PRESENTATION

ON

"PLC"

(PROGRAMMABLE LOGIC CONTOLLER)

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What is PLC?

PLC is a **digital computer** designed for **multiple inputs and output** arrangements, **extended temperature ranges, immunity to electrical noise**, and **resistance to vibration and impact**. A PLC is an example of a **real time system.**

History of PLC

➤PLC was introduced in late 1960's

➤First commercial & successful Programmable Logic Controllers was designed and developed by **Modicon** as a relay replacer for General Motors.

➤Earlier, it was a machine with thousands of electronic par

➤Later ,in late 1970's,the microprocessor became reality & greatly enhanced the role of PLC permitting it to evolve for simply relay to the sophisticated system as it is today.

Major Components of a Common PLC

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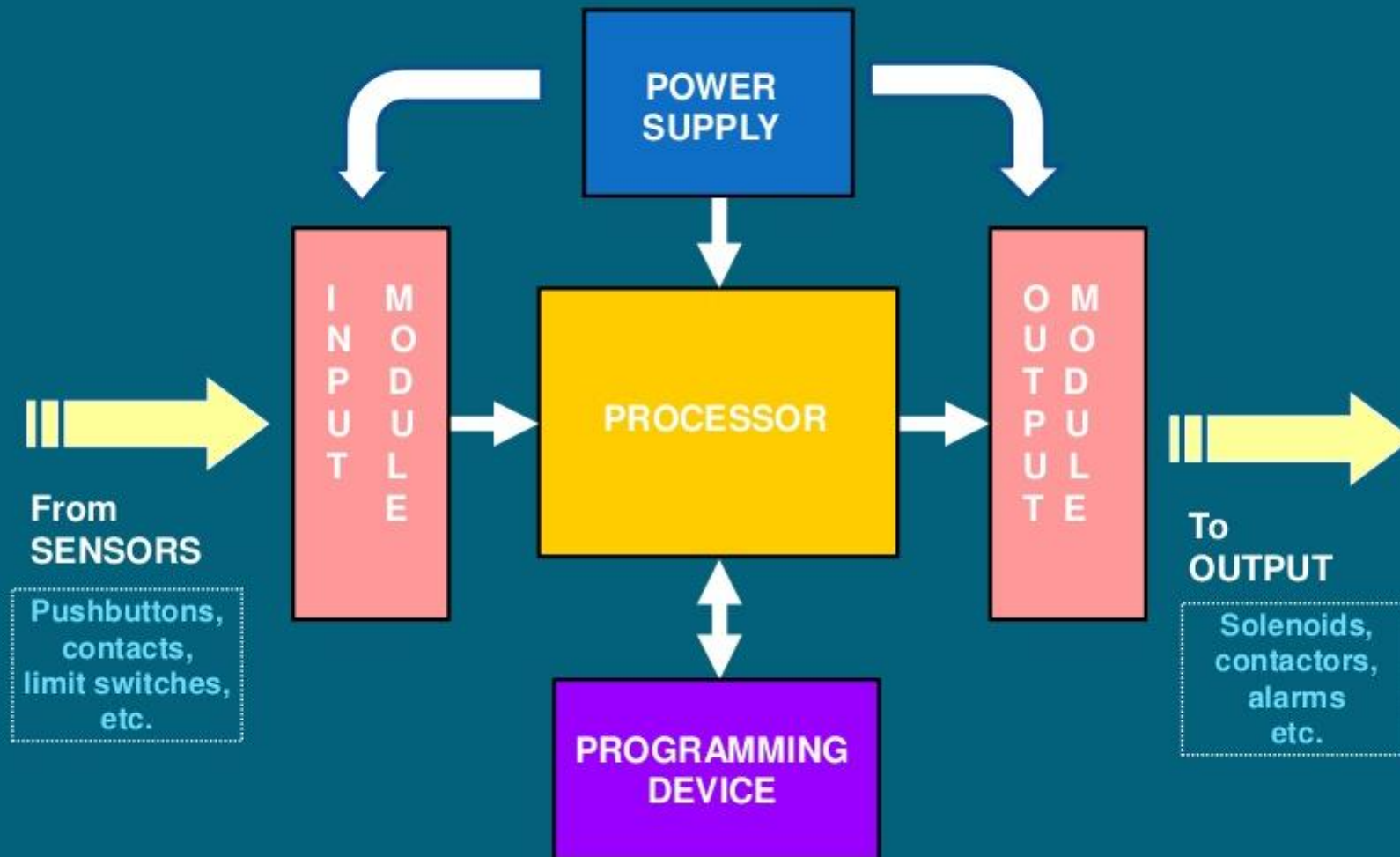
Major Components of a Common PLC

