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# LOW COST AUTOMATIC STREET LIGHT CONTROL USING PLC AND TIMER

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**Abstract**: in most of the already existing systems energy is wasted by glowing all the street lights. As an urge to save energy, a simply logic is used to control the street lights. Using functional block diagram logic the required simulation is drawn. Using timer, after a particular duration 50% of the total lights are switched of and remaining 50% are operated. Also we have used two logic gates, which are xor and or gates which requires 2 inputs. In timer control we can set the delay time in seconds, minutes, hours depending on our necessity. The main supply is connected to the plc as a switch and also control switch.

Keywords**: plc, logic gates, timer, delay, control switch, main supply switch**

## I. INTRODUCTION

In this project we have discussed about automatic street light control using plc. In already existing methods ladder logic is used but in this project we have used functional block diagram logic which is easily understood by everyone. The installation cost may be little high but the operating cost and efficiency are more better than other topologies. In this project energy is conserved by switching off 50% of the load after a particular duration. In this we have generally considered from 6 a.m. To 6. P.m. This duration is split into equal halves and the street lights are glown .this project uses logic gates for its operation. Hence we can expect an efficient output. In this we have used crouzet millennium plc, cd 24v dc essential, with 12 inputs and 8 outputs.

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## II. SYSTEM ARCHITECTURE

In this the plc is connected to the main eb supply. The logic gate control and timer control logic are fed into the plc. The loads are the street lights which are connected to the output side of the plc. Both the main supply and the on/off control switch are connected to the logic gates and timer. The timer is set with count. the logic gates used here are **EXOR** gate and **OR** gate. To understand the concept of street light control we should have deep knowledge about the truth table.the whole logic is drawn using functional block diagram. As shown in fig.1.

Logic. Which is easy to operate as well as easy to be understood.

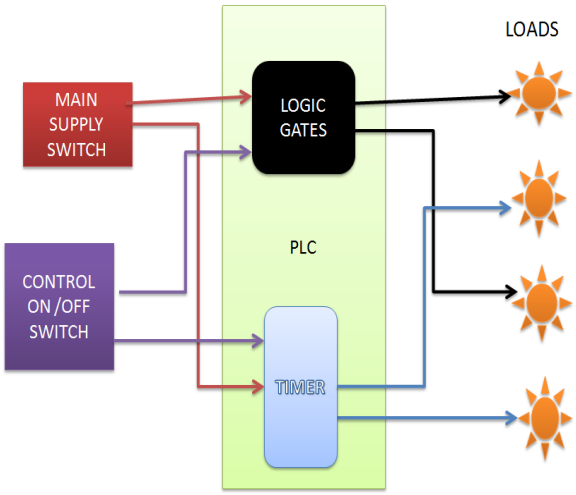


Fig.1. Block diagram

## III. LOGICAL OPERATION

we have used EXOR and or gates. Here the concept of each gate is discussed in detail.

### A. EXCLUSIVE OR GATE.

In this gate if any one of the input is high the output is high or else the output is low. It represents inequality

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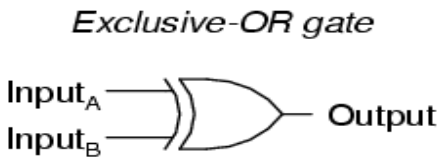
function. It uses 0 and 1 as low and high. The logical expression is given BY $Y = A \oplus B$. As shown in the fig.2.

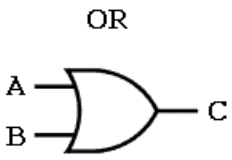
**B. OR GATE:**

In this gate if any one of the input is high then the output will be high otherwise it will be low. It is represented using 0 and 1 . Its expression is giben by $Y = A + B$. As shown in the fig.3.




| A | B | Output |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 0 |

Fig.2: eor gate




| Inputs | | Output |
|---|---|---|
| A | B | C |
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 1 |

Fig.3:or gate

## IV. WORKING PRINCIPLE

TABLEI OPERATIONAL LOGIC

| Inputs switches | | Outputs bulbs | Delay timer |
|---|---|---|---|
| S1 | S2 | | Seconds |
| Off | Off | None | 0 |
| On | Off | All | 0 |
| On | On | All | 0 |
| On | On | 2,4 | 15 |
| Off | On | All | 0 |

In this both the switches are connected to the logic gates . The fig.4. Represents , both the switches are off so no load is set on.

