

Basic Programmable Logic Controller

Introduction to Programmable Logic Controller

by

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Chapter Overview

1

- Principles of Control System

2

- Background and development of PLC



Learning Outcomes

Define what PLC is and list its advantages and disadvantages.

Identify the main parts of PLC and describe their functions.

Outline the basic sequence of operation for a PLC.

Identify different types of PLC.

List possible applications of PLC



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Principles of Control System

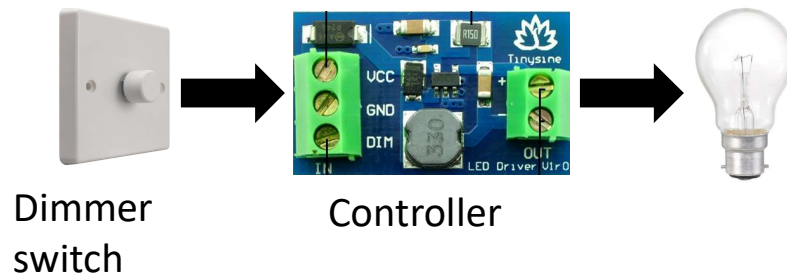


Control System: Consists of subsystems and a process, assembled for the purpose of controlling the output of the process



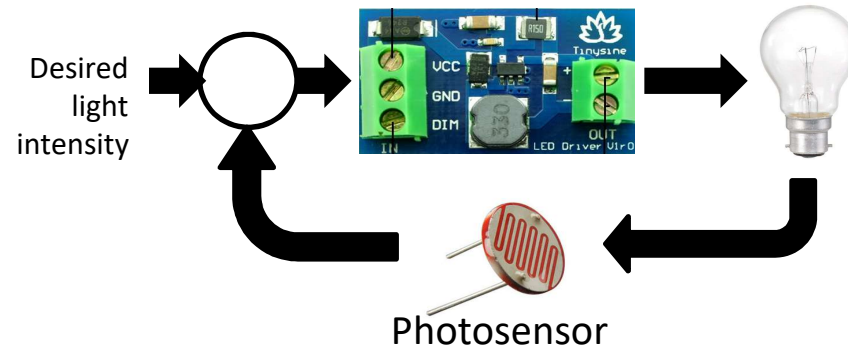
Types of Control System

Open-loop system



Utilizes a controller to control the output. Example: dimmable light system controlled by a dimmer switch(Figure 1).

