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# Traffic Light (Vehicles And Pedestrians) Control System Using PLC

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**ABSTRACT:** This paper is intended to show the basic building blocks of a traffic light control system based on a programmable logical control (PLC). The traffic signals work has been two parts. The first regulates the functioning of vehicles that consists of three lamps for each line (green, orange, red) and the second regulates pedestrians walking and consists of two lamps for each line (green and red). The research was designed to work at the intersection consists of four lines. The priority of work has been reversing clockwise towards. Good results we have obtained and can be developed.
**Keywords:** PLC, Traffic light, Control.

## I. INTRODUCTION

The modern technology to various control systems was used in many areas and that purpose is the service of humanity, through the simplification of procedures and organize various business. It is these areas that have benefited from it human is controlling the action of traffic signals and through which regulate the conduct of vehicles and pedestrians at intersections and prevent traffic jams that cause many problems for human, especially in a large cities, as well as the prevention of accidents caused by pedestrians who cross through traffic junctions[1],[4],[5].

The work of the traffic signals is by giving a specific time each way for the passage of cars through it and then other lines so doing, it is to regulate the conduct cars are smooth. As well as give a specific time for pedestrians to use traffic intersections to cross to their destination specified [6],[7],[8]. The traffic light has a three colours green, orange and red [2] [9].

In this research was to use the programmable logical control (PLC) for control to the traffic lights that contents 12 lamps for the intersection of four lines (three lamps for each line) for the vehicles. In addition, 8 lamps for pedestrians each line has two lamps. The lighting control of optical signal lights has been through a programmable of device control by one of the programming methods of controlling a time of operation of the ports to the output device control.

## II. OBJECTIVE OF REASERCH

The primary objective of this research is to use one of the new technologies which are logical programming to control the work of the traffic signals by time division for the passage of vehicles and pedestrians during consists of four lines of intersection with the addition of part controls the emergency pedestrian cases.

## III. FLOW DIAGRAM OF TRAFFIC

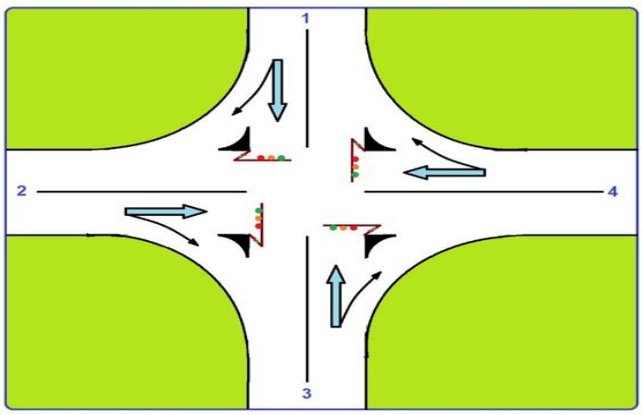


**Figure 1:** Flow diagram of traffic.

## IV. WHY PLC

**The control process by (PLC) characterized by the following:**

1. The device (PLC) Includes a large number of controls (such as timers, counters comparisons, recorders displacement, the elements of time, such as time and date ...) where substitute these programming elements from the classic elements known since we were previously forced to purchase and installation of external components.
2. Substitute for direct assistance contacts (open) and reverse (closed) storage orders and thus dispense with control relays that were formerly in the plates we use the old control.
3. Ease of adjustment work the machine as it only needs to be adjusted in the program (in most cases).
4. The inputs and outputs of the PLC device optically isolated from the processor or by relays, leading to reduce breakdowns dramatically.
5. The tried and tested can being complete the program before connecting the PLC device to the machine, which ensures the results in advance through the so-called Simulation supplied with the software PLC.

- From the above, it can be said that by using devices (PLC) provide the space needed to be placed in the hardware controls in vector In necessary for installation, modification, maintenance time and here we find great ease in the adjustment and maintenance.
- The devices (PLC) are similar in principle, and it varies every kind from the others in terms of the number of items contained in, or the type and speed of reading and responding, or the number of inputs and outputs, or the number of jobs can be undertaken or capacity should therefore be on the user be aware of the advantages of these types to choose appropriate of which.

## V. OVERVIEW OF PLC

The PLC devices are used a memory of (RAM) for the desired program and fed this memory from external or internal battery shipped by feeding the (PLC) itself it gives the (RAM) the ability to retain the program even though it was cut off nutrition for the (PLC ), but when the program is completed and validated prefer to program store another type of memories in order to ensure the correctness of the information and protection of low tension as a result of the end of battery life or survive a long time without charging because the device does not run for a long time and used portable (PLC) for that task type ( EEPROM), where the programmer can to convey his program from memory (RAM) to memory (EEPROM), or vice versa in addition to that, when storage (EEPROM) will the device itself when it runs to take a copy of the (EEPROM) to (RAM) in order to operate the (PLC ) to store the program [3],[10],[11].

## VI. PROGRAMMING LANGUAGE FOR PLC

The program is a series of instructions designed ultimately to control the work of a machine or a particular system and program instructions are written using one allocated for languages (PLC) and the use of special software also each (PLC) according to the manufacturer [12].
There are three basic languages for programming (PLC), namely:

1. Ladder language (LD).
2. Function Black Diagram (FBD) or (FC).
3. Instruction List language (IL) or (IS).

After the program has been written using the ladder language being sent from the PC memory (programming tool) to the program memory in the device (PLC) and includes a translation of the instructions to the machine language accepted by the processor by the translator (Compiler) supplied with the device's software.

