Introduction to Industrial Communication
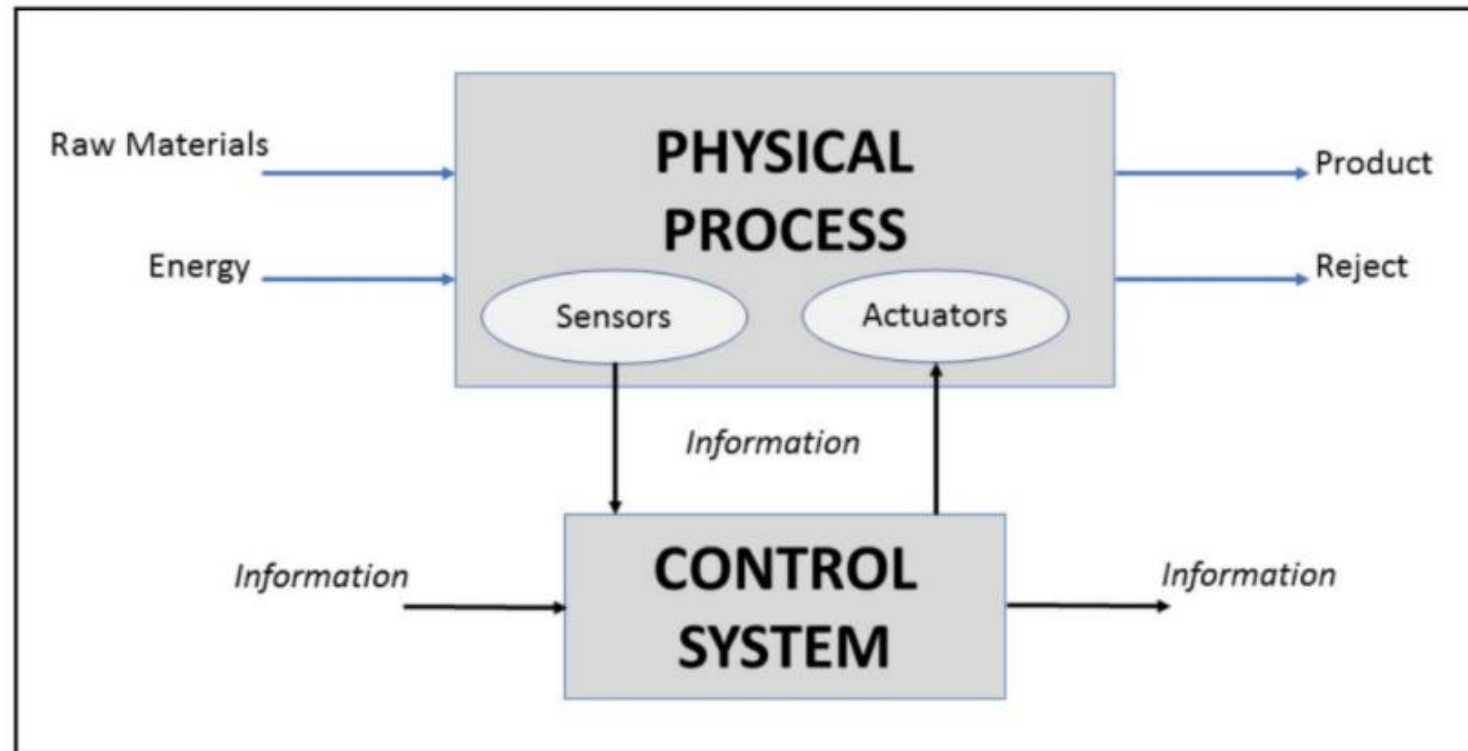
Mathias Gregersen

