Tutorial 3

ET0917 / ET0817 / ET0832

PROGRAMMING TIMER, COUNTER, EDGE DETECTION, SET, RESET

Q1 - MCQ

The hotel would cut off the power to the room 5 seconds after the access card is removed. Which type of timer is the most suitable?

a) Pulse Timer

b) On delay timer

c) Off delay timer

d) Retentive Timer

Q2 - MCQ

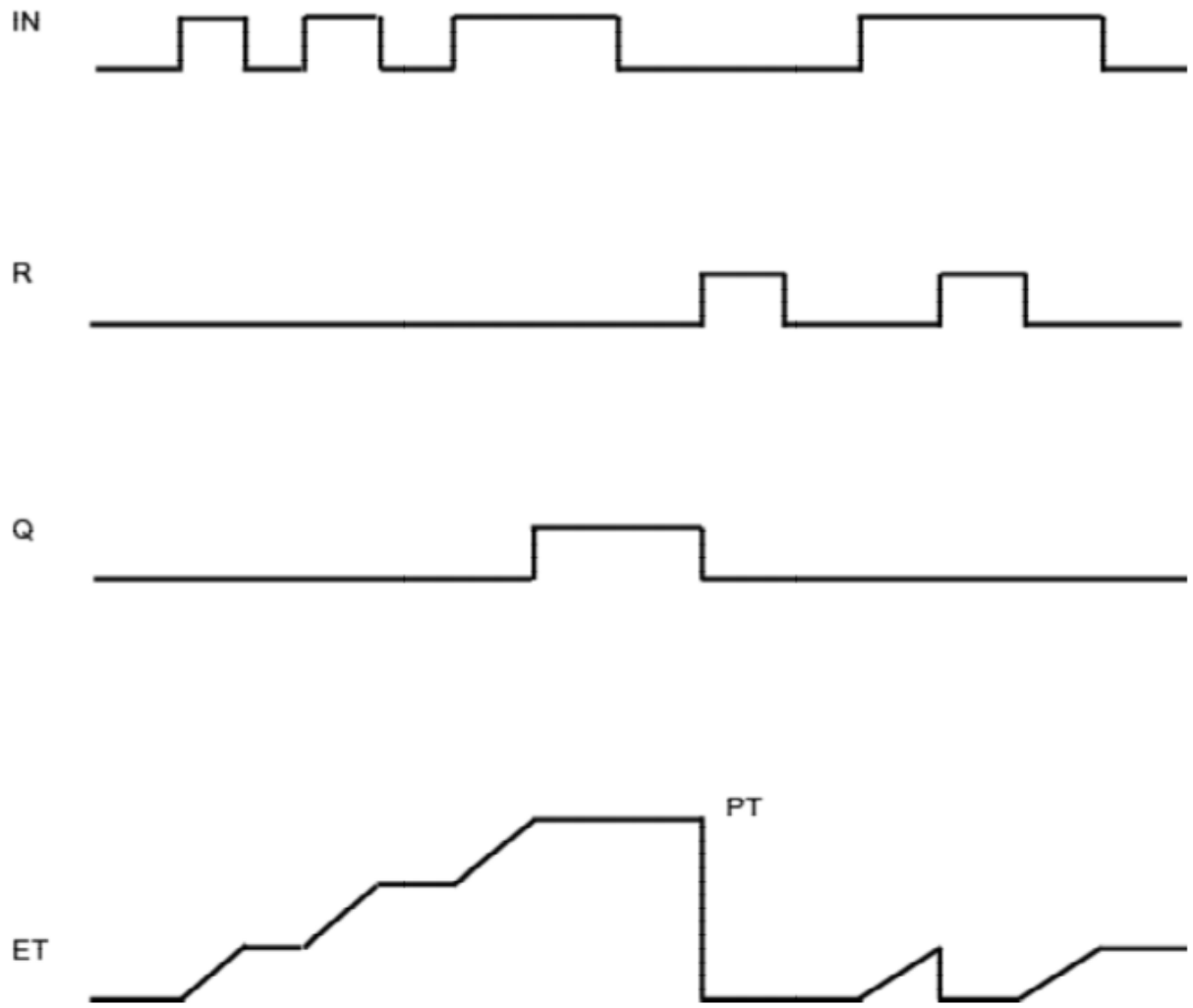
Which type of timer correspond to the timing diagram?

a) Pulse Timer

b) On delay timer

c) Off delay timer

d) Retentive Timer



Q3 - MCQ

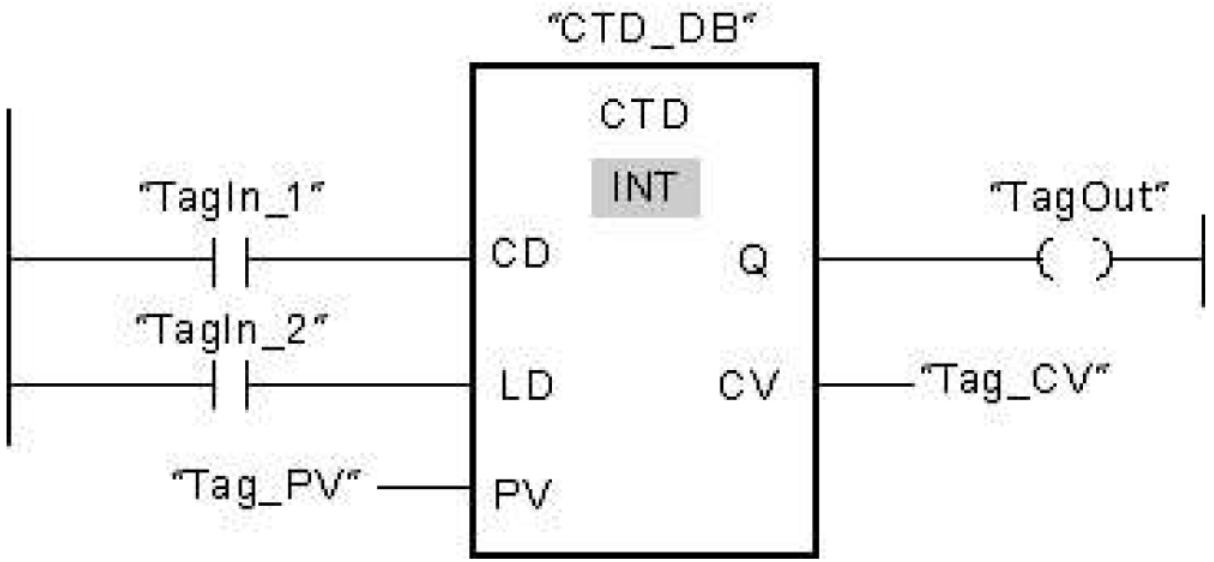
What will happen when Tag_PV = 3, TagIn_1 = 0 and TagIN_2 = 1?

a) Tag_CV = 0

b) Tag_CV = 1

c) Tag_CV = 2

d) **Tag_CV = 3**



Q4 - MCQ

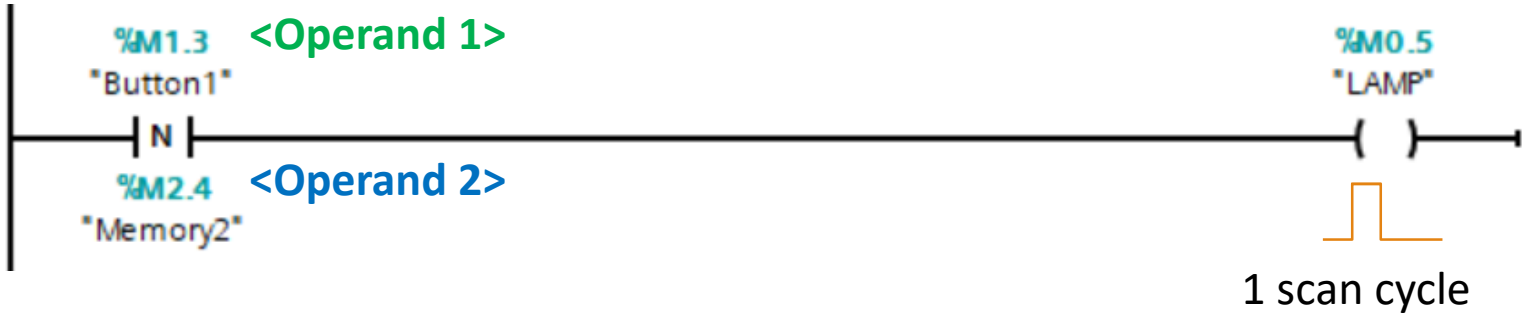
When will %M0.5 turn on for 1 scan cycle?