POWER SUPPLY
Provides the voltage needed to run the primary PLC components

I/O MODULES
Provides signal conversion and isolation between the internal logic-level signals inside the PLC and the field's high level signal.

PROCESSOR
Provides intelligence to command and govern the activities of the entire PLC systems.

PROGRAMMING DEVICE
Used to enter the desired program that will determine the sequence of operation and control of process equipment or driven machine.

PLC operation sequence

1)**Self test**: Testing of its own hardware and
   software for faults.

2)**Input scan**: If there are no problems, PLC
   will copy all the inputs and copy their values
   into memory.

3)**Logic solve/scan**: Using inputs, the ladder
   logic program is solved once and outputs are
   updated.

4)**Output scan**: While solving logic the output
   values are updated only in memory when
   ladder scan is done, the outputs will be
   updated using temporary values in memory.

Self test

Input scan

Logic scan

Output scan
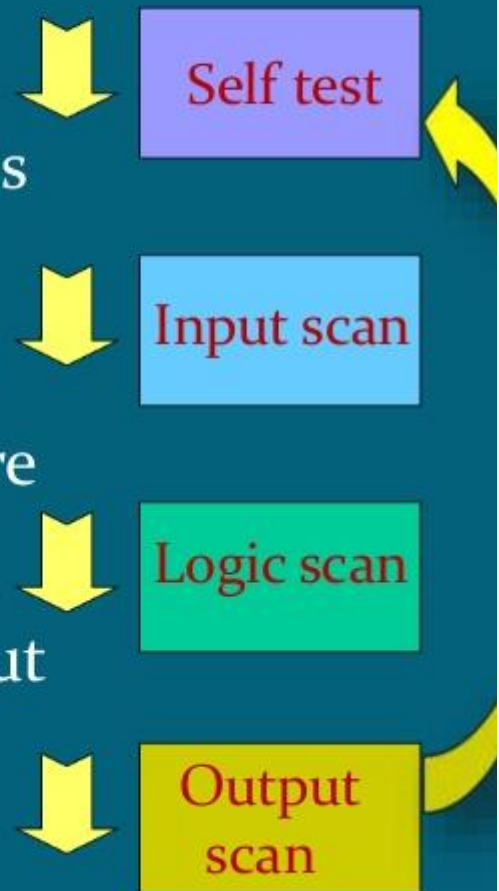
Programming Languages of PLC

Most common languages encountered in PLC
programming are:

1) Ladder Logic
2) Functional Block Diagram
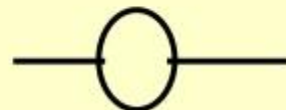3) Sequential Function Chart
4) Boolean mnemonics

Ladder Logic

➢ The ladder logic is the oldest programming language for PLC.

➢ It is well suited to express Combinational logic.

➢ The main ladder logic symbols represent the elements :
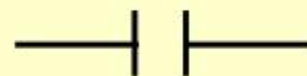
—| |—	make contact
—|/|—	break contact
—O—	relay coil