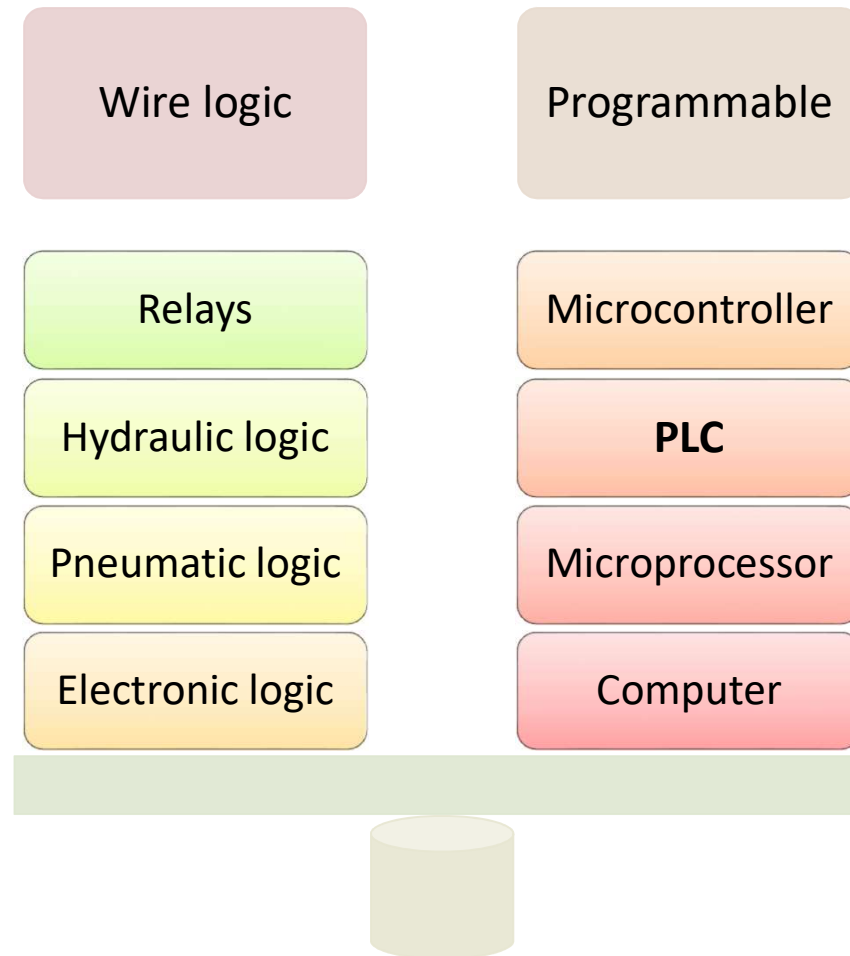
Closed-loop system



Utilizes an additional device that measures the actual output to be compared with desired output. Example: adding photosensor to a dimmable light system to measure the light intensity.



Wire logic versus Programmable Control System



What is PLC?



Heart of Control System – a specialized computer used to control machines & processes.



Designed to operate in the industrial environment (e.g: control a repetitive task)



Equipped with special input and output interfaces and control programming language.

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Relay versus PLC

What is the difference between relay and PLC system?

Watch a video [HERE](#)

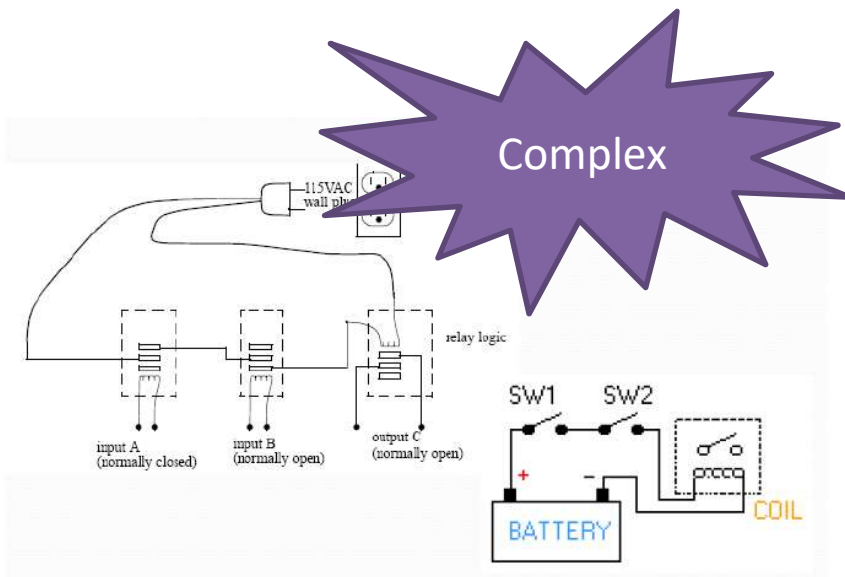


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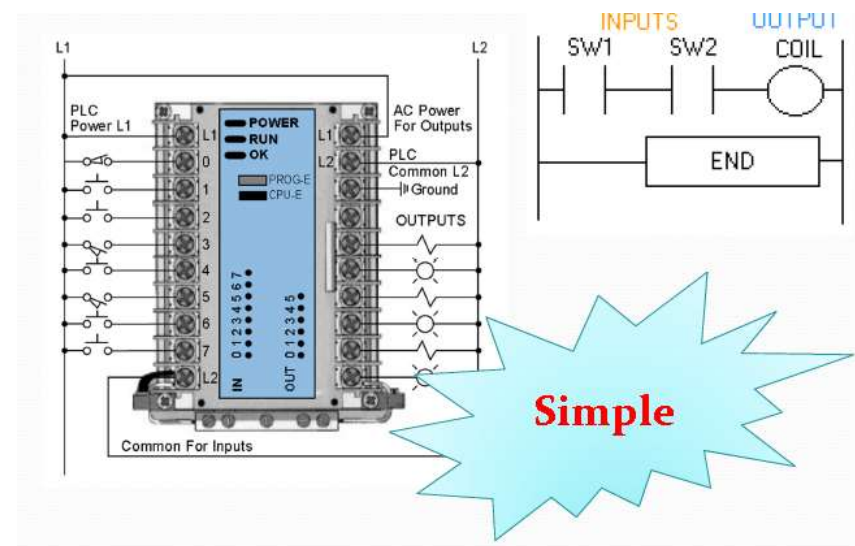
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Relay versus PLC