Topics

- Introduction to the course

- Introduction to industrial automation

- Break

- PLCs

- Ladder programming
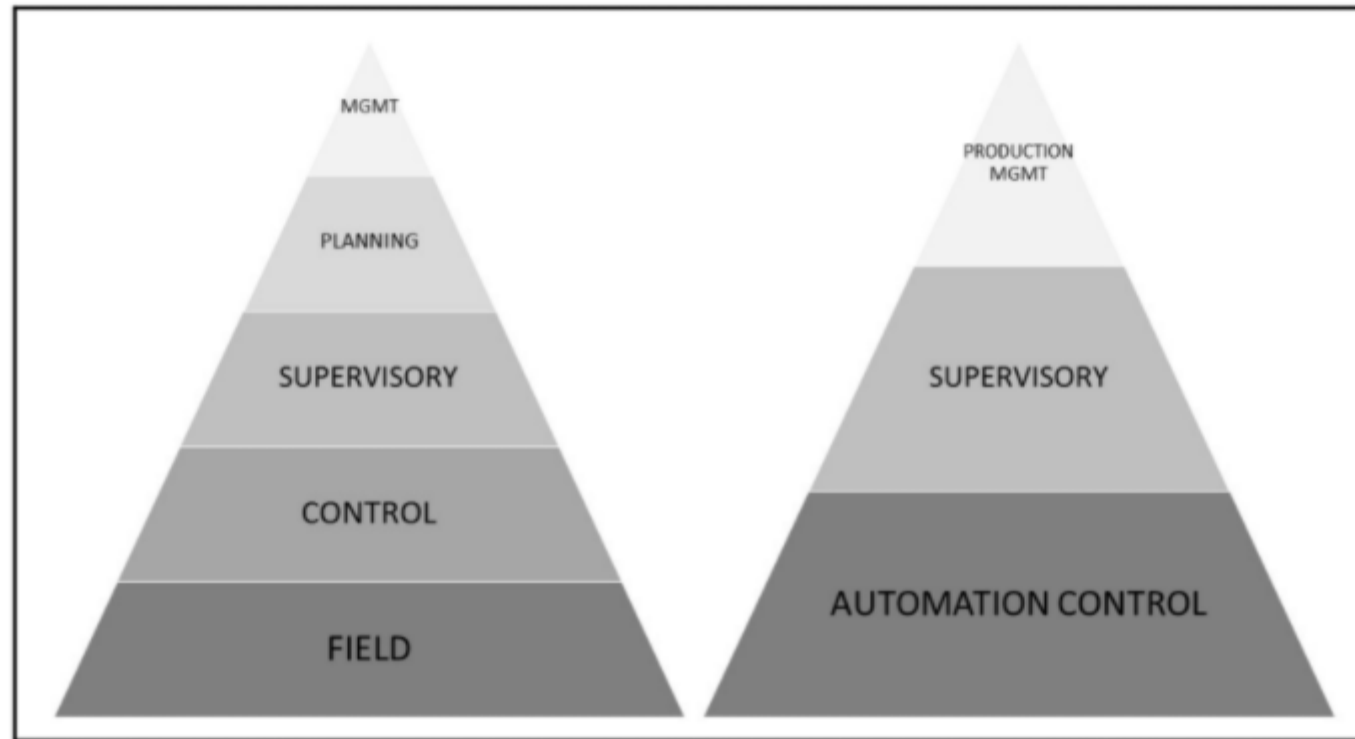
Introduction to the course

