```
% Fourth-Order Runge-Kutta (RK4) Method for Solving a Cauchy Problem
clear; clc; close all;

% Define the function f(x, y) = dy/dx
f = @(x, y) -2*x*y;  % Example: dy/dx = -2xy

% Initial conditions
x0 = 0;    % Initial x-value
y0 = 1;    % Initial y-value
h = 0.1;   % Step size
x_end = 2; % Final x-value

% Number of iterations
N = (x_end - x0) / h;

% Initialize arrays for x and y
x = zeros(1, N+1);
y = zeros(1, N+1);

% Set initial values
x(1) = x0;
y(1) = y0;

% RK4 Method Iteration
for i = 1:N
    k1 = f(x(i), y(i));
    k2 = f(x(i) + h/2, y(i) + (h/2) * k1);
    k3 = f(x(i) + h/2, y(i) + (h/2) * k2);
    k4 = f(x(i) + h, y(i) + h * k3);

    y(i+1) = y(i) + (h/6) * (k1 + 2*k2 + 2*k3 + k4);
    x(i+1) = x(i) + h;
end

% Display results
disp('x-values:');
disp(x);
disp('y-values:');
disp(y);

% Plot the numerical solution
plot(x, y, 'bo-', 'LineWidth', 2, 'MarkerSize', 6);
hold on;
xlabel('x');
ylabel('y');
title('Fourth-Order Runge-Kutta (RK4) Method for Solving Cauchy Problem');
grid on;
legend('RK4 Approximation');
```