a) When Button1 %M1.3 is pressed (off to on state)

b) When Button1 %M1.3 is released (on to off state)

c) When Button1 %M1.3 is pressed and held ON

d) This is an invalid operation, %M0.5 will not turn on



Q5 – Tank Level Control

1. **Prepare I/O table for physical input/output**
2. **Draw a flow chart and implement ladder diagram**

When system starts, and Level Switch High (LSH) (NC) is not activated, SOL A will open (ON) to fill the tank.

When the tank is full - LSH is activated,

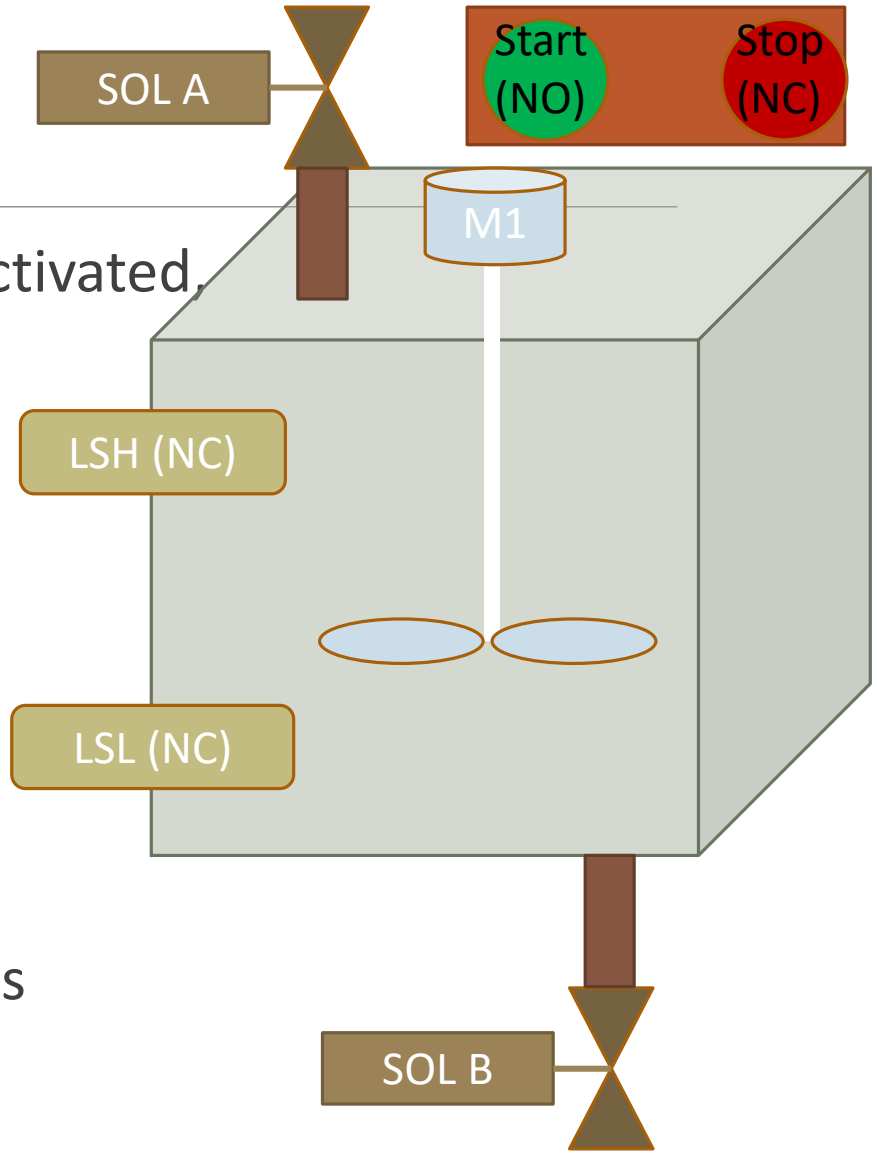
SOL A will close (OFF)