Ladder Logic For Basic gates

AND Gate

A	B	Logic(Y)
OFF	OFF	OFF
OFF	ON	OFF
ON	OFF	OFF
ON	ON	ON

OR Gate

A	B	Logic(Y)
OFF	OFF	OFF
OFF	ON	ON
ON	OFF	ON
ON	ON	ON
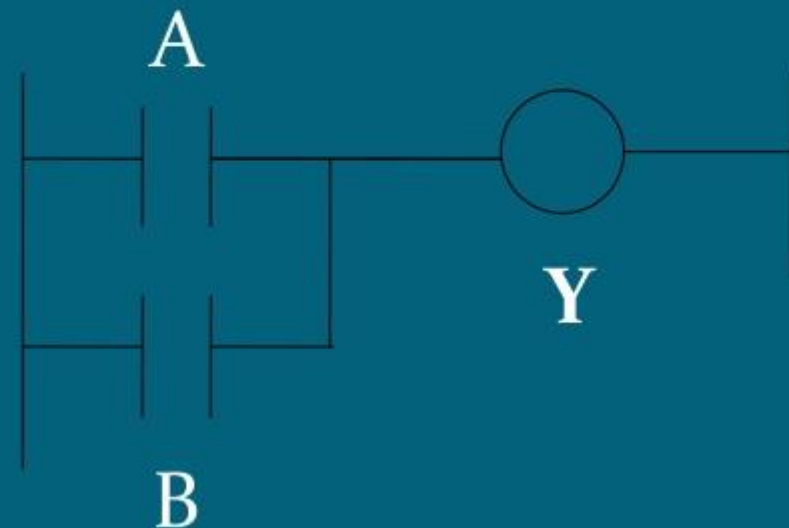
NOR Gate

