PLC Tutorial 4

IEC61131

Q1: Choose **one or more** reasons to justify paying more $$ for Brand A vs Brand B

- Assurance of suitability for industrial
- Easily understood by PLC programmers using other brands
- Ease of reusing program code
- Faster operating speed
- interfacing with wider range of products

Brand A
IEC61131
compliant

Brand B
IEC61131
NON-compliant

Importance of IEC 61131

There are numerous manufacturers of PLCs, IEC 61131 provides a standard for all manufacturers to follow.

It assure users of the suitability for industrial applications.

The most significant benefit reaped is with the standardisation of programming languages in IEC 61131-3:

- Ease of understanding works from other PLC programmers
- Independent of PLC brands
  - Reduction of training time
  - Buying and selling products and services easily
- Easier reuse of program code

Q2: What is **NOT** defined in IEC 61131-3?

a) Addressing

b) Use of Symbols

c) Software user interface

d) Data format/data structure

Brand A
IEC61131
compliant

Brand B
IEC61131
NON-compliant

IEC 61131 - 3

In addition to definition of languages, the standard also covers the important aspects:

- Addressing
- Execution
- Data formats/data structures
- Use of symbols
- Connections between languages

- It is NOT an absolute standard for all manufacturers to follow.
- Instead, the standard define a comprehensive set of guidelines.
- Manufacturers decide the extend to follow the guidelines and document the conformities clearly.

In this way, programming PLC of different brands would largely be the same, with exception of software user interface, graphics and other competitive features could still be implemented to differentiate themselves.

Q3: What programming language is shown in the image?

a) Structure Text

b) Instruction List

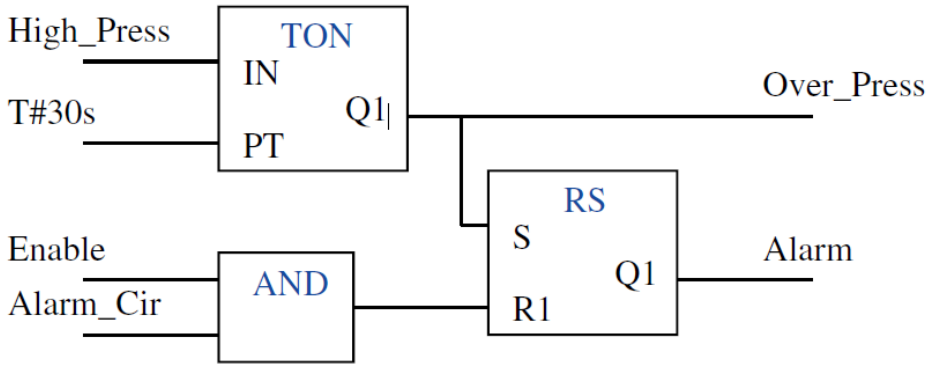
c) Ladder Diagram

d) Function Block Diagram

```
A     M     10.0
AN    M     20.0
O
A     M     10.1
AN    M     20.1
O
A     M     10.2
AN    M     20.2
=     Q      1.0
=     Q      1.1
=     Q     10.0
```

Q4: Select **one or more** benefits of the language shown?

- It is similar to hard-wired relay logic
- Easy for programmers with digital electronics knowledge
- Ease of linking standard logic functic blocks
- Practical to implement logical Boole overview