Agitator M1 will run (ON) for 30s

After 30s,

Agitator M1 will stop

SOL B will open (ON) to drain till Level Switch Low (LSL) (NC) is activated

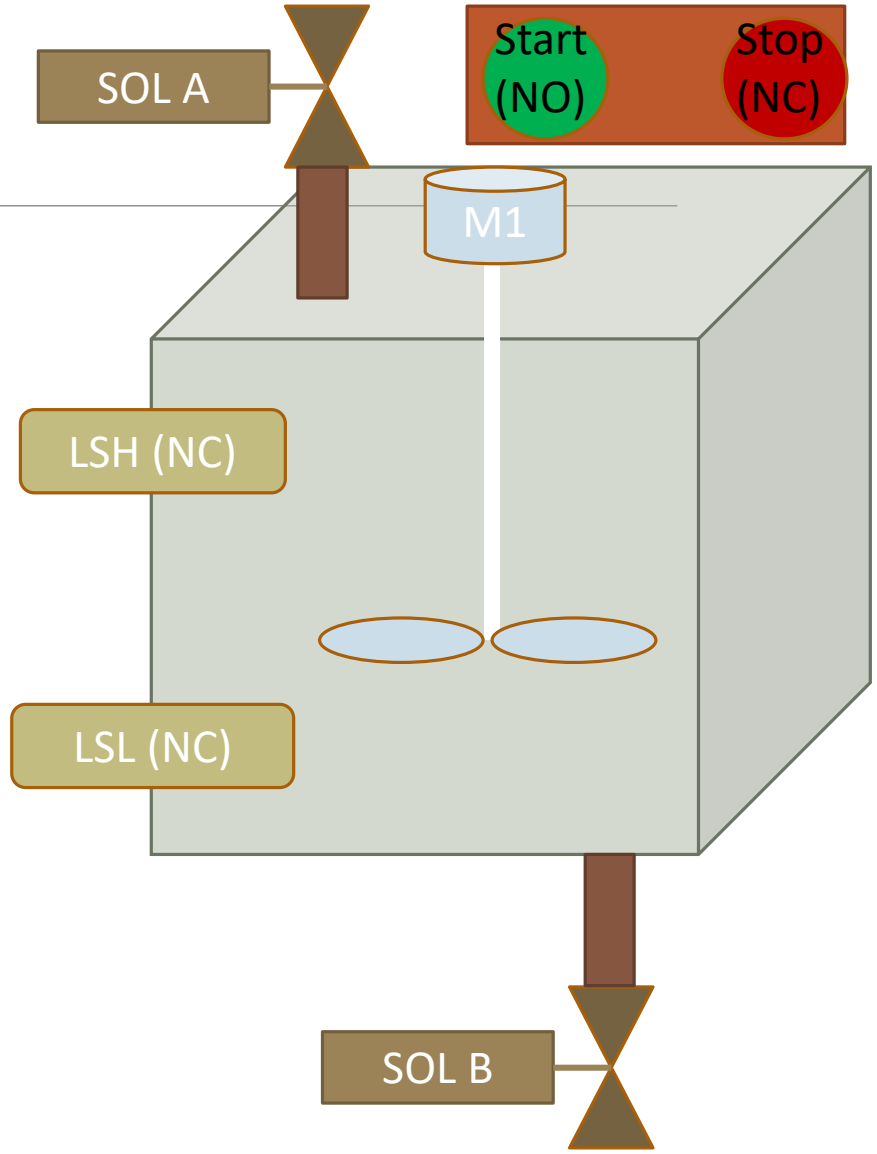


Q5 – Image Upload – Tank Level Control

SUGGESTED SOLUTION

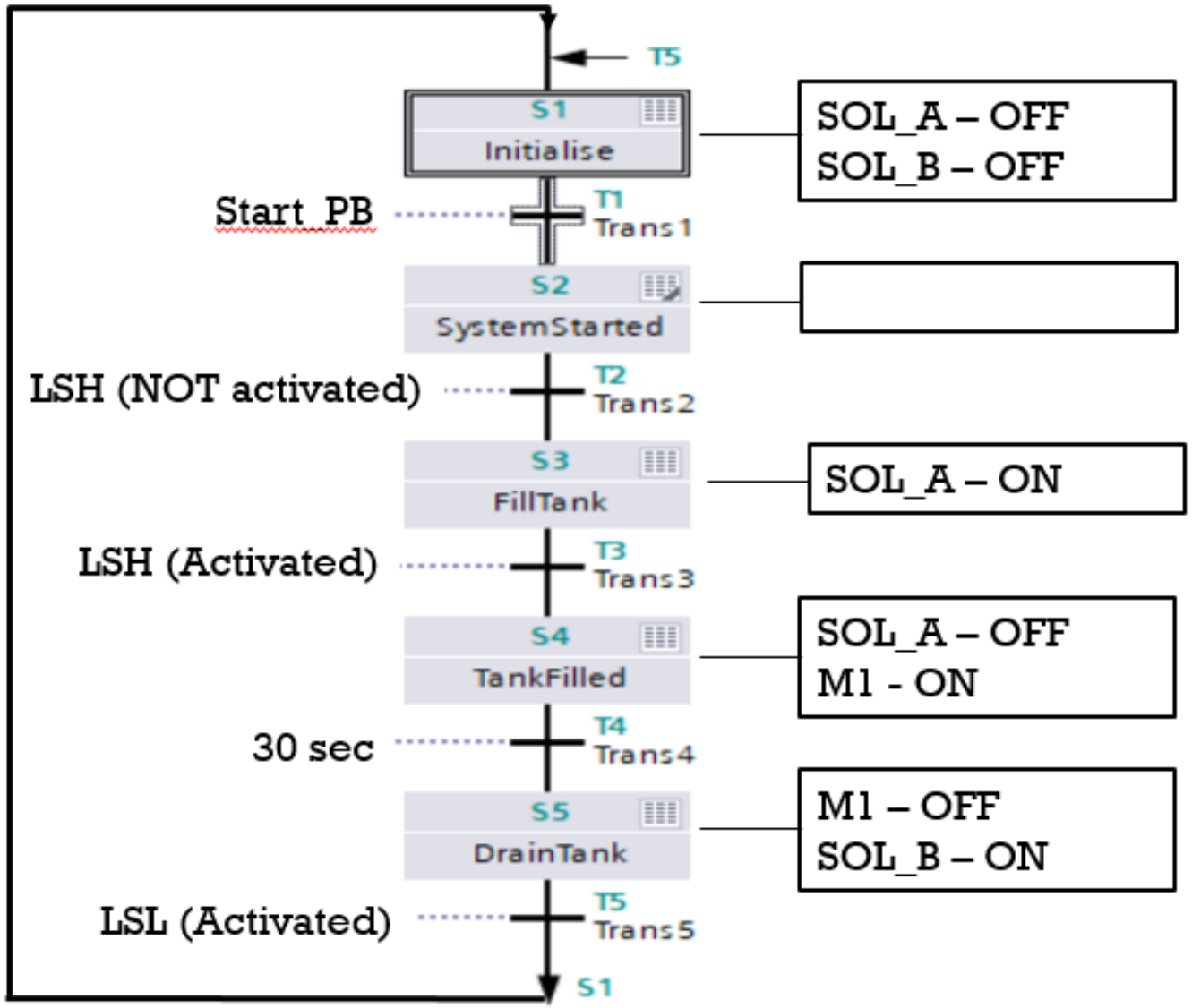
Input/Output Table

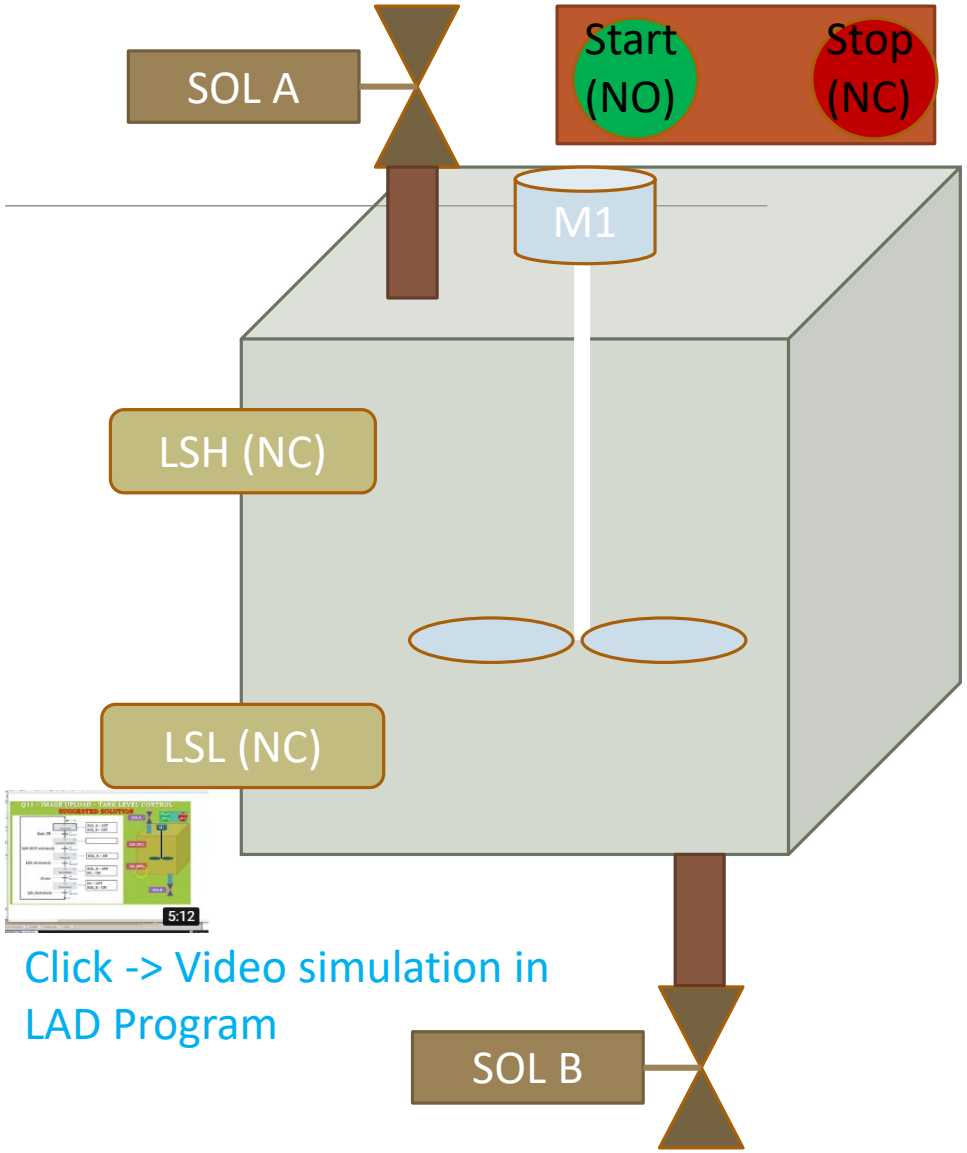
Tag Name	Data Type	Address	Comments
Start_PB	Bool	%I10.0	Normally Open
Stop_PB	Bool	%I10.1	Normally Close
LSL	Bool	%I10.2	Normally Close
LSH	Bool	%I10.3	Normally Close
M1	Bool	%Q4.0	Agitator
SOL_A	Bool	%Q4.1	
SOL_B	Bool	%Q4.2	



