



# **PLC program for Object Sorting – Industrial Automation**

**Industrial Automation  
Project  
[15EIE402]**

By

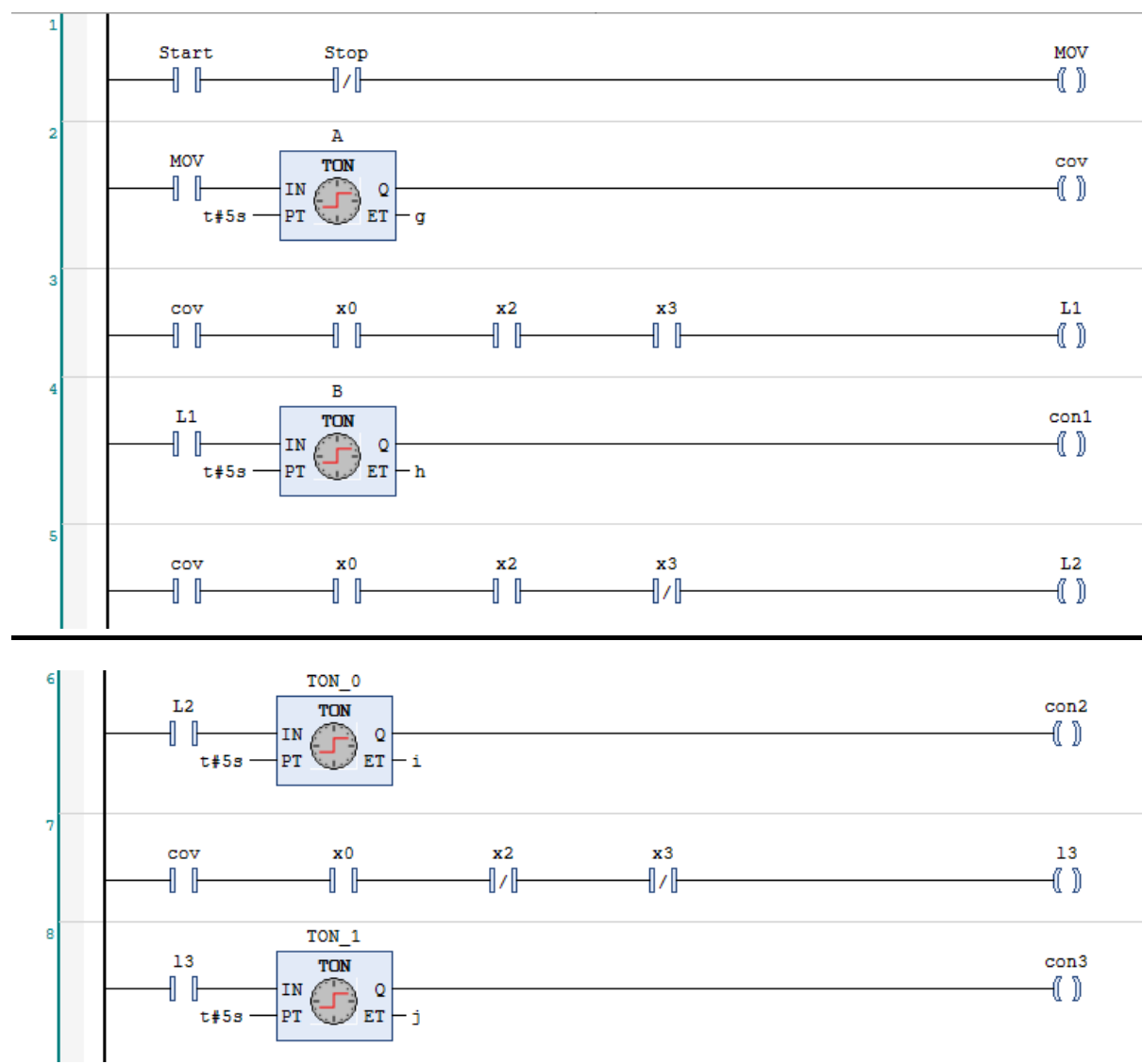
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