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**NPTEL** (<https://swayam.gov.in/explorer?ncCode=NPTEL>) » **Problem Solving Through Programming In C (course)**



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## Course outline

How does an  
NPTEL  
online  
course  
work? ()

Week 0 : ()

Week 1 ()

Week 2 ()

Week 3 ()

Week 4 ()

Week 5 ()

Week 6 ()

Week 7 ()

# Week 10 : Programming Assignment 01

**Due on 2023-10-05, 23:59 IST**

Write a C program to find the root of the equation using bisection method for different values of allowable error of the root.

$$f(x) = 2x^3 - 3x - 5$$

## Sample Test Cases

	Input	Output
Test Case 1	0.01	Root = 1.7266
Test Case 2	0.001	Root = 1.7197
Test Case 3	0.1	Root = 1.6875

The due date for submitting this assignment has passed.

**Assignment submitted on 2023-10-05, 21:34 IST**

Your last recorded submission was :

```

1 #include<stdio.h>
2 float fun (float x); //Function fun returns the function value of f(x)
3 void bisection (float *x, float a, float b, int *itr); // This function comp
4
5 int main ()
6 {
7     int itr = 0, maxitr=10;
8     float x, a=1.0, b=2.0, allerr, x1; // x is the value of root in each iter
9     // a and b are the initial range for calculating the root using bisection
10
11 scanf("%f", &allerr); // allerr is the allowable error taken from test case
12     bisection (&x, a, b, &itr);
13
14 /* Use the printf statement as given below to print the root
15 printf("Root = %1.4f\n", x1); */
16 do
17 {
18     if(fun(a)*fun(x) < 0)

```



Week 8 ()

Week 9 ()

Week 10 ()

Week 11 ()

Week 12 ()

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```

19         b=x;
20     else
21         a=x;
22     bisection (&x1, a, b, &itr);
23     if(((x1-x)<0 && -(x1-x)< allerr) || ((x1-x)>0 && (x1-x)< allerr))
24     {
25         printf("Root = %1.4f", x1);
26         return 0;
27     }
28     x=x1;
29 } while(itr < maxmitr);
30 return 1;
31 }
32
33 float fun(float x)
34 {
35     return (2*x*x*x - 3*x - 5);
36 }
37
38 void bisection(float *x, float a, float b, int *itr)
39 /* this function performs and prints the result of one iteration */
40 {
41     *x=(a+b)/2;
42     ++(*itr);
43 }

```

Sample solutions (Provided by instructor)

```

1 #include<stdio.h>
2 float fun (float x); //Function fun returns the function value of f(x)
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11 scanf("%f", &allerr); // allerr is the allowable error taken from test case
12     bisection (&x, a, b, &itr);
13
14 /* Use the printf statement as given below to print the root
15 printf("Root = %1.4f\n", x1); */
16 do
17 {
18     if (fun(a)*fun(x) < 0)
19         b=x;
20     else
21         a=x;
22     bisection (&x1, a, b, &itr);
23     if (((x1-x)<0 && -(x1-x)< allerr) || ((x1-x)>0 && (x1-x)< allerr))
24     {
25         printf("Root = %1.4f\n", x1);
26         return 0;
27     }
28     x=x1;
29 }
30 while (itr < maxmitr);
31 return 1;
32 }
33 float fun (float x)
34 {
35     return (2*x*x*x - 3*x - 5);
36 }
37 void bisection (float *x, float a, float b, int *itr)
38 /* this function performs and prints the result of one iteration */
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40     *x=(a+b)/2;
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```



