**PROGRAM 2**

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**Course/Branch:** B.TECH/CSE

**Sem/Sec:** 5/E

**Roll\_no:** 47

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**1.Objective:-**

Write a program to find the root of given polynomial using Bisection method correct up to 3 decimal places.

Question: x^3-4\*x-9

**2.Method/Algorithm:-**

Bisection method

1.Enter value of x

2.calculate/estimate x1-,x2- using round of concept

3.formulas

4.calculate relative error

**Bisection step:- step 1***-*enter the equation

2.enter the interval values a and b

3.check the interval values using ivt

(f(a).f(b))<0

4.repeat

5.covergence criteria

6.if f(a).(fx)<0 b=x f(x).(fb)<0 a=x

**3.Program:**

#include <bits/stdc++.h>

using namespace std;

double solution(double x)

{

return x\*x\*x - 4\*x - 9;

}

int ibt(double a,double x,double b)

{

if((solution(a)\*solution(x)) <0 )

{

return 1;

}

else if((solution(x) \*solution(b)) <0)

{

return 0;

}

else

{

return -1;

}

}

int main()

{

double temp=solution(0);

double a;

double b;

cout<<" iteration 1 the value is: "<<temp<<endl;

//bisection

// find the solution for any arbitary expression using bisection method

for(double i=1;i<200;i++)

{

double iter\_value=solution(i);

cout<<"iteration -"<<i<<" the value is: "<<iter\_value<<endl;

if((temp<0 && iter\_value >0) || (temp>0 && iter\_value<0))

{

a=temp;

b=iter\_value;

break;

}

else

{

temp=iter\_value;

}

}

cout<<"value of a is :"<<a<<" "<<"the value of b is :" <<b<<endl;

double x=(a+b)/2;

// cout<<x<<endl;

while((x-a) >= 0.0001 || (x-b) >= 0.0001)

{

int check\_ibt=ibt(a,x,b);

if(check\_ibt == 1)

{

b=x;

cout<<"the new interval is : "<<'('<< a <<"-"<<b<<")"<<endl;

}

else if(check\_ibt == 0 )

{

a=x;

cout<<"the new interval is : "<<'('<< a <<"-"<<b<<")"<<endl;

}

x=(a+b)/2;

}

cout<<"the answer is : "<<x<<endl;

return 0;

}

**4.Output:-**

iteration 1 the value is: -9

iteration -1 the value is: -12

iteration -2 the value is: -9

iteration -3 the value is: 6

value of a is :-9 the value of b is :6

the new interval is : (-1.5-6)

the new interval is : (2.25-6)

the new interval is : (2.25-4.125)

the new interval is : (2.25-3.1875)

the new interval is : (2.25-2.71875)

the new interval is : (2.48438-2.71875)

the new interval is : (2.60156-2.71875)

the new interval is : (2.66016-2.71875)

the new interval is : (2.68945-2.71875)

the new interval is : (2.7041-2.71875)

the new interval is : (2.7041-2.71143)

the new interval is : (2.7041-2.70776)

the new interval is : (2.70593-2.70776)

the new interval is : (2.70593-2.70685)

the new interval is : (2.70639-2.70685)

the new interval is : (2.70639-2.70662)

the new interval is : (2.7065-2.70662)

the answer is : 2.70656

**PROGRAM 3**

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**Date:** 14-sep-2022

**1.Objective:-**

Write a program to find the solution of given polynomial using regular falsi method correct up to 4 decimal places.

**Question**:- x^3-2\*x-5

**2.Method/Algorithm:-**

Regular falsi method

**3.Program:**

#include<bits/stdc++.h>

using namespace std;

double solution(double x)

{

return x\*x\*x -2 \*x -5;

}

int ibt(double a,double x,double b)

{

if((solution(a)\*solution(x)) <0 )

{

return 1;

}

else if((solution(x) \*solution(b)) <0)

{

return 0;

}

else

{

return -1;

}

}

int main()

{

double temp=0;

double a;

double b;

for(double i=1;i<100;i++)

{

if(solution(i)< 0 && solution(temp)>0 || solution(i)> 0 && solution(temp)<0)

{

a=temp;

b=i;

break;

}

temp=i;

}

double x =(a\*solution(b) - b\*solution(a))/( solution(b)- solution(a));

while((x-a) >= 0.0001 || (x-b) >= 0.0001)

{

int check\_ibt=ibt(a,x,b);

if(check\_ibt == 1)

{

b=x;

cout<<"the new interval is : "<<'('<< a <<"-"<<b<<")"<<endl;

}

else if(check\_ibt == 0 )

{

a=x;

cout<<"the new interval is : "<<'('<< a <<"-"<<b<<")"<<endl;

}

x=(a\*solution(b) - b\*solution(a))/( solution(b)- solution(a));

}

cout<<"the answer is : "<<x<<endl;

cout<<x;

return 0;

}

**4.Output:-**

the new interval is : (2.05882-3)

the new interval is : (2.08126-3)

the new interval is : (2.08964-3)

the new interval is : (2.09274-3)

the new interval is : (2.09388-3)

the new interval is : (2.09431-3)

the new interval is : (2.09446-3)

the answer is : 2.09452