Project

Goals

1. Advanced FreeRTOS programming
2. Designing a full working embedded application

Objective of the project

Building off of lab 4, you are ready to build your own project! This lab specification is designed to be vague, so you can design your own application yourself. Please be creative and it is a great chance to impress us!

What you need for the lab

1. The EK-TM4C123 Launchpad (http://www.ti.com/tool/EK-TM4C123GXL)
2. TM4C123 data sheet (https://canvas.uw.edu/courses/1205180/files/folder/Ek-TM4C123GXL?preview=49165887)
3. IAR workbench or other IDE
4. ADC (https://en.wikipedia.org/wiki/Analog-to-digital_converter)
5. DMA(https://sites.google.com/site/luiselectronicprojects/tutorials/tiva-tutorials/tiva-dma/understanding-the-tiva-dma)
6. UART (https://en.wikipedia.org/wiki/Universal_asynchronous_receiver-transmitter)
7. LCD (EB-LM4F120-L35)(http://www.kentecdisplay.com/uploads/soft/Products_spec/EB-LM4F120-L35_UserGuide_04.pdf)
8. LEDs (https://learn.adafruit.com/all-about-leds/the-led-datasheet)
9. Push buttons (https://www.alps.com/prod/info/E/HTML/Tact/SnapIn/SKHH/SKHHAKA010.html)
10. Debouncing (https://canvas.uw.edu/courses/1205180/files/folder/labs?preview=49719211)
11. Gantt Chart (https://canvas.uw.edu/courses/1205180/files/folder/hw?preview=49958856https://canvas.uw.edu/courses/1205180/files/folder/hw?preview=49958856)

System Requirements

1. FreeRTOS is required.
2. The LCD: both the display and the touch features are required.
3. Add wireless communication into the system, for example, Bluetooth, WIFI, etc.
4. Add one extra module into the system, for example, Gyro, etc.
5. Add a front-end display the data, for example, android app, web server, etc.
6. Extra credit (IOT): add a backend data processing system. The data will be captured by the sensors and past back to the backend (for example, SQL database, webserver, etc) for data processing, and send back to the front end for displaying.

Deliverables:

1. A report with all the details of the project design. Successes, setbacks, and future work should be addressed.
2. Source code
3. A 4-5 minute video demonstrating the functionality of your group's project.
4. Any slides you made for the final presentation