A	B	Logic(Y)
OFF	OFF	ON
OFF	ON	OFF
ON	OFF	OFF
ON	ON	OFF

NAND Gate

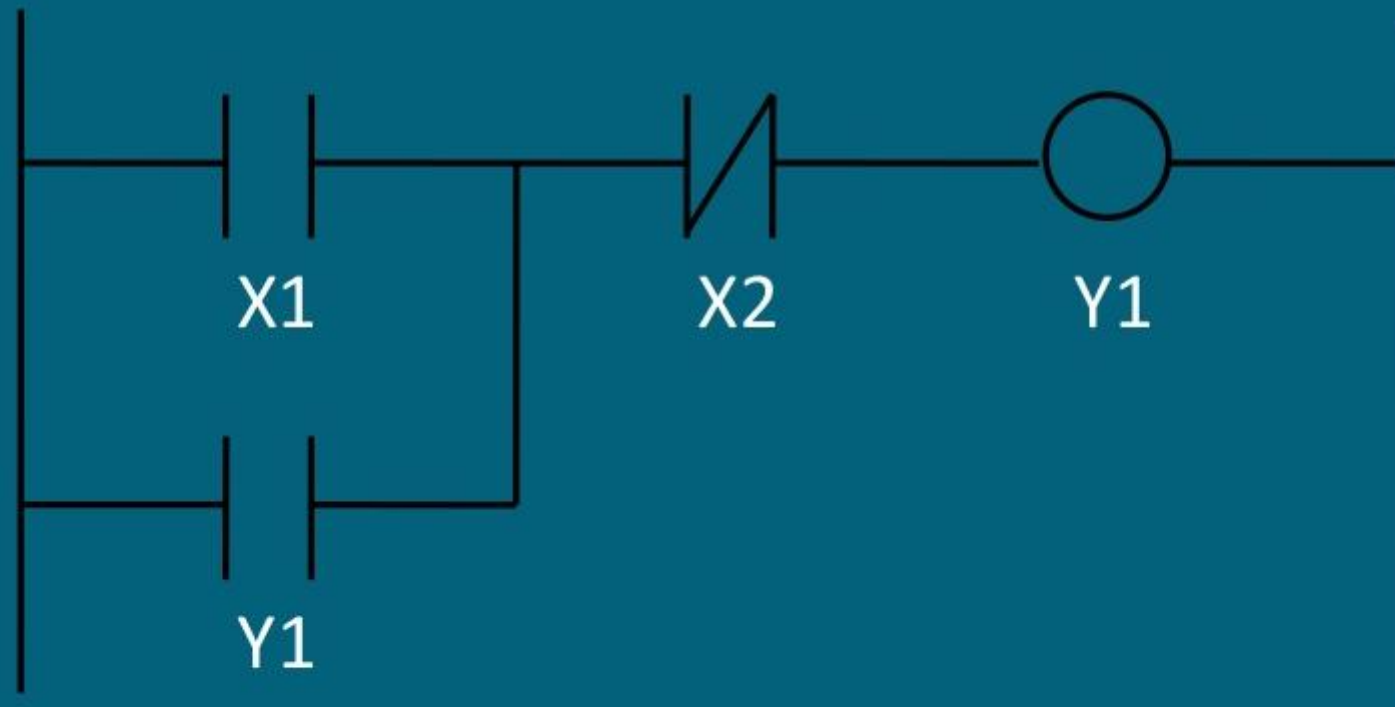