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% ----- Matlab script file demoprogram1.m -----%
% Demo Program for a MATLAB script file
% Aim: Introduce some basic Matlab commands
% Problem: Generate graphs for the following two nonlinear equations
% Equation 1:  $f_1(x) = x(1)^2 + x(2)^2 - 4 = 0$ 
% Equation 2:  $f_2(x) = x(1) * x(2) - 1 = 0$ 
% Plot these two graphs on same plot

% Follow the given steps:

clear all % This command clears the workspace
close all % This command closes all Matlab created graphics windows
clc % This command clears the command window

% Create vector x starting from x = 0.3 to x = 2 such that
% the difference between two successive elements dx is not less
% than 0.01 and not more than 0.1
dx = input('Input increment between 0.01 to 0.1: ');
if( dx < 0.01 ) % This is how an if-then-else construct is used
dx = 0.01 ;
elseif ( dx > 0.01 )
dx = 0.1 ;
end
xvec = 0.3:dx:2 ; % This command creates a vector with xvec(1) = 0.3
% and xvec(N) = 2 with the successive elements differing by dx
nx = length( xvec )
xvec % typing variable name without semicolon will display the variable
% pause command waits till you hit some key on the keyboard
fprintf('\n\n \t Hit Any Key to Continue! \n'), pause

% Using elements of xvec, generate function elements
for i = 1: nx
y1(i) = 1 / xvec(i) ;
y2(i) = sqrt( 4 - xvec(i)^2) ;
end

% Plot the graphs for f1(x) and f2(x)
set(0,'DefaultLineWidth',2) %sets the curve line width on the plot
set(0,'DefaultAxesFontSize',15) %sets the Font Size on the plot
set(0,'DefaultAxesFontName','Times New Roman')
set(0,'DefaultAxesFontWeight','Bold')
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plot(xvec,y1, 'b') % First plot xvec v/s y1 in blue color
hold on
plot( xvec, y2, 'r' ) % Then plot xvec v/s y2 in red color in same figure
hold off
grid % Draws Grid

% Label your figure and give figure title
xlabel('x (sec)'),
ylabel('y_1 and y_2'),
title('2-dim Nonlinear Functions')
```