- General overview

- Learning goals

- Lecture plan

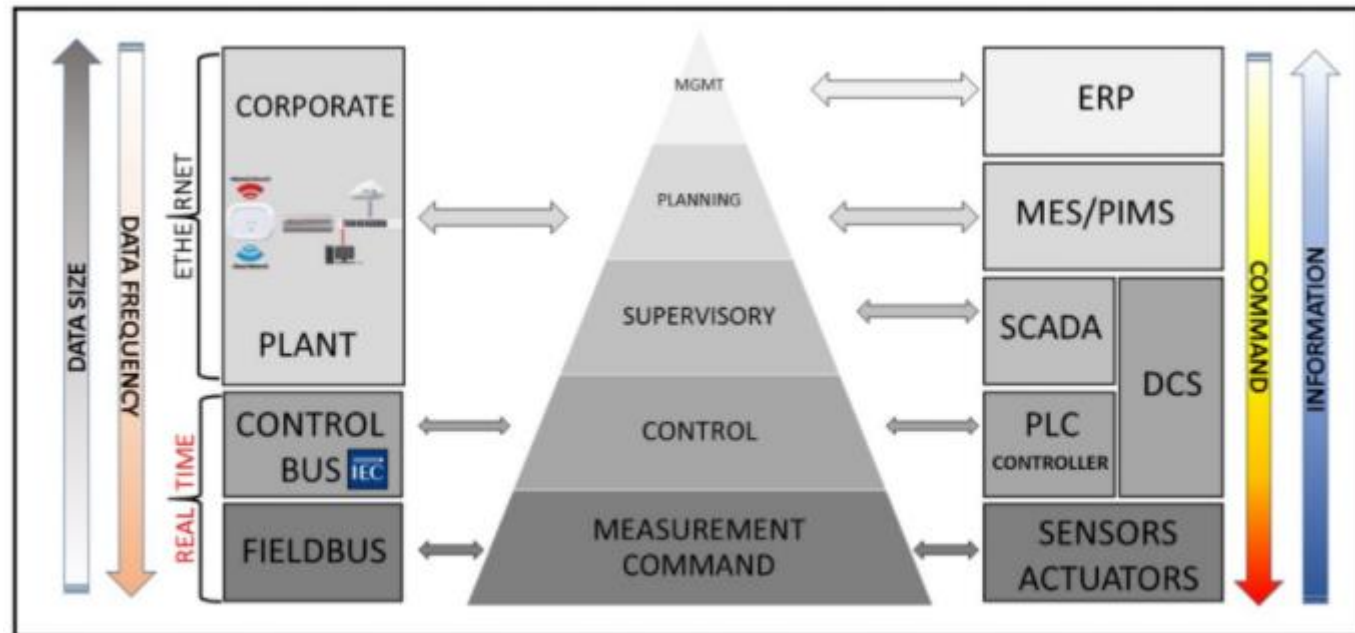# Introduction to industrial automation

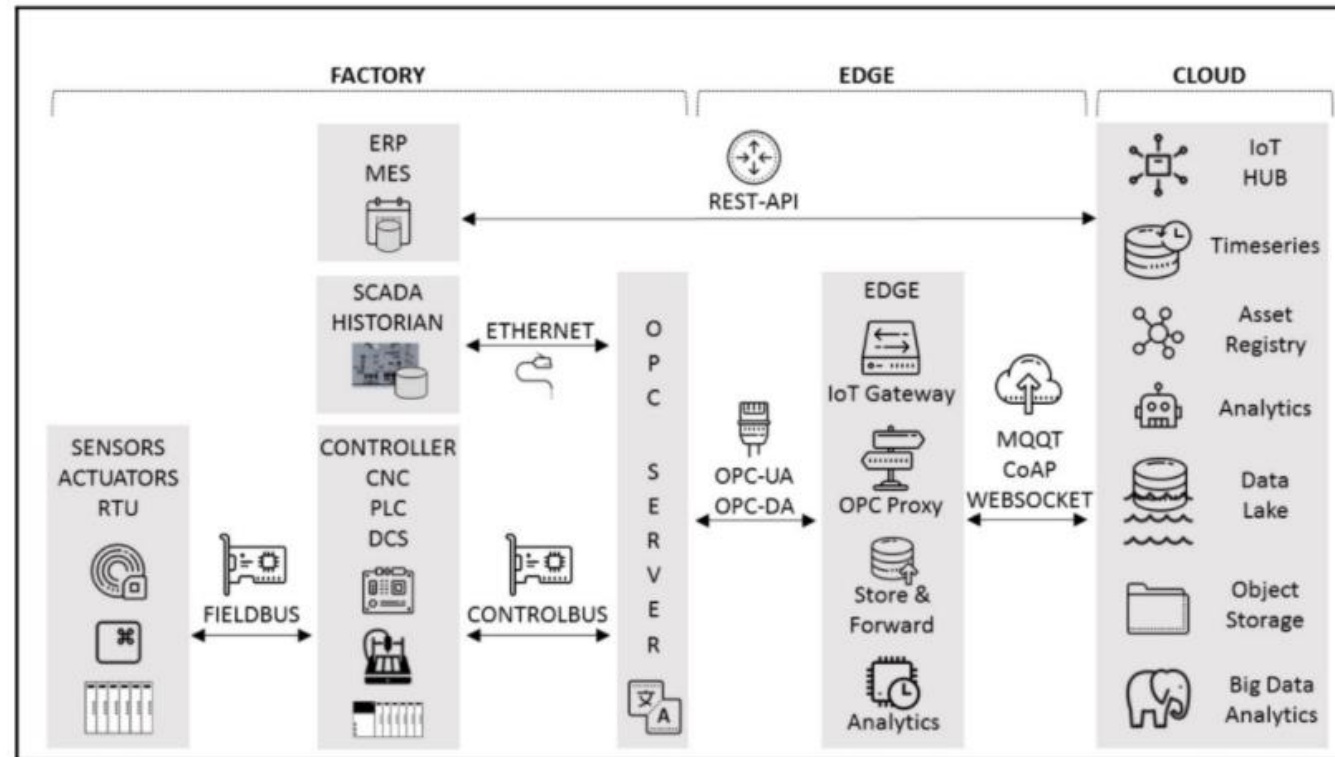Elements of an automated industrial system

