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%==========================================================================
%============== Accelerometer Vector Skeleton Code ========================
%==========================================================================

% EPED 067 Group 3 - Joe Massott and Abul Hasnat

%This skeleton script does the following:
% 1. Specifies the COM port that the Arduino board is connected to
% 2. Initializes the Serial Port - setupSerial() (not to be altered)
% 3. Runs a calibration routine if needed - calibrate() (not to be altered)
% 4. Opens a new figure and customizes it by adding start/stop and close
%    serial buttons
%    - A different stop call
% 5. Runs a loop that continually reads the accelerometer values
%    readAcc() - (not to be altered)
%    The accelerometer data is placed in the variables [gx gy gz].
% 6. Displays the vectors using line() command
```

1. Specifies the COM port that the Arduino board is connected to

```
%comPort = 'COM27';%This can be found out using the device manager (Windows)
                   %On a mac type ls /dev/tty* in Terminal and
                   %  identify the device that is listed as usbmodem
                   %  Example for a MAC comPort = '/dev/tty.usbmodemfa131';
%abul
%comPort = '/dev/tty.usbmodem1411';
%Joe
comPort = '/dev/tty.usbmodemfd121';
```

2. Initialize the Serial Port - setupSerial() (not to be altered)

```
%connect MATLAB to the accelerometer
if (~exist('serialFlag','var'))
 [accelerometer.s,serialFlag] = setupSerial(comPort);
end
```

```
            serial read
```

3. Run a calibration routine if needed - calibrate() (not to be altered)

```
%if the accelerometer is not calibrated, calibrate now
if(~exist('calCo', 'var'))
    calCo = calibrate(accelerometer.s);
end
```

4. Open a new figure - add start/stop and close serial buttons

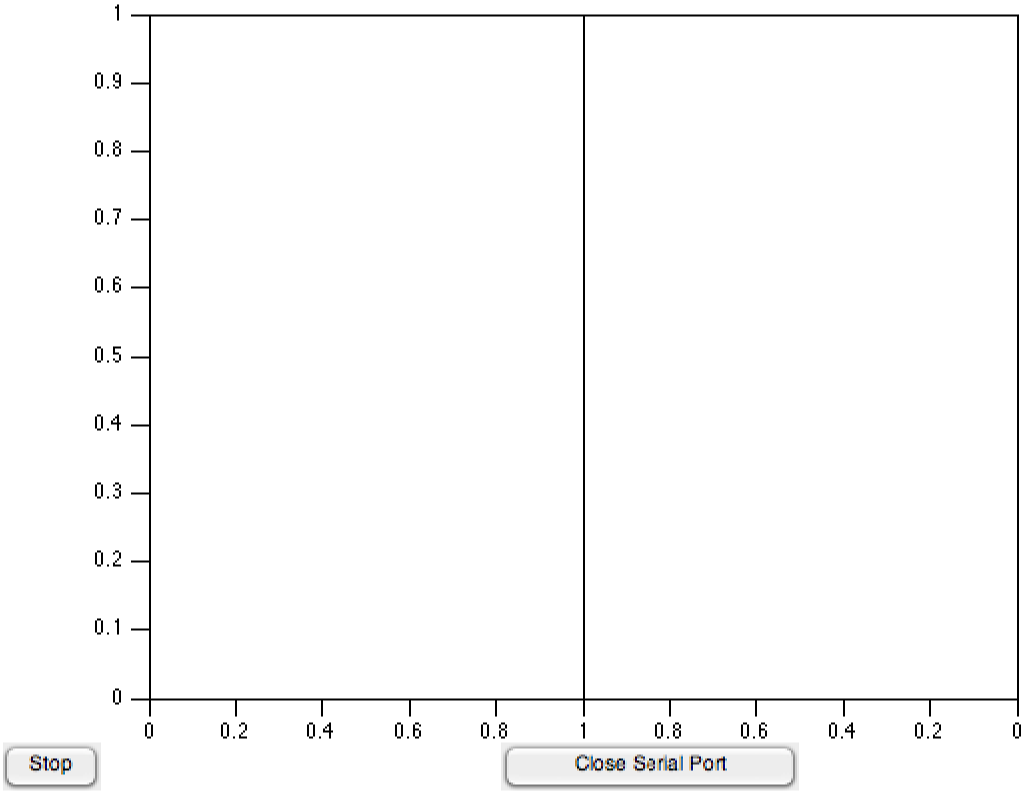
```
%initalize the figure that we will plot in if it does not exist
if(~exist('h', 'var') || ~ishandle(h))
    h = figure(1);
    ax = axes('box','on','CameraPosition',[1,1,.5]);
end

%add a start/stop and close serial button inside the figure
%Keep in mind the 'stop_call_wk3' function that this button calls everytime
%it is pressed

if(~exist('button','var'))
    button = uicontrol('Style','pushbutton','String','Stop',...
                    'pos',[0 0 50 25],'parent',h,...
                    'Callback','stop_call_vector','UserData',1);
end

%Keep in mind the 'close_call' function that this button calls everytime
%it is pressed

if(~exist('button2','var'))
    button2 = uicontrol('Style','pushbutton','String','Close Serial Port',...
                    'pos',[250 0 150 25],'parent',h,...
                    'Callback','closeSerial','UserData',1);
end
```



5. Runs a loop that continually reads the accelerometer values

```
readAcc() - (not to be altered)
The accelerometer data is placed in the variables [gx gy gz].
```

```
while (get(button, 'UserData'))

    %read accelerometer output
    [gx gy gz] = readAcc(accelerometer, calCo);

    cla;            %clear everything from the current axis

    %plot X and Y acceleration vectors and resultant acceleration vector
    %line([0 gx], [0 0],  [0 0], 'Color', 'r', 'LineWidth', 2, 'Marker', 'o');
    %line([0 0],  [0 gy], [0 0], 'Color', 'b', 'LineWidth', 2, 'Marker', 'o');
    %line([0 0],  [0 0],  [0 gz], 'Color', 'y', 'LineWidth', 2, 'Marker', 'o');

    % plot3(gx,'Color', 'r', 'LineWidth', 2, 'Marker', 'o',gy,...
    %    'Color', 'b', 'LineWidth', 2, 'Marker', 'o',gz,'Color', 'y', 'LineWidt
    %    2, 'Marker', 'o');
    % plot3(gx,gy,gz,'Color', 'r', 'LineWidth', 2, 'Marker', 'o');

line([0 gx], [0 0],  [0 0], 'Color', 'r', 'LineWidth', 2, 'Marker', 'o');
line([0 0],  [0 gy], [0 0], 'Color', 'b', 'LineWidth', 2, 'Marker', 'o');
line([0 0],  [0 0],  [0 gz], 'Color', 'y', 'LineWidth', 2, 'Marker', 'o');
line([0 gx],[0 gy],[0 gz])

    %limit plot to +/- 1.25 g in all directions and make axis square
    limits = 2.5;
    axis([-limits limits -limits limits -limits limits]);
    axis square;

    %calculate the angle of the resultant acceleration vector and print
    theta = atand(gy/gx);
    title(['Accelerometer tilt angle: ' num2str(theta, '%.0f')]);

    %force MATLAB to redraw the figure
    drawnow;

end
% EPED 067 Group 3 - Joe Massott and Abul Hasnat
```

```
Serial Port Closed

Undefined function or variable 'button'.

Error in wk3_vector (line 77)
while (get(button, 'UserData'))
```

Published with MATLAB® 7.13