

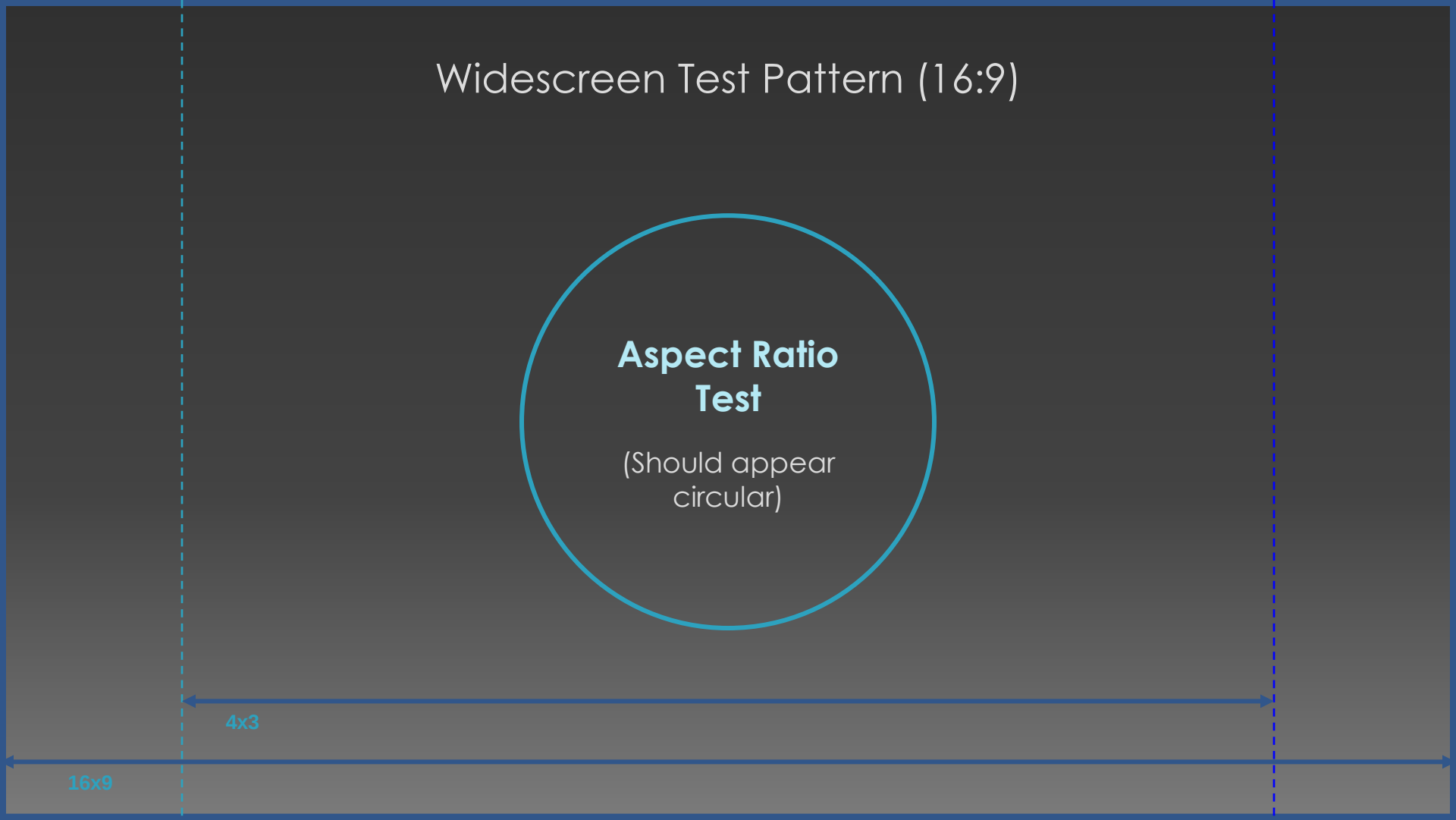
Widescreen Test Pattern (16:9)

Aspect Ratio Test

(Should appear
circular)

4x3

16x9





ANY IDEA WHAT THIS IS ?

