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# ON DEMAND TRAFFIC PROJECT DOCUMENTATION

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## SYSTEM DESCRIPTION

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The project goal is to create functioning car traffic light and when the push button is pressed pedestrian traffic shall be functioning as well with the car traffic.

The car traffic is running in normal mode which is

green -> yellow blinking -> red-> yellow blinking-> green with delay of 5 seconds between each light.

When the push button is pressed the pedestrian mode becomes active which implements both the car traffic and pedestrian traffic simultaneously so that if the button was pressed when the car traffic light was green or yellow it will immediately begin blinking both yellow lights for 5 seconds starting from when the button was pressed and then turn on green pedestrian traffic and red car traffic for 5 seconds then get back to yellow blinking for 5 seconds then the green car traffic will turn on and turn on pedestrian red traffic light and it stays this way until the push button is pressed again.

If the button was pressed when the car light was red it will keep it on and turn the green pedestrian green traffic for 5 seconds starting from when the button was pressed. Then the two yellow lights will be blinking for 5 seconds then the car traffic will return to normal mode from green traffic and the pedestrian traffic will remain red until someone pushes the button again.

## SYSTEM DESIGN

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### HARDWARE

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- 6 LEDs 2 of each color of red, yellow and green to implement cars and pedestrians traffic lights
- Push button
- Resistors to limit the current in the components
- Power source to implement push button functionality

### SOFTWARE

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#### UTILITIES

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#### TYPES

Any new types needed using typedef, only uint8\_t was needed

#### REGISTERS

Define registers by dereferencing their locations obtained from the data sheet. This was used for the port and pin registers, timer registers and interrupt registers

#### INTERRUPT

Define needed interrupt functions such as enabling and disabling global interrupts

#### MCAL

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#### DIO

Create functions that help initialize the direction of the I/O pins of the microcontroller and introduce useful functions to control them such as write and toggle in case of output pins and read in case of input.

#### TIMER

Implement needed delay functions with the microcontroller using Timer1 to get functions of 1 second delay needed in the blinking functionality and 5 seconds to help with interfacing of traffic lights.

#### ECAL

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#### LED

Used to control the output of led using variety of controls such as on, off and toggle as well as initialization to implement the direction as output.