Wire Logic



PLC



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Advantages of PLC

Increased
Reliability

More Flexibility

Lower cost

Communications
capability

Faster response
time

Easier
troubleshoot



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Disadvantages of PLC

Expensive for
small system

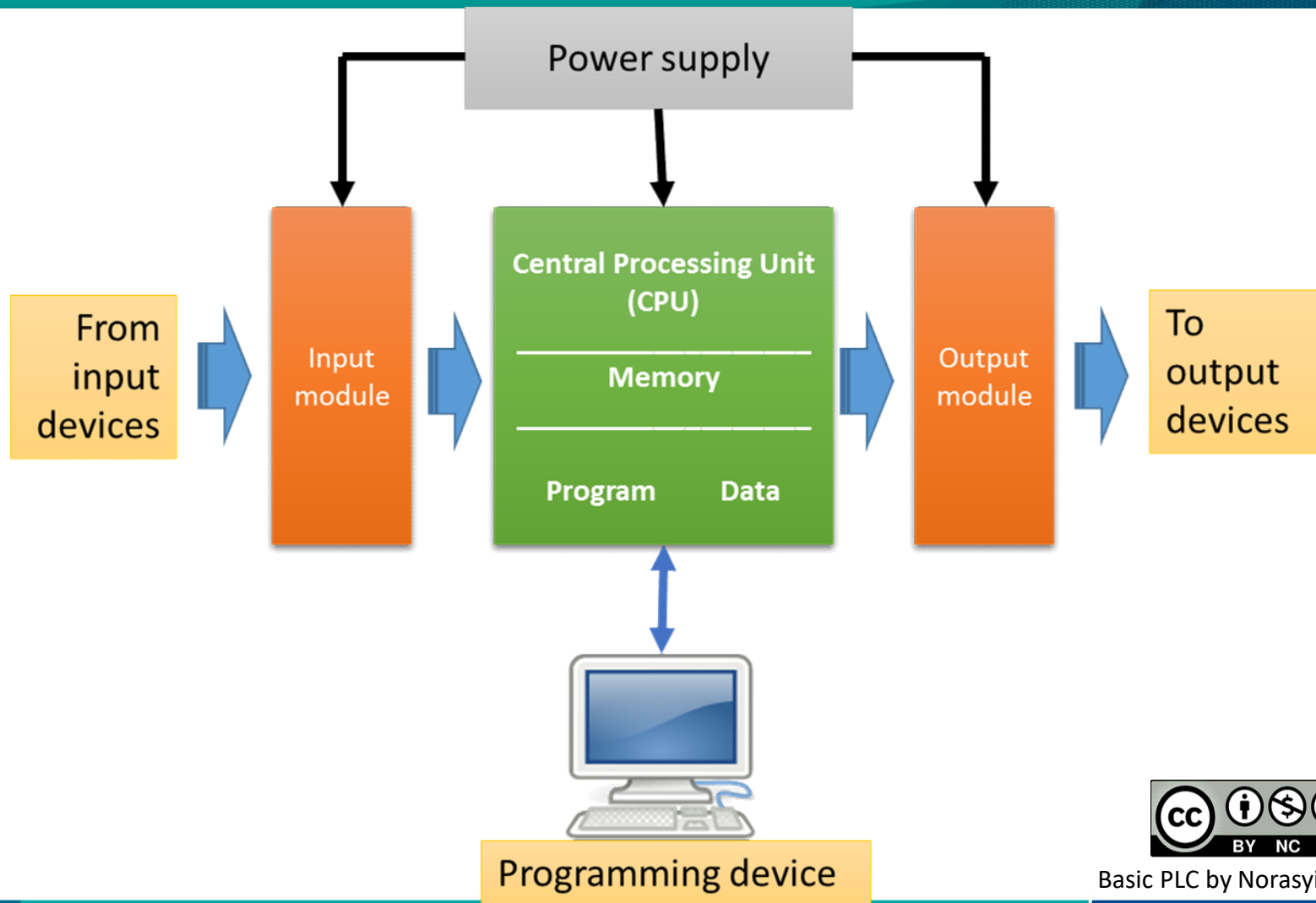
Expensive
replacement

Needs skilled &
experience worker
to program

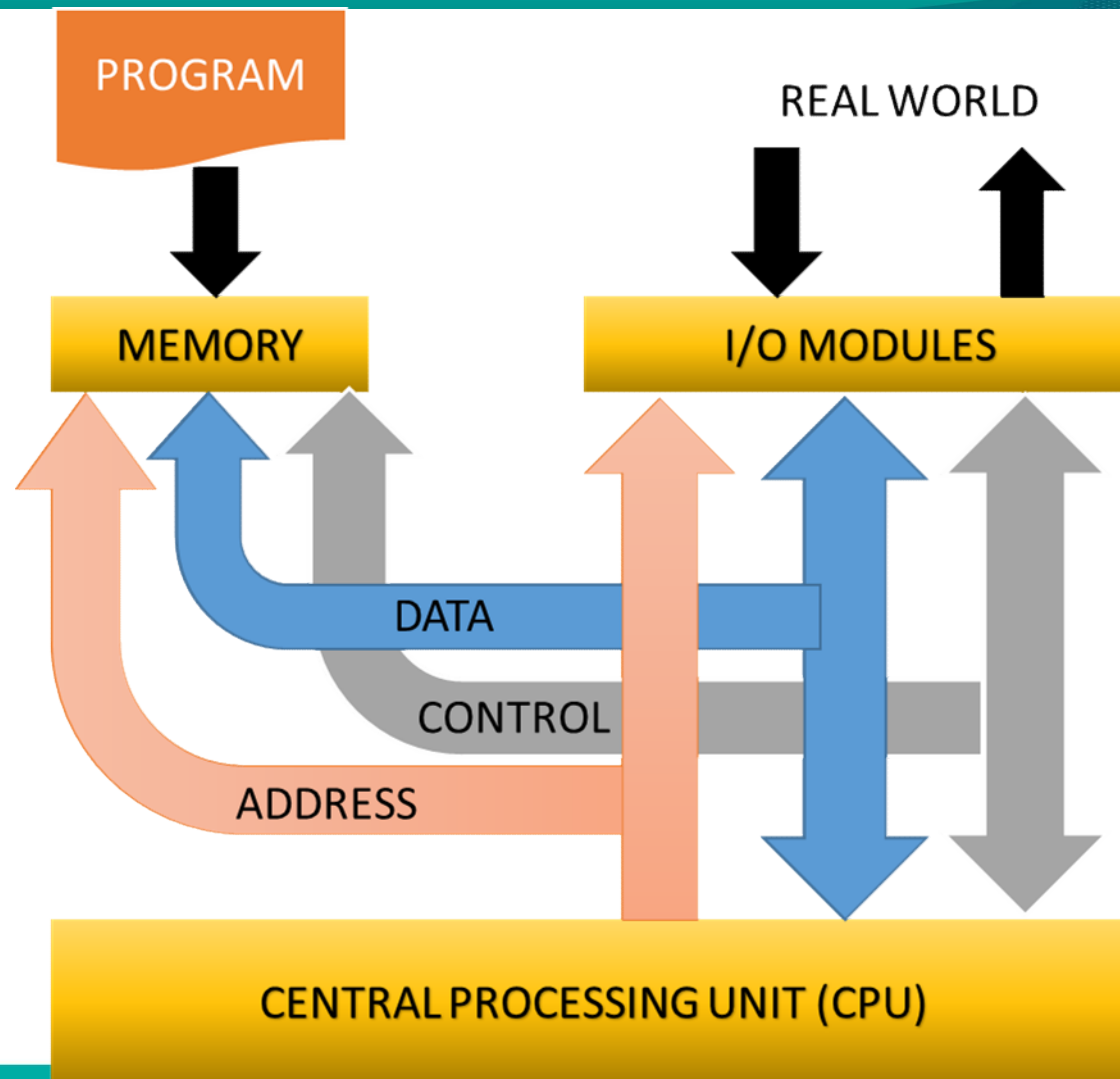
Difficult to get
replacement when
discontinued