Programmable Logic Controllers

A Presentation

by *K. Venu Gopal*

for BITS UC211 (Practice School -1)

What is a PLC?

A Programmable Logic Controller, or PLC for short, is simply a special purpose computer used for industrial control systems.

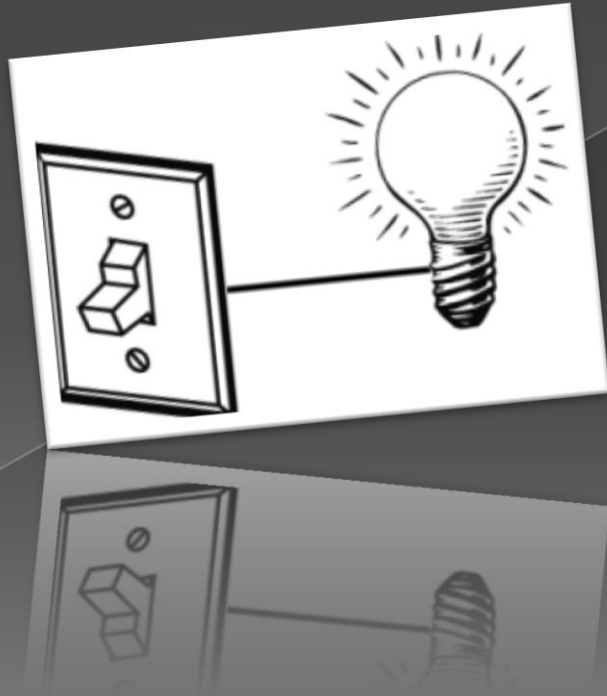
Invented by Dick Morley, the founder of Modicon (MOdular DIgital COntroller) in 1968.

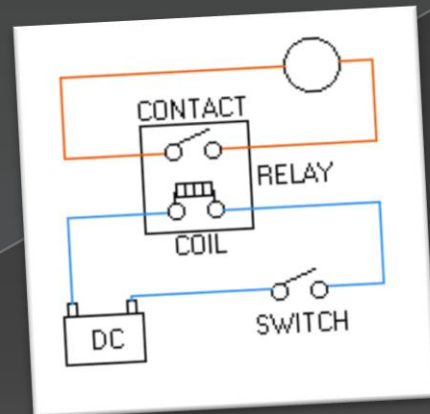
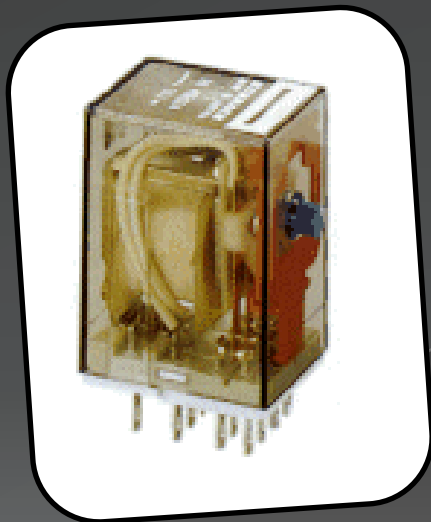
Has a CPU that is dedicated to run one program that monitors a series of different inputs and logically manipulates the outputs for the desired control.

Where ever there is a need for automation the PLC provides a flexible way to "soft wire" the components together.

Why do we need them ?