Q5 – Image Upload – Tank Level Control

SUGGESTED SOLUTION

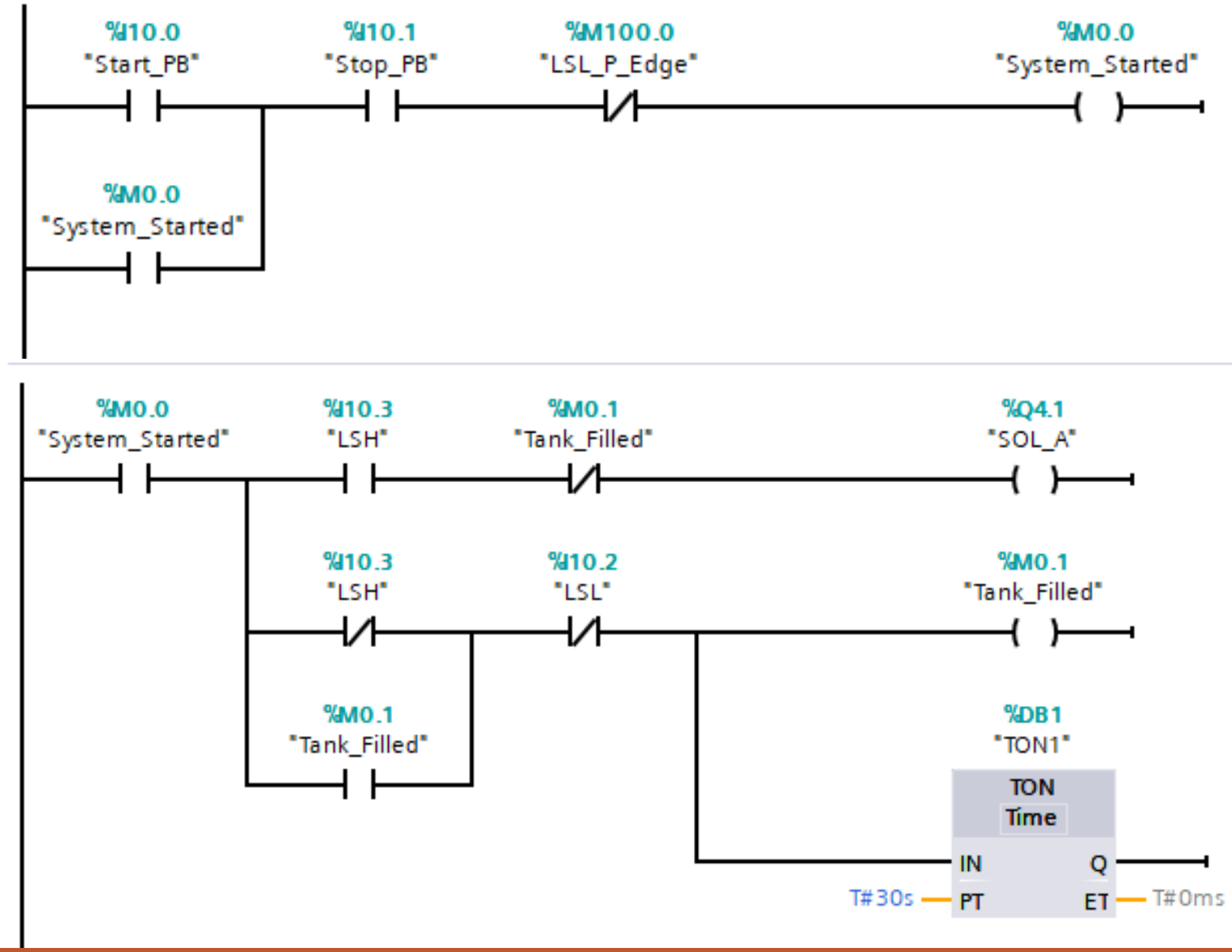


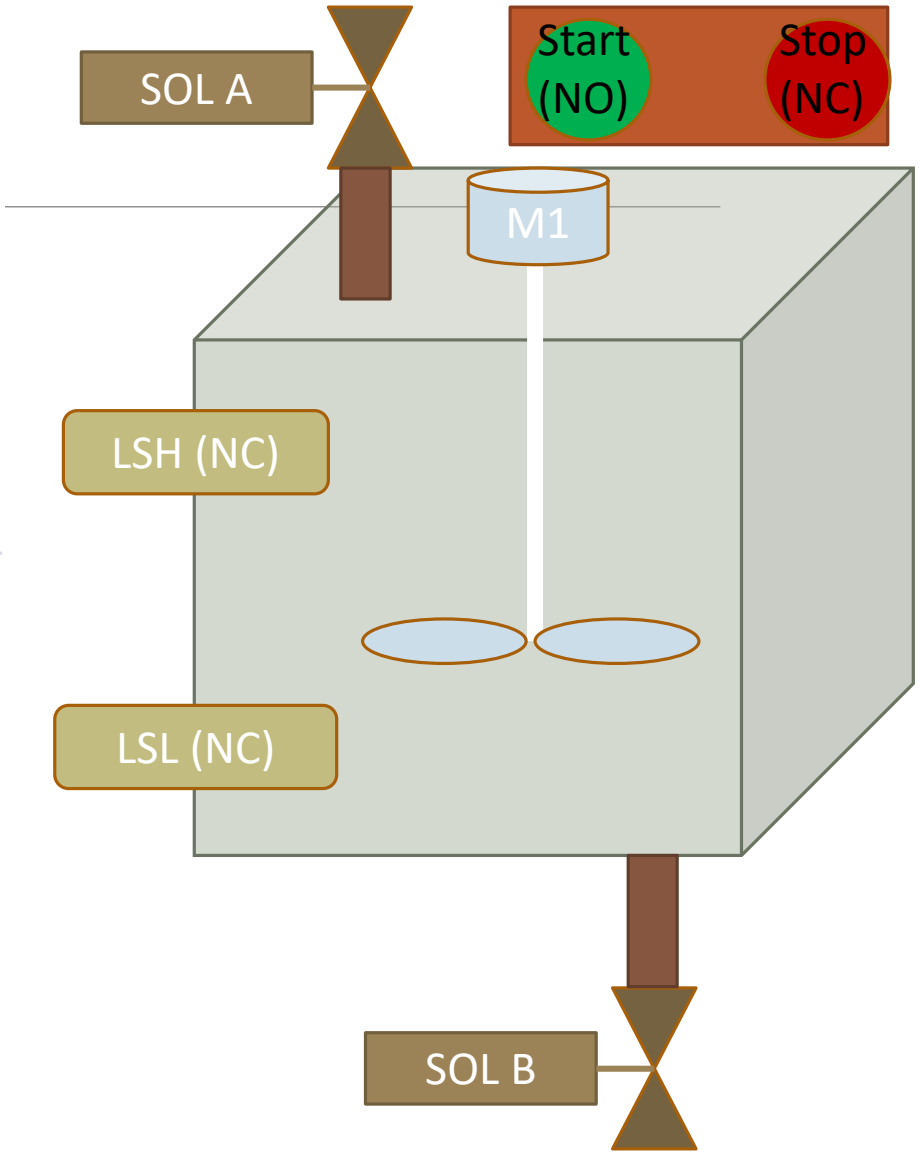


Click -> Video simulation in LAD Program

