TRC2400 Computer Programming
ECE2071 Computer Organisation and Programming

Laboratory Session 7

Week 8– Semester 1 2011

IMPORTANT – MARKING
You will receive marks for preliminary work and lab completion by completing quizzes on Blackboard All quizzes receive equal marks and these will be scaled to give a final lab mark worth 10% of your final assessment. You MUST complete the preliminary work quiz BEFORE midnight of the day before your lab otherwise you will receive a zero mark for the lab exercise (both preliminary and completion mark) You must start the completion quiz before the end of your laboratory period (you will need the demonstrator to enter a password which will only be provided when you complete the lab)

1. Objectives

This laboratory is intended to provide further experience of programming the S7-200 Programmable Logic Controller (PLC). This week you write a more complicated ladder logic program.

2. Preliminary work

Before coming to the lab you should complete the preliminary work quiz on Blackboard. This week's quiz will cover your understanding of the exercises in this prac.

3. First Programming Exercise - light sequence

In this exercise you will write a program to control the traffic lights on both the North-South and East-West roads. The following table shows the desired sequence and the timing in seconds.

North-South			East-West		
Red	Yellow	Green	Red	Yellow	Green
8					8
4				4	
		8	8		
	4		4		
8					8
Note Timing sequence is top to bottom and continues repeating the sequence in the first 4 lines					

In the previous laboratory exercise you used two timers to produce an on-off flashing sequence for the amber lights (two states). For this exercise you can extend this to a sequence of 4 states by using 4 timers. In your ladder diagram you should only have a single instance of a relay coil (e.g. Q0.1). If you have two or more instances of a coil then only the last one will be effective (it overwrites the action of the other instances of the coil). Therefore, to get a light to come on for more than one signal you must OR the signals feeding the associated coil.

4. Second Exercise - North-South priority.

Modify your program from the first exercise so that North-South traffic has priority. This means that unless a car triggers the switch on the East-West road then the North-South road will continue to get a green light. The East-West car must trigger the sensor for 8 seconds before the lights change.

5. Conclusion

Please note that marks will not be allocated to people who do not attend their allocated lab and complete the appropriate quizzes by their deadline. Under no circumstances will marks be recorded after the laboratory period is finished.

RAR 17/2/2009; RAR 1/3/2011

Appendix A

Siemens S7-200 PLC Input/Output

Digital Input

Car Push Button - South	I0.0
Walk Push Button - South	I0.1
Car Push Button - East	I0.2
Walk Push Button - East	I0.3
Emergency Push Button	I0.4

Digital Output

North Traffic LED - Red	Q0.1
North Traffic LED - Yellow	Q0.2
North Traffic LED - Green	Q0.3
South Traffic LED - Red	Q0.4
South Traffic LED - Yellow	Q0.5
South Traffic LED - Green	Q0.6
East Traffic LED - Red	Q0.7
East Traffic LED - Yellow	Q1.0
East Traffic LED - Green	Q1.1
West Traffic LED - Red	Q1.2
West Traffic LED - Yellow	Q1.3
West Traffic LED - Green	Q1.4
Walk LED – South - Red	Q1.5
Walk LED – East - Red	Q1.6
Address – LED - Red	Q0.0