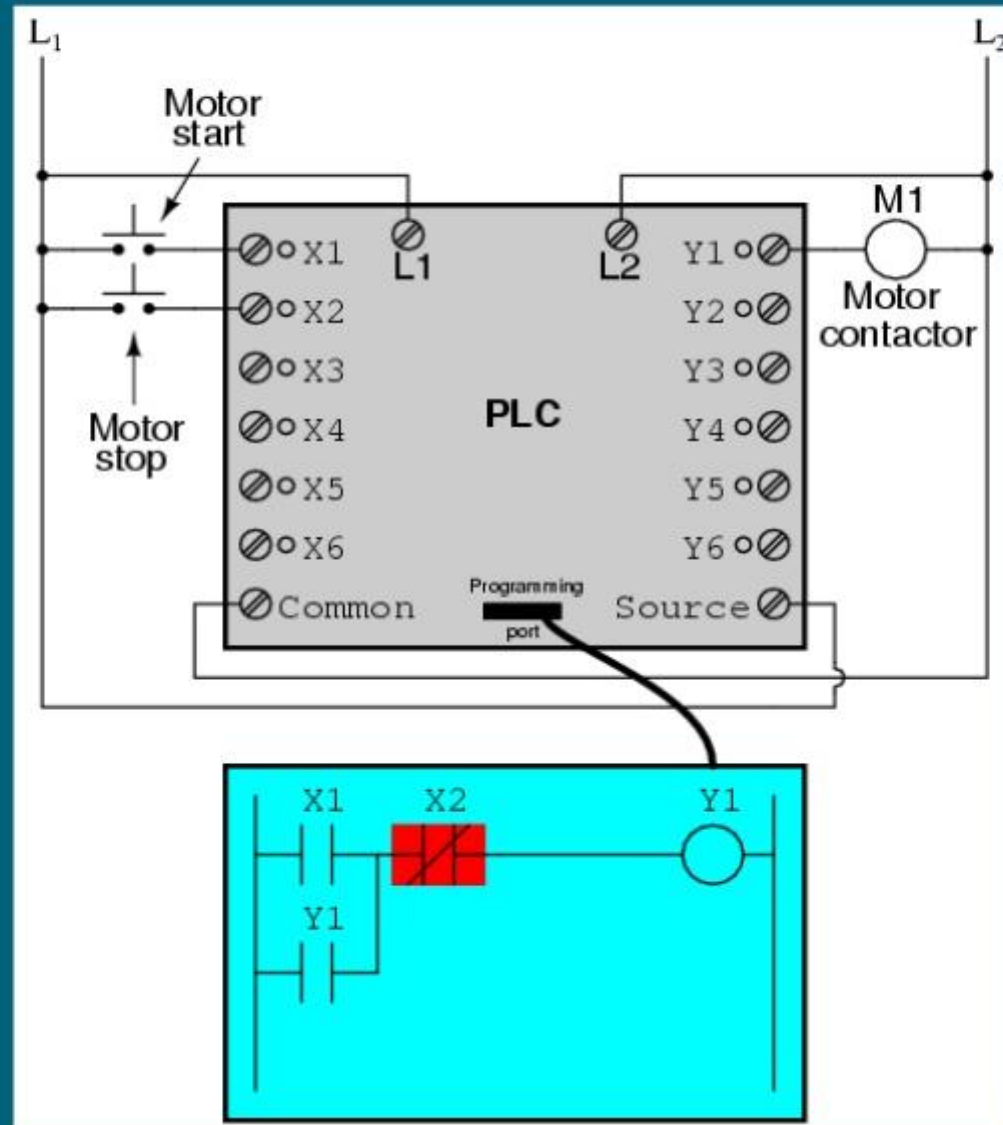| A	B	Logic(Y)
OFF	OFF	ON
OFF	ON	ON
ON	OFF	ON
ON	ON	OFF
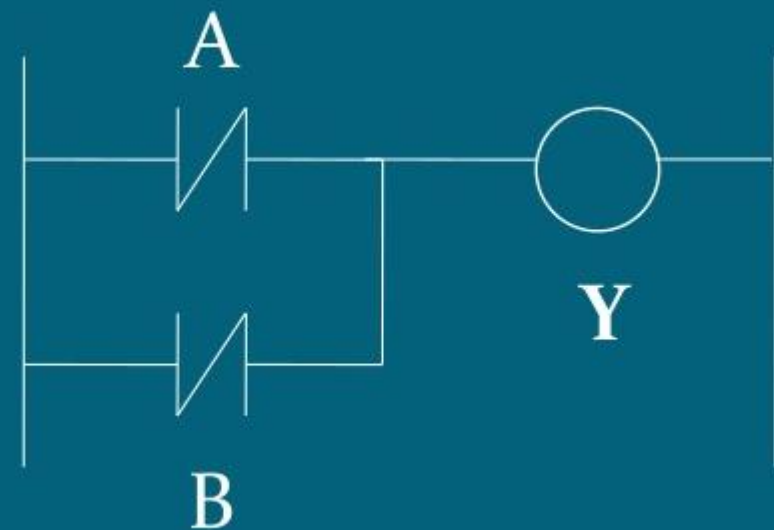