Q5 – Image Upload – Tank Level Control

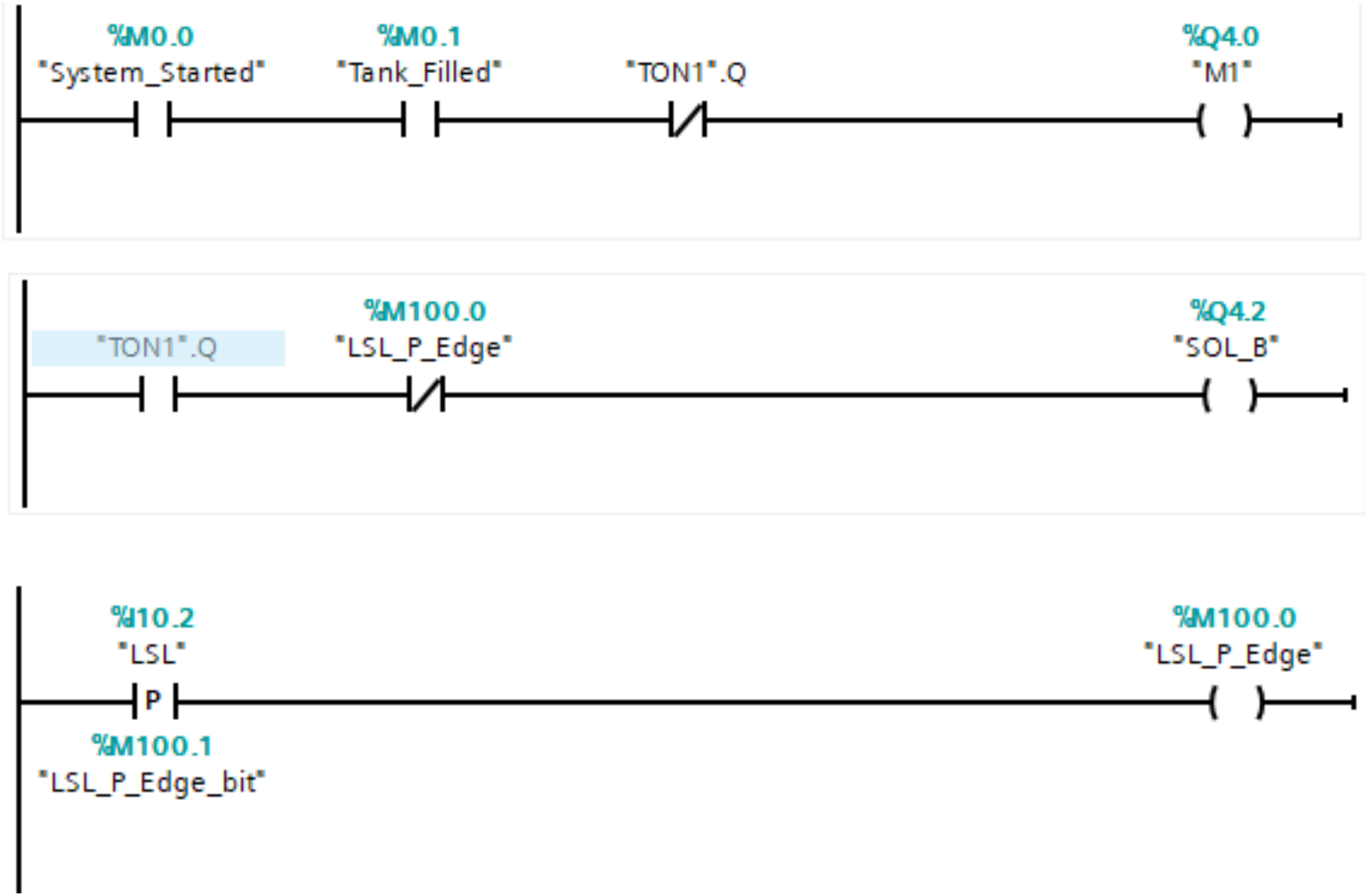
SUGGESTED SOLUTION

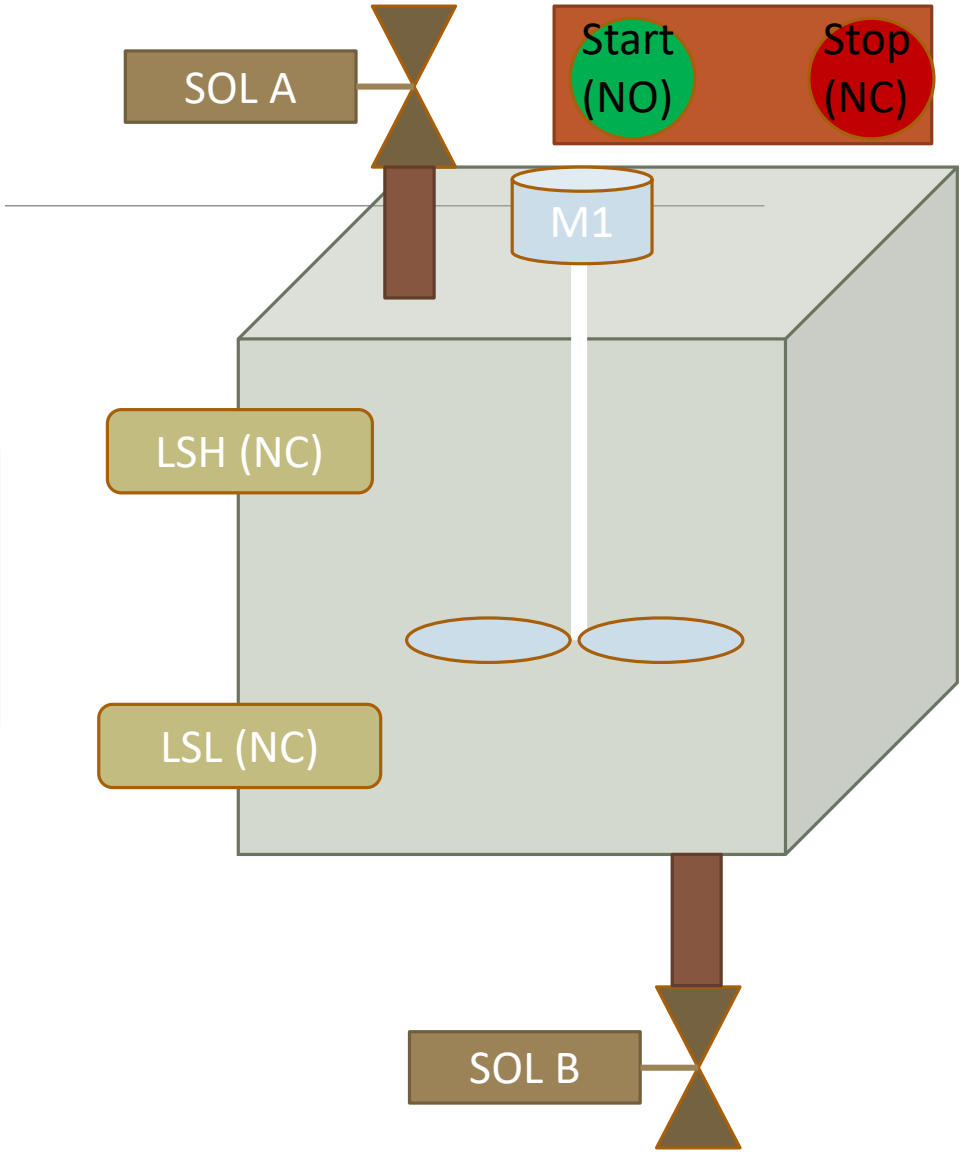




Q5 – Image Upload – Tank Level Control

