

## Testing of the final project

I have used manual as well as automated testing in this project.  
Every component was initialized and status was printed over UART.

The heart of this project accelerometer sensor was checked for proper initialization.

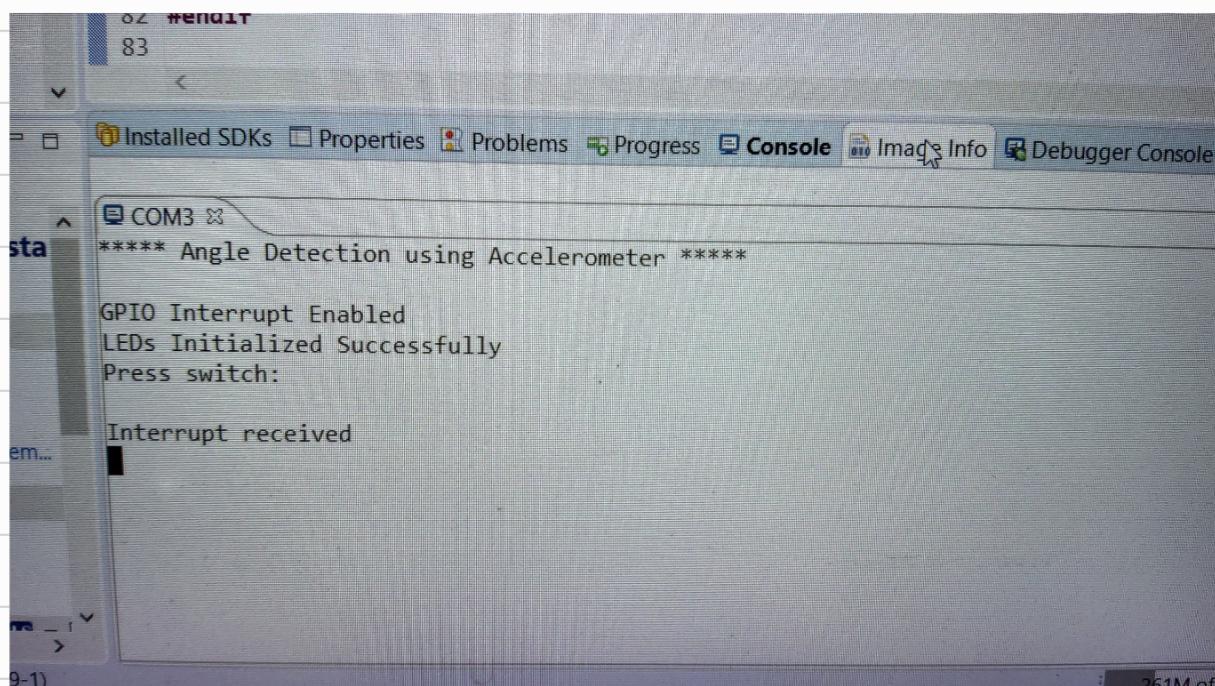
### AUTOMATED TESTS:

Automated tests were used for VART circular buffer and sine function. These tests were implemented from previous assignments.

### MANUAL TESTS:

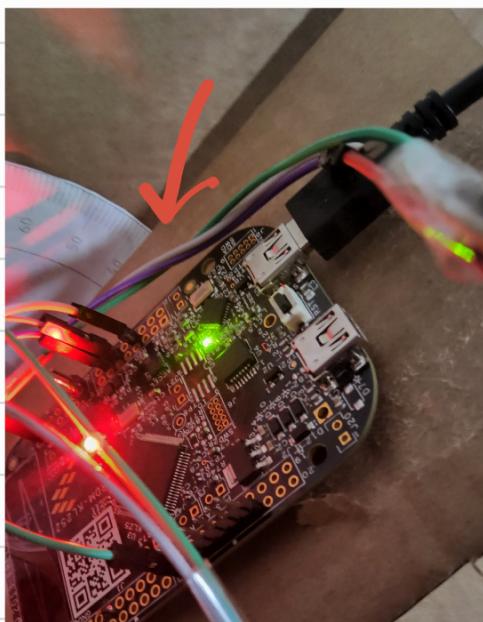
#### GPIO Button:

- Button was initialized to give interrupt on rising edge.
- I tried to check if button press was triggering the interrupt by manually pressing.
- Found out that sometimes the interrupt was triggering multiple times.
- Resolved that issue using software debouncing.



## Accelerometer functionality.

- Obtained Raw values at the start
  - Angle can be found out using trigonometry so, and some formulae to find roll () and pitch angle ()
  - To check whether the calculated angle is correct, i used a traditional protractor to measure the angles from reference.



```
DebugConsole();  
Installed SDKs Properties Problems Progress Console Image Info Debugger Console Terminal  
COM3  
Roll angle from reference is 37 degree  
Roll angle from reference is 41 degree  
Roll angle from reference is 34 degree  
Roll angle from reference is 32 degree  
Roll angle from reference is 34 degree  
Roll angle from reference is 36 degree  
Roll angle from reference is 26 degree  
Roll angle from reference is 36 degree  
Roll angle from reference is 38 degree  
Roll angle from reference is 41 degree  
Roll angle from reference is 40 degree  
Roll angle from reference is 39 degree  
Roll angle from reference is 41 degree  
Roll angle from reference is 41 degree  
Roll angle from reference is 41 degree  
Roll angle from reference is 42 degree  
Roll angle from reference is 41 degree
```

- I was getting precise measurement with accuracy of  $\pm 1$

# UART interface

- For UART, I had an functionality to enter target angle.
  - I used a function which converts input characters to integer value.
  - To test that, I entered various input numbers, and printed them in decimal form to test if it is getting converted properly.

Enter target angle using UART, Range: 0 to 180 degree: 23  
Target Angle selected: 23

- Also I tested the input angle range and backspace functionality using random values .

```
COM3
*****
Angle Detection using Accelerometer *****

GPIO Interrupt Enabled
LEDs Initialized Successfully
Accelerometer Initialized
Set the reference angle:
    By adjusting the axis and pressing tactile switch

Reference angle is 0 degree on roll_angle axis

Enter target angle using UART, Range: 0 to 180 degree: 560
***INVALID ANGLE***

Enter target angle using UART, Range: 0 to 180 degree: 181
***INVALID ANGLE***

Enter target angle using UART, Range: 0 to 180 degree: 180
Target Angle selected: 180
Roll angle from reference is 0 degree
```

- All other functionalities like LED and Buzzer output was tested visually if correct color and sound is played on angle detection.