Block diagram of a PLC
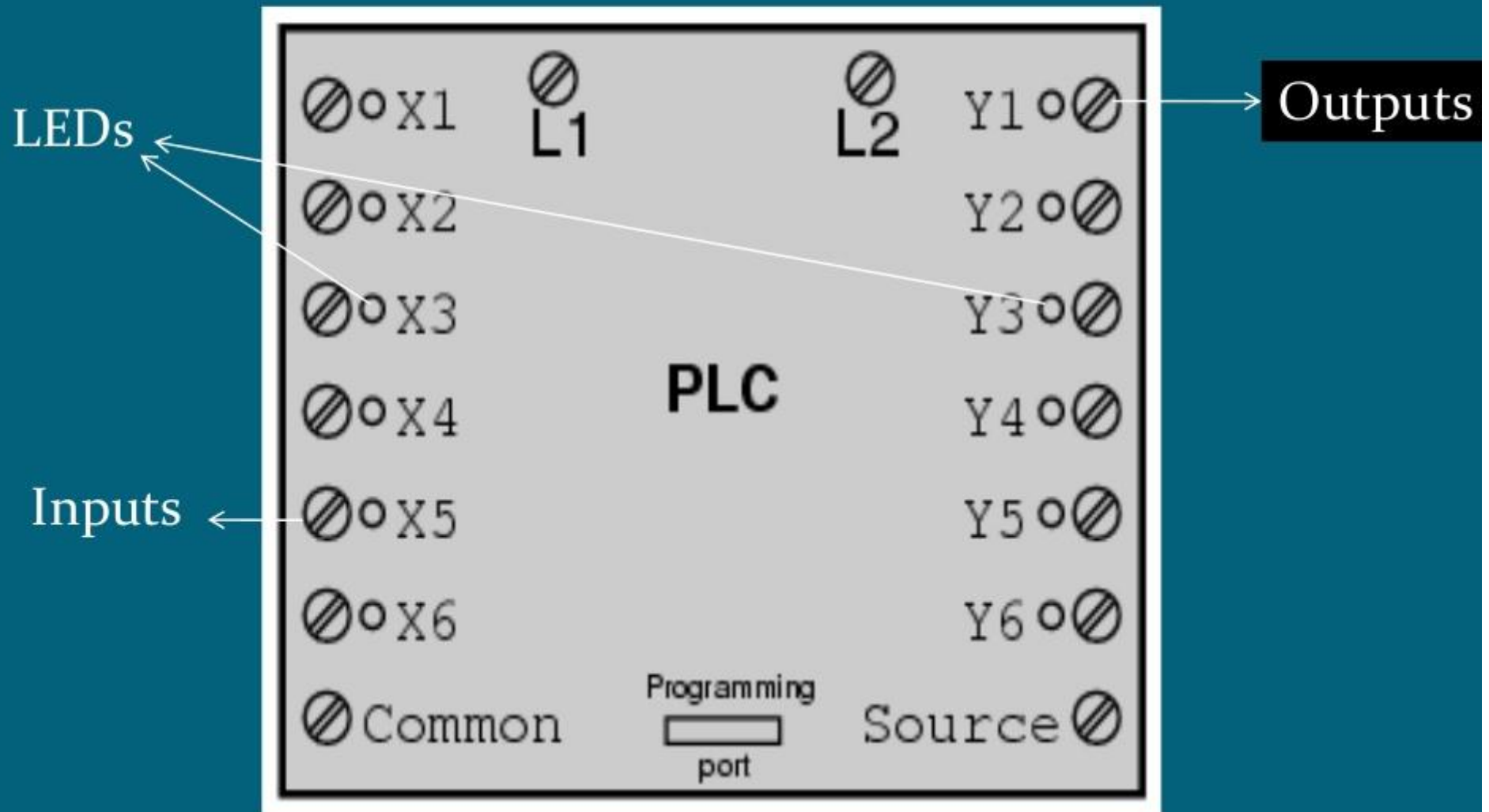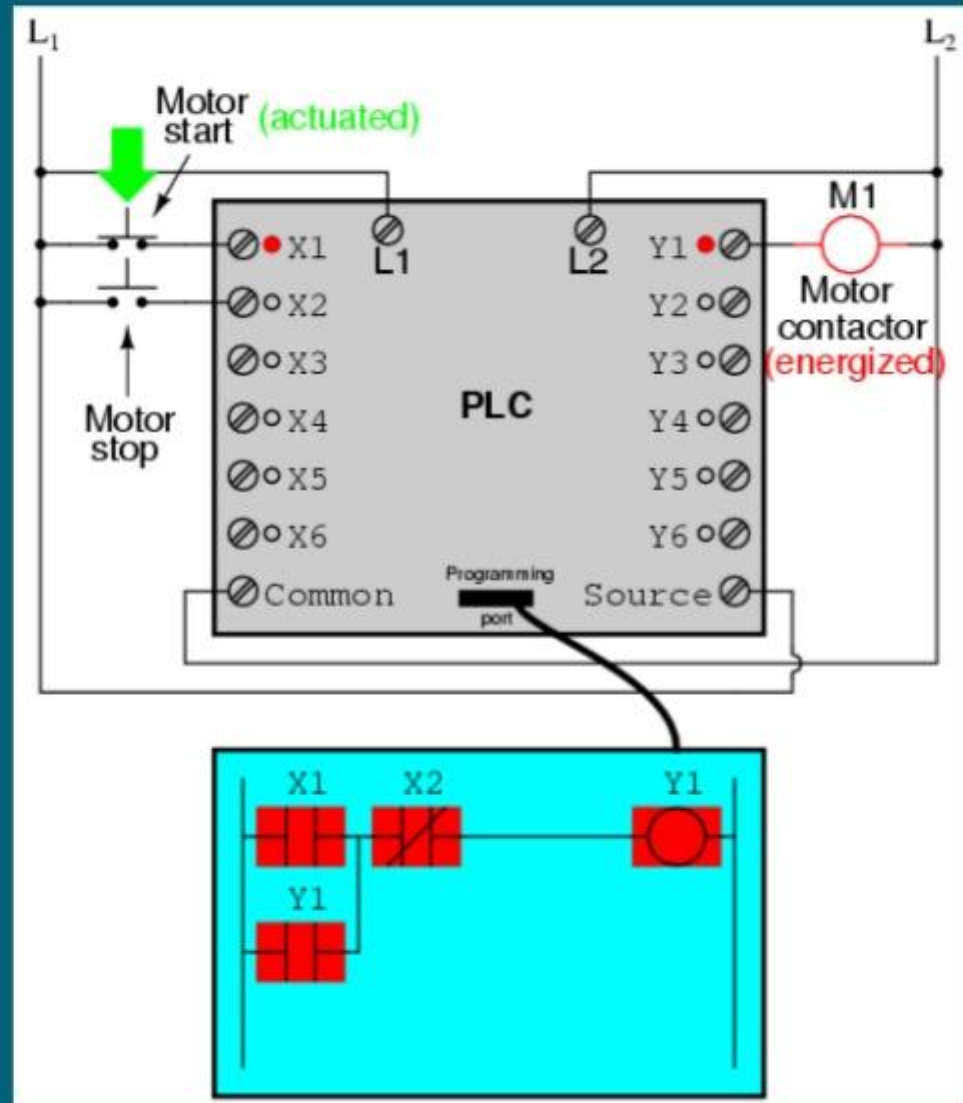
Programming Example:

