```matlab
% close all; clear all;
% This Matlab code generates a vector field for the system of ODEs
% dx1/dt = f(x1,x2), dx2/dt = g(x1,x2)

% This code currently will find the vector field for the EXAMPLE problem
%            dx1/dt = a*x2
%            dx2/dt = -x1
%-----------------------------------------------------------------------
%         THESE ARE NOT THE PROBLEMS YOU ARE SOLVING FOR PROJECT 1!
% (To have this code generate the vector fields for the Project 1 systems
% of equations, make any necessary adjustments in the sections of code
% labeled with "Step i" where i = 1, 2, 3, 4, or 5)
%-----------------------------------------------------------------------


% Step 1: Set the axis limits so that you plot the vector field over the
%            intervals x1min < x1 < x1max, x2min < x2 < x2max
    x1min = -1; x1max = 6; x2min = -1; x2max = 6;

% Step 2: pick step sizes for x1 and x2;
    x1step = 0.25; x2step = 0.25;

% generate mesh for plotting
    [x1, x2] = meshgrid(x1min:x1step:x1max, x2min:x2step:x2max);

% Step 3: define all needed parameter values
    a = 1.5;
    b = 1.1;
    y = 2.5;
    d = 1.4;
    k = 0.5;

% Step 4: define the system of equations you are using
%     dx1 = (-a.*x1)+(b.*x1.*x2);
%     dx2 = (y.*x2)-(d.*x1.*x2);
%
    dx1 = (-a.*x1)+(b.*x1.*x2);
    dx2 = y.*(1-k.*x2).*x2-(d.*x1.*x2);

% normalize vectors (to help plotting)
    dx2 = dx2./sqrt(dx1.^2 + dx2.^2);
    dx1 = dx1./sqrt(dx1.^2 + dx2.^2);


% generate the vector field
    quiver(x1, x2, dx1, dx2, 'blue', 'AutoScaleFactor',0.5)

% specify the plotting axes
    axis([x1min x1max x2min x2max])

% Step 5: label the axes, include a title
    xlabel('$x1$','Interpreter','latex')
```

```matlab
ylabel('$x2$','Interpreter','latex')
title('Vector field example','Interpreter','latex')
```

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