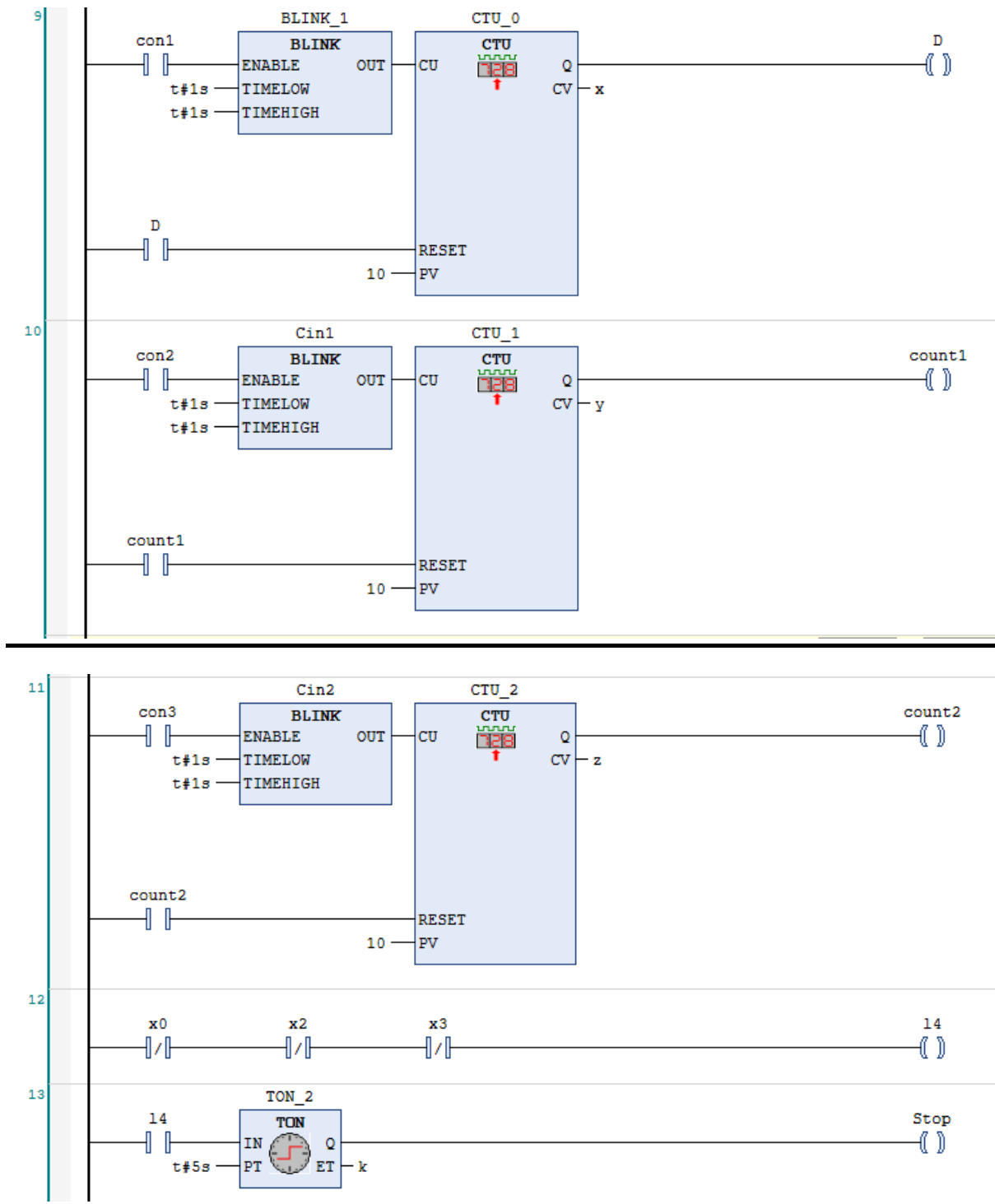
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## Problem Statement:

To sort the objects according their size and simultaneously count the number of objects in each size and pack.

