Project Documentation

Embedded Systems Professional Track

UDACITY

On-Demand Traffic Light Control

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SYSTEM DESCRIPTION

Description Summary

The traffic lights system consists of three signals to lead the drivers and riders through colors. The traffic light colors are red, yellow, and green arranged vertically or horizontally in that order.
The system contains a crosswalk button to let the signal operations know that someone is planning to cross the street, so the light adjusts, giving the pedestrian enough time to get across.

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. The Yellow LED will blink for five seconds before moving to Green or Red LEDs.

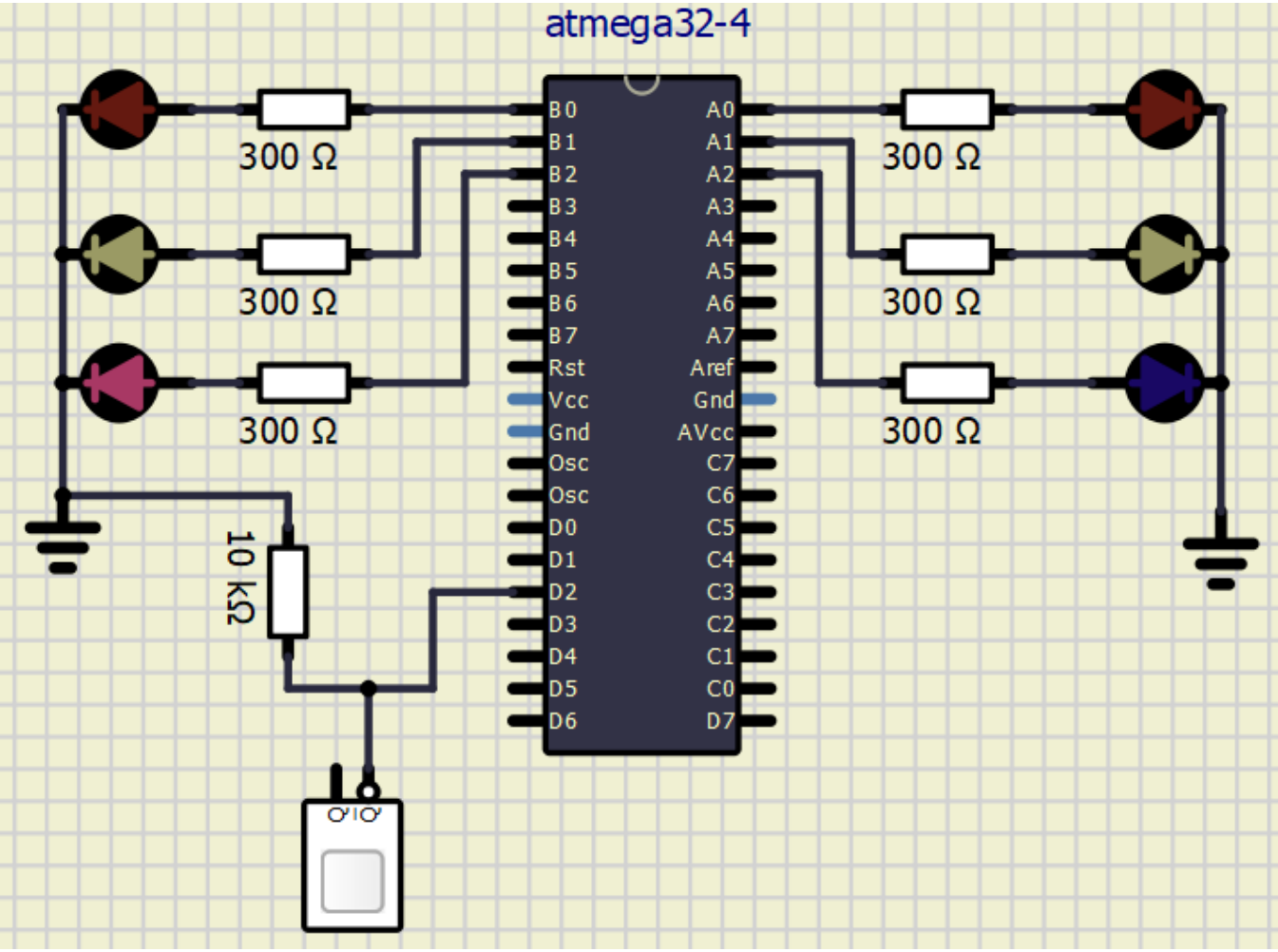
In pedestrian mode:

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 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.