Simplified CIM pyramid

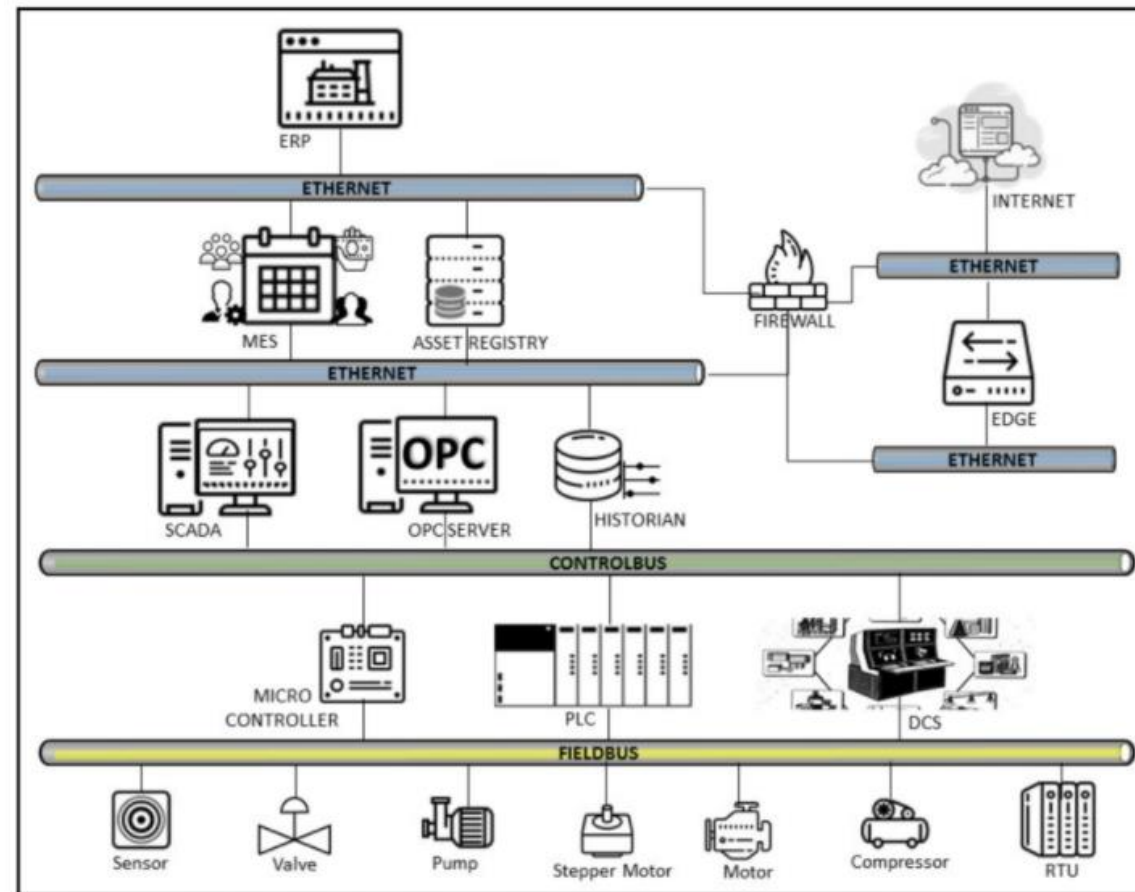Two simplified versions of the CIM pyramid