SUGGESTED SOLUTION

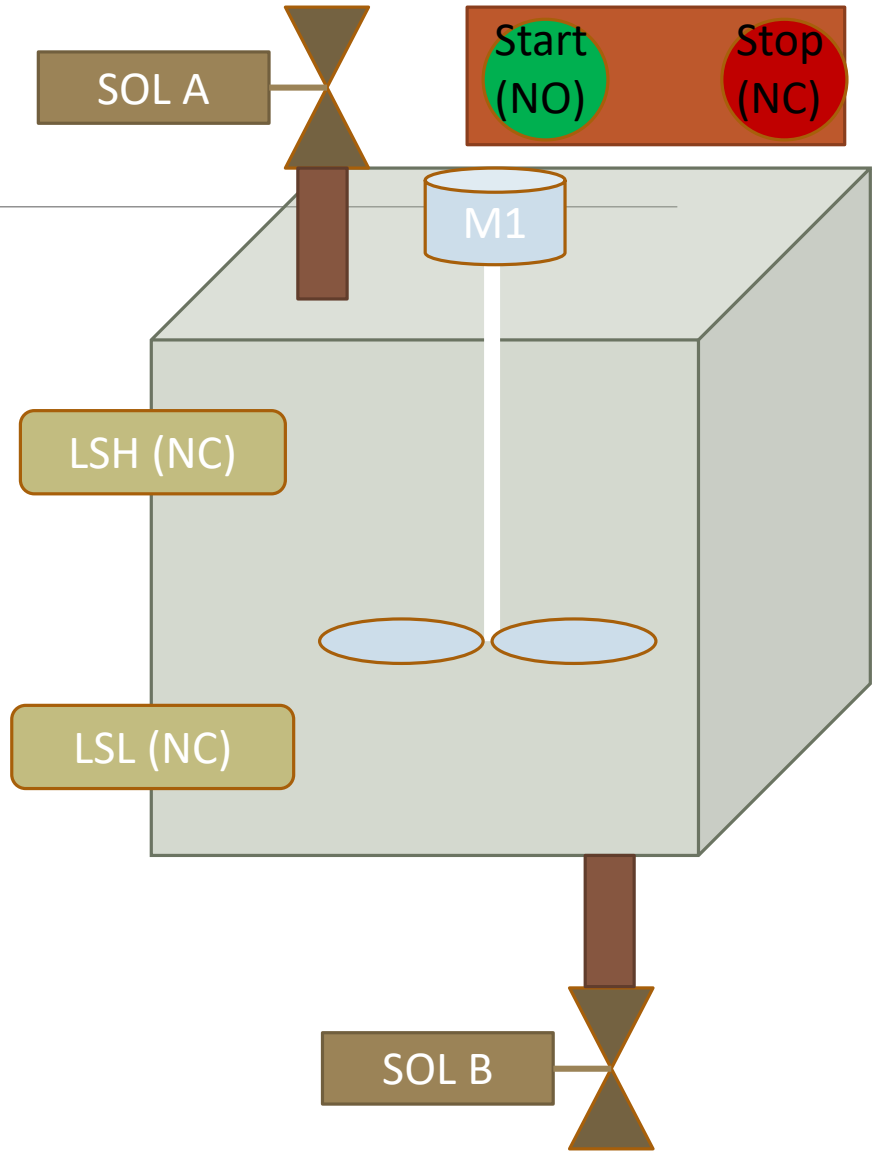




Q6 – Tank Level Control

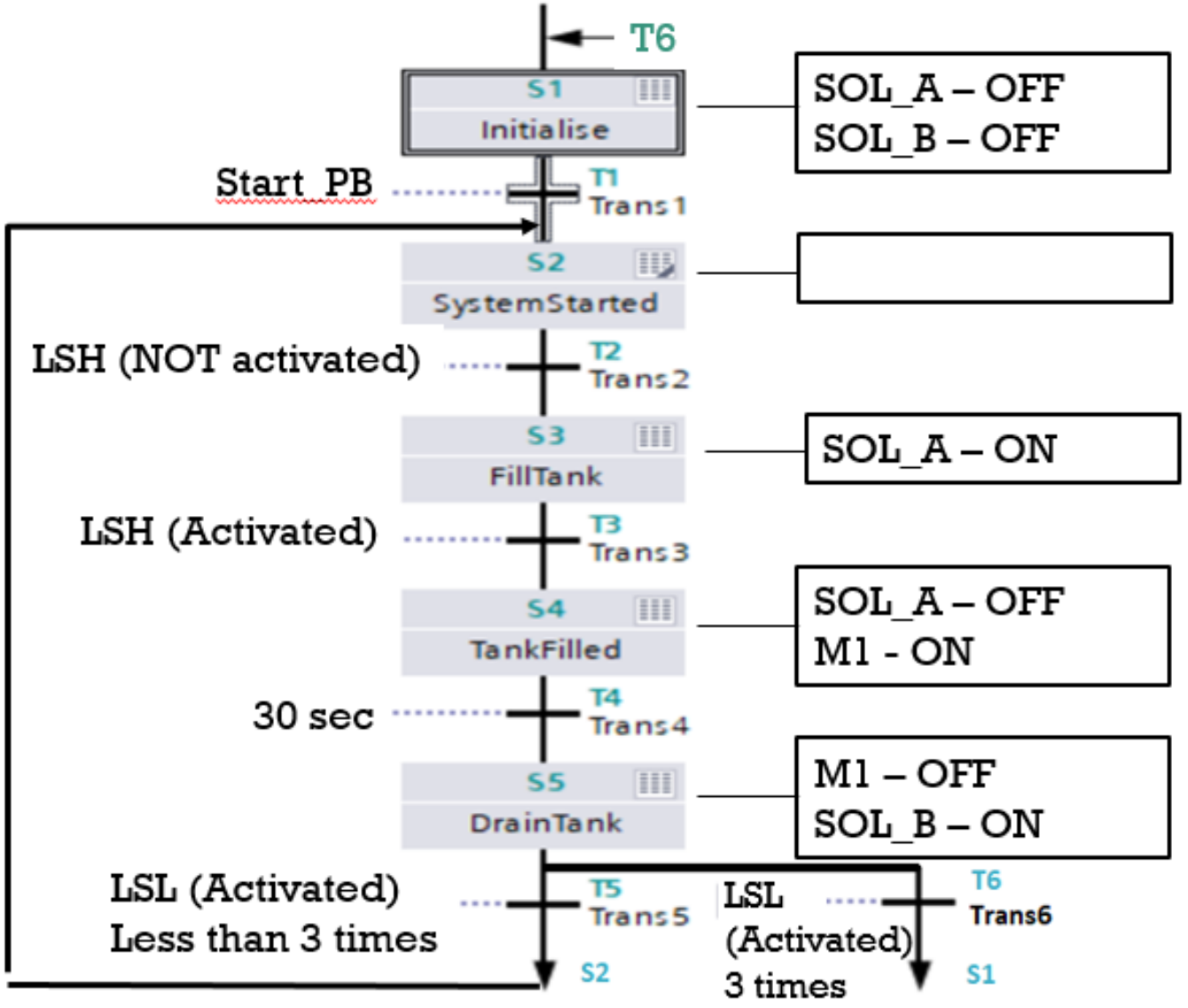
Modify Q6 flow chart to allow repeat of the process 3 times.

