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# Laboratory 5 Program #1

# This example calculates the roots of equation f(x)=0
# given an initial guess value,
# using Newton-Raphson method
#
clear all # Clear all local and global user-defined variables
disp('Solving the eq. cos(x)-x^3=0 using Newton-Raphson method');
# NOTE: The exact solution of f(x)=0 eq. is x=0.86547422
#
# Define the f(x) function
f =@(x) cos(x)-x^3;
# Define the derivative of the f(x) function
fd =@(x) -sin(x)-3*x^2;
#
# Read the initial data
xi = input("Enter the initial guess value = ");
tol = input("Enter the tolerance = ");
maxit = input("Enter the maximum number of allowable iterations = ");
#
it = 1; # Initial number of iterations
#
while it <= maxit
  xr = xi-f(xi)/fd(xi);
  printf("iter= %i \t xi= %f \t xr= %f \n", it, xi, xr); # Print it, xi and xr
  if abs(f(xr)) < tol
    printf("Root is x= %f \n", xr); # The procedure was successful!
    break
  else
    it = it + 1;
    xi = xr;
  endif
endwhile
if it > maxit
  printf('Unable to find the root with tolerance %f in %i iterations! \n',
            tol, it-1)
  printf('Increase the maximum number of allowable iterations ! \n')
endif
```