(CSE211s) INTRO. TO EMBEDDED SYSTEMS

PROJECT DOCUMENTATION

Team members:

- Shehab Mahmoud Salah (2100320)
- Abdelrahman Hany Mohamed (2100627)
- Youssef Ahmed Mohamed (2101006)
- Omar Mamon Hamed (2100767)
- Seif El Din Tamer Shawky (2100268)
- Seif Eldeen Ahmed Abdulaziz (2100339)
- Habiba El-sayed Mowafy (2100792)
- Moaz Ragab (2100938)
- Mohamed Waleed Sayed (2100623)
- Ahmed Ashraf Ali (2100255)

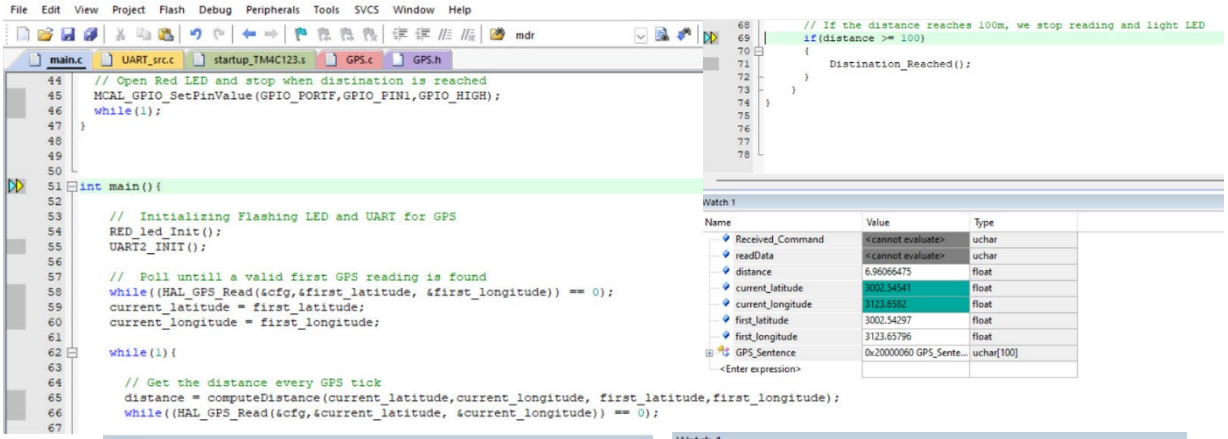
1. Project Outline:

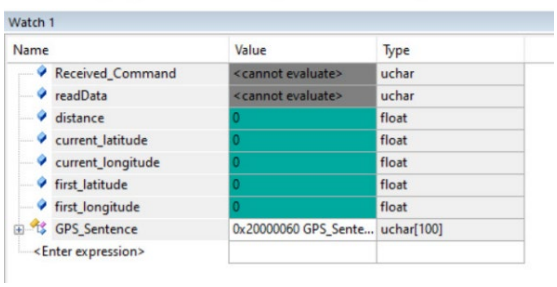
In the given project, we are assigned to a **GPS TRACKING SYSTEM** developed using embedded C programming, by gathering real-time positional coordinates while a microcontroller is in motion (using TM4C123G LaunchPad) after power-on until a destination point is reached. The collected data will be efficiently transferred to a personal computer and visualized on a map application.

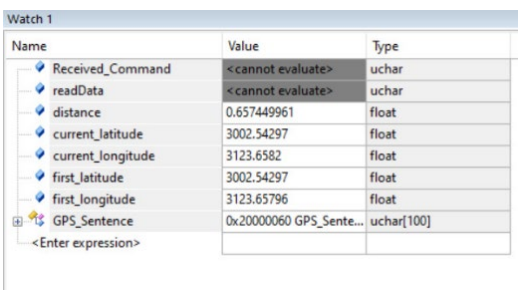
2. Project in Action:

Video documenting the TM4C123G LaunchPad up and running:
https://drive.google.com/file/d/1StEVD5kAbZR1trFrzM2KsKkFHEyRKAmb/view

The following *screenshots* were also captured real-time, as we tested our **GPS** module:



