

Objective:

The objective of this laboratory exercise is to create a PLC program to simulate traffic lights at an intersection using Timer, Counter and Data Compare Instructions.

Task to be accomplished:

1. There is a set of traffic lights (Red, Yellow and Green), one for Street A & other for Street B at an intersection.
2. When the START Switch (Normally Open Selector Switch) is turned ON (Activated), Street B - Red Light and Street A - Green Light should turn ON.
3. This condition exists as long as 5 vehicles are not detected on Street B. The presence of a vehicle on Street B is determined by pressing a NO Momentary Push Button Switch. Pressing the push button switch 5 times will indicate 5 vehicles at the intersection, on Street B.
4. When the PLC reads a count of five, the signal lights should follow the cycle shown below:

Street A - Green Light OFF Street A - Yellow Light ON
3 Seconds Delay
Street A - Yellow Light OFF Street A - Red Light ON
1 Second Delay
Street B - Red Light OFF Street B - Green Light ON
5 Seconds Delay
Street B - Green Light OFF Street B - Yellow Light ON
3 Seconds Delay
Street B - Yellow Light OFF Street B - Red Light ON
1 Second Delay
Street A - Red Light A OFF Street A - Green Light ON
25 Seconds Delay

5. The counter should reset at the end of 13 seconds to detect new vehicles and the signals should remain in the same condition (Street B - Red Light and Street A - Green Light ON) for next 25 seconds.
6. During the 25 seconds delay period the cycle should not start even if there are 5 cars present on Street B.
7. After 25 seconds are over and 5 new vehicles are present the signals should start the cycle again.

IMPORTANT NOTE:

You are allowed to use only **ONE TIMER** for the whole application.

Only one light from the Street A and one from Street B should be ON at any time.

HINT:









Draw a Timing Diagram to understand the ON and OFF of the traffic light (Complete the one provided at the end of this handout)

Input/output Listing for the experiment:

	Inputs/Outputs	PLC
Inputs	START Switch - NO Selector Switch	Local:5:I.Data.20
	NO Momentary Pushbutton Switch	Local:5:I.Data.16
Outputs	Street A - Red	Local:6:O.Data.20
	Street A - Yellow	Local:6:O.Data.21
	Street A – Green	Local:6:O.Data.22
	Street B – Red	Local:6:O.Data.23
	Street B – Yellow	Local:6:O.Data.24
	Street B – Green	Local:6:O.Data.25

What needs to be submitted?

1. Test the program and show the demo to the instructor in the lab.
(Only for on-campus students)
2. A well documented functional PLC program (RsLogix File), containing all tasks should be submitted with title, your name and rung comments, in the drop box within MyCourses. (You should have tested the program before submission)
3. Use the table as a reference to understand the use of NO contact symbol for the Selector Switch used in this program.

Physical switch or sensor used on the experiment setup	Is the physical switch or sensor NO or NC?	Value recorded in the memory for the switch or sensor when PLC is powered (1 or 0)	User Changing Physical State (Switch can be Closed or Opened by user)	Value recorded in the memory, for the switch or sensor when the user changes its physical state	Switch or sensor programmed as a NO or NC contact	Logical State of contact (1 or 0)
Selector Switch	NO	0	Not Activated (Open)	0		0
						1
			Activated (Closed)	1		1
						0
Momentary Push Button Switch	NO	0	Not Activated (Open)	0		0
						1
			Activated (Closed)	1		1
						0