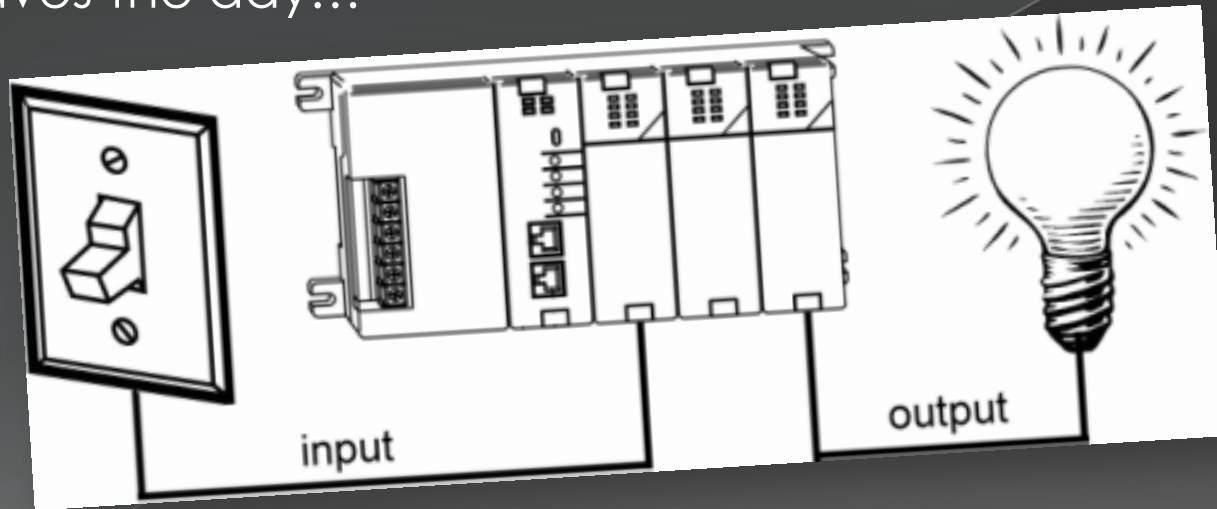
A simple example...





Why do we need them ?

A PLC saves the day...



Downfall of relays...

- ✓ A small design change needs shutting down, move some wires, add some relays, debug and do it all over again.
- ✓ A single PLC can be programmed to replace thousands of relays.
- ✓ Software revision replaced the re-wiring of hard-wired control panels when production models changed.

... and rise of PLCs.

- ⦿ Gave flexibility to control logic change
- ⦿ Enabled rapid modification
- ⦿ Enabled future growth
- ⦿ Were highly reliable
- ⦿ Reduced Downtime
- ⦿ Occupied very little space
- ⦿ Increased capability
- ⦿ data collection and communications became easy
- ⦿ Overall costs dropped

COMPONENTS OF A PLC



The power supply rack unit.

The central processing unit.