CIM devices and networks

CIM devices and networks

Industrial IoT, I-IoT

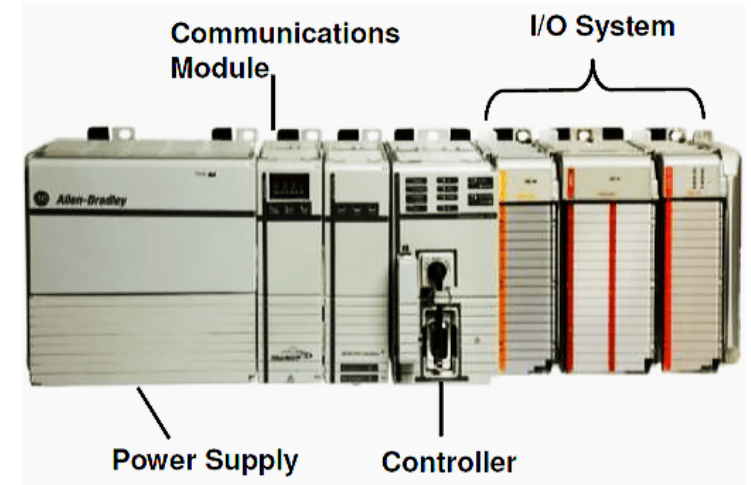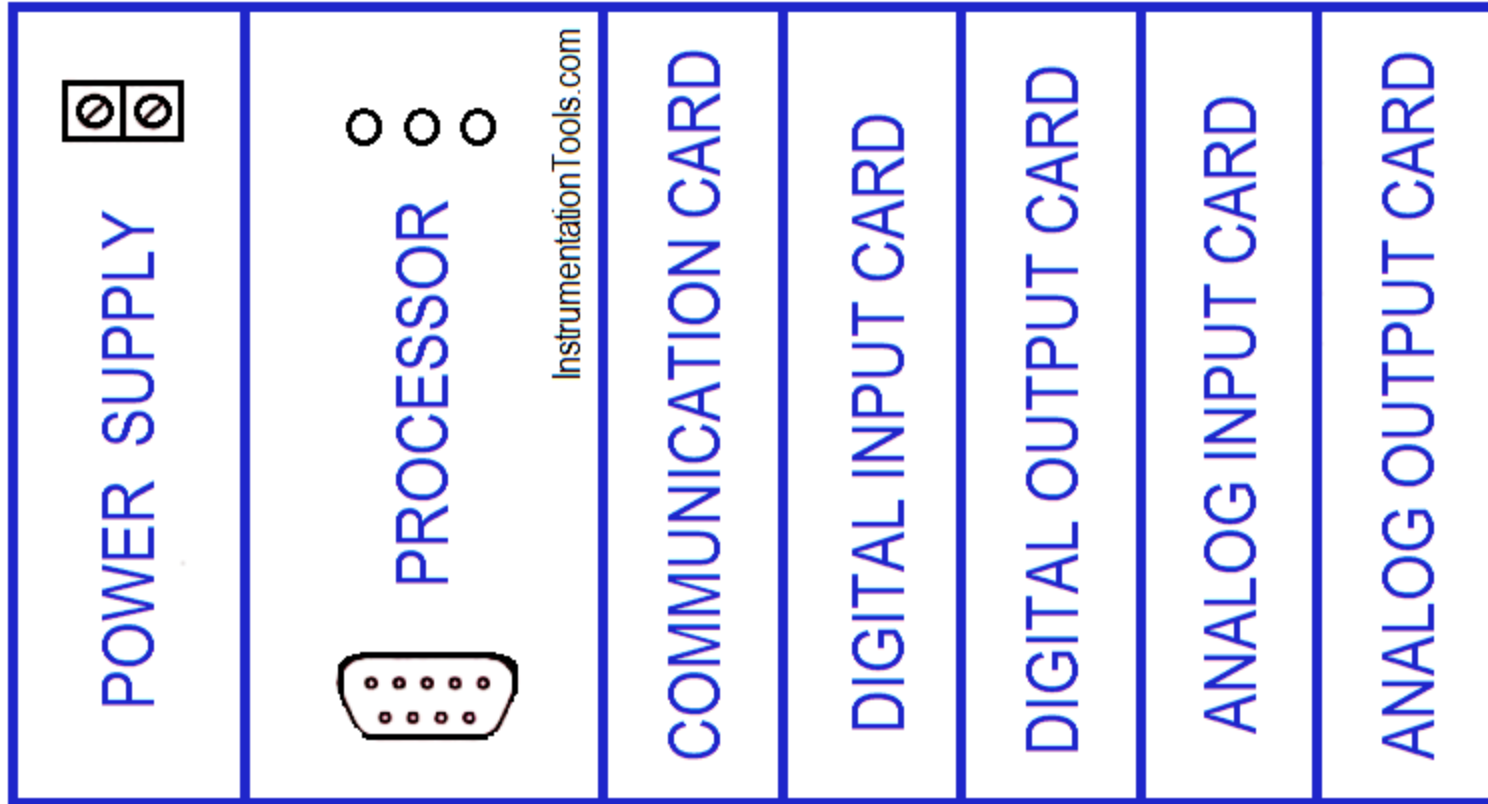The I-IoT data flow

