

Success Criteria

Specifications

Read System Requirements

▪ Hardware requirements:

- 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

▪ Software requirements:

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**”.

	<ul style="list-style-type: none"> ▪ 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.
<p>Make full static architecture for your system.</p>	<ul style="list-style-type: none"> ▪ 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. <p>Note: You will need Button driver and LED driver.</p>
<p>Apply your layered architecture into project's folder structure.</p>	<ul style="list-style-type: none"> ▪ 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.
<p>Prepare all files for development.</p>	<ul style="list-style-type: none"> ▪ 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	<ul style="list-style-type: none">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	<ul style="list-style-type: none">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	<ul style="list-style-type: none">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	<ul style="list-style-type: none">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.