



University of Jordan
School of Engineering
Department of Mechatronics Engineering
Automation and Process Control Lab (0908462)
Traffic Light Control

Objective

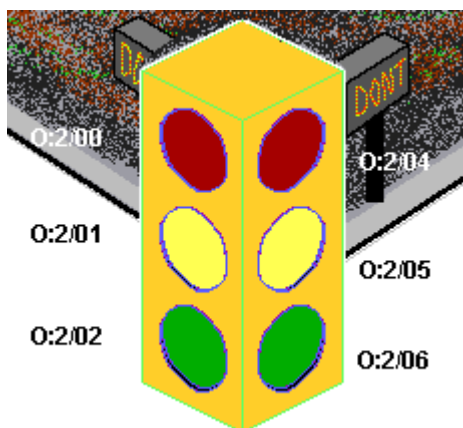
To be familiar with basic timer logic.

Pre-lab Preparation:

Read Chapter 4

Procedure:

From the Simulations Menu at the top of the screen, select the Traffic Light Simulation



Exercise #1 -- Traffic Control using 3 Lights

Using your knowledge of cascading timers, develop a ladder logic program which will sequence a set of green, amber and red lights in the following manner:

Sequence of Operation:

1. Light O:2/00 (Red) = 12 seconds ON
2. Light O:2/02 (Green) = 8 seconds ON
3. Light O:2/01 (Amber) = 4 seconds ON
4. The sequence now repeats with Red = ON.

RED	GREEN	AMBER
12 Sec.	8 Sec.	4 Sec.

<----- Time in Seconds ----->

Exercise #2 -- Traffic Control using 6 Lights

Modify your program so that the 3 lights which represent the other traffic direction are also controlled. It is tempting to use six timers for this task, but the job can be done with just four, and you'll end up with a much cleaner program as a bonus.

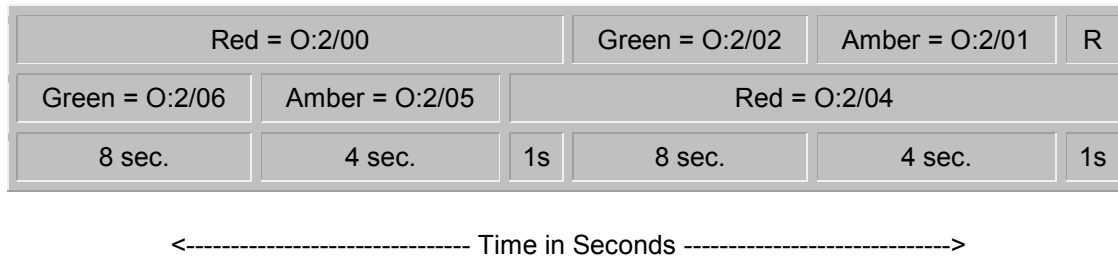
Red = O:2/00		Green = O:2/02	Amber = O:2/01
Green = O:2/06	Amber = O:2/05	Red = O:2/04	
8 Sec.	4 Sec.	8 Sec.	4 Sec.

<----- Time in Seconds ----->

Still getting the odd Crash? Well it's pretty obvious that these drivers aren't paying much attention to Amber Lights! No need for any more wiring however. You can solve this problem, but it's going take a little more programming.

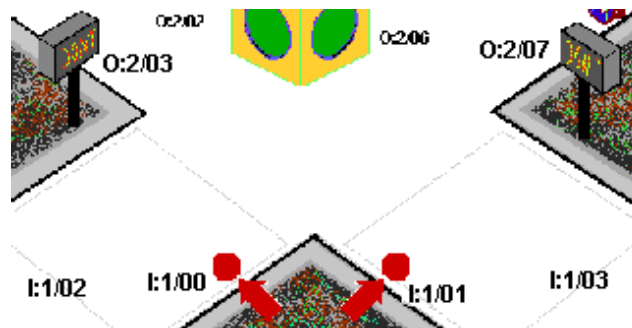
Exercise #3 -- Traffic Light With Delayed Green

Modify your program so that there is a 1 second period when both directions will have their RED lights illuminated. Note that there are actually 2 such overlaps that need to be accounted for. The timing diagram below shows the six discrete timing intervals required to accomplish the desired sequence of operation, and with proper cascading you should be able to come up with an easy to follow solution using just 6 timers.



Exercise #4 -- Dealing with Pedestrians

Modify your program so that the crosswalks are also controlled. This is not necessarily a word comparison exercise, but it's a task that needs doing, and you should now have sufficient expertise to accomplish it. It might not be all that easy however!



Your program should operate as follows:

- When depressed, the crosswalk pushbutton will cause the appropriate Walk Sign to be illuminated at the next occurrence of a Red to Green transition for the appropriate direction.
- If the Green light is already illuminated when the button is pressed then the Walk signal sequence will be delayed until the next Red to Green transition occurs.
- Once the Walk Sign is illuminated, it will remain so for the duration of the Green signal.
- When the Amber light appears, the Walk Sign will commence to flash On and Off and continue to do so until the Red signal appears.

You might consider using a bit from the free-running timer located in S2:4 to create the cautionary flashing effect.