I-IoT and CIM

I-IoT devices and protocols in the factory

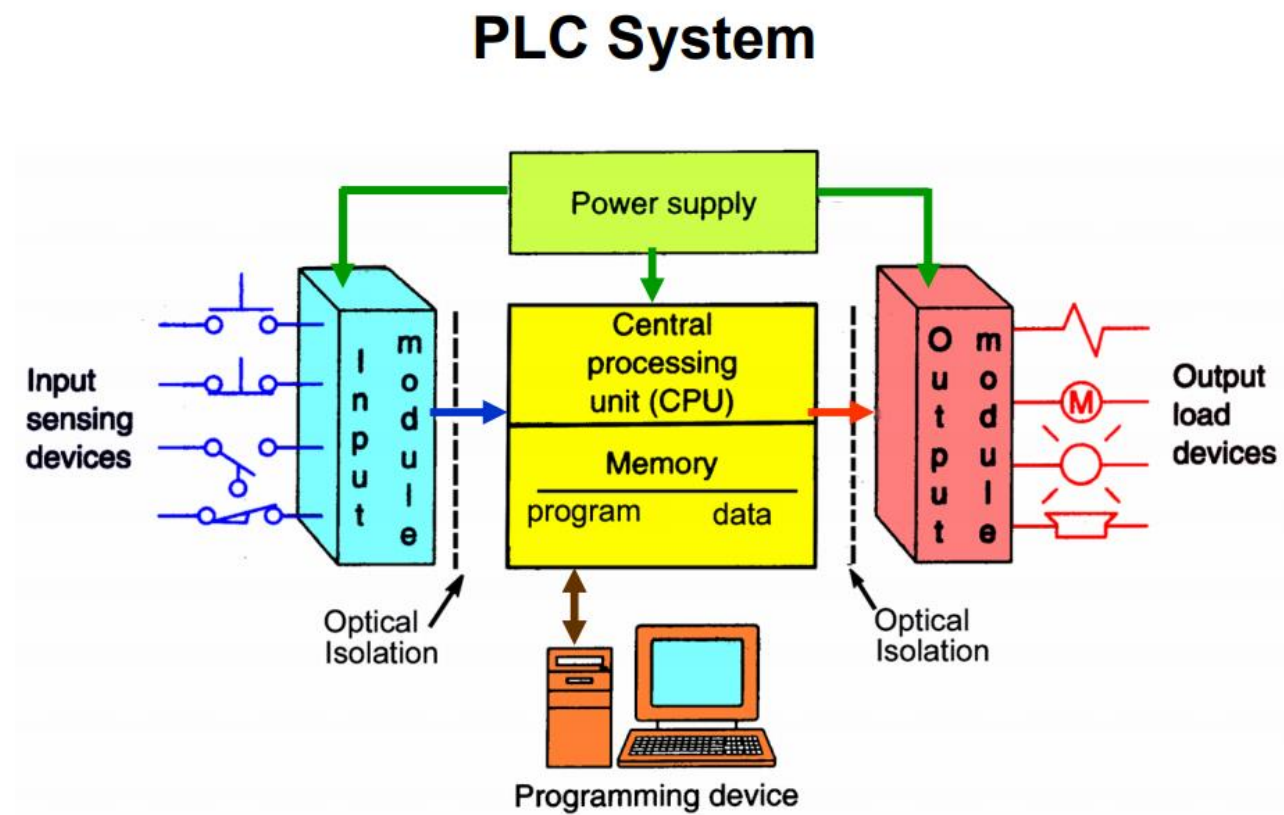# Time for a break!

What is a PLC?

?

The physical make up of a PLC

The PLC system

The PLC architecture
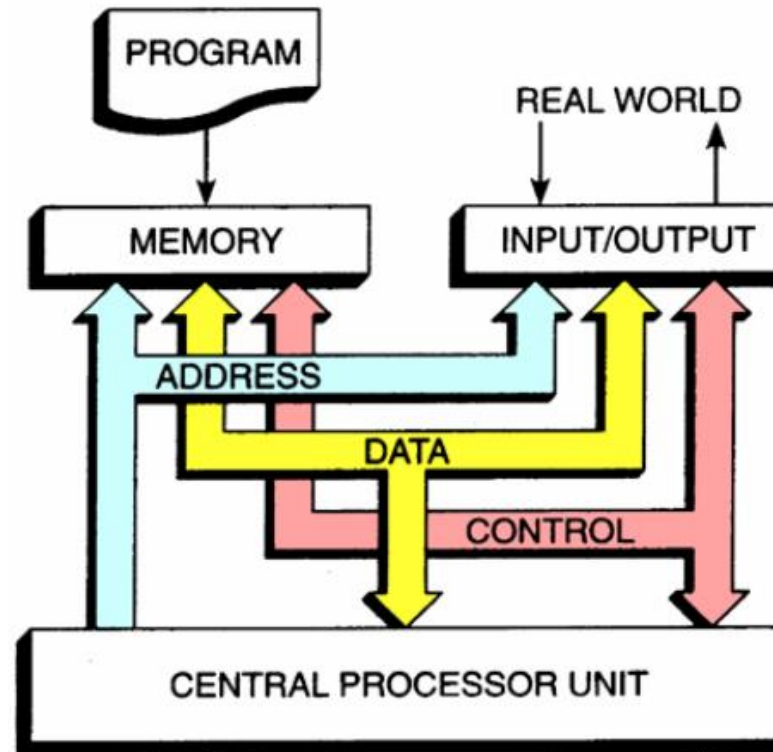
Why use a PLC if it is the same as microchip?