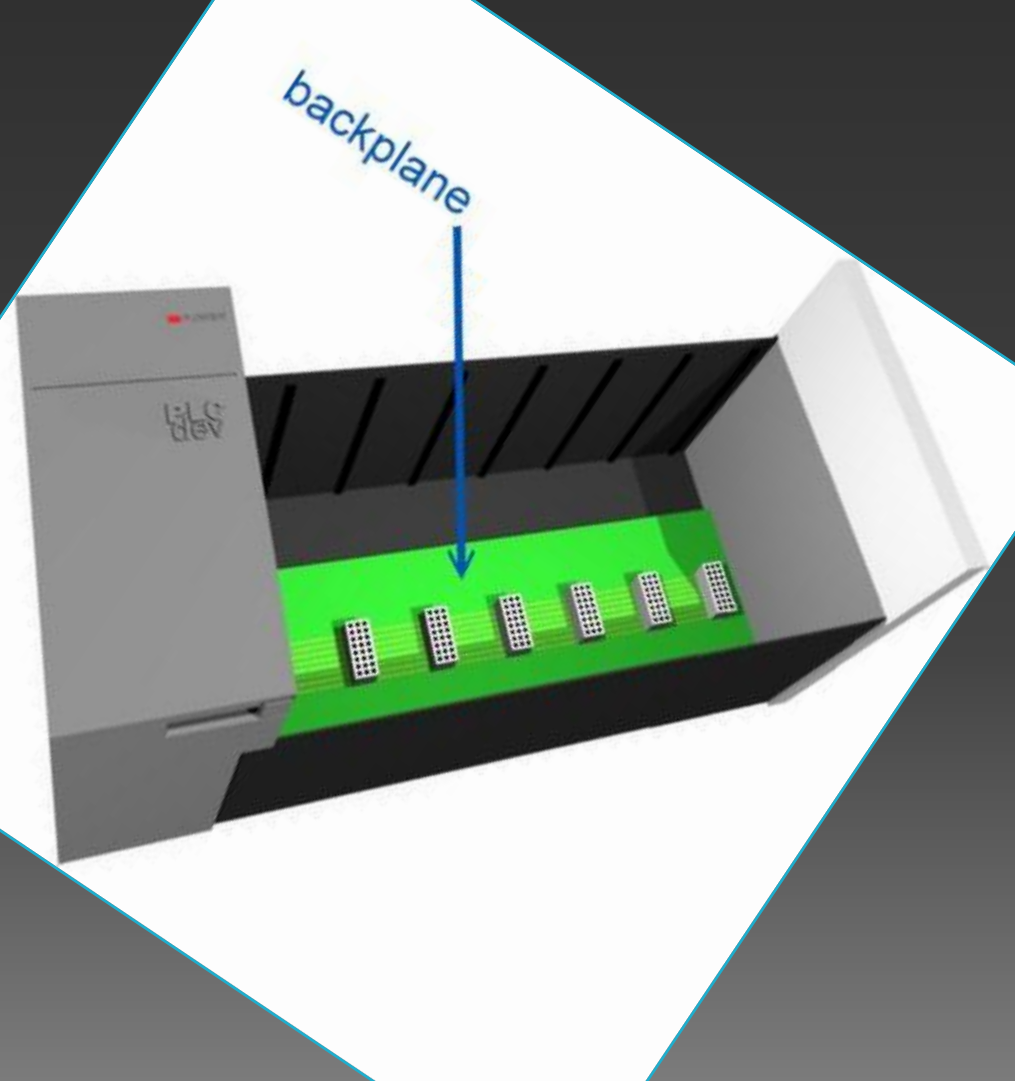
The input/output section.

The input/output section.

PLC RACK

PLC RACK

This is a PLC rack showing the backplane connectors onto which a PLC module can be plugged in.

