On-demand Traffic light control

FWD project with ATmeag32 report

SYSTEM DESCRIPTION

A traffic light with 2 sets of LED red, yellow and green for both and a push button connected to INT0 pin. The traffic lights operate in normal mode, if there is no interruption, the green LED lights then the yellow LED blinks for 5 seconds then the red LED lights the yellow LED blinks again for five seconds then repeats.

If the push button is pressed the pedestrian mode activates if the cars light is red the pedestrian green lights up for 5 second if the yellow or green are on both yellow LED blink for 5 seconds then car red and pedestrian green lights up for 5 seconds, afterwards the system returns to normal mode and lights the car green and pedestrian red.

Components

Component	Amount
ATmega32	1
Red LEDs	2
Yellow LEDs	2
Green LEDs	2
Push button	1
300Ω resistor	6
10kΩ resistor	1

SYSTEM DESIGN

The first set of LEDs are connected to port A for the cars traffic and the second set is connected to port B for pedestrians and the button is connected to pin 2 in port D (INT0) if pushed will active pedestrian mode.

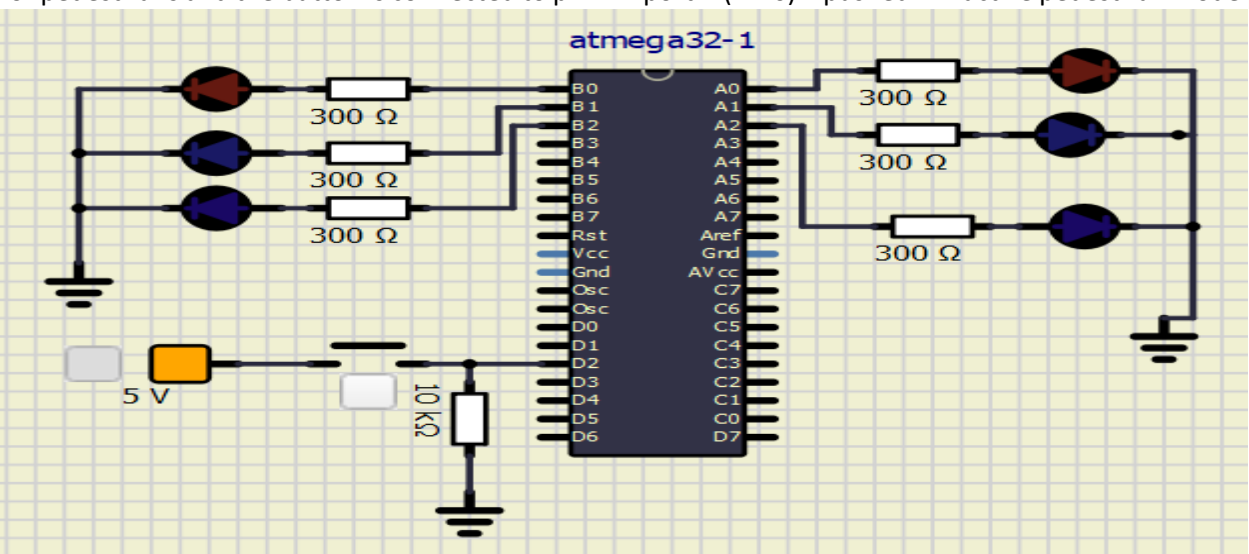

Figure 1: System design on SimulIDE

Software layers:

App layer:
Contains the app structure.

ECUAL:
Contains the LED and Button drivers.

MCAL:
Contains the Timer, Interrupt and DIO drivers and connects directly to microcontroller layer.

SYSTEM STATE MACHINE

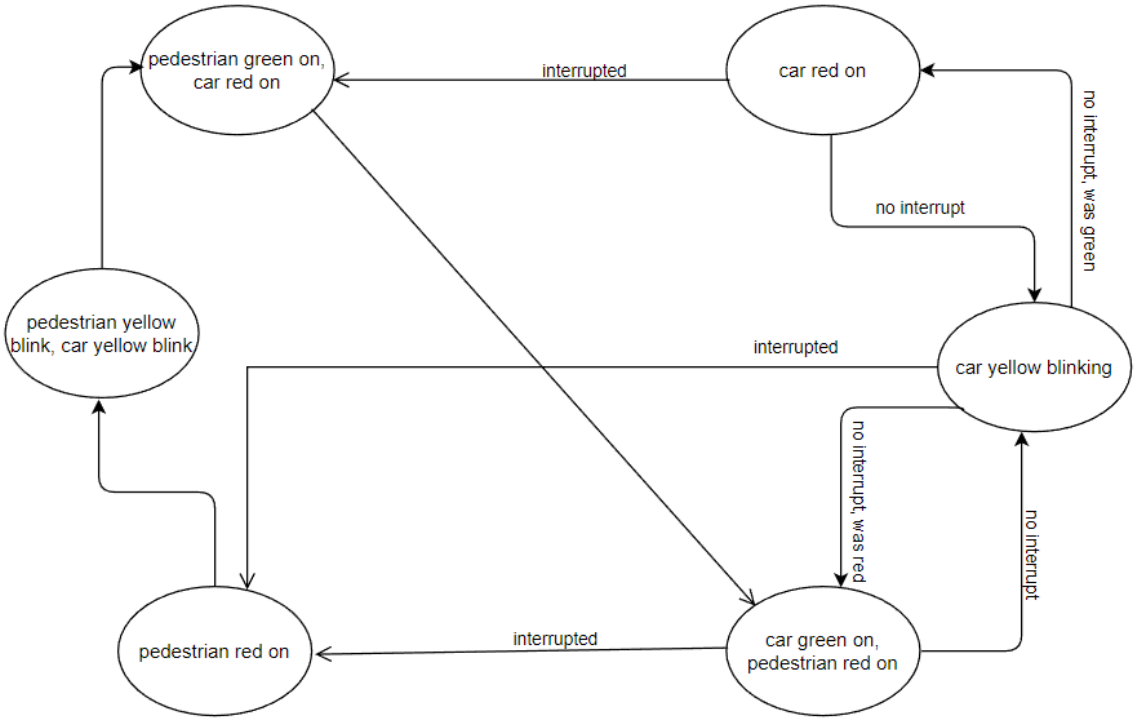

Figure 2: System state machine

SYSTEM COSNTRAINTS

Double press will work as only one press.

Long press will do nothing.

Pressing while in pedestrian mode will do nothing.