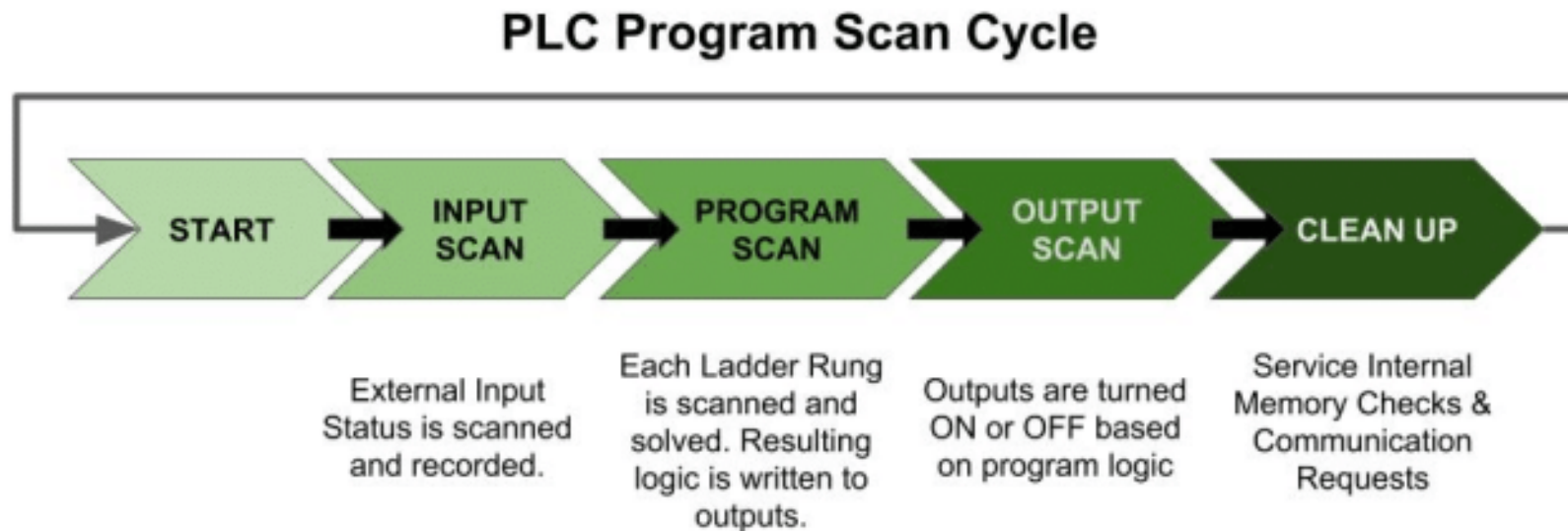# Why use a PLC if it is the same as microchip?

Robustness

Programming

Real-time control systems

Hard RTS Vs Soft RTS

Characteristics	Hard RTS	Soft RTS
Response Time	Hard-Required	Soft- required
Peak Load Performance	Predictable	Degraded
Controlled by	Environment	Computer
Safety	Critical	Non Critical
Size of Data	Small	Large
Error Detection	Autonomous	User Assisted

PLC scan cycles

PLC Program Scan Cycle

START → INPUT SCAN → PROGRAM SCAN → OUTPUT SCAN → CLEAN UP

External Input Status is scanned and recorded.

Each Ladder Rung is scanned and solved. Resulting logic is written to outputs.