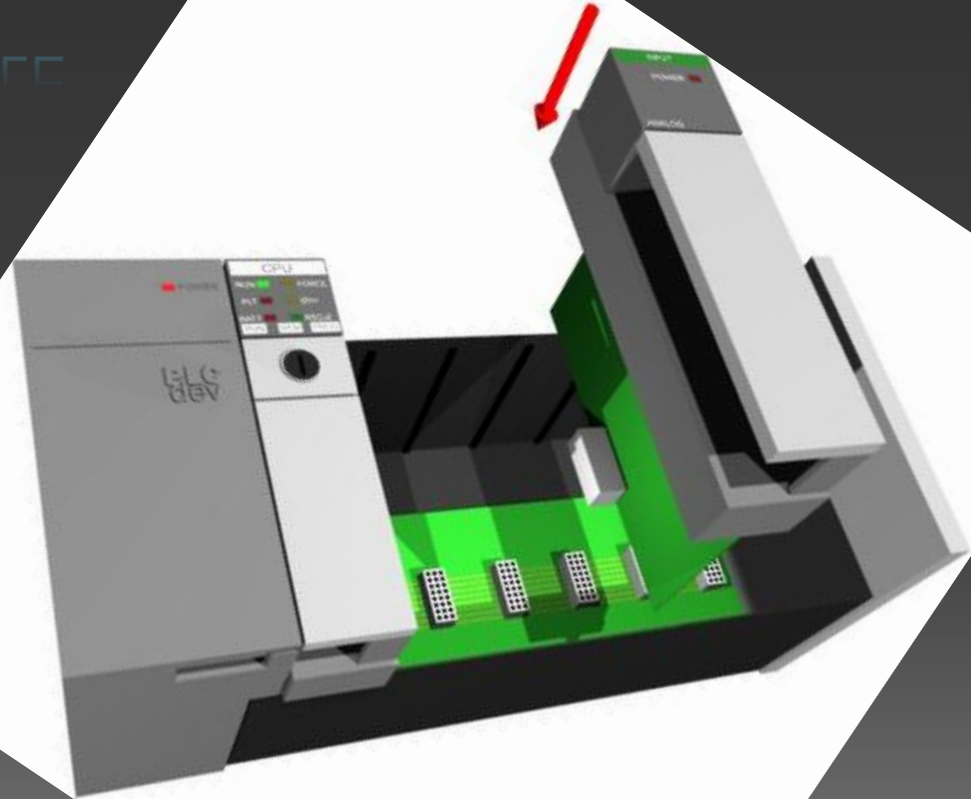


PLC MODULE

LEGO MODULE

Modules can be plugged in whenever required, giving the PLC expandability.

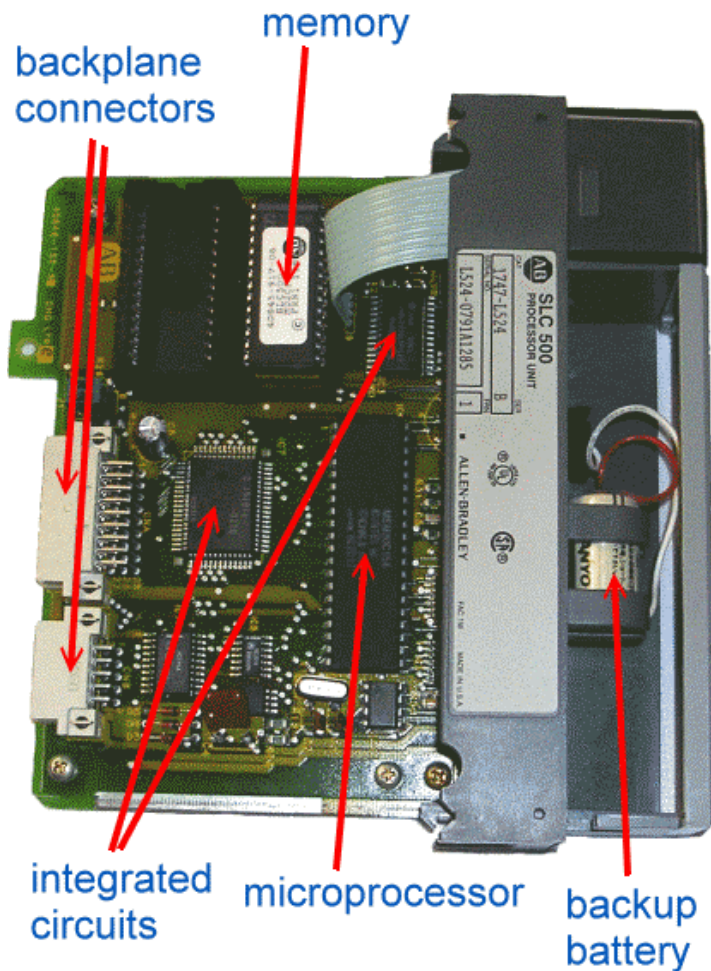
The different types of modules are Analog, and Digital.



CPU MODULE

This is the PLC's CPU module.