Parts of PLC



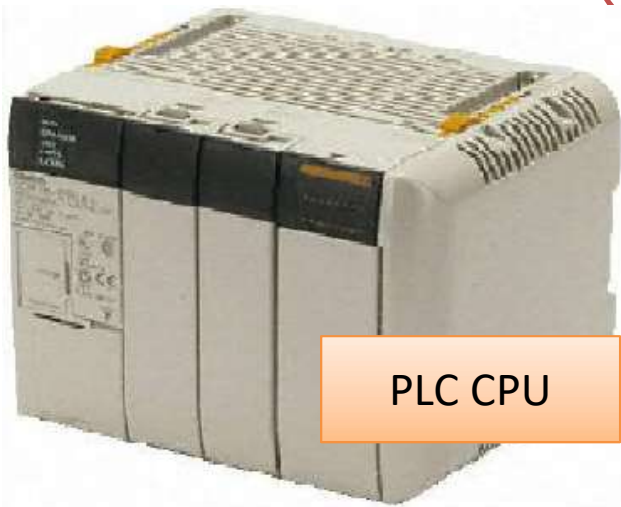
PLC Architecture



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Central Processing Unit (CPU)



Communicates with external devices

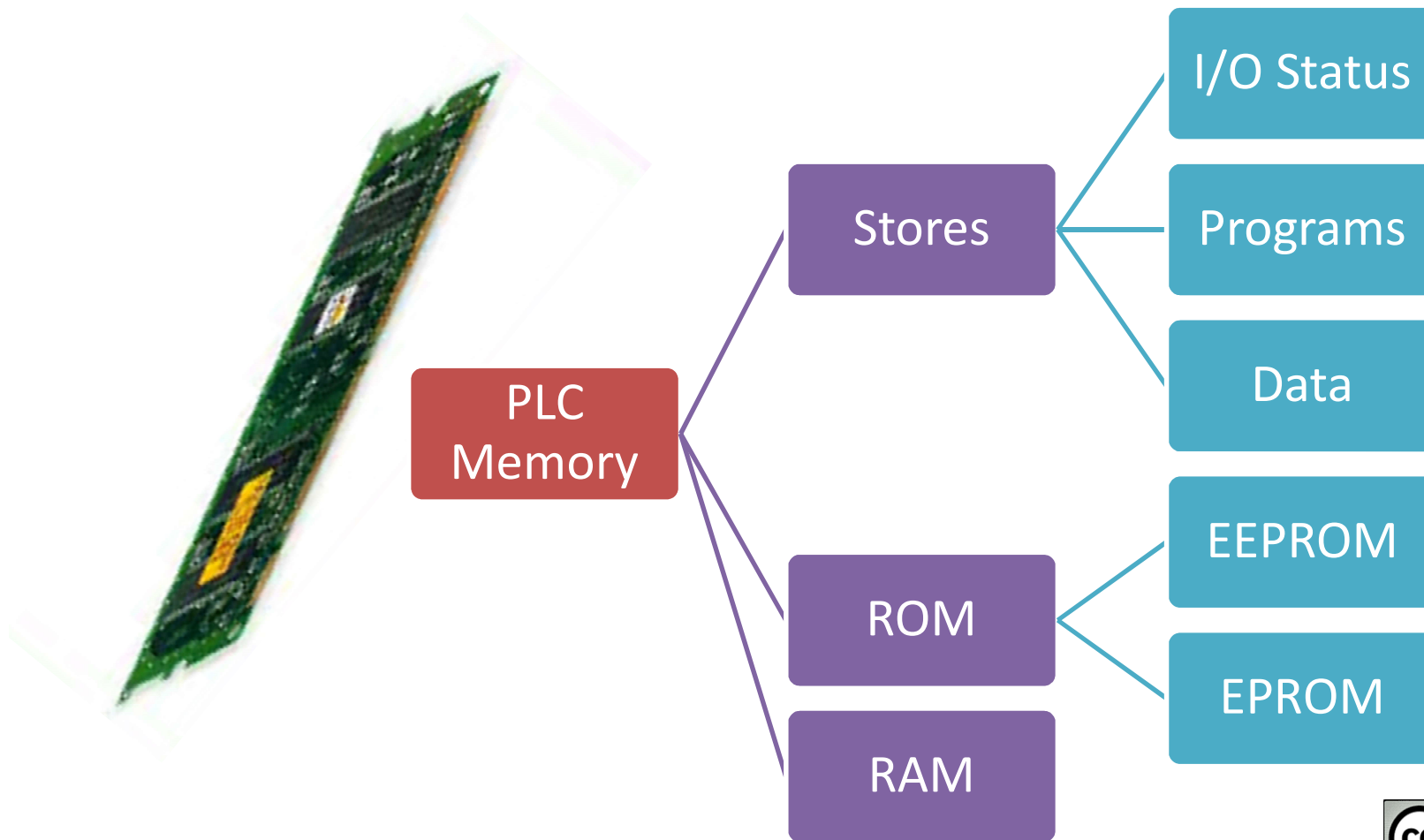
Coordinates activities in PLC system

Executes program

Processes Input/Output signals

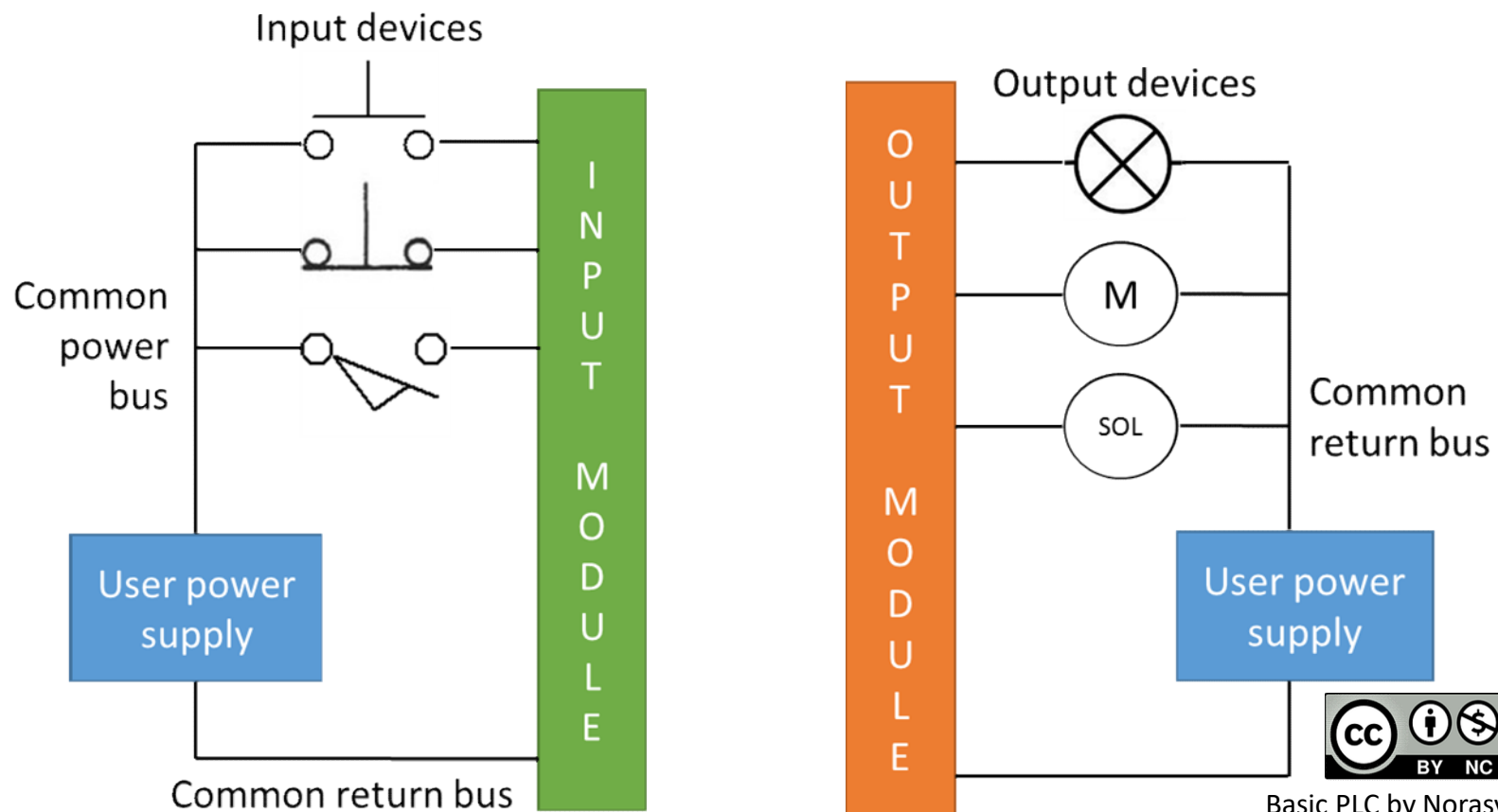


Memory