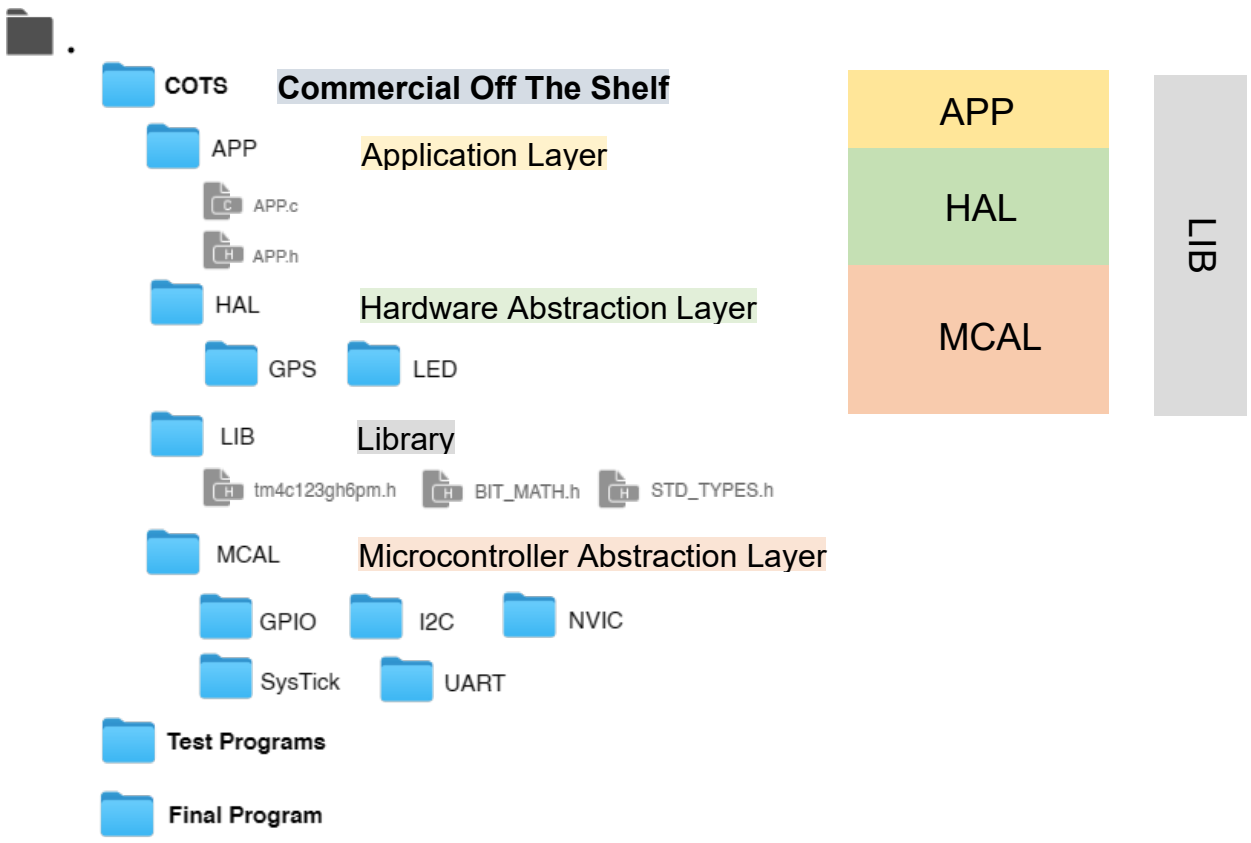




3. Source Code:

Entire project source code can be found on our team's GitHub repo:
https://github.com/MashaWaleed/GPS-System-TIVAC-CSE211

The tree structure of our repo is explained briefly on this page:



The layers, as depicted in the figures above are demystified as follows:

(APP) Application Layer:
It's where the main flow of the program resides and is software specific.

(HAL) Hardware Abstraction Layer:
provides a high-level interface to the hardware. It makes the application code more portable as the same application code can work with different hardware just by using a different HAL implementation.

(MCAL) Microcontroller Abstraction Layer:
manages the microcontroller hardware. It includes our main drivers, i.e: GPIOs, communication interfaces (SPI, I2C, UART), ADCs, etc.

(LIB) Library:
Include third-party or proprietary libraries that the project might depend on. They provide various functions and utilities that are not specific to the hardware or the application but are used by them, such as data structures, math functions, or communication protocols.