It has,
Microprocessor
Memory
Backplane connectors
A backup battery
And IC's



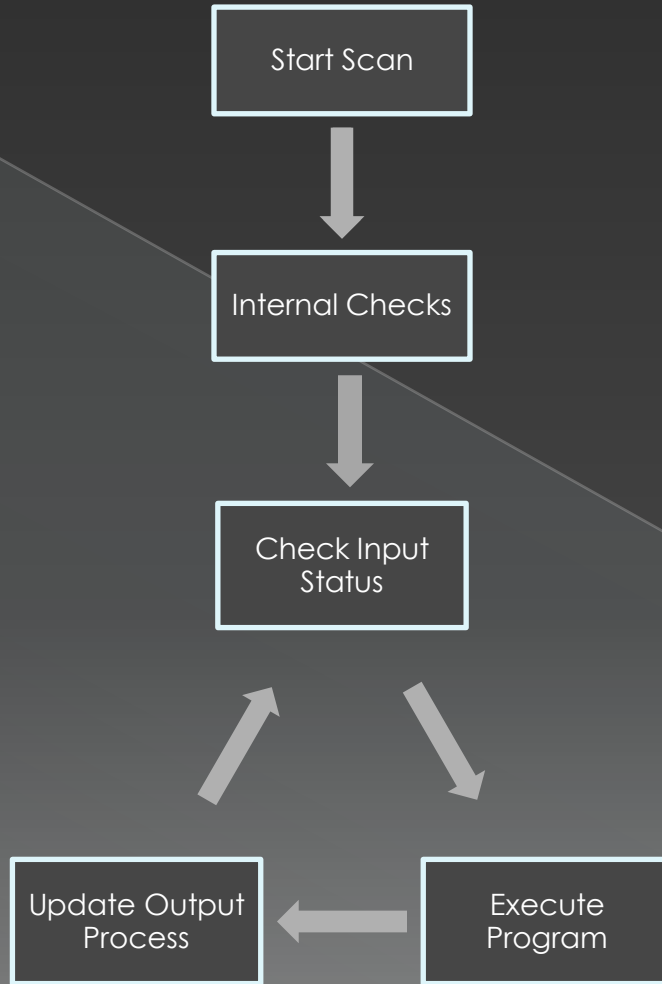
PLC FRONT PANNEL



This is the front view of the PLC showing the I/O connections. Common connections found in PCs are present here.

9-Pin RS232, RS485, Ethernet, DF1, etc.

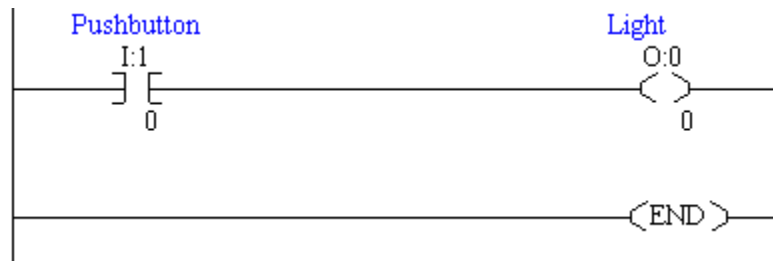
CPU OPERATING CYCLE



PLC being a dedicated controller processes one program over and over again.

It involves reading inputs from the other modules, executing the logic based on the inputs and then updated outputs accordingly.