When the main supply is on , and the on/off control switch is off, the loads are all set on. Fig 5.when both the supplies are set on, all the loads are active irrespective of the timer delay fig 6. The timer is set at a delay of 15 seconds , all the alternative loads are set off. Fig.7. In fig.8. The timer dialogue box is shown, in this we can set the time in seconds, cycles, and also hours/minutes, seconds can be used to set the delay.

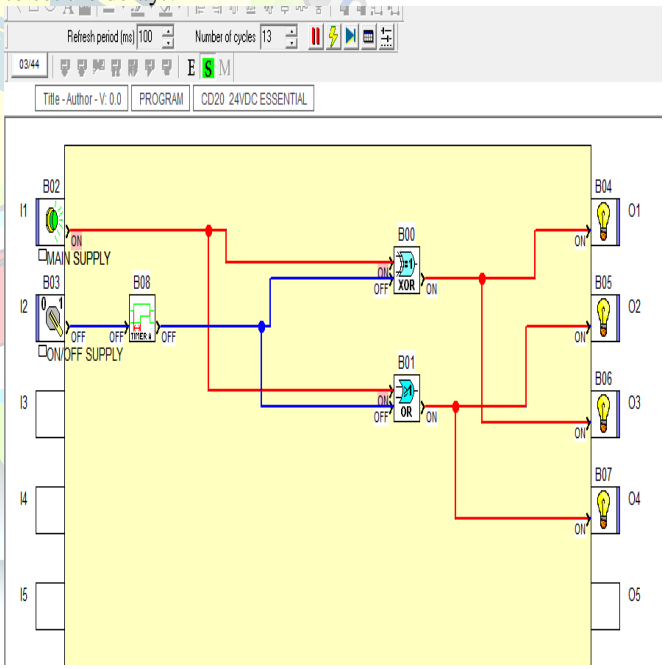



Fig.4.: When anyone supply is on

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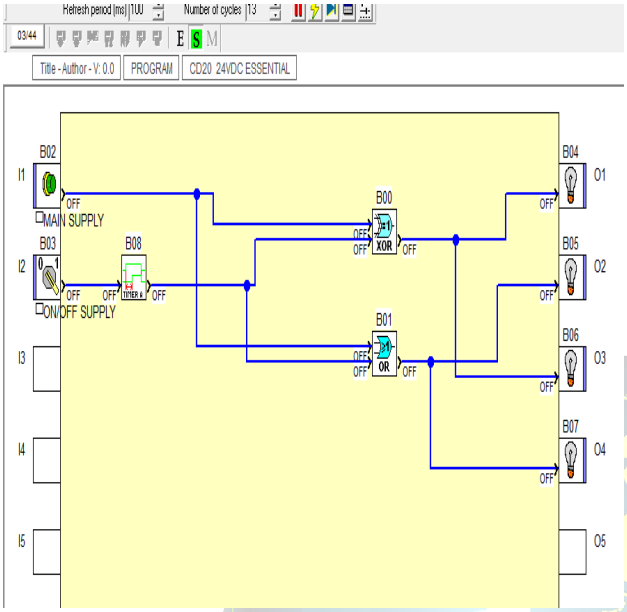


