EXPERIMENT - 4

APPLIED MATHEMATICS LAB

Aim

To find the solution of algebraic and transcendental equations using
(a) Bisection method
(b) Newton- Raphson method.

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4C7

EXPERIMENT – 4

Aim:

To find the solution of algebraic and transcendental equations using

(a) Bisection method

(b) Newton- Raphson method.

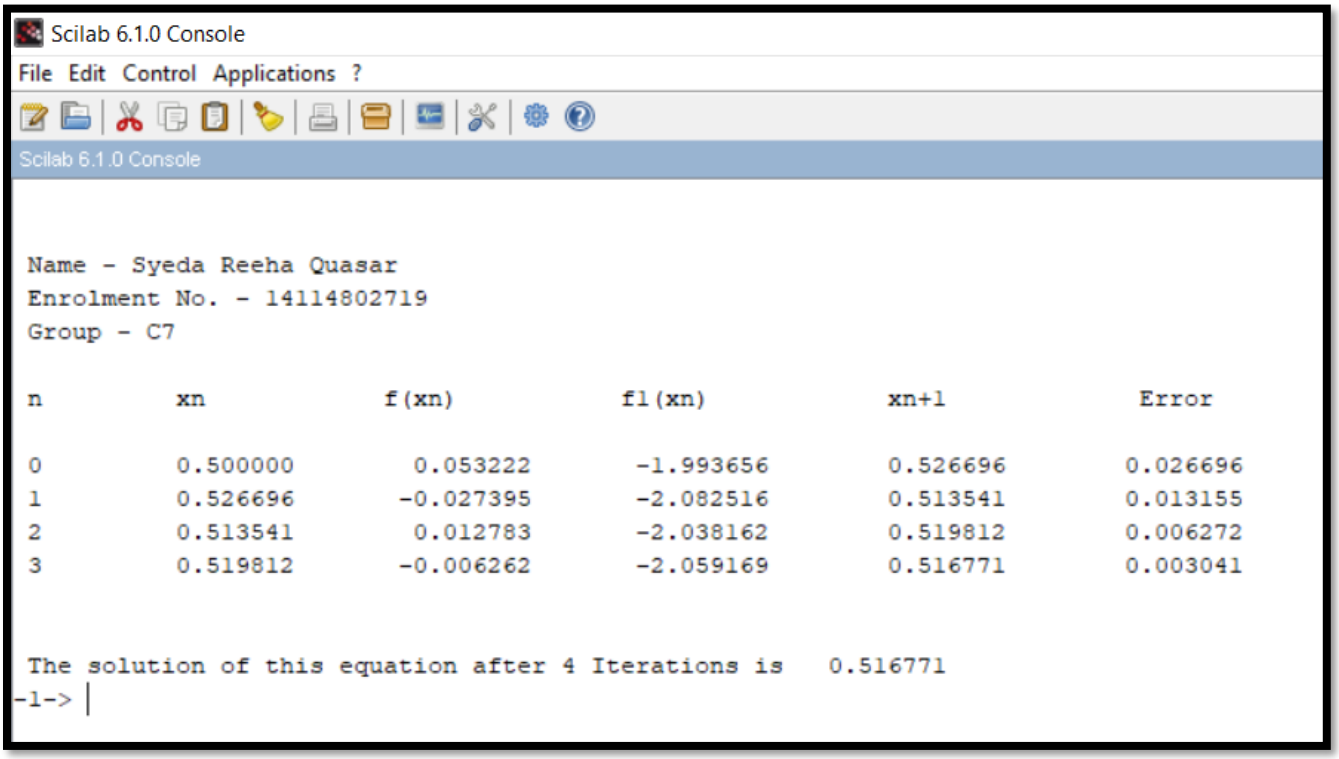
Source Code:

Newton RAPHSON

// Newton Raphson Method

```
clc
printf('\n\n Name - Syeda Reeha Quasar \n Enrolment No. - 14114802719 \n Group - C7 \n\n')

deff ('x = f(x)', 'x = cos(x) - x * exp(x)')
deff ('x = f1(x)', 'x = sin(x) - (x+1) * exp(x)')

x0 = 0.5; e = 0.00001;
printf(' n \t   xn \t\t f(xn) \t\t f1(xn) \t   xn+1 \t    Error \n\n')

for i = 1:4
   x1 = x0 - f(x0)/f1(x0)
   e1 = abs(x0 - x1)
   printf(' %i \t %10f \t %10f \t %10f \t %10f \t %10f \n', i-1, x0, f(x0), f1(x0), x1, e1)
   x0 = x1
   if e1 < e then
      break
   end
end

printf('\n\n The solution of this equation after %i Iterations is %10f', i, x1)
```