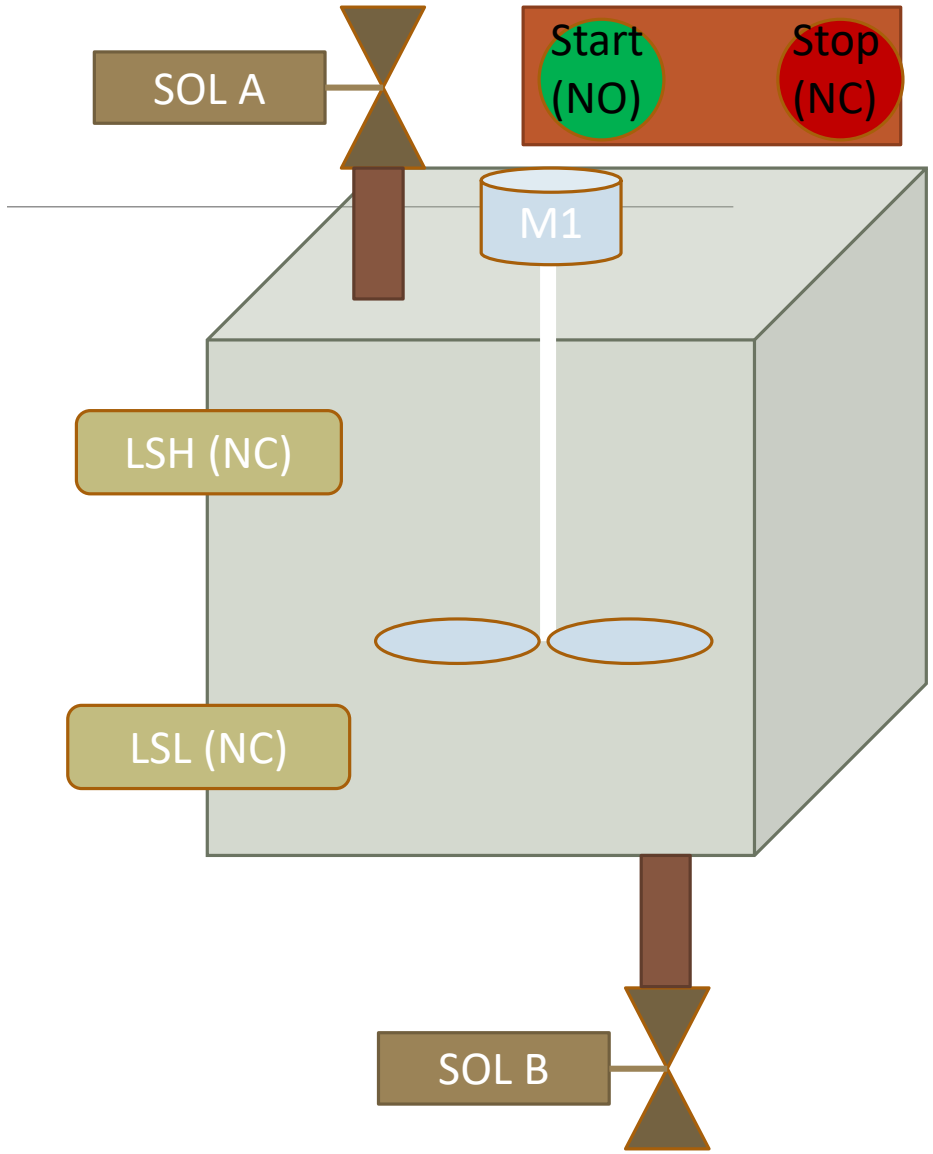
Implement this modification in ladder diagram



Q6 – Image Upload – Tank Level Control

SUGGESTED SOLUTION





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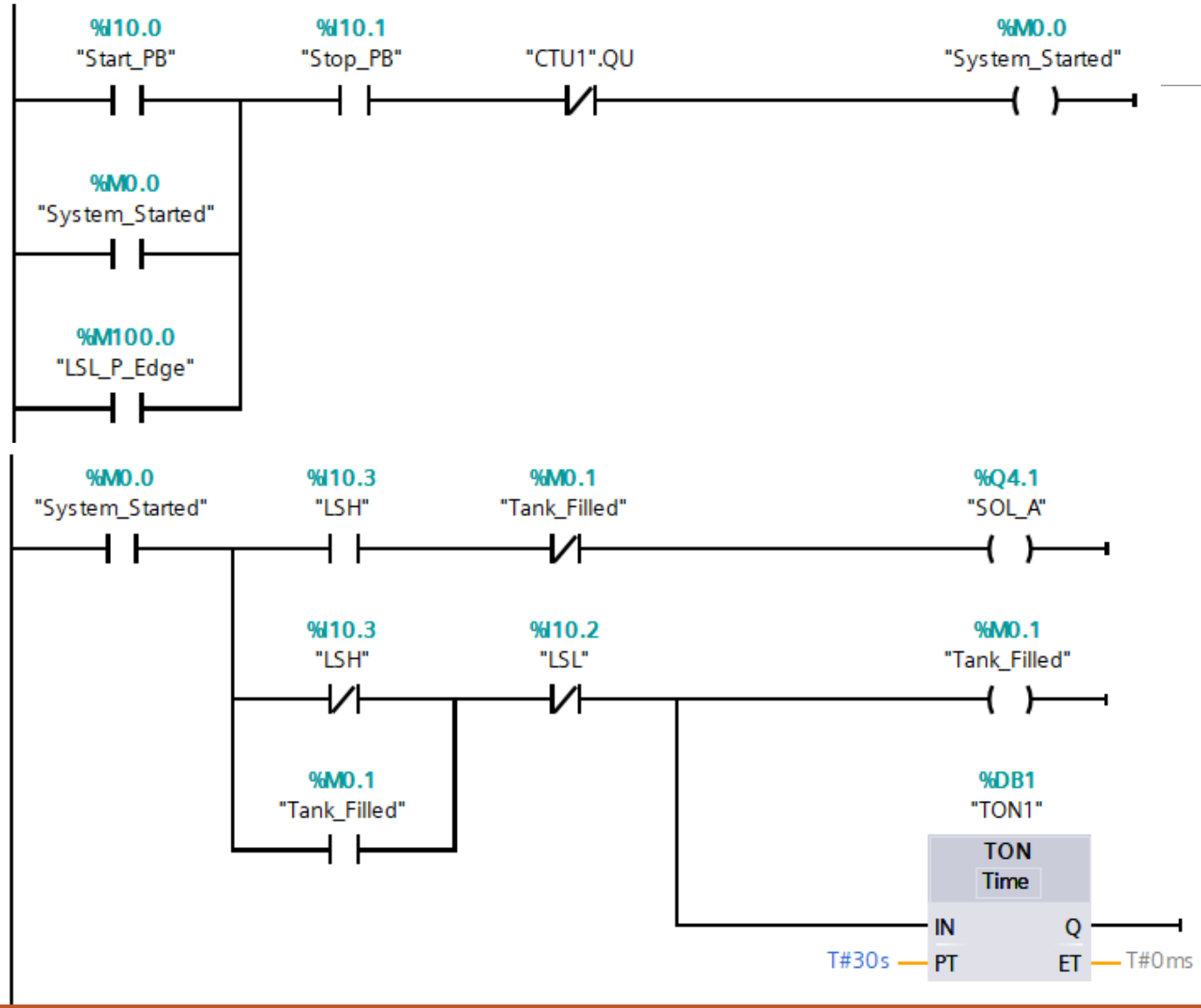
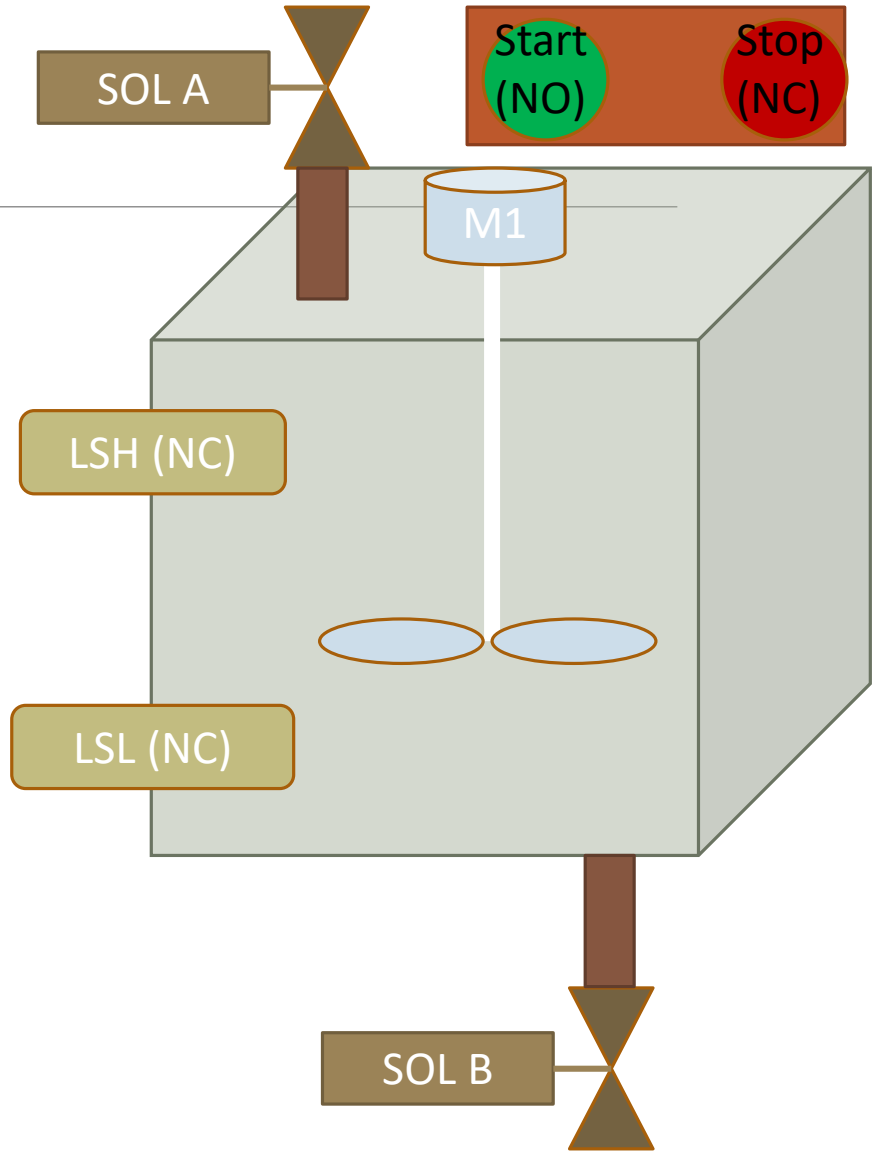
Q6 – Image Upload – Tank Level Control