Fig .5.When both the supplies are off

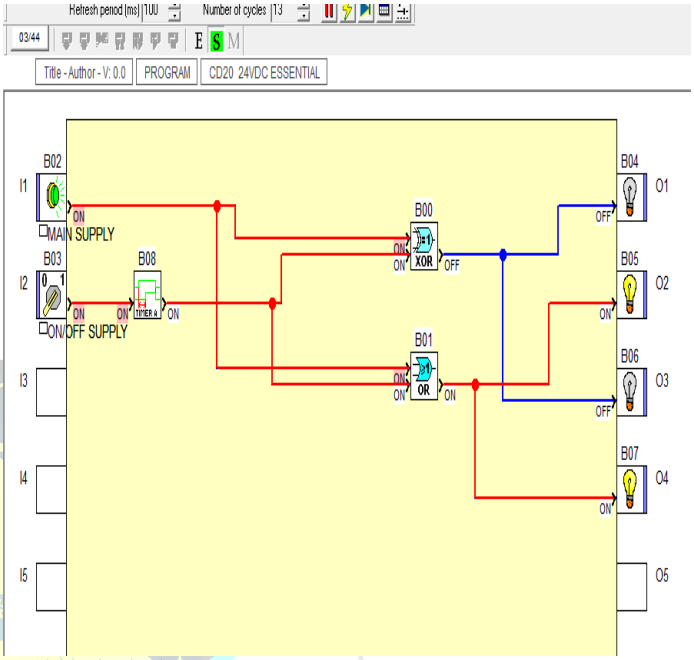


Fig.7. Alternative loads are on

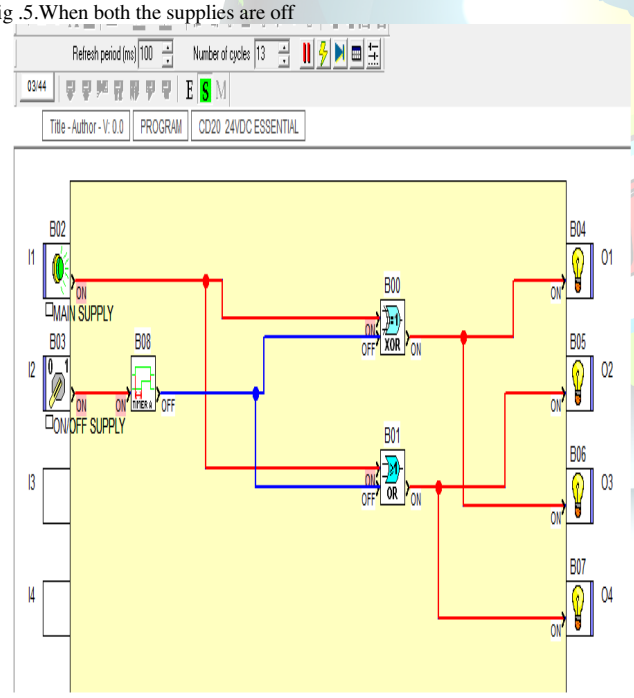


Fig .6. When both supplies are on

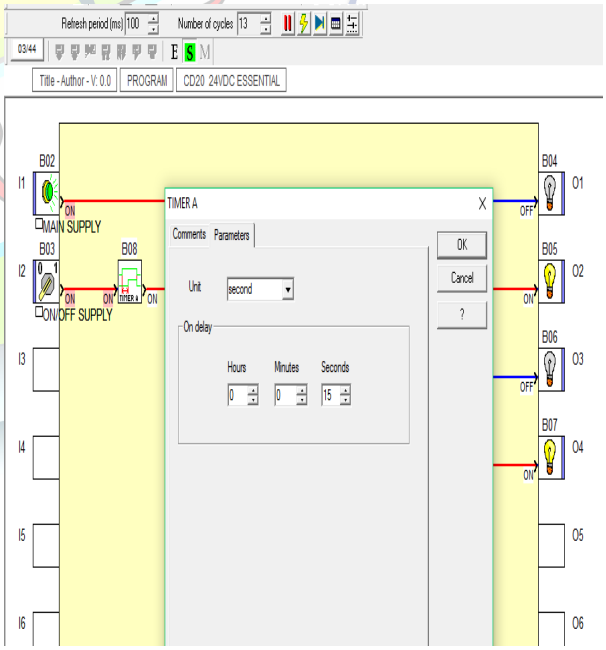


Fig .8. Timer controller dialogue box.

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## V. CONCLUSION

It is observed that the street light can be controlled automatically using plc and a timer delay is used to control the glow of alternate loads. The installation cost , operational cost are very less and the output efficiency is high. When compared to other topologies , plc plays a vital role in automatic control. Further we can also attach a solar supply to overcome power interruption. Using plc we can connect many inputs and outputs as required in the design specifications.

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