egypt fwd
initiative

UDACITY

Embedded Systems Professional Track egfwd -
Udacity

On-demand Traffic Light control

By: Saher Attia Farid

Project Description:

In normal mode:

1. Cars' LEDs will be changed every five seconds starting from Green then yellow then red then yellow then Green.
2. When Cars' Green LED is on Pedestrian Red LED is on and when Cars' Red LED is on Pedestrian Green LED is on
3. The Yellow LED will blink for five seconds before moving to Green or Red LEDs.
4. While yellow led blinking the previous led is still on
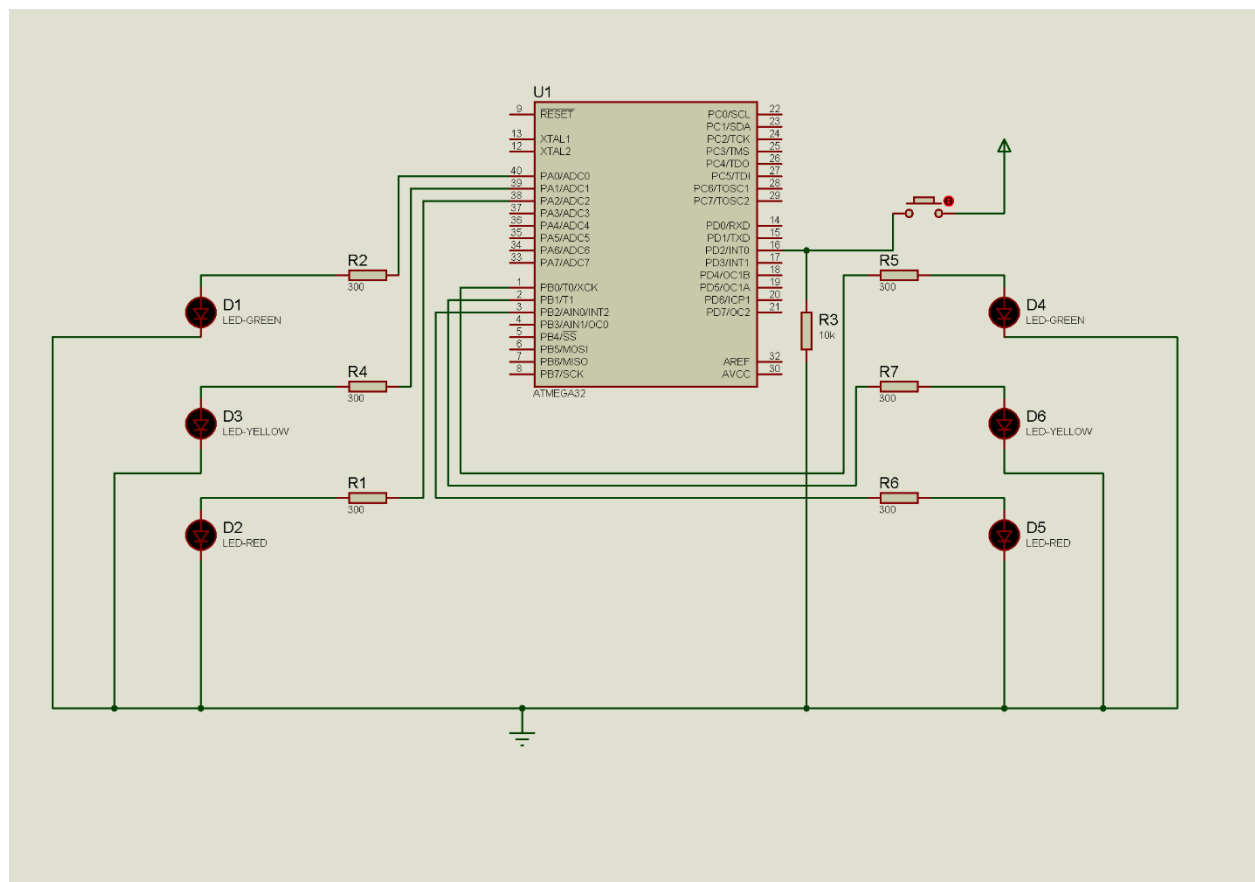
In pedestrian mode:

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 seconds and the pedestrian's Green LED is still on.
5. 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.
6. Traffic lights signals are going to the normal mode again.
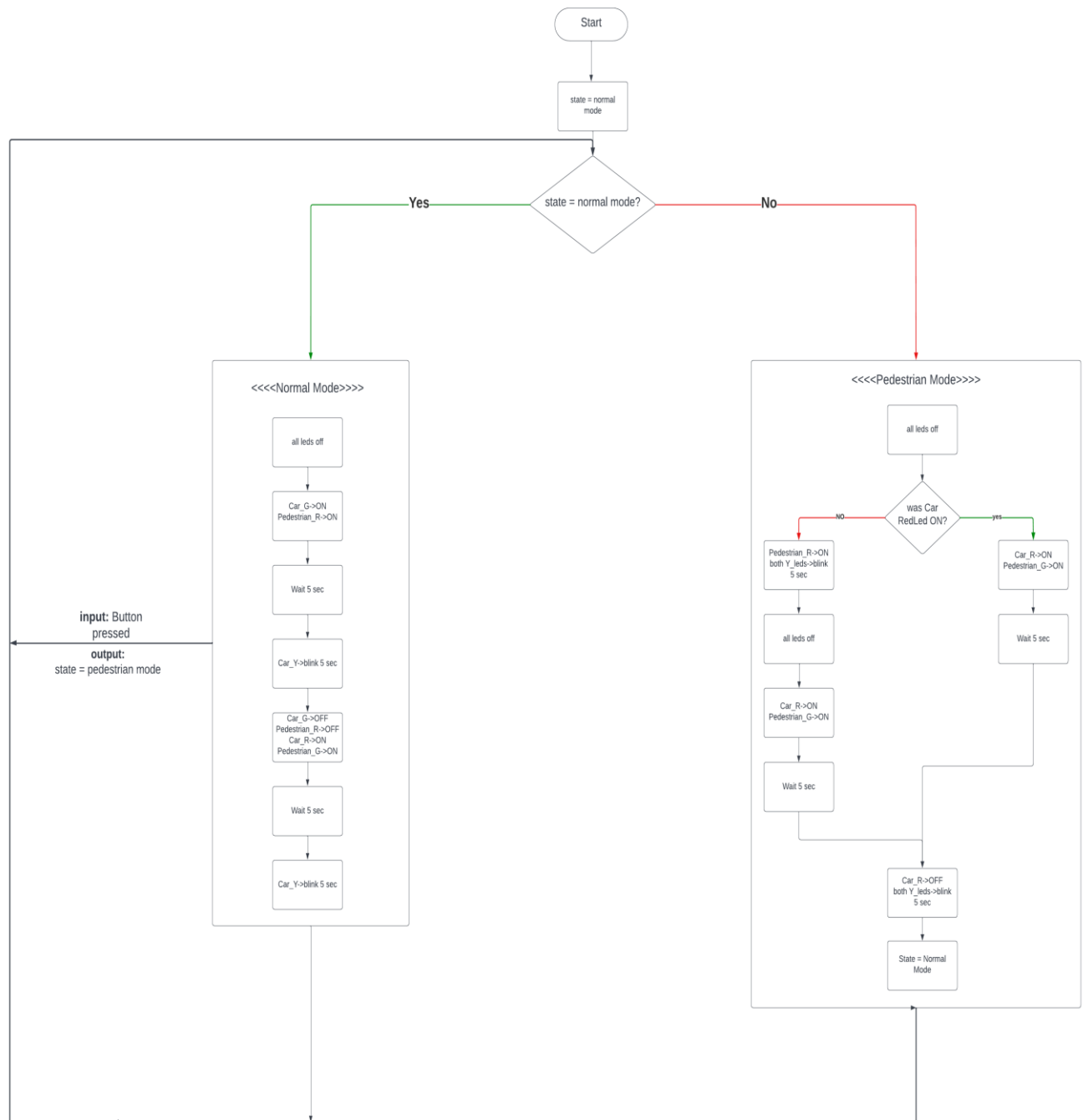
Project Circuit:

Hardware requirements:

1. ATmega32 microcontroller

2. One push button connected to INT0 pin for pedestrian

3. Three LEDs for cars - Green, Yellow, and Red, connected on port A, pins 0, 1, and 2

4. Three LEDs for pedestrians - Green, Yellow, and Red, connected on port B, pins 0, 1, and 2

Circuit Diagram:

Flow Chart:

Start

state = normal mode

state = normal mode?

Yes ——— No

<<<<Normal Mode>>>>

all leds off

Car_G->ON
Pedestrian_R->ON

Wait 5 sec

Car_Y->blink 5 sec

Car_G->OFF
Pedestrian_R->OFF
Car_R->ON
Pedestrian_G->ON

Wait 5 sec

Car_Y->blink 5 sec

input: Button pressed

output:
state = pedestrian mode

<<<<Pedestrian Mode>>>>

all leds off

was Car RedLed ON?

NO ——— yes

Pedestrian_R->ON
both Y_leds->blink 5 sec

all leds off

Car_R->ON
Pedestrian_G->ON

Wait 5 sec

Car_R->ON
Pedestrian_G->ON

Wait 5 sec

Car_R->OFF
both Y_leds->blink 5 sec

State = Normal Mode

System constrains:

1. **System is not affected by long press on pedestrian button**
2. **System is not affected by double press on pedestrian button**