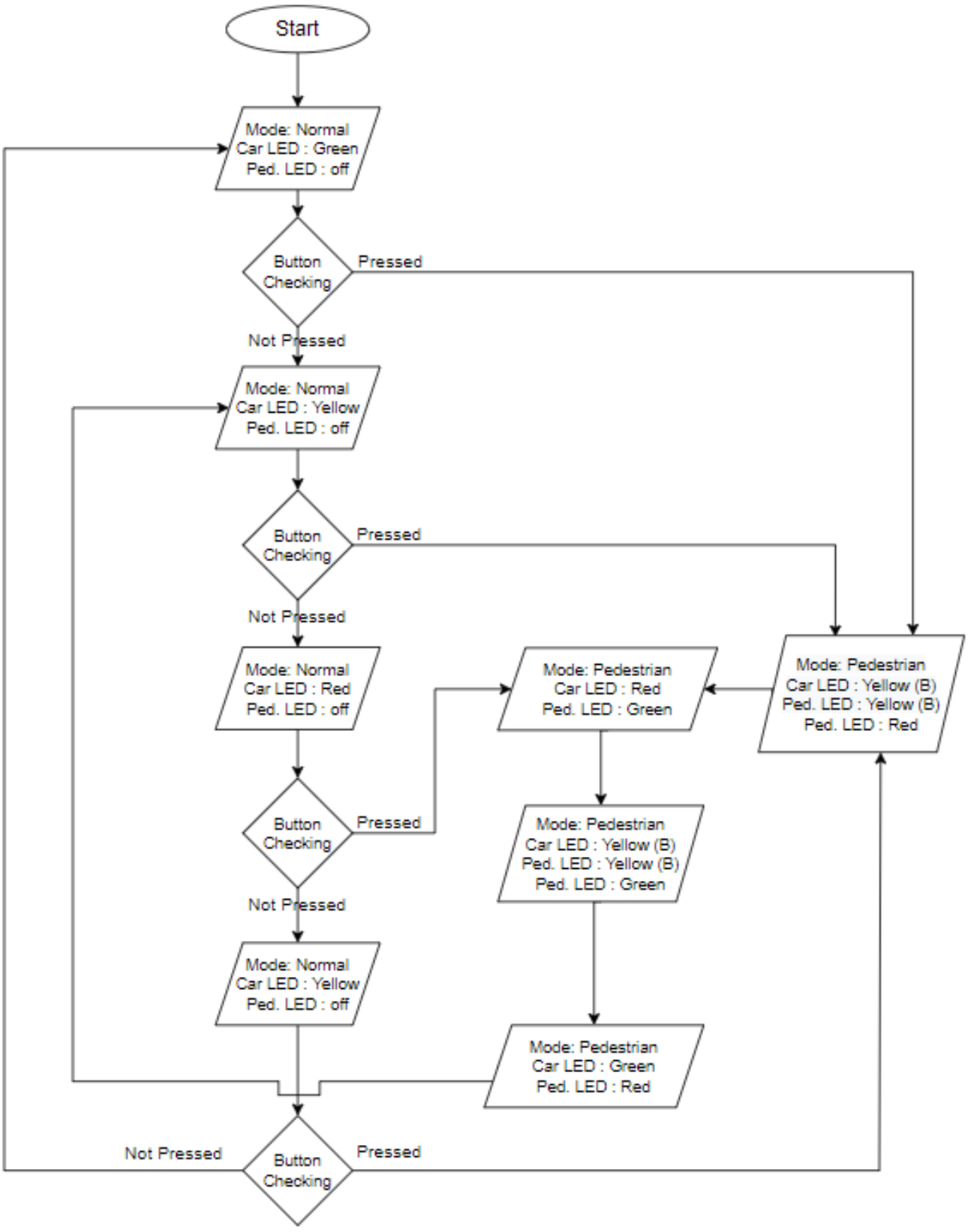
SYSTEM DESIGN

System Components

- 1 Atmega32 Microcontroller
- 1 Push Button (input device)
- 2 Green LEDs (output device)
- 2 Yellow LEDs (output device)
- 2 Red LEDs (output device)
- 6 300 ohm Resistors
- 1 10 k ohm Resistor



SYSTEM FLOWCHART



SYSTEM CONSTRAINTS

Long button press: In a pedestrian mode when anyone made a long press on the crosswalk button, nothing will be done.

Multiple button presses: In a pedestrian mode when anyone made a double press on the crosswalk button, just the first press will do the action and nothing to be done after the second press.

Green pedestrian LED: In a pedestrian when anyone will make a short press on the crosswalk button while the cars red light is on and pedestrian green light is on, nothing will be done.