Outputs are turned ON or OFF based on program logic

Service Internal Memory Checks & Communication Requests

Erhvervsakademi og Professionshøjskole

PLC scan cycles
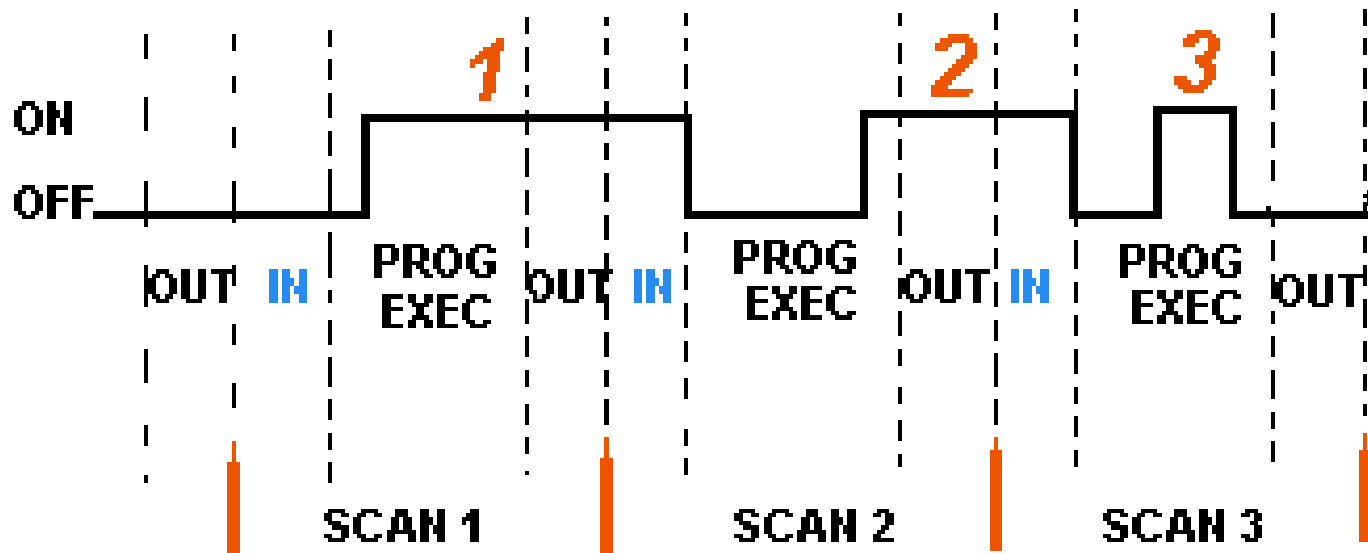
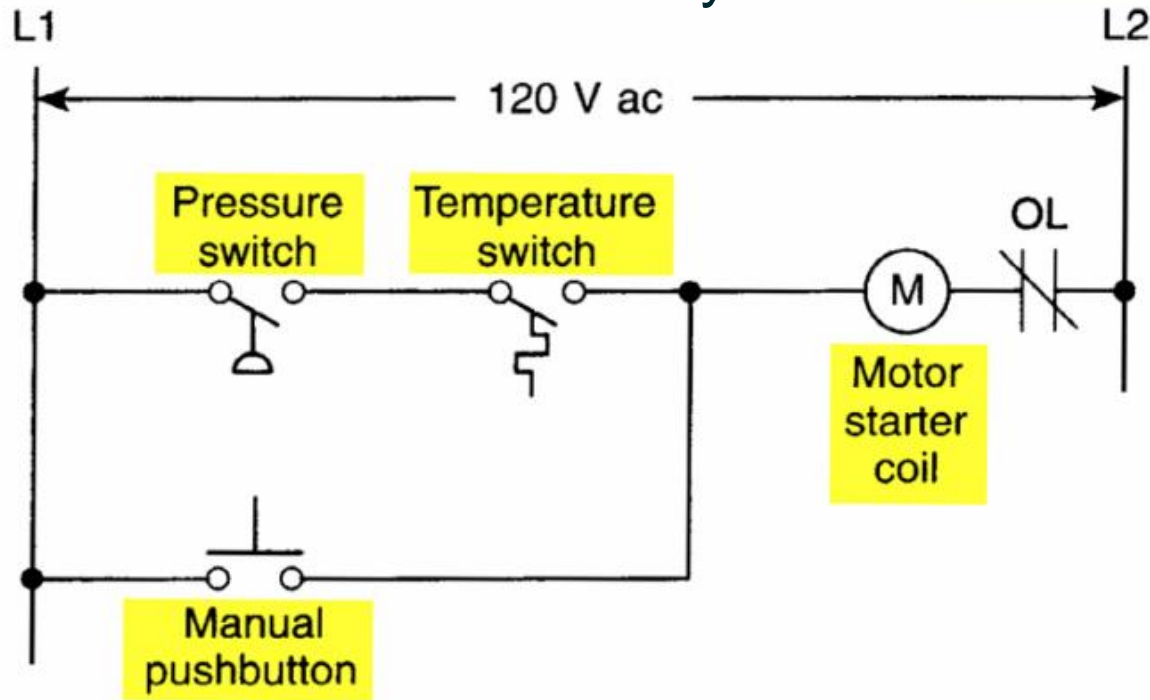