

Advanced Embedded Software Development

Homework-5

Github Link: [https://github.com/satya45/Advanced Embedded Software Development](https://github.com/satya45/Advanced_Embedded_Software_Development).

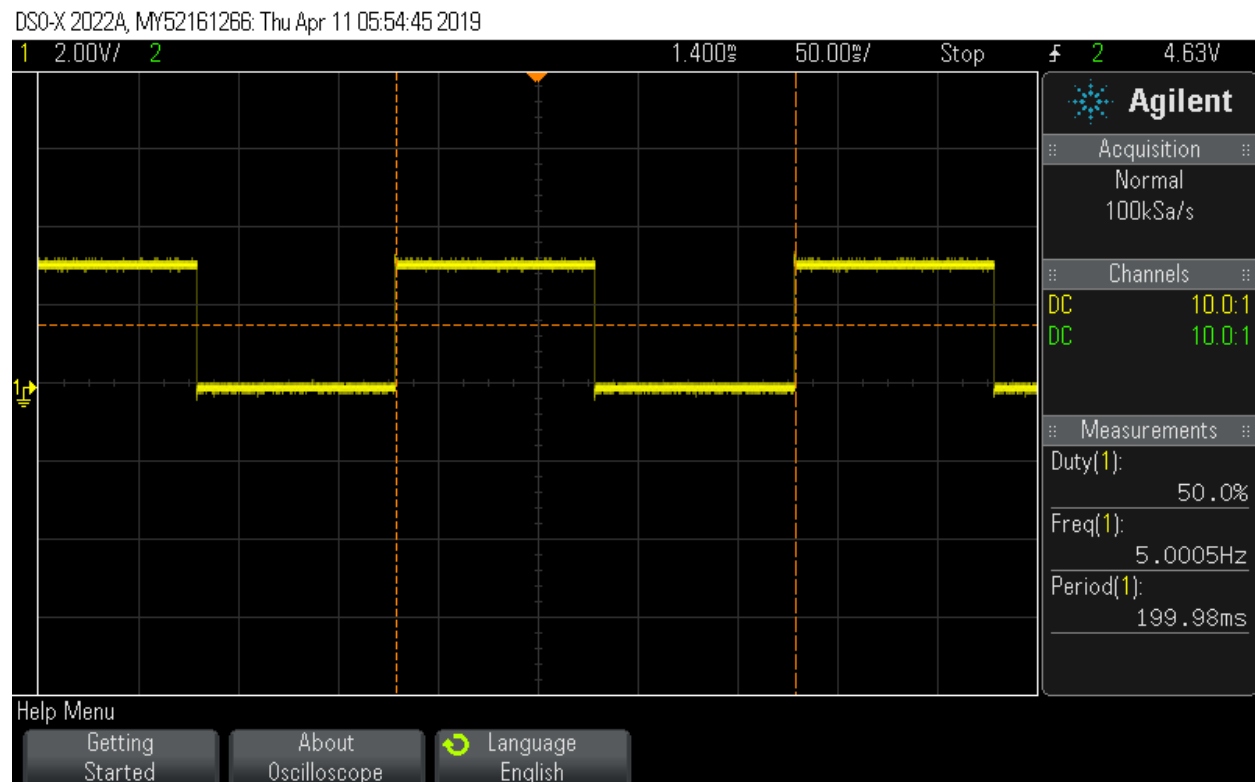
Code uploaded on Github.

Implementation: -

I have two hardware timers initialized where the Timer0 is running at 1Hz which posts semaphore for the temperature task. The Timer1 is configured to run at 10Hz which posts semaphore for the led task.

The Timer1 handler will run every 100ms which will toggle each LED 1 time. Hence, the ON time of the led is 100ms and the off time of the LED is 100ms which shows the frequency as 5Hz.

Scope shot of the LED toggling: -



UART Terminal Screenshot: -

Screenshot shows temperature and led data both.

```
*****Temperature Data Received*****
Temperature Read 22.152 C
Timestamp 51000ns

*****LED Data Received*****
LED Toggle Count 510
My Name: Satya
Timestamp 51000ns

*****LED Data Received*****
LED Toggle Count 511
My Name: Satya
Timestamp 51100ns

*****LED Data Received*****
LED Toggle Count 512
My Name: Satya
Timestamp 51200ns

*****LED Data Received*****
LED Toggle Count 513
My Name: Satya
Timestamp 51300ns

*****LED Data Received*****
LED Toggle Count 514
My Name: Satya
Timestamp 51400ns

*****LED Data Received*****
LED Toggle Count 515
My Name: Satya
Timestamp 51500ns

*****LED Data Received*****
LED Toggle Count 516
My Name: Satya
Timestamp 51600ns

*****LED Data Received*****
LED Toggle Count 517
My Name: Satya
Timestamp 51700ns
```

EXTRA Credit: - The alert task prints the alert statement on the UART showing temperature is above threshold.

Implementation: - The alert task created waits on for the notification from the temperature task using api `ulTaskNotifyTake()`. I have defined a macro `TEMP_THRESHOLD` which is set to 23 degree Celsius. The temperature task after every temperature read checks if the temperature crosses the threshold. If it does so, the temperature task notifies the alert task using `xTaskNotfyGive()` api.

Screenshot showing Alert message: -

```
*****Temperature Data Received*****  
Temperature Read 28.240 C  
Timestamp 132060ms  
  
*****LED Data Received*****  
LED Toggle Count 1321  
My Name: Satya  
Timestamp 132060ms  
  
ALERT::: Temperature beyond 24 threshold  
  
*****LED Data Received*****  
LED Toggle Count 1322  
My Name: Satya  
Timestamp 132160ms  
  
*****LED Data Received*****  
LED Toggle Count 1323  
My Name: Satya  
Timestamp 132260ms
```