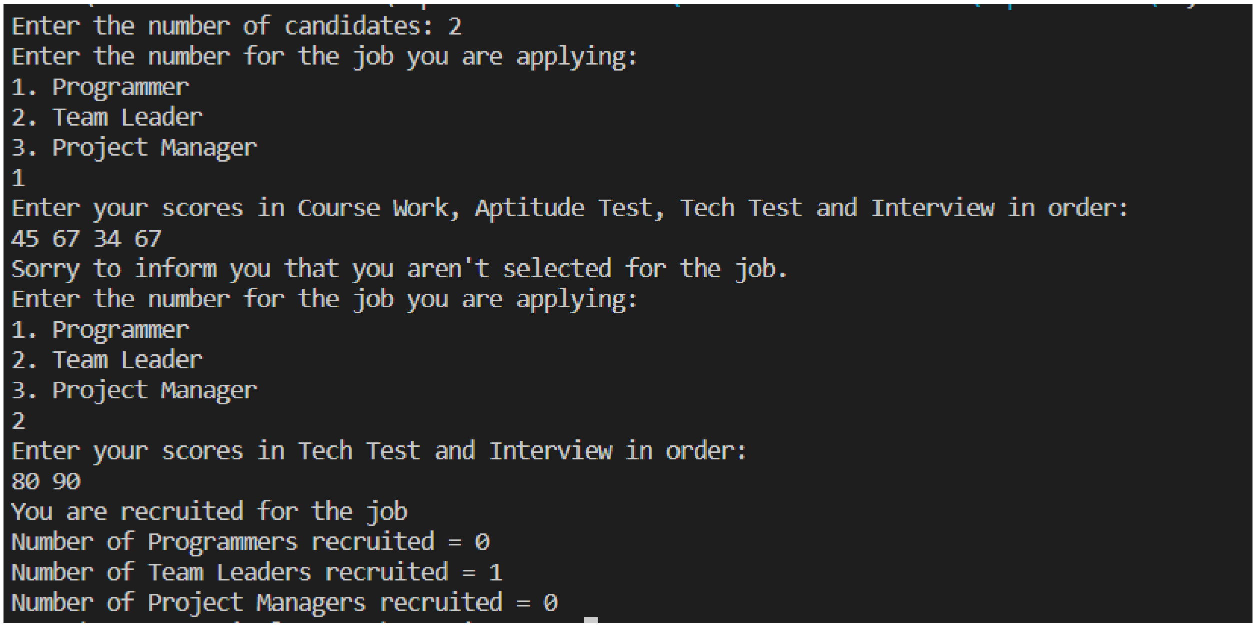
- **Posting (int courseWork, int AptTest, int TechTest,int interview)**
- **Posting (int TechTest,int interview)**
- **Posting (int interview)**

Make use of ‘this’ keyword.

PROGRAM:

```
import java.util.*;

class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter the number of candidates: ");
        int n = sc.nextInt();
        Posting b[] = new Posting[n];
        int pcount = 0;
        int lcount = 0;
        int mcount = 0;
        for (int k = 0; k < n; k++) {
            System.out.println("Enter the number for the job you are applying: ");
            System.out.println("1. Programmer\n2. Team Leader\n3. Project
Manager");
            int choice = sc.nextInt();
            int c, a, t, i;
            float score;
            switch (choice) {
                case 1:
                    System.out.println("Enter your scores in Course Work, Aptitude
Test, Tech Test and Interview in order:");
                    c = sc.nextInt();
                    a = sc.nextInt();
                    t = sc.nextInt();
                    i = sc.nextInt();
                    b[k] = new Posting(c, a, t, i);
                    score = b[k].getScore();
                    if (score / 4 >= 80) {
                        System.out.println("You are recruited for the job");
                        pcount++;
                    } else {
                        System.out.println("Sorry to inform you that you aren't selected for
the job.");
                    }
                    break;
                case 2:
                    System.out.println("Enter your scores in Tech Test and Interview in
order:");
                    t = sc.nextInt();
                    i = sc.nextInt();
                    b[k] = new Posting(t, i);
                    score = b[k].getScore();
                    if (score / 2 >= 85) {
                        System.out.println("You are recruited for the job");
                        lcount++;
                    } else {
                        System.out.println("Sorry to inform you that you aren't selected for
the job.");
                    }
                    break;
                case 3:
                    System.out.println("Enter your scores in Interview in order:");
                    i = sc.nextInt();
                    b[k] = new Posting(i);
                    score = b[k].getScore();
                    if (score >= 90) {
                        System.out.println("You are recruited for the job");
                        mcount++;
                    } else {
                        System.out.println("Sorry to inform you that you aren't selected for
the job.");
                    }
                    break;
                default:
                    System.out.println("Enter correct choice.");
            }
        }
        System.out.println("Number of Programmers recruited = " + pcount);
        System.out.println("Number of Team Leaders recruited = " + lcount);
        System.out.println("Number of Project Managers recruited = " + mcount);
    }
}

class Posting {
    private int courseWork;
    private int AptTest;
    private int TechTest;
    private int interview;

    Posting() {
        courseWork = 0;
        AptTest = 0;
        TechTest = 0;
        interview = 0;
    }
    public Posting(int courseWork, int AptTest, int TechTest, int interview) {
        this.courseWork = courseWork;
        this.AptTest = AptTest;
        this.TechTest = TechTest;
        this.interview = interview;
    }

    public Posting(int TechTest, int interview) {
        this.TechTest = TechTest;
        this.interview = interview;
        courseWork = 0;
        AptTest = 0;
    }

    public Posting(int interview) {
        this.interview = interview;
        courseWork = 0;
        AptTest = 0;
        TechTest = 0;
    }

    float getScore() {
        return courseWork + AptTest + TechTest + interview;
    }
}
```

RESULT:



```
Enter the number of candidates: 2
Enter the number for the job you are applying:
1. Programmer
2. Team Leader
3. Project Manager
1
Enter your scores in Course Work, Aptitude Test, Tech Test and Interview in order:
45 67 34 67
Sorry to inform you that you aren't selected for the job.
Enter the number for the job you are applying:
1. Programmer
2. Team Leader
3. Project Manager
2
Enter your scores in Tech Test and Interview in order:
80 90
You are recruited for the job
Number of Programmers recruited = 0
Number of Team Leaders recruited = 1
Number of Project Managers recruited = 0
```

CONCLUSION:	In this experiment, method overloading allows having more than one method with the same name in a class.