## VII. PROPOSED METHODOLOGY

**The type of PLC:**

The PLC device contains a number of digital and analog inputs and contains a number of digital and analog outputs. Therefore, the user can choose the appropriate device must be what is needed from a number of digital and analog inputs and outputs. In our research, we used DELTA type that contains 12 inputs and 12 outputs.

**A.** System block diagram:

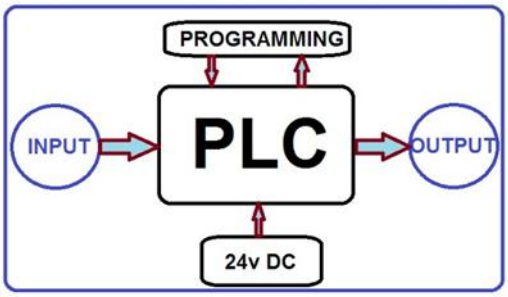


**Figure 2:** system block diagram.

**B. WPLsoft2.4 software**

The PLC device programming is required for this project. It has programmed by (WPLsoft2.4) software. This software enables us to design and simulations designed program before sending it to the PLC device.

**C. Vehicles state:**

The work was designed by internal timer of PLC device. The time was divided depend on the priorities for action of each line. The work of a full cycle time (four lines) was 80 seconds. The time of a green lamp was 20 seconds, while the orange lamp be done interface with green lamp which works in the last 5 seconds of the work of the green lamp. As for the lamp with the red colour shall be done when Extinction green colour and be done time 60 seconds (fig 3). When making a green lamp line that will be running red lamps for the rest of the lines. Priority action is anticlockwise direction.

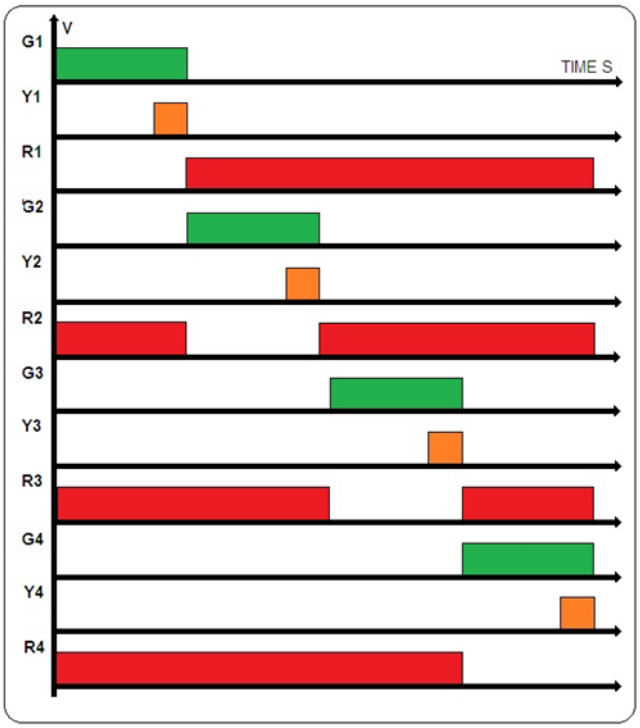


**Figure 3:** Expected Responses for each output (vehicles state).

**D. Pedestrians state:**

As for the pedestrian, the green lamp was running the right side of the vehicle line. Also, the priority direction was anticlockwise. The work time was amount 20 seconds (fig4). The red lamps of pedestrian signals shall be in working condition.

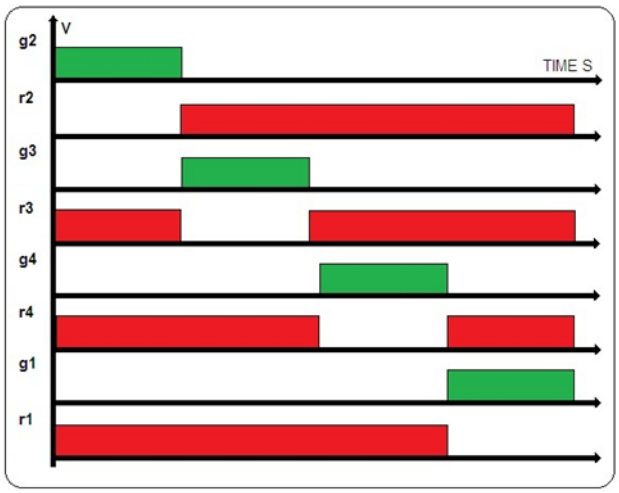


**Figure 4:** Expected Responses for each output (pedestrians state).

## VIII. CONCLUSION

This research had suggested for helping to reduce congestion at traffic intersections and maintain the safety of human by dividing the time equally for each line and giving interface time for pedestrian. The PLC had been used to time dividing between the lines through internal timer.

## IX. RECOMMENDATION

The development of this research is possible of this work by putting sensors mounted on the signal poles. These sensors are going to sensitive the congestion on the lines, which will give a signal to the PLC device, thus be a priority action signals for the line's congestion.

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