

System Design

1. System description

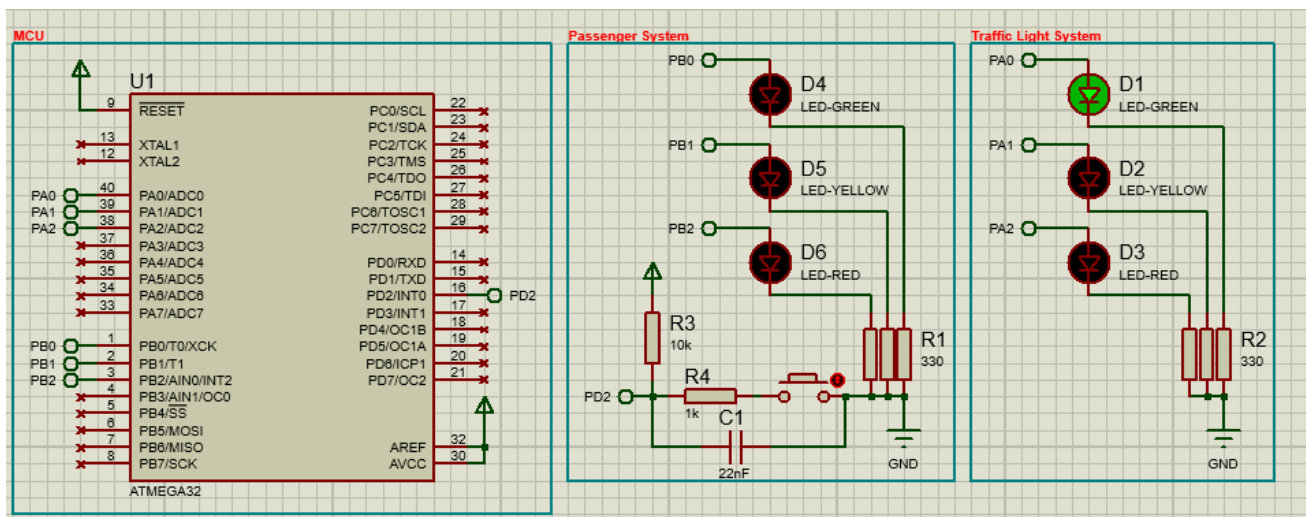
Traffic lights are signaling devices used to govern traffic flow and are placed at road intersections, pedestrian crossings, and other sites. Traffic lights typically have three signals, which convey information to vehicles and cyclists via colours and symbols like arrows and bicycles. Red, yellow, and green are the standard traffic light colours, and they are often positioned vertically or horizontally in that sequence. Although this is globally standardized, there are differences in traffic light legislation and sequences at the national and local levels. You must put into place a crosswalk button-equipped traffic signal system. Using crosswalk buttons alerts signal operators that a person is about to cross the street, which causes the light to change and provide the pedestrian ample time to cross.

2. System description

A. Hardware requirements

ATmega32 microcontroller

1. One push button connected to INT0 pin for pedestrian
2. Three LEDs for cars - Green, Yellow, and Red, connected on port A, pins 0, 1, and 2
3. Three LEDs for pedestrians - Green, Yellow, and Red, connected on port B, pins 0, 1, and 2



B. Software requirements

In normal mode:

1. Cars' LEDs will be changed every five seconds starting from Green then yellow then red then yellow then Green.
2. The Yellow LED will blink for five seconds before moving to Green or Red LEDs.

In pedestrian mode:

1. Change from normal mode to pedestrian mode when the pedestrian button is pressed.
2. If pressed when the cars' Red LED is on, the pedestrian's Green LED and the cars' Red LEDs will be on for five seconds, this means that pedestrians can cross the street while the pedestrian's Green LED is on.
3. If pressed when the cars' Green LED is on or the cars' Yellow LED is blinking, the pedestrian Red LED will be on then both Yellow LEDs start to blink for five seconds, then the cars' Red LED and

pedestrian Green LEDs are on for five seconds, this means that pedestrian must wait until the Green LED is on.