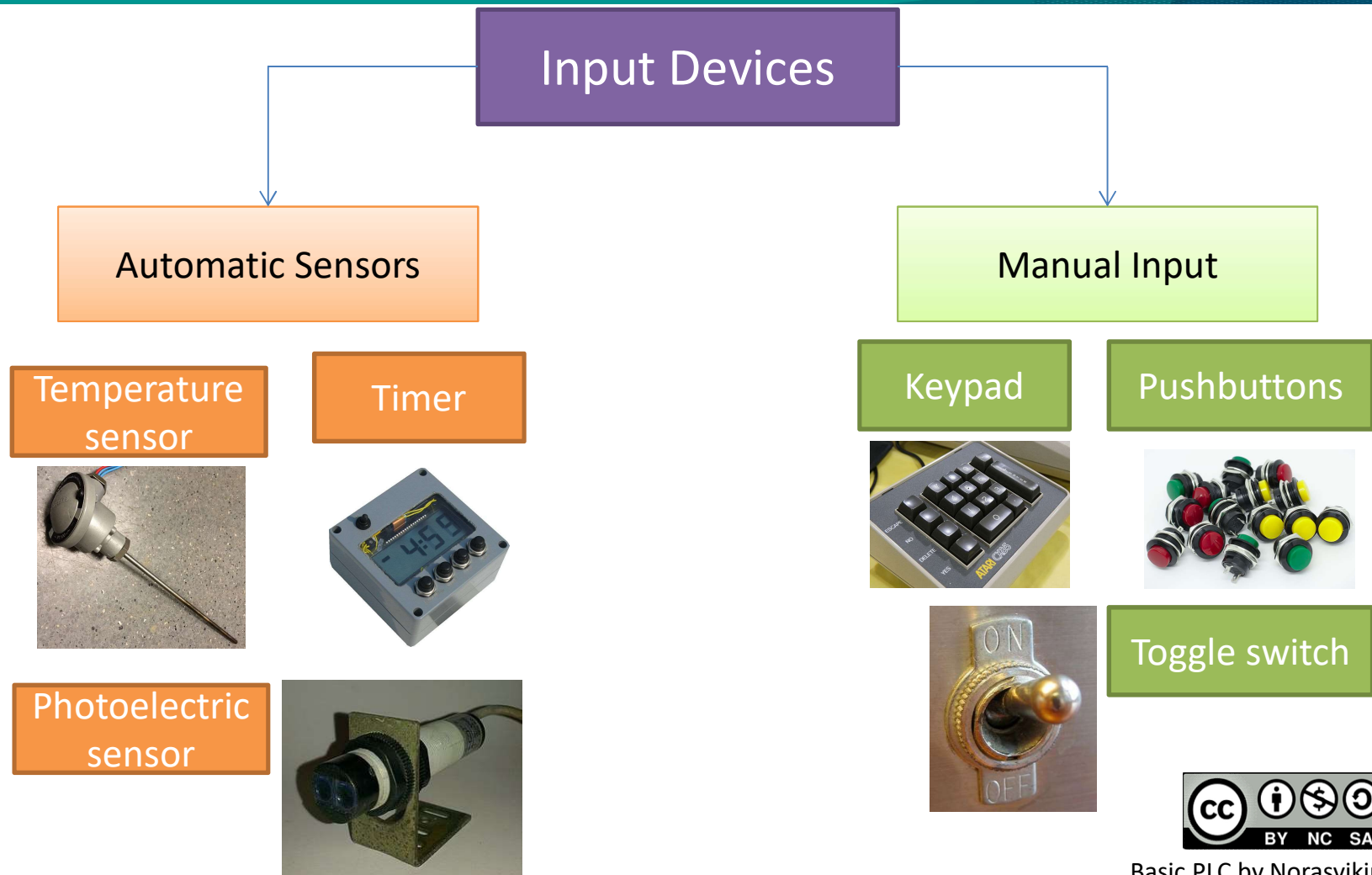
I/O Modules

Interfacing units to connect the I/O devices to the CPU



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Input Devices



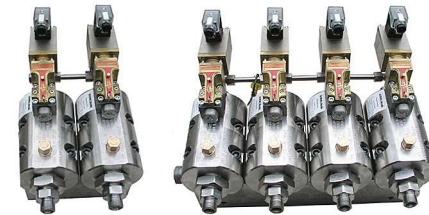
Output Devices



Motor



Indicator
lights



Solenoid
valve

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Input/Output Configurations

Fixed I/O