Ladder Logic Program for Start/Stop of Motor :
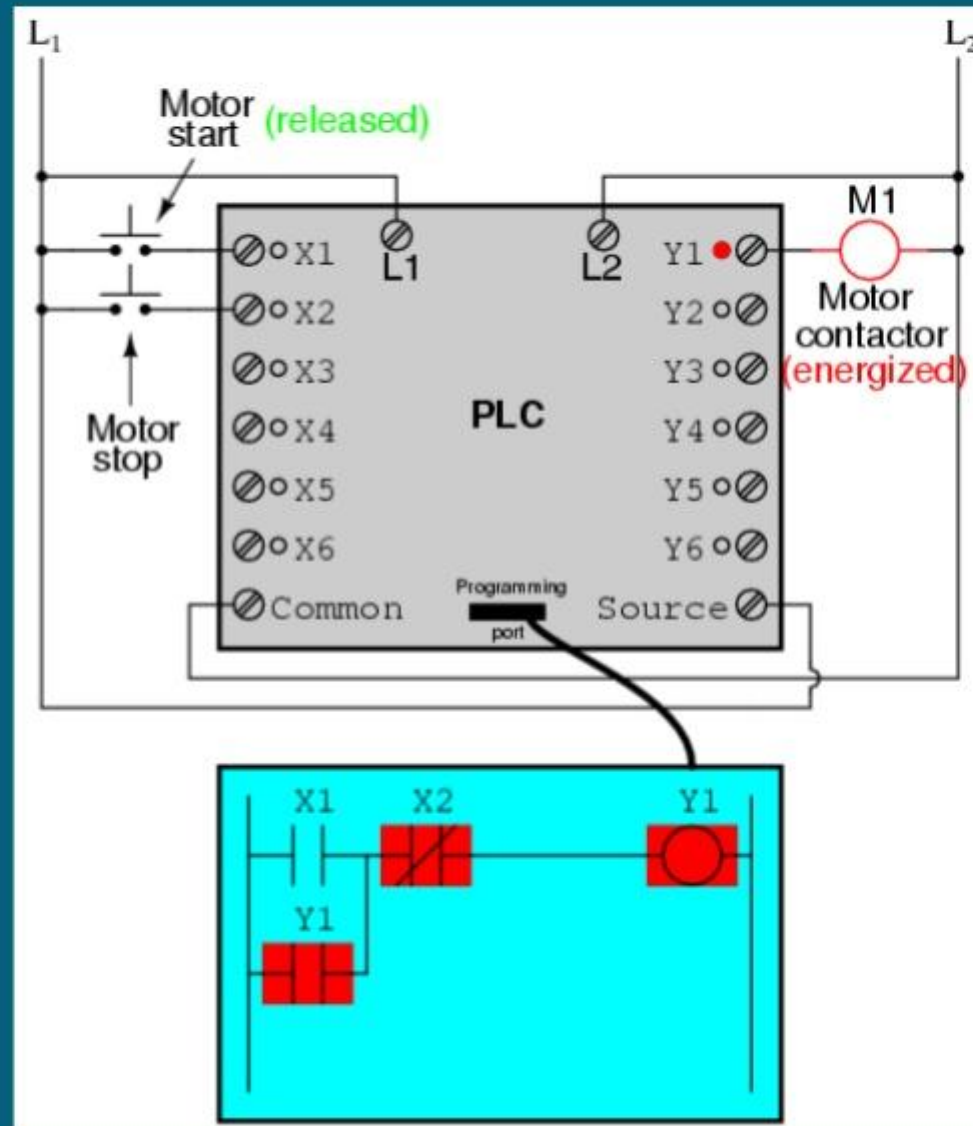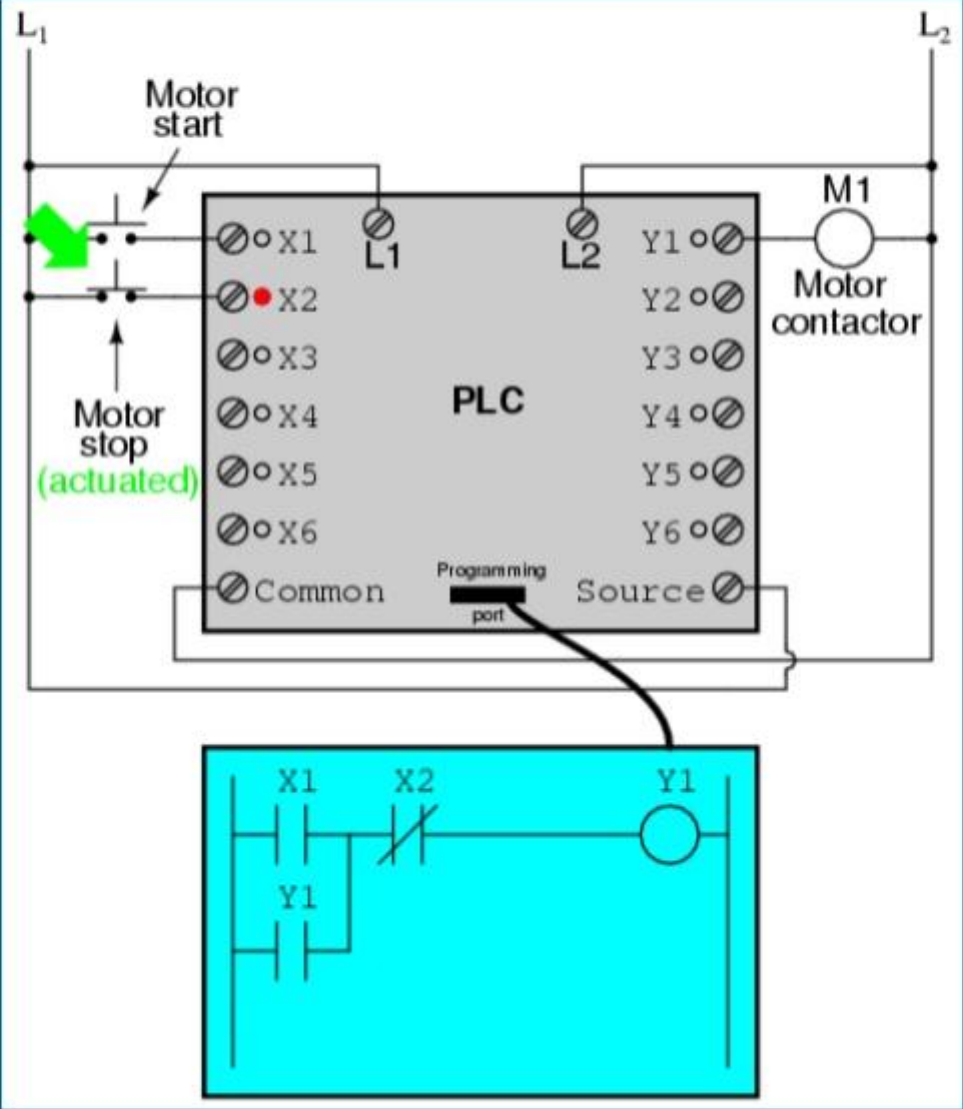
Programming PLC:

Starting of Motor:

Continuous Running of motor when Start Button is released:

To Stop the Motor :

Advantages of PLCs:

- Reliability.
- Flexibility in programming and reprogramming.
- Cost effective for controlling complex systems.
- Small physical size, shorter project time.
- High speed of operation.
- Ability to communicate with computer systems in the plant.
- Ease of maintenance /troubleshooting.
- Reduced space.
- Energy saving.

Disadvantages of PLCs

➢ PLC devices are proprietary it means that part or software of one manufacturer can't be used in combination with parts of another manufacturer.

➢ Limited design and cost option

➢ Fixed Circuit Operations.

➢ PLCs manufacturers offer only closed architectures.

Applications:

➤ Wherever automation is desired the PLCs are best suited to meet the task.

➤ Few examples of industries where PLCs are used :

1) Robots manufacturing and control
2) Car park control
3) Train control station system
4) Food processing
5) Materials handling
6) Machine tools
7) Conveyer system etc.

Thank You!!!