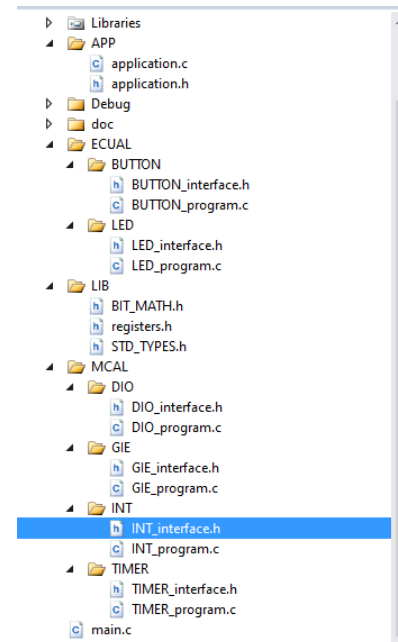
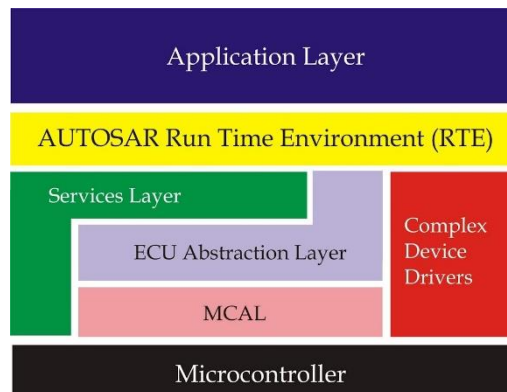
4. At the end of the two states, the cars' Red LED will be off and both Yellow LEDs start blinking for
5. 5 seconds and the pedestrian's Green LED is still on.
6. After the five seconds the pedestrian Green LED will be off and both the pedestrian Red LED and the cars' Green LED will be on.
7. Traffic lights signals are going to the normal mode again.

3. System Architecture

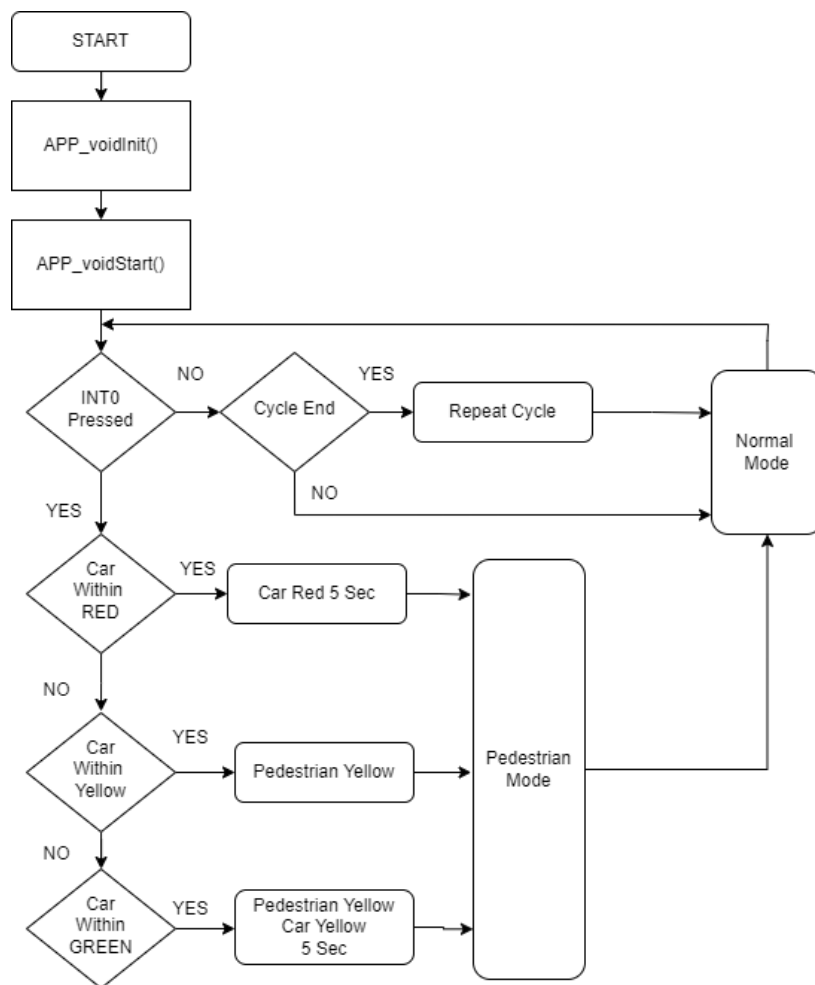
Applying some of AUTOSAR Layers

Layers:

1. LIB
 - STD_TYPES
 - BIT_MATH
 - registers
2. APPLICATION
3. ECUAL
 - LED
 - BUTTON
4. MCAL
 - DIO
 - GIE
 - INT
 - TIMER



4. System flow chart



5. System constraints

If passenger pressed the button multiple times WILL NOT repeat the interrupt (not NASTED intrrupt).