## Ladder Logic:







## Ladder Logic Explanation:

1. **Start** and **Stop** push buttons are used to switch on and switch off the **Mov**.
2. After **Mov** starts, a timer (TON) with pre-set value 5s, This is time taken to the conveyor (cov) and reach the point where sensors are placed.
3. The sensors are x0, x2, & x3.

When the object reaches the sensors, the sensors will be activated according to their size.

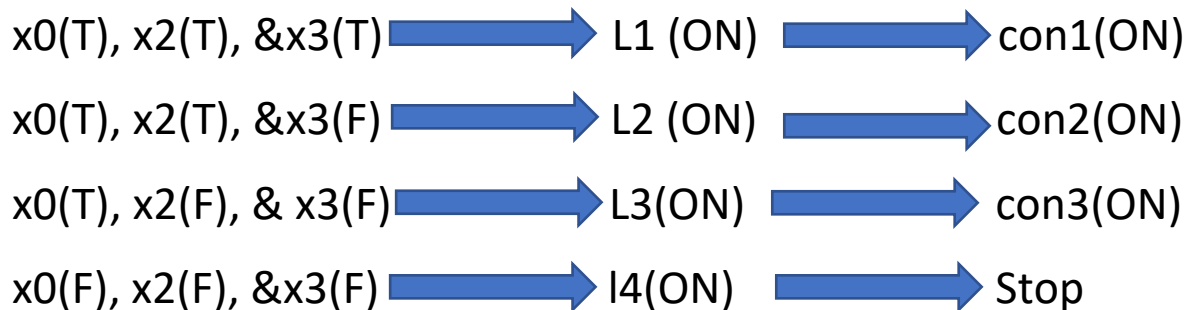
The below table shows the size

Object Size	x0	x2	x3
Large	True	True	True
Medium	True	True	False
Small	True	False	False



No object	False	False	False
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### Timer of 5s

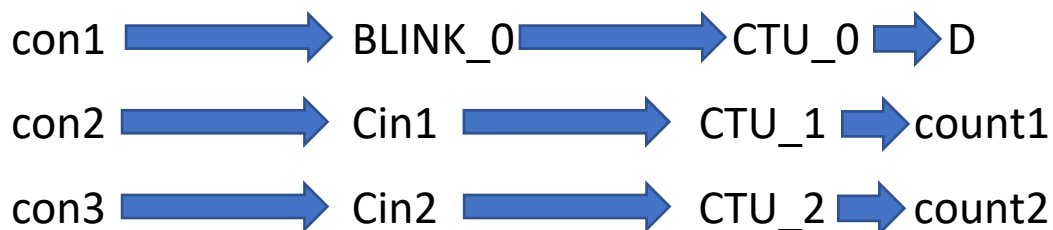


3.After the logic, light L1, L2, L3, L4 will glow according to the logic and the output light is given as the input to the timer to send the sorted objects for counting and packing, through the different conveyors for different sizes.

Counting:

4.When the above logic is performed the output (i.e. con1, con2, & con3) is given as the input to the respective blink (BLINK\_1, Cin1, & Cin2) assuming that each object will appear in 1s (i.e. total time for one object is 1s). So TIMELOW(t#1s) & TIMEHIGH(t#1s).

5. The Blink (BLINK\_0, Cin1, & Cin2) is connected to the up counters (CTU\_0, CTU\_1, & CTU\_2) respectively with a pre-set value (PV) of 10.



6. The done bits of counters (Q) (D, count1, & count 2) are activated when the counter reaches the pre-set value. These are also connected as the reset contact of the same counter, so that when the counter reaches the pre-set value it will automatically reset the count (i.e. again starts from 0).

Packing:

7. The Current Values (CV) of the counters (CTU\_0, CTU\_1, & CTU\_2) are declared to the variables x, y, z are the current values (i.e. how many objects are of the same size). This is done in order to count and pack the objects

8. For math operator EQ (equal) conveyor (con1, con2, & con3) are given as in input, and x, y, z is given to check the equality condition against 10.

