KF6010 Mini Project

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Abstract

1 Introduction

This mini project runs at the end of the first semester, and can be viewed as a formative exercise to get feedback ready for the final assessment at the end of the module.

> Do treat this as seriously as if it were an assignment. Because this isn't assessed, we can give you much more help and feedback than we can with the final assignment.
>
> *Take this opportunity to build up your knowledge and confidence.*

2 Scenario

A pedestrian crossing has the following features:

- Traffic lights to control traffic on the road
- Pedestrian lights to control the flow of pedestrians across the road
- A push button for pedestrians to signal that they want to cross

The safety constraints are:

- Traffic and pedestrians should not be permitted in the crossing at the same time
- When a pedestrian signals that they want to cross, that request must be satisfied
- Timing constrains (see 2.2) and light sequences (see 2.1) must be followed.

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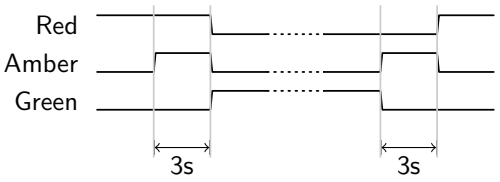

Figure 1: Traffic light timing sequence

2.1 Light sequences

The lights in the crossing follow prescribed sequences, which must be adhered to.

2.1.1 Traffic light

The traffic lights have Red, Amber , and Green lights. These show in a fixed sequence;

use the blue led for the amber light

1. Red only
2. Red and Amber
3. Green
4. Amber
5. Red

2.1.2 Pedestrian lights

The lights signalling to the pedestrians consists of a Red and Green lights. The sequence for these is

1. Red
2. Green
3. Red

2.2 Timings

The light sequences are subject to time constraints between transitions. These apply to the traffic lights performing the Red→Green and Green→Red parts of the sequence. Shown in figure 1

2.2.1 Red→Green

The “Red and Amber” part of the sequence should show for 3 seconds

2.2.2 Green→Red

The “Amber” part of the sequence should show for 3 seconds

A Frequency of bleep and duration of beeps

From http://www.ukroads.org/webfiles/TR%202509%20A.pdf

> The fundamental frequency of the tone shall be between 2.0 kHz and 3.5 kHz, which is pulsed at 240 pulses per minute 60 pulses per minute with a mark space ratio of 1.5:1 10%.

B Timings of light sequences

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/330214/ltn-2-95_pedestrian-crossings.pdf

PERIOD	SIGNALS SHOWN		TIMINGS (Seconds)
	TO PEDESTRIANS	TO VEHICLES	
1	Red	Green	20–60
2	Red	Amber	3
3	Red	Red	1 to 3
4	Green	Red	4 to 9
5	Red	Red	1–5
6	Red	Red	0–22
7	Red	Red	0–3
8	Red	Red	0–3
9	Red	Red with Amber	2