All the PLC parts (power supply, CPU, I/O modules) come in one package.

Modular I/O



All the PLC parts (power supply, CPU, I/O modules) are separated by different modules.



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Programming Device

Used to enter the desired program into the memory.

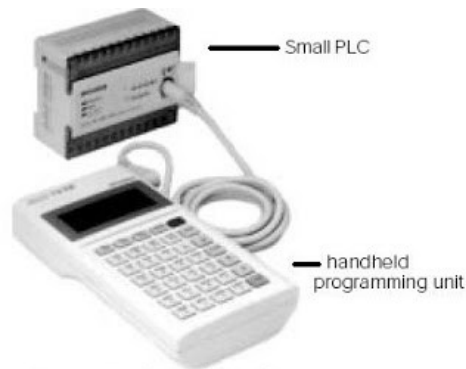
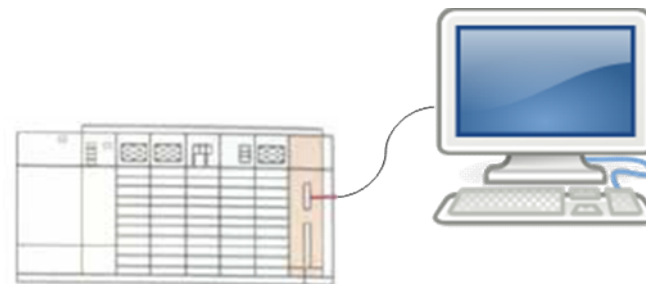