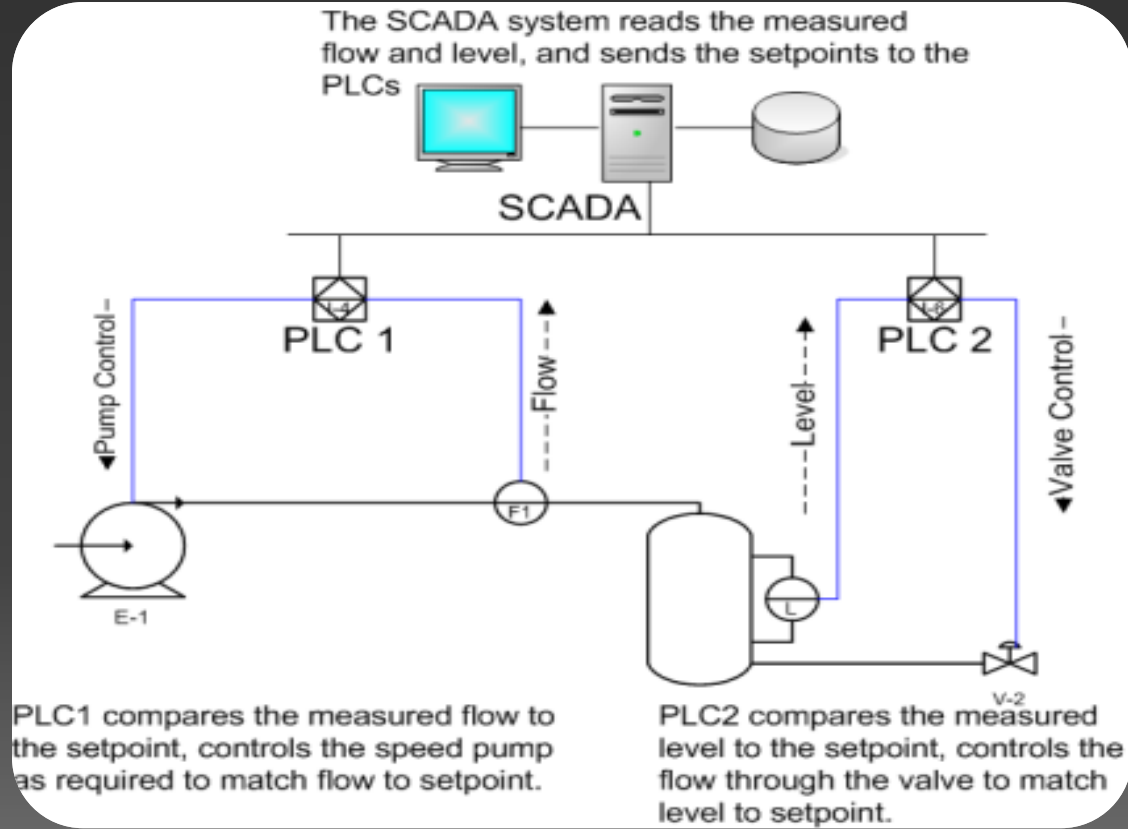
PROGRAMMING : State Level Diagrams or Ladder Diagram



USER INTERFACE

- A Human-Machine Interface (HMI) is employed for this purpose of configuration, alarm reporting, etc.
- Most modern PLCs can communicate over a network to RTUs (Remote Terminal Unit) or some other system, such as a computer running a SCADA (Supervisory Control And Data Acquisition) system .

USER INTERFACE (SCADA)



PLC V/S PC

	PLC	PC
Environment	Specifically designed for harsh conditions.	Not designed for harsh environments.
Ease of Use	Connections are easy thereby interfacing.	Connecting I/O to the PC is not always as easy.
Flexibility	Easy to add modules. Designed for modularity and expansion.	Limited by the number of cards slots and not easily expandable.
Speed	Executes only a single program in sequential order. Easy to handle real time tasks.	Meant to handle simultaneous tasks. They have difficulty handling real time events.
Reliability	A PLC never crashes over long periods of time.	Freezes up and crashing is frequent.
Programming languages	Languages are typically fixed to ladder logic.	Very flexible and powerful in what to use for programming.
Data management	Limited memory cant store a lot of data.	Long term data storage possible.
Cost	Just too hard to compare	

Well known PLC brands are

Modicon (purchased by Schneider Electric)

Allen-Bradley

General Electric

Omron

Siemens

Mitsubishi Electric

Automation Direct (subsidiary of Koyo Electronics)

Honeywell

Panasonic (Matsushita)

CONCLUSION

PLCs are meant to be very flexible in how they can be programmed while also providing the advantages of high reliability, compact and economical over traditional control systems.

Thank You !