9. When the equality condition is true for con1, pack\_large is activated.

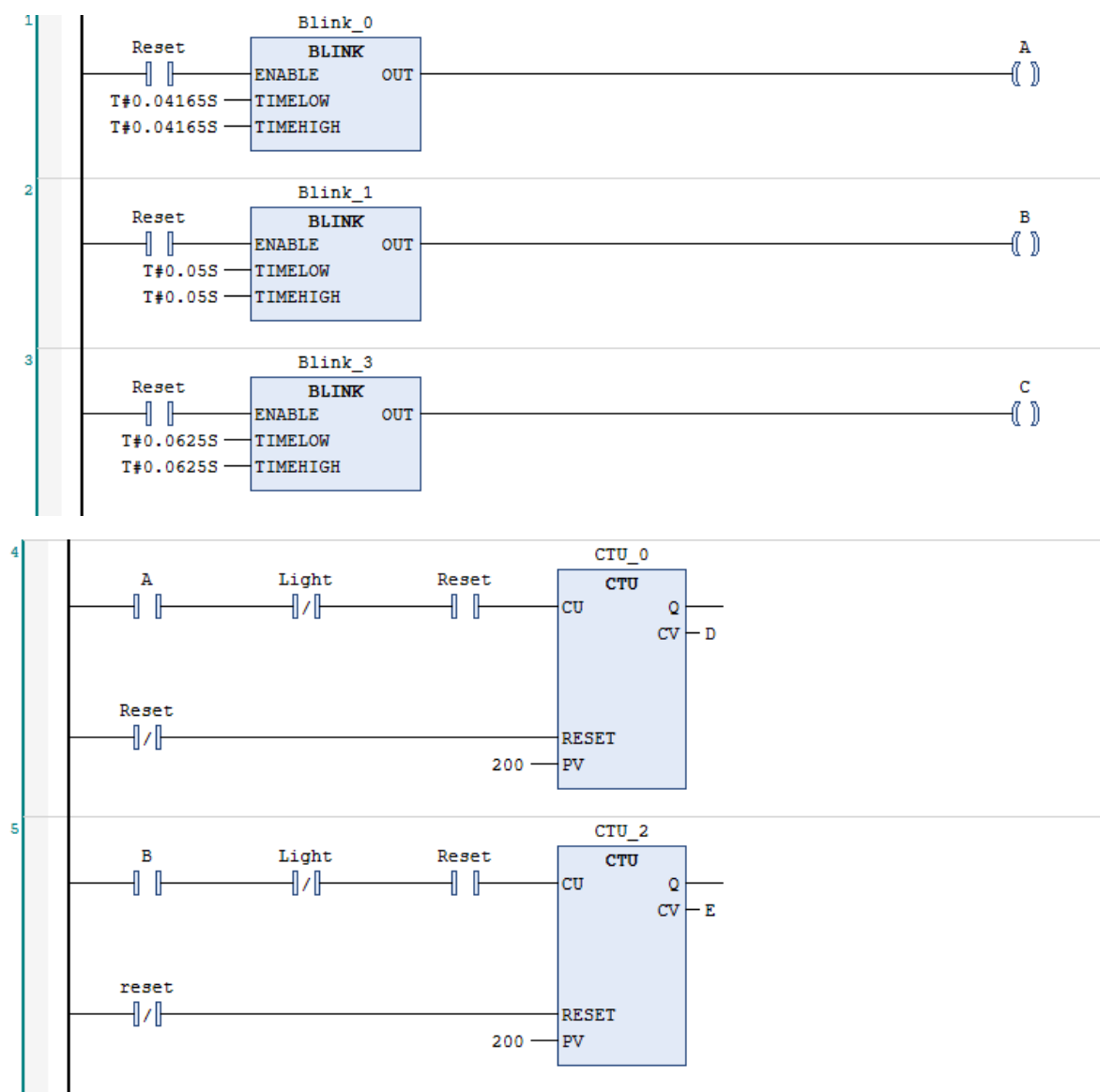
When the equality condition is true for con2, pack\_medium is activated.

