Assignment week 2.5-2.7: Traffic Control Intersection

Requirements

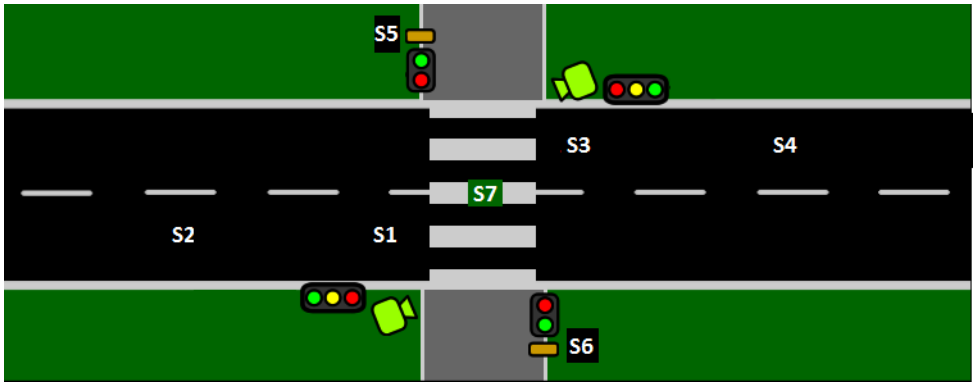
- A laptop or desktop computer
- A Cerebot MX4cK board
- 2 USB A to micro B cable (can also be done with 1)
- MPLAB IDE v8.83 and MPLAB C32 C Compiler v2.02B
- Our N@Tschool entry
- The PmodCLP LCD display by Digilent Inc. (not necessary)
- The PmodSWT switch module by Digilent Inc. (not necessary, could be used for controlling the sensors)

Objectives

- Take a structured approach to realize and test your implementation.
- Learn how to handle a real world problem (modeling and data typing)
- Learn how to use the state machine principles in Embedded Systems
- Learn how to handle input signals in an embedded systems.
- Learn how use UART in an embedded system.

Requirements

Given the following Traffic Control Intersection



Specification:

- The software visualization model of the intersection can be made by using the graphics objects of C#. In this way the detectors, pushbuttons, camera and switches are simulated.
- The above intersection is a pedestrian crossing which means that a zebra crossing crosses a main road.
- The control system must be made with the aid of the design techniques indicated in Digital Design
- A detection loop signals whether somebody goes through the red light(S7). The control system must react to it by making the relevant camera take a photograph.
- This intersection signals whether the road is busy with the aid of the traffic flow detection loops (S2 and S1 or S3 and S4). The control system is reacting to this by temporarily doubling the green time.

- In the default situation the pedestrians light is red and that of the cars is green. That is; the main road is on green by default.
- The traffic flows that run in the same direction simultaneously obtain green.
- At all pedestrian lights the pedestrian pushes a button to indicate that he/she wants to cross.
- The communication protocol must be made beforehand.

Design and implement a system that meets the above requirements. Deliver a report in which you state how you solved the problem (process report)

References

[1] PIC32MX Family Reference Manual, Section 12. I/O Ports
Microchip Technology, Inc., 2011
URL: http://ww1.microchip.com/downloads/en/DeviceDoc/61120E.pdf