09/10/20

LAB 1

Java program to find roots of quadratic equation

```
import java.util.Scanner;
import static java.lang.Math.*;
class Quadratic
{ public static void main (String args[])
  { Scanner sc = new Scanner (System.in);
    System.out.print ("Enter the value of a:");
    float a = sc.nextFloat();
    System.out.print ("Enter the value of b:");
    float b = sc.nextFloat();
    System.out.print ("Enter the value of c :");
    float c = sc.nextFloat();
    if (a==0)
    { System.out.print ("Invalid! a cannot be zero");
    }
    else if{
    float d = b*b - 4*a*c;
    float sqrt_val = (float) Math.sqrt(abs(d));
    float root1 = (-b+sqrt_val)/(2*a);
    float root2 = (-b-sqrt_val)/(2*a);
    if (d==0)
      System.out.print ("Roots are real and equal :"+root1);
    else if (d>0)
    { System.out.print (" Roots are real and unique :");
      System.out.print (root1+"\n"+root2);
    }
    else
    { System.out.print ("Roots are imaginary");
      System.out.print (-b/(2*a)+"+i"+sqrt_val);
      System.out.print (-b/(2*a)+"-i"+sqrt_val);
    }
  }
}
```

Batch : 2
USN: 1BM19CS137
Name: S Skanda

Algorithm

1) Get the input for the values of a, b, c in expression ax^2+bx+c;
2) Calculate the value of discriminant $d = \sqrt{b^2-4ac}$
3) Calculate the value of the roots
   root1 $= \frac{-b+\sqrt{b^2-4ac}}{2a}$ root2 $= \frac{-b-\sqrt{b^2-4ac}}{2a}$
4) If value of a is zero print invalid statement and exit.
5) If d is equal to zero print that the roots are real and equal and also print the roots
6) If d is greater than zero print the roots with a message saying the roots are real and unequal/distinct
7) If d is less than zero print the roots with a message saying that the roots are imaginary

Output:

Enter value of a: 1
Enter value of b: 2
Enter value of c: 1
The roots are real and equal: -1.0

Enter value of a: 0
Enter value of b: 2
Enter value of c: 5
Invalid Input.

LAB 2 09/10/20

Develop a java program to create a class Student with members usn, name, an array credits and an array marks. Include methods to accept and display details and a method to calculate SGPA of a student.

Algorithm :-

1) Define student class and declare variables name, usn, array of marks and credits, sgpa.
2) Define function/method to read details from the user
3) Define function/method display details to display the user details and sgpa.
4) Define function/method to calculate grade points for each subject and thus calculate the sgpa using following formula

sgpa = (Σ grade points * credits) / (Σ Credits);

```
import java.util.scanner.
class student{
  string usn, name;
  int credits[] = new int[6];
  int marks[] = new int[6];
  int i;
  float sgpa;
  Scanner in = new Scanner(System.in);
  void read_details()
  { System.out.print("Enter your Name : ");
    name = in.nextLine();
    System.out.print("Enter your USN : ");
    usn = in.nextline();
    System.out.println("Enter credits for each Sub:");
    for(i=0; i<6; i++)
    { system.out.print("Subject"+(i+1)+":");
      credits[i] =inext Int();
    }

    for(i=0; i<6; i++)
    { System.out.print("Subject Marks:");
      marks[i] =in.next Int();
    }
  }
  void display_details()
  { System.out.println("Name : "+name);
    System.out.println("USN :"+usn);
    System.out.println("Credits ");
    for(i=0; i<6; i++)
    { system.out.println("Subject"+(i+1)+":"
                  + credits[i]);

    }
    System.out.println("Marks");
```

```
        for(i=0; i<6; i++)
        {System.out.println("Subject"+(i+1)+
                    "marks :"+ marks[i]);
        }
        calc_sgpa();
        System.out.println("Sgpa:"+sgpa);
    }
    void calc_sgpa()
    { int sumgp=0, sumcred=0, gp;
      for(i=0; i<6; i++)
      { if(marks[i]>=90) gp=10;
        else if(marks[i]>=80) gp=9;
        else if(marks[i]>=70) gp=8;
        else if(marks[i]>=60) gp=7;
        else if(marks[i]>=50) gp=6;
        else gp=5;
        sumgp = sumgp+(gp*credits[i]);
        sumcred = sumcred+credits[i];
      }
      sgpa = (sumgp/sumcred);
    }
class student_main{
  public static void main(String args[])
  { student s = new student();
    s.read_details();
    s.display_details();
  }
}
```

Expected Output:

Enter your name : QWERTY
Enter your USN : 123
Credits for each subject:
subject 1 : 2
subject 2 : 4
Subject 3 : 4
subject 4 : 4
Subject 5 : 4
subject 6 : 5
Marks for each subject:
subject 1 : 45
subject 2 : 56
subject 3 : 67
subject 4 : 78
subject 5 : 89
subject 6 : 90

Name : QWERTY
USN : 123
~~Subject~~
Credits:
Subject 1 : 2
Subject 2 : 4
Subject 3 : 4
Subject 4 : 4
Subject 5 : 4
Subject 6 : 5
Marks : subject 1 : 45
Subject 2 : 56
Subject 3 : 67
Subject 4 : 78
Subject 5 : 89
Subject 6 : 90
SgPA : 7.0