Traffic Control Lights Project

Prepared By: Mossab Tarek

Success Criteria	*Specifications*
Read System Requirements	▪ **<u>Hardware requirements:</u>** ▪ ATmega32 microcontroller ▪ One push button connected to INT1 pin for pedestrian. ▪ Three LEDs for cars - **Green**, **Yellow**, and **Red**, connected on Port A – Pin 4, port A – Pin 6 and Port B – Pin 7 respectively. ▪ One LED for pedestrians - **Blue**, connected on Port A – Pin 5. ▪ LCD ▪ **<u>Software requirements</u>:** **In Cars mode:** ▪ Cars' LEDs will be changed every five seconds starting from Green then yellow then red then Green again. ▪ The Yellow LED will blink for five seconds before moving to Green or Red LEDs. ▪ LCD will display the mode "**Cars** ". **In Pedestrian mode:** ▪ Change from **Cars** mode to **Pedestrian** mode when the pedestrian button is pressed. ▪ If pressed when the cars' **Red** LED is on, the pedestrian's **Blue** LED and the cars' **Red** LEDs will be on for five seconds and LCD will display "Pedestrian", this means that pedestrians can cross the street while the pedestrian's **Blue** LED is on. ▪ If pressed when the cars' **Green** LED is on then **Yellow** LED will start blinking for five seconds while keeping "**cars**" on LCD, then the cars' **Red** LED and pedestrian **Blue** LED are on for five seconds and LCD will display "**Pedestrian**", this means that pedestrian must wait until the **Blue** LED is on. ▪ If pressed when the cars' **Yellow** LED is blinking, then **Yellow** LED will keep blinking for five seconds while keeping "**cars**" on LCD, then the cars' **Red** LED and pedestrian **Blue** LED are on for five seconds and LCD will display "**Pedestrian**".

	▪ After the five seconds the pedestrian **Blue** LED will be off and the cars' **Green** LED will be on. ▪ Traffic lights signals are going to the **Cars** mode again.
Make full static architecture for your system.	▪ Define system layers. ▪ Define system drivers. ▪ Place each driver into the appropriate layer in the appropriate order. ▪ Define APIs that will be used for each driver, with its input arguments, output arguments, and return. ▪ Define the data types you will use in these drivers. **Note: You will need Button driver and LED driver.**
Apply your layered architecture into project's folder structure.	▪ Create a folder for each layer. ▪ In each layer folder, create a folder for each driver related to this layer. ▪ In each driver folder, create .c and .h files. ▪ Create a main.c file that will call your application.
Prepare all files for development.	▪ Add header file guard to all header files. ▪ Write all typedefs related to each driver in its header file. ▪ Write all prototypes for all drivers' APIs in their header files. ▪ Include lower layer drivers into the .h files of the upper layer/calling drivers. ▪ Include each driver's .h file into its related .c file. ▪ Include app.h into main.c .

Test Your Application:

User Story 1	▪ As a pedestrian when I will make a press on the Pedestrian button while the cars **green** light is on and LCD says "**Cars**", I will wait for the **yellow** light to blink for five seconds then the cars **red** light is on, pedestrian **Blue** light is on for five seconds and LCD says "**Pedestrian**", so that I can cross the street.
User Story 2	▪ As a pedestrian when I will make a press on the Pedestrian button while the cars **yellow** light is blinking and LCD says "**Cars**", I will wait for **yellow** LED to blink for five seconds then the cars **red** light is on, pedestrian **Blue** light is on for five seconds and LCD says "**Pedestrian**", so that I can cross the street.
User Story 3	▪ As a pedestrian when I will make a press on the Pedestrian button while the cars **red** light is on and pedestrian **Blue** light is on, I expect nothing to be done.
User Story 4	▪ As a pedestrian when I will make a press on the Pedestrian button while the cars **Red** light is on and LCD says "**Cars**", I will wait for the **Blue** LED to be on for five seconds and LCD says "**Pedestrian**", so that I can cross the street.

Deliver Your Work:

- You should deliver your code files.
- You should deliver user stories results as a video where you show executing all the user stories by hardware.
- Zip the files Named with your name and ID.
- Send it to mossab.tarek@seitech-solutions.com and dina.zakaria@eui.edu.eg