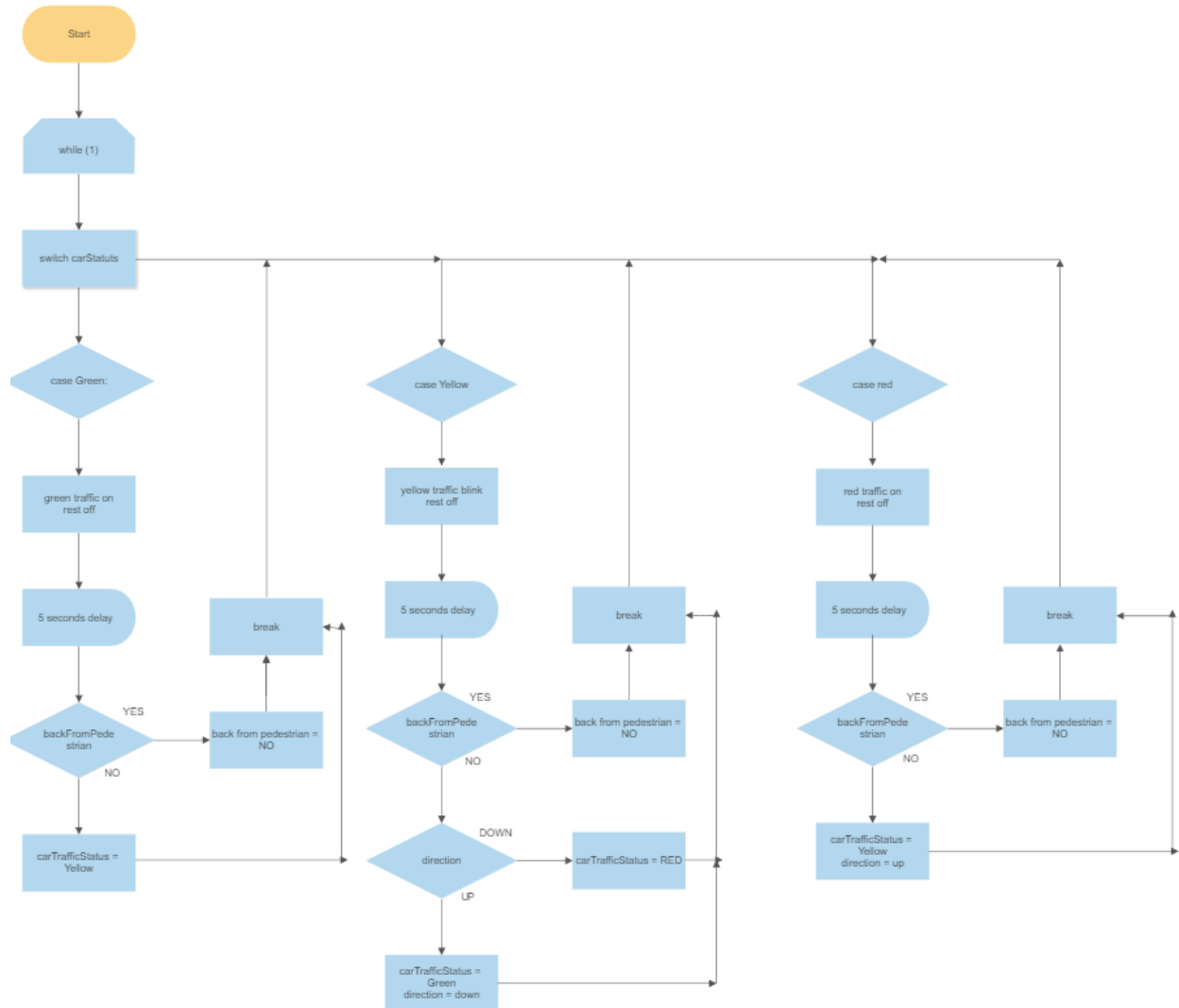
#### APPLICATION

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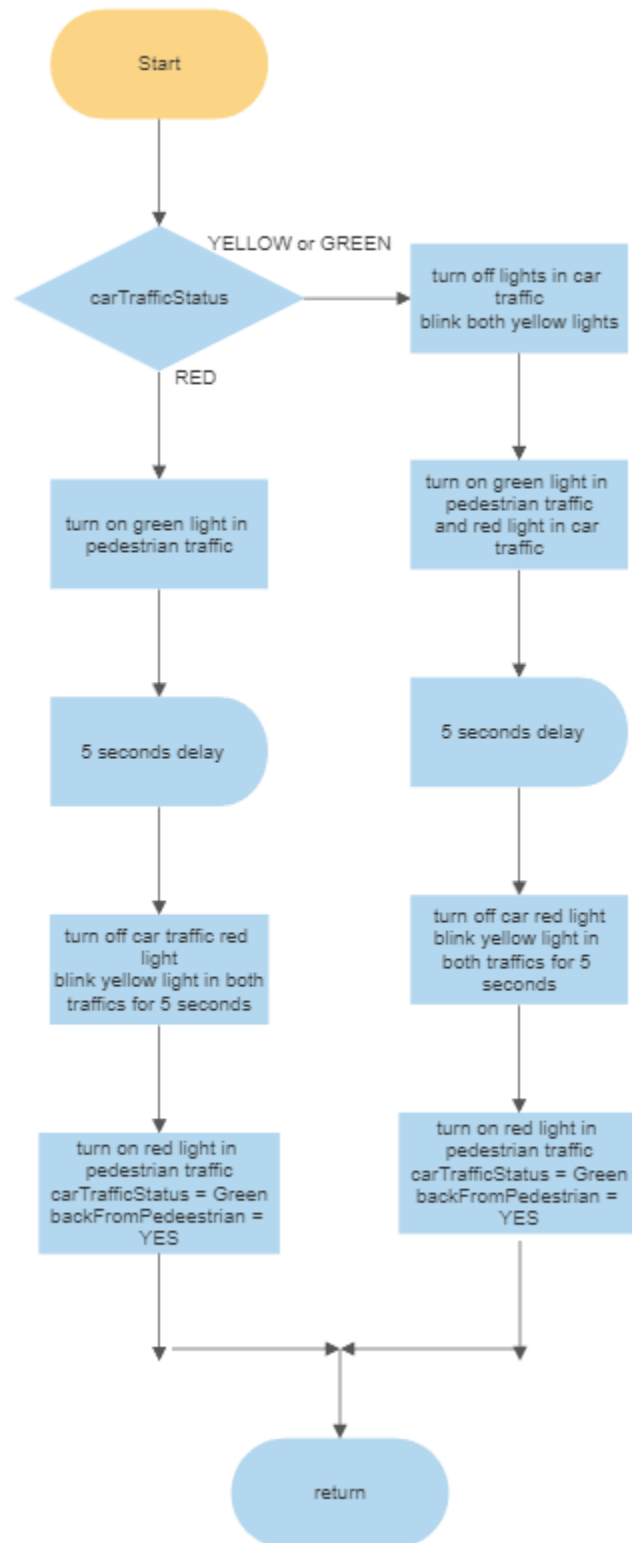
The application implements the needed initializations such as the direction of pins and needed variables. It also implements normal mode and pedestrian mode as well as the blinking function of yellow light

# FLOWCHART

## NORMAL MODE



## PEDESTRIAN MODE



## CONSTRAINS

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- Long press on push button has no effect pedestrian mode
- While the pedestrian mode is running any more presses on the button has no effect