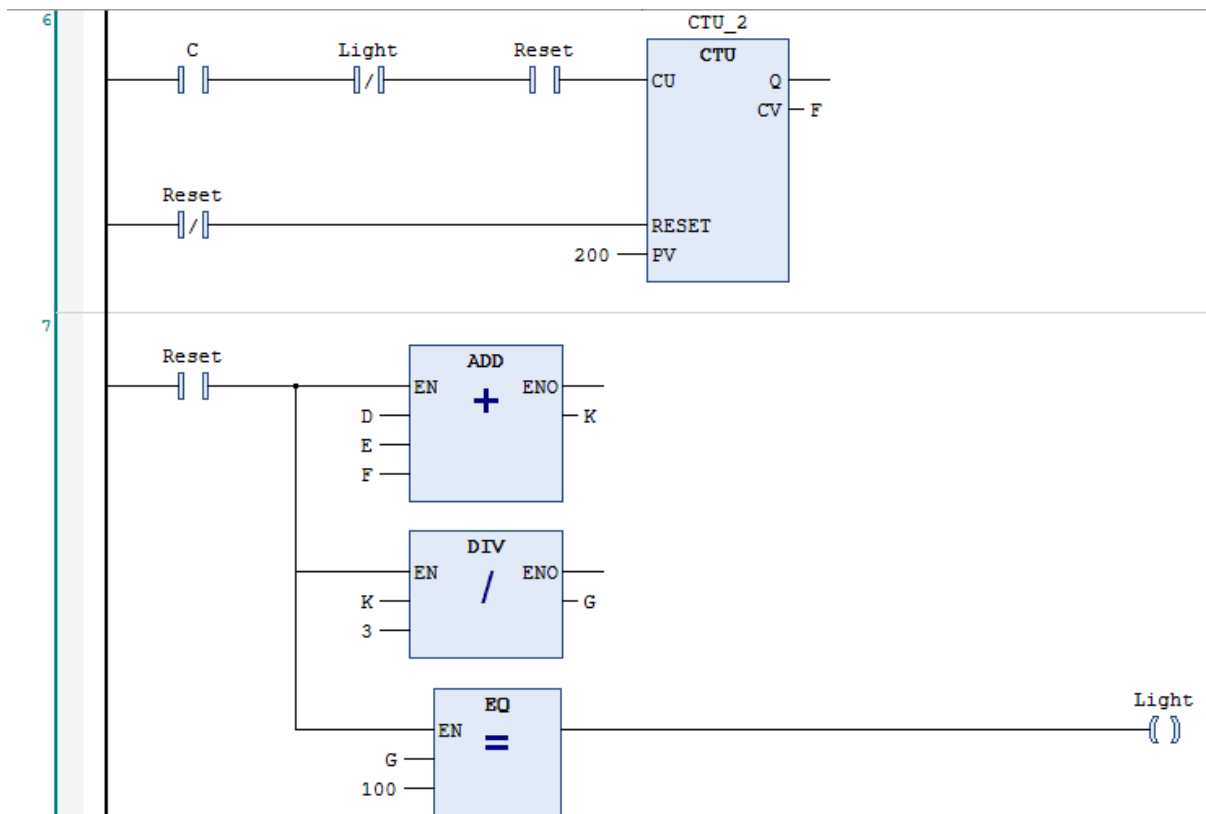
When the equality condition is true for con3, pack\_small is activated.

10. When stop button is pushed it stops the entire operation.

## Assignment Question:

1) A machine ejects parts into three chutes. Three optical sensors (A, B and C) are positioned in each of the slots to count the parts. The count should start when the reset (R) button is pushed. The count will stop, and an indicator light (L) turned on when the average number of parts counted equals 100.





2) A light should glow for 10s and then switch off

Or

A PLC is to be used to control a flood light. When a sensor with a normally open contact detects movement, the light is to switch on for 10 seconds and then switch off. Draw the ladder logic to operate the system as designed.

