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# Laboratory 5 Program #2

# This example calculates the roots of f(x)=0 equation
# given two initial guess values,
# using the Secant method.
#
clear all # Clear all local and global user-defined variables
disp('Solving the eq. cos(x)-x^3=0 using the Secant method');
# NOTE: The exact solution of eq. f(x)=0 is x=0.86547422
#
# Define the f(x) function
f =@(x) cos(x)-x^3;
#
# Read the initial data
x1 = input("Enter the first initial guess value = ");
x2 = input("Enter the second initial guess value = ");
tol = input("Enter the tolerance = ");
maxit = input("Enter the maximum allowable number of iterations = ");
#
it = 2; # Initial number of iterations
f1 = f(x1);
f2 = f(x2);
while it <= maxit
  xr = x2-f2*(x2-x1)/(f2-f1);
  printf("iter= %i \t x1= %f \t x2= %f \t xr= %f \n", it, x1, x2, xr);
  if abs(f(xr)) < tol
    printf("Root is x= %f \n", xr); # The procedure was successful!
    break
  else
    it = it + 1;
    x1 = x2;
    f1 = f2;
    x2 = xr;
    f2 = f(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 allowable number of iterations ! \n')
endif
```