Control Systems

Project (60%) 2015

(NOTE: this is the same project as used in 2014. There is a sound pedagogical reason for that)

This project is intended to test your ability to assemble the parts of a system and to control outputs with a program you have developed to monitor and respond to inputs.

- This project is based on traffic lights. (If you have another project which you would prefer to do, based on other components you have used, obtain or studied, please consult with your tutor.)

For assessment purposes any shared work must be submitted by each team member, in which the individual work of each participant will be clearly identifiable.

Description

At a T-junction in a small town there is a set of traffic lights.

The lights are the standard green, amber, red with their normal traffic meanings in Ireland.

It is intended to automate access to the main road from the side road based on traffic numbers and other inputs.

Rules

The main road is the priority and should be showing green lights whenever possible.

When three or more cars are waiting on the side road, the side road lights should be switched to green.

The light-switching system knows when there are cars waiting because of traffic sensors on the road. (Input from that sub-system can be replicated as momentary switch pushes).

When one or more cars are waiting for more than one minute on the side road, the side road lights should be switched to green.

At night both sets of lights should flash amber.

When the nearby fire station signals, both sets of lights should turn red.

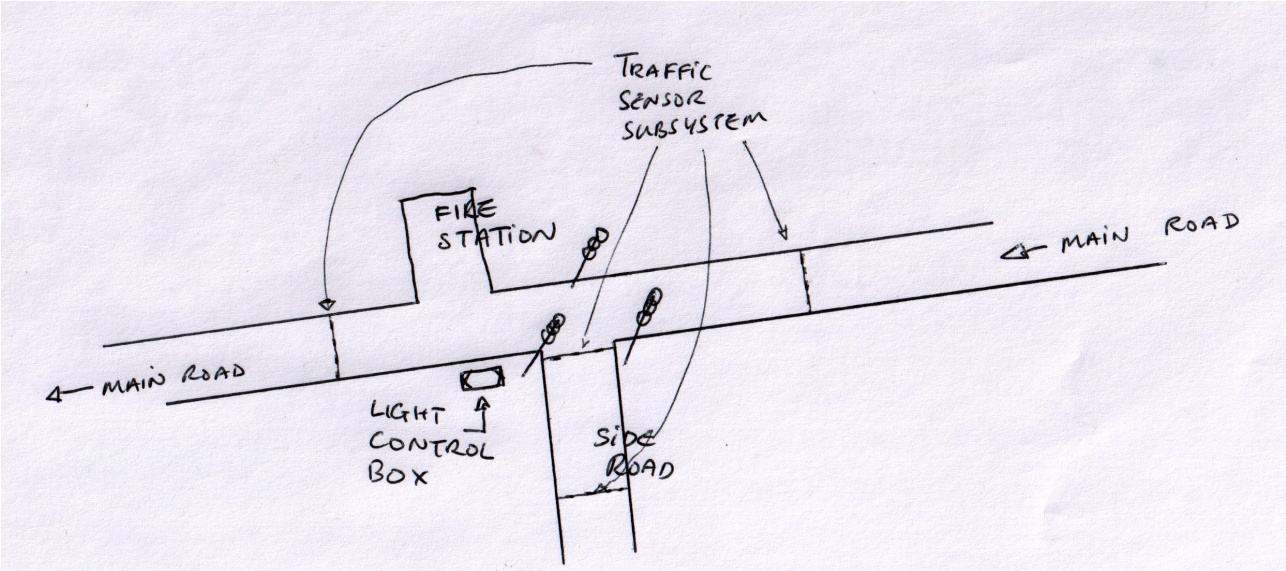
Assumptions

Any vehicles waiting for lights to change can be assumed to be cleared instantaneously from the junction when the lights change – there is no need to wait for vehicles to leave or to check that they have left.

Only two sets of lights need to be programmed – one for each road.

Diagram

Below is a diagram to help you visualise the junction and the control box and lights.



Summary
Write a control program to monitor the switches used to emulate the traffic-sensor subsystem.

Assemble a demonstration circuit, with LEDs representing the traffic lights. Add any circuitry and components you feel are suitable.

Signalling from the fire station and daylight sensing may be emulated as you see fit.

Make a video demonstration of how your traffic controller program operates.

Deliverables
Learner record, control program, **video**, diagrams (circuits).

Due
PROVISIONAL: April 2nd 2015 12:45