Industrial Processes Automation

MSc in Electrical and Computer Engineering

Scientific Area of Systems, Decision, and Control

Winter Semester 2010/2011

2nd Training Laboratory Work

Automation of an Access System

This preliminary work aims at providing an automation solution for the Access to the underground transportation network, and its implementation on the PLCs available on the laboratory.

Suppose that to implement the automatic Access to the transportation network, e.g. the *Metropolitano de Lisboa*, the following systems are available:

i)   Ticket Validation System, with one activation input and one validation output. The processing time is 1 second;

ii) Warning System (light and acoustic) from an external joint input;

iii) Automatic Door Opening System, commanded from a digital input. This system requires one second to open the door and one second to close it;

iv) 24 Volt Power Supply, with a manual switch;

The functional specifications for the aforementioned system are detailed next:

Following the introduction of the ticket in the validation system, if it is valid, the door opening system is activated for 5 seconds, upon ticket removal by the passenger. In the case that the ticket is not valid, the warning system is activated for 2 seconds, also upon the ticket removal. It must also be implemented a passenger counter and a defective ticket counter, that could be daily re-initialized.

1.   Propose the architecture for the access system. Discuss the components that must be present on the PLC and the externals required, to solve the problem at hand. For all sub-systems enumerate the respective inputs and outputs.

2.   Discuss the PLC inputs and outputs for the access system and identify all of them in the next table

PLC Inputs	Identifier	Outputs	Identifier

3. Enumerate for all timers that will use on the system, its function, and the counting base time

Timers	Function	Time Basis	Mode of Operation

4. Draw one or more ladder diagrams to solve the problem at hand.

5. The Micro PLC from Schneider, model 3722, performs vertical or horizontal scanning cycles? Suggest a small program to clarify this manufacturer option. Discuss the results obtained.

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