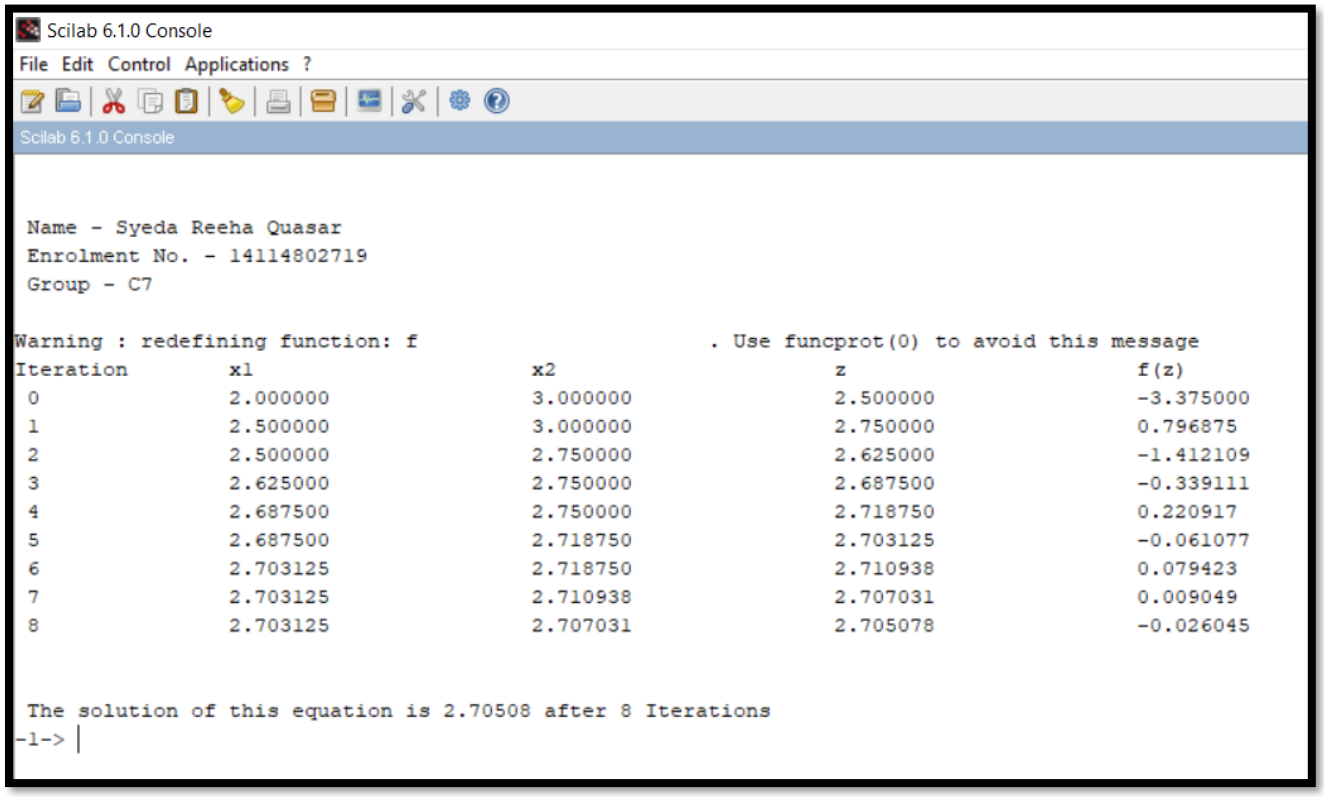
Output:


Scilab 6.1.0 Console
File Edit Control Applications ?
Scilab 6.1.0 Console
Name - Syeda Reeha Quasar
Enrolment No. - 14114802719
Group - C7
n xn f(xn) fl(xn) xn+1 Error
0 0.500000 0.053222 -1.993656 0.526696 0.026696
1 0.526696 -0.027395 -2.082516 0.513541 0.013155
2 0.513541 0.012783 -2.038162 0.519812 0.006272
3 0.519812 -0.006262 -2.059169 0.516771 0.003041
The solution of this equation after 4 Iterations is 0.516771
-1->

Bisection Method

```
// Bisection method

clc
printf('\n\n Name - Syeda Reeha Quasar \n Enrolment No. - 14114802719 \n Group - C7 \n\n')

deff ('y = f(x)', 'y = x^3- 4*x -9')

x1 = 2; x2 = 3; e = 0.001; i = 0;
printf('Iteration \t x1 \t\t\t x2 \t\t\t z \t\t\t f(z) \n')

while abs(x1 - x2) > 2*e
   z = (x1 + x2)/2
   printf(' %i \t\t %f \t\t %f \t\t %f \t\t %f \n', i, x1, x2, z, f(z))
   if f(z) * f(x1) > 0 then
      x1 = z
   else
      x2 = z
   end
   i = i + 1
end

printf('\n\n The solution of this equation is %g after %i Iterations', z, i-1)
```

Output:


Scilab 6.1.0 Console
File Edit Control Applications ?
Scilab 6.1.0 Console
Name - Syeda Reeha Quasar
Enrolment No. - 14114802719
Group - C7
Warning : redefining function: f . Use funcprot(0) to avoid this message
Iteration x1 x2 z f(z)
0 2.000000 3.000000 2.500000 -3.375000
1 2.500000 3.000000 2.750000 0.796875
2 2.500000 2.750000 2.625000 -1.412109
3 2.625000 2.750000 2.687500 -0.339111
4 2.687500 2.750000 2.718750 0.220917
5 2.687500 2.718750 2.703125 -0.061077
6 2.703125 2.718750 2.710938 0.079423
7 2.703125 2.710938 2.707031 0.009049
8 2.703125 2.707031 2.705078 -0.026045
The solution of this equation is 2.70508 after 8 Iterations
-1->