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Handheld unit
with LED display



PC with appropriate
software

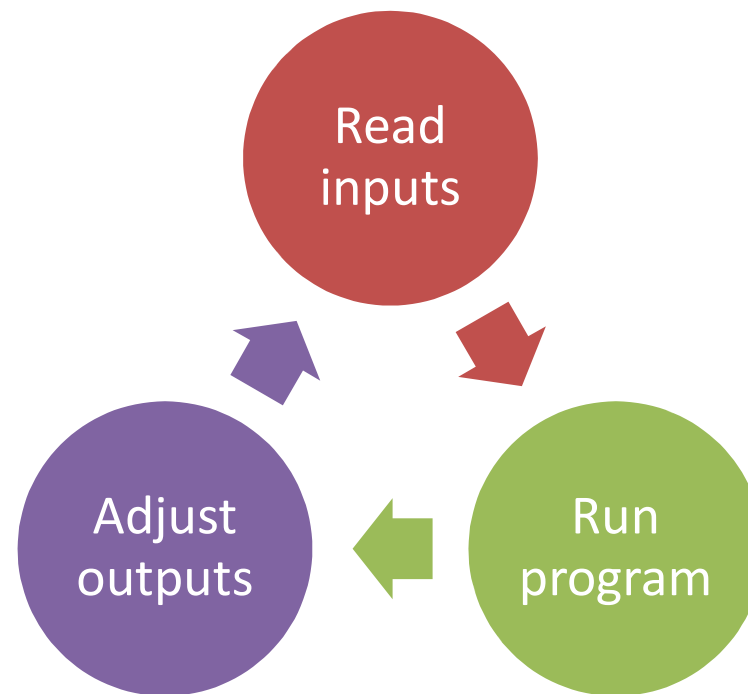


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PLC Operation – Scan Time

Scan time: indicates how fast controller can react to changes in input.



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