SUGGESTED SOLUTION





https://youtu.be/FNZrc1-EC6A

Q7 –Duty Standby Pump

Design a Ladder logic:

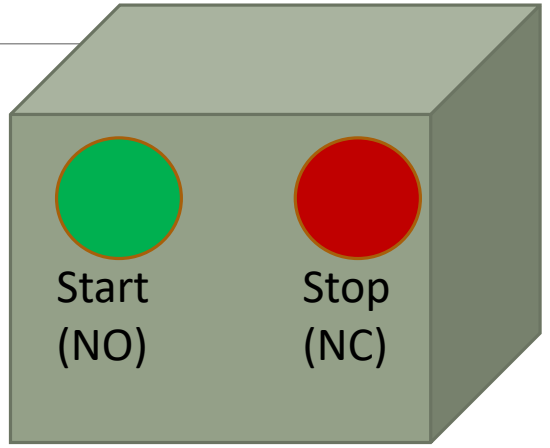
Duty Cycle Change Over Pump – 2 Pumps will alternate the operation.

When Start button (NO) is pressed, Pump 1 will run

Pump 1 will stop when Stop button (NC) is pressed.

When Start button is pressed, Pump 2 will run.

Similarly Stop button will stop the pump



Hint:

- ***Set-Reset***
- ***Edge Detection***

Pump 1

Pump 2

Q7 – Image Upload – Duty Standby Pump

SUGGESTED SOLUTION

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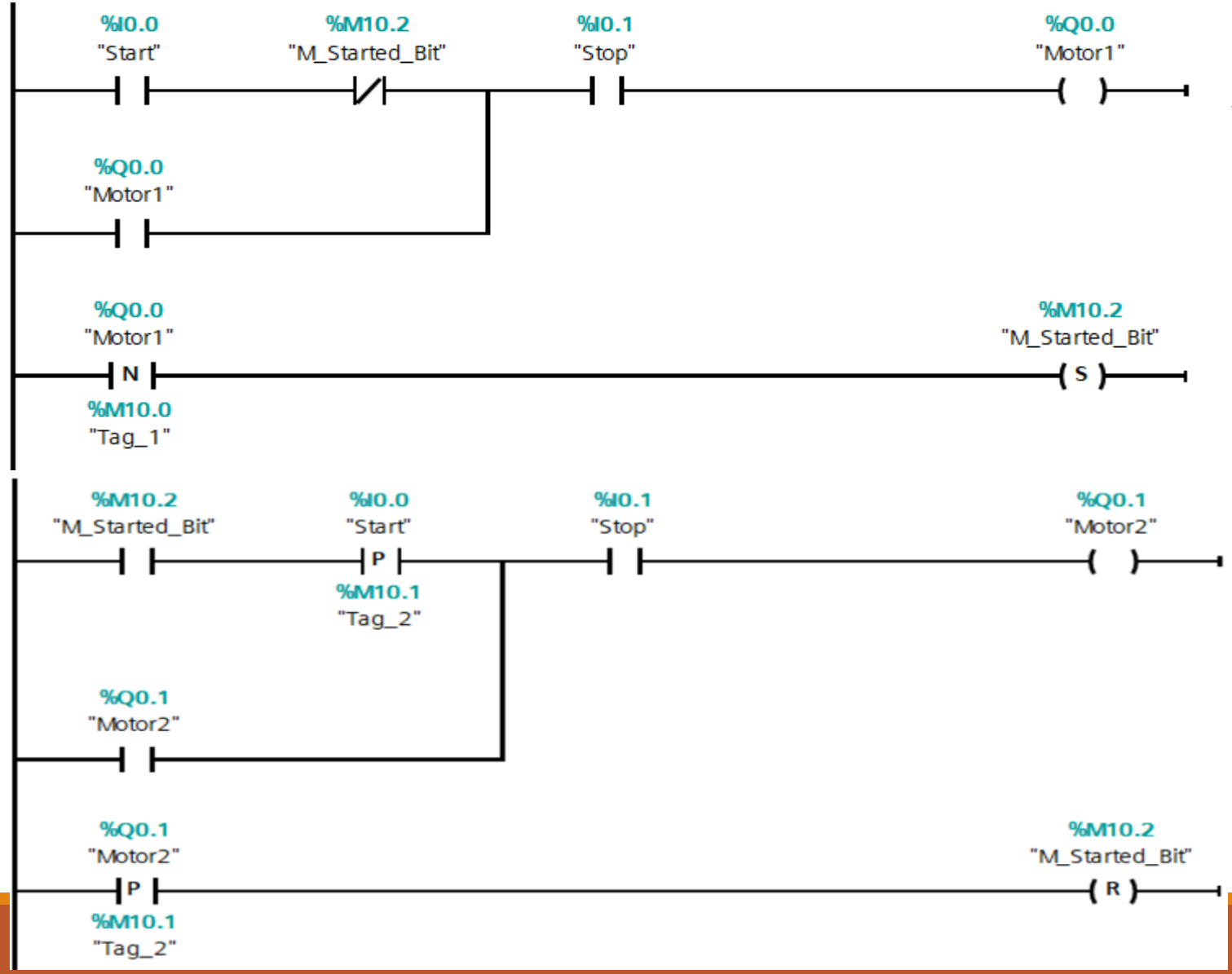

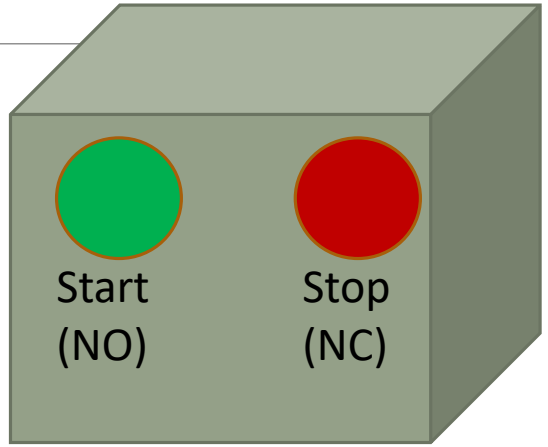

Pump 1

Pump 2