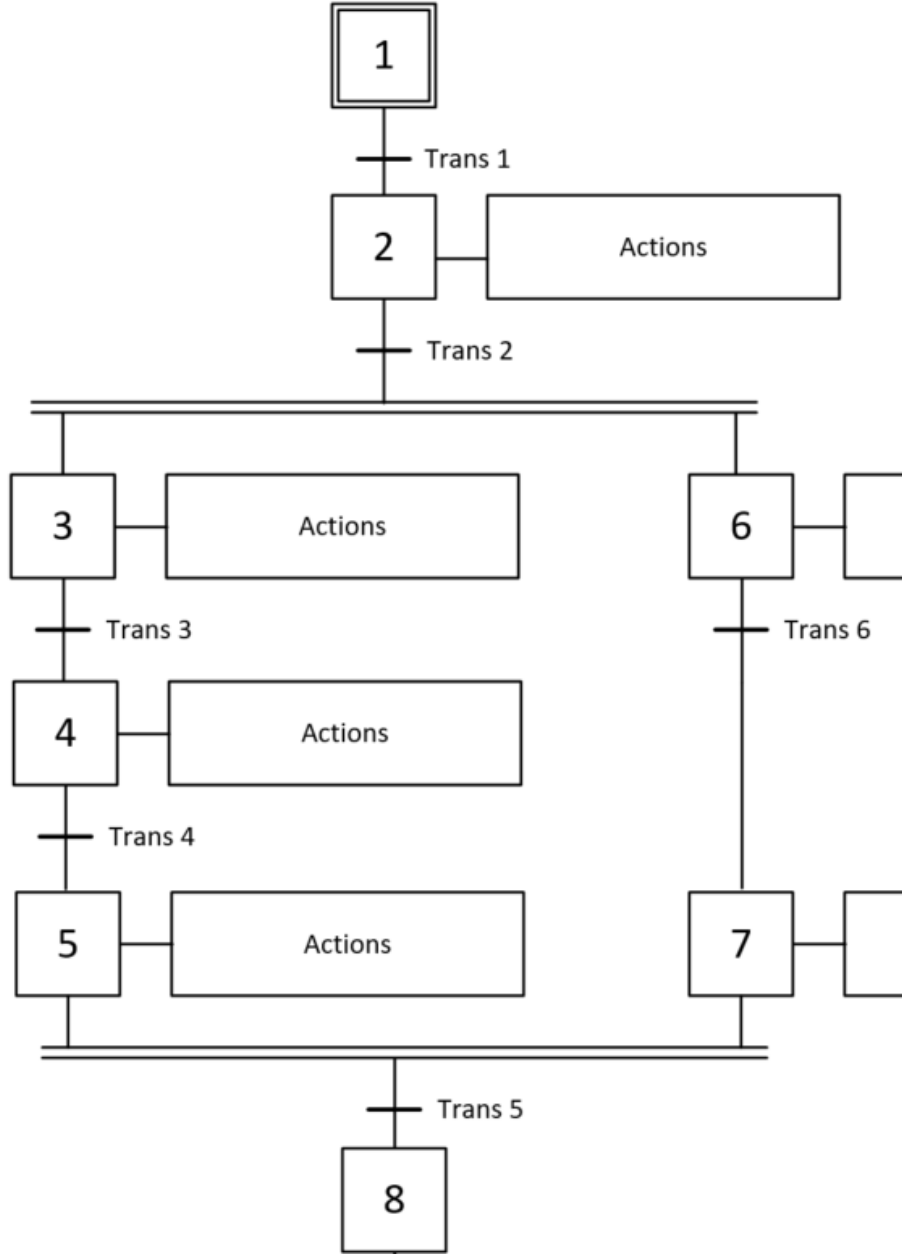
Q5: What is the condition for Step 8 to be active?

a) Trans5 True only

b) Step5 & 7 active only

c) Step5 & 7 active, & Trans5 True

d) Step7 OR 5 active, & Trans5 True



Q6 – IMAGE UPLOAD – TANK LEVEL CONTROL

When the system starts, Valves 1, 2 & 3 would open to fill the mixing tank.

Valve 1 will open for 5s

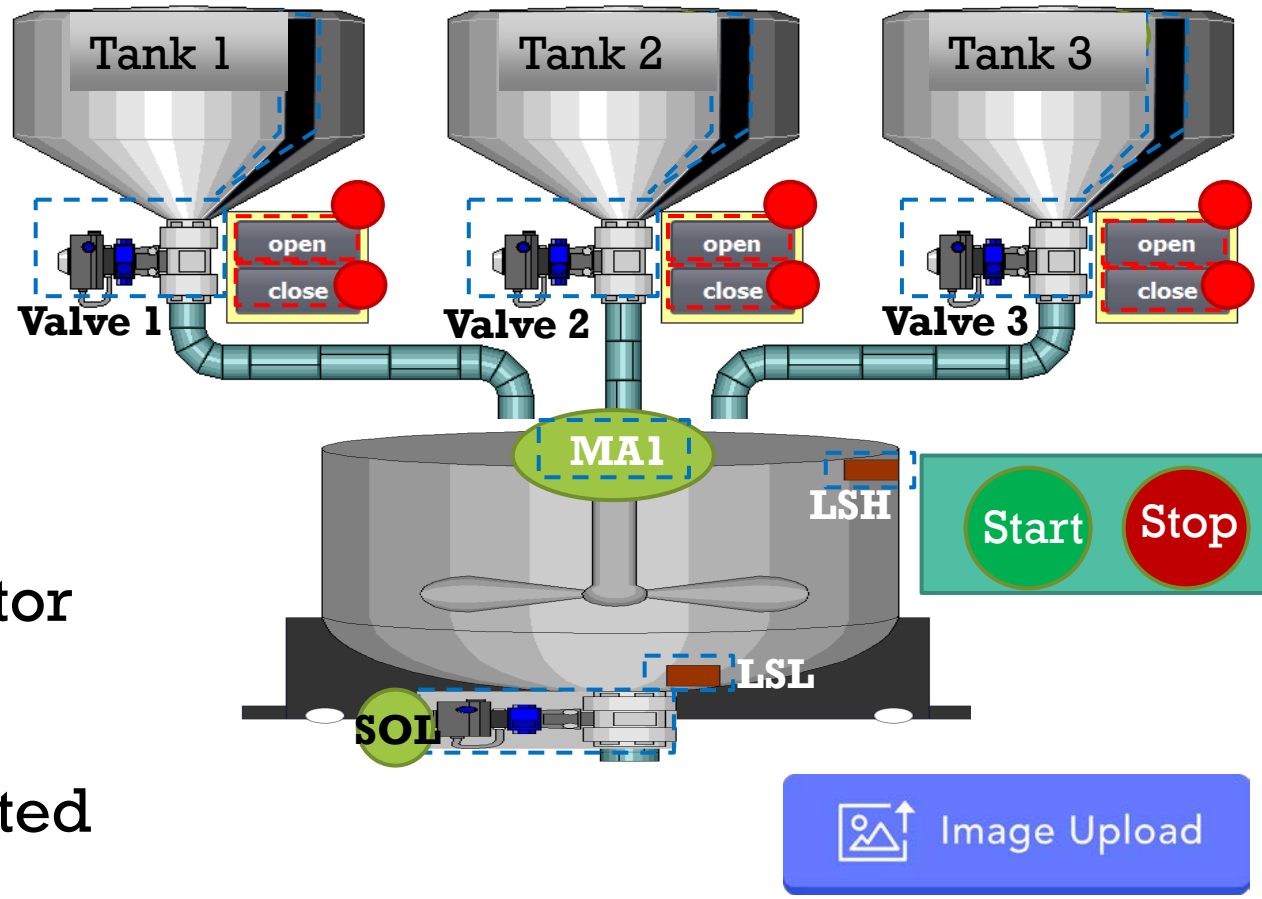
Valve 2 will open for 7s

Valve 3 will open until LSH is activated

After all the tank valves are closed, Agitator MA1 will run for 10sec

After mixing, SOL turn on till LSL is activated

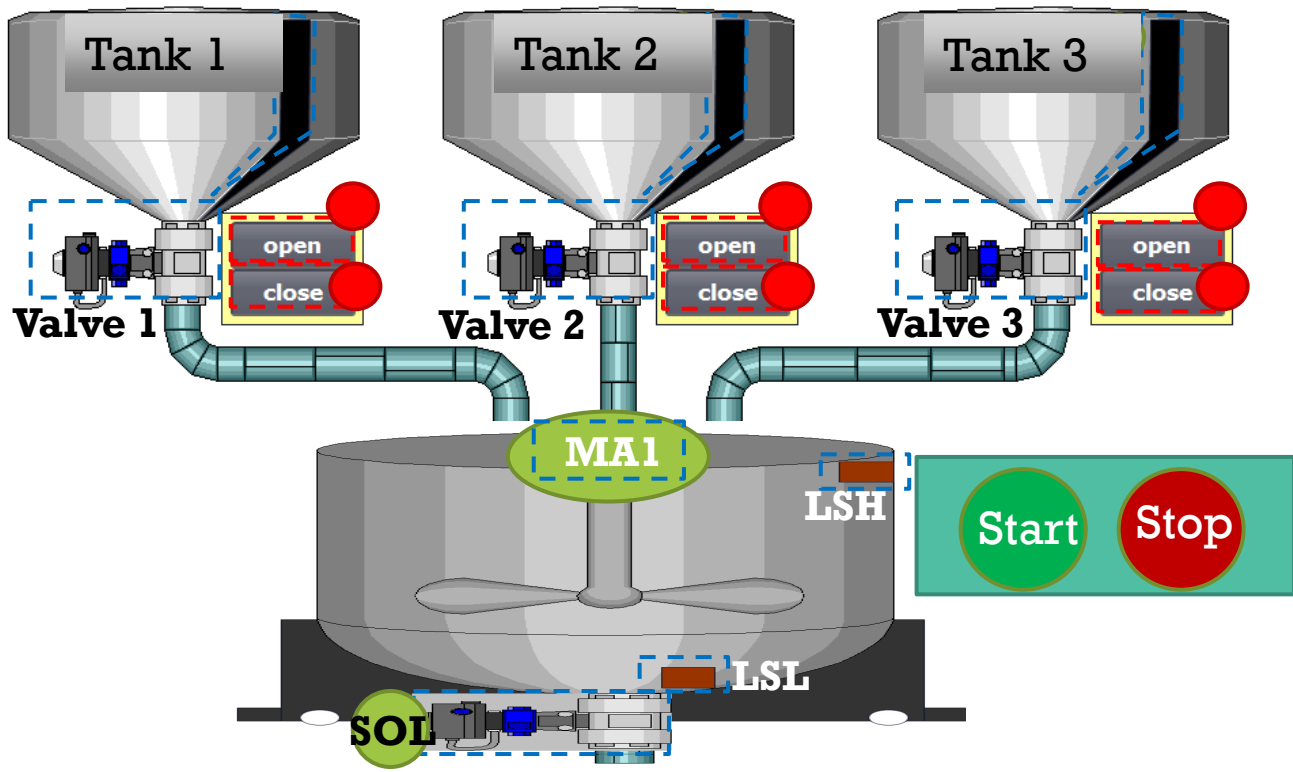
Tank valves will open by providing 24Vdc, upon de-engerisation, it will spring return to close the valve. Open and Close switches will reflect the status of the valve.



1. **Prepare I/O table for physical input/output**
2. **Draw a SFC**

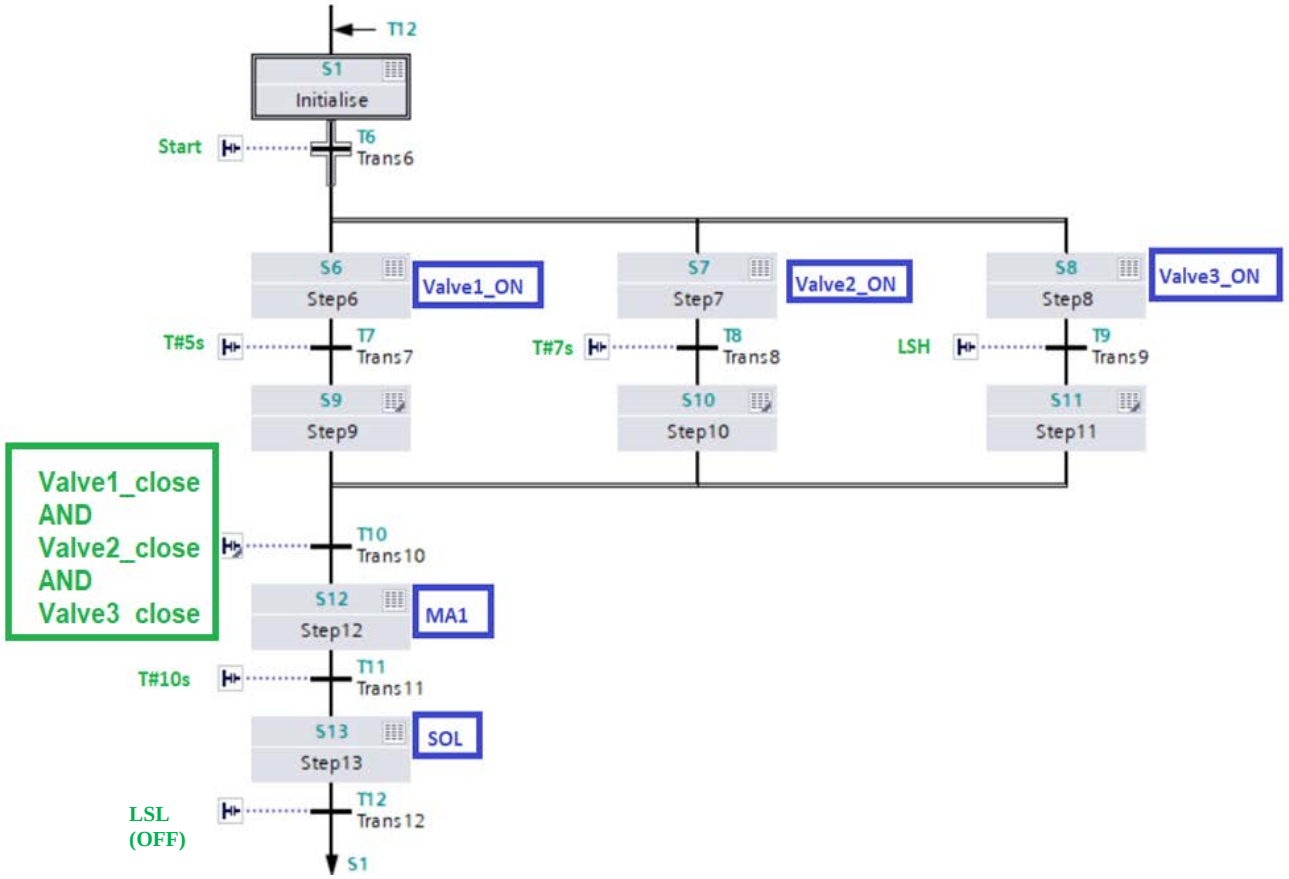
Q6 – IMAGE UPLOAD – TANK LEVEL CONTROL SUGGESTED SOLUTION

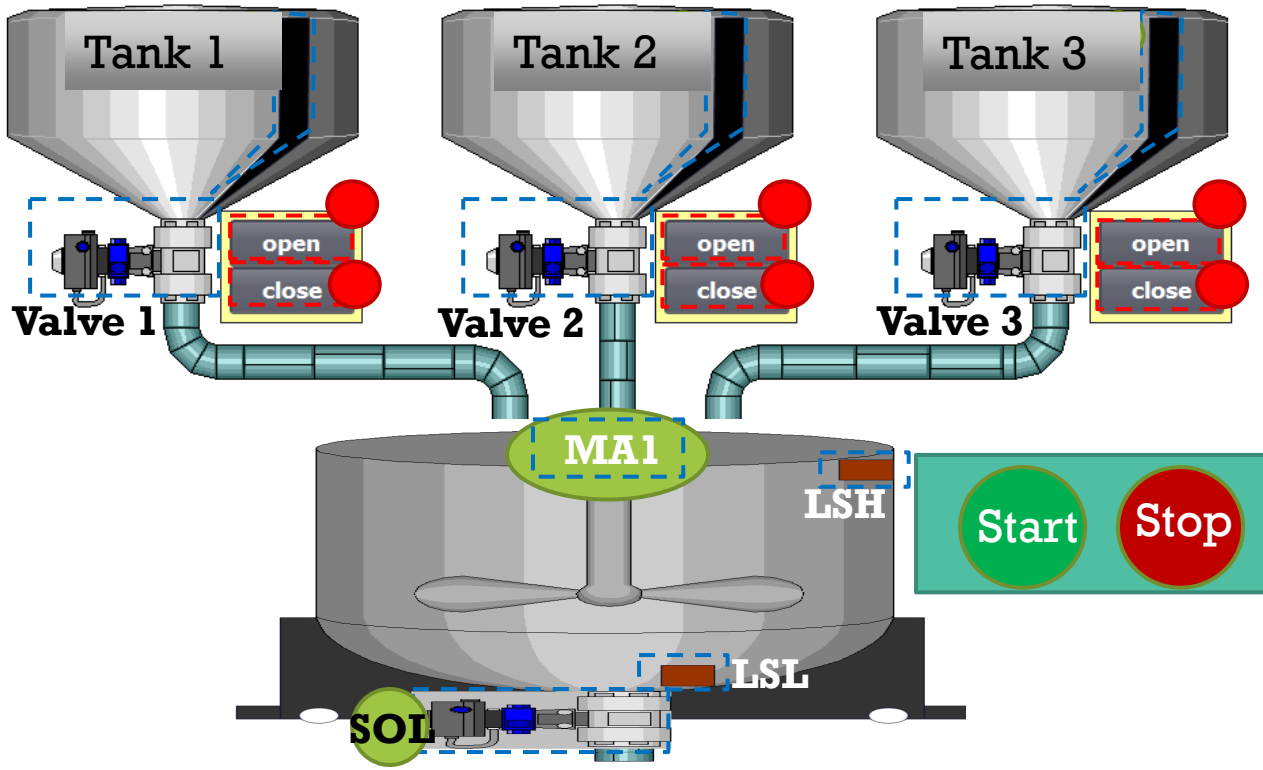
Tag Name	Data Type	Address
Start_PB	Bool	%I10.0
Stop_PB	Bool	%I10.1
LSL	Bool	%I10.2
LSH	Bool	%I10.3
Valve1 Open	Bool	%I11.0
Valve1 Close	Bool	%I11.1
Valve2 Open	Bool	%I11.2
Valve2 Close	Bool	%I11.3
Valve3 Open	Bool	%I11.4
Valve3 Close	Bool	%I11.5
Valve 1 ON	**Bool**	**%Q0.0**
Valve 2 ON	**Bool**	**%Q0.1**
Valve 3 ON	**Bool**	**%Q0.2**
MA1	**Bool**	**%Q0.3**
SOL	**Bool**	**%Q0.4**



1. **Prepare I/O table for physical input/output**
2. **Draw a SFC**

Q6 – IMAGE UPLOAD – TANK LEVEL CONTROL SUGGESTED SOLUTION





1. Prepare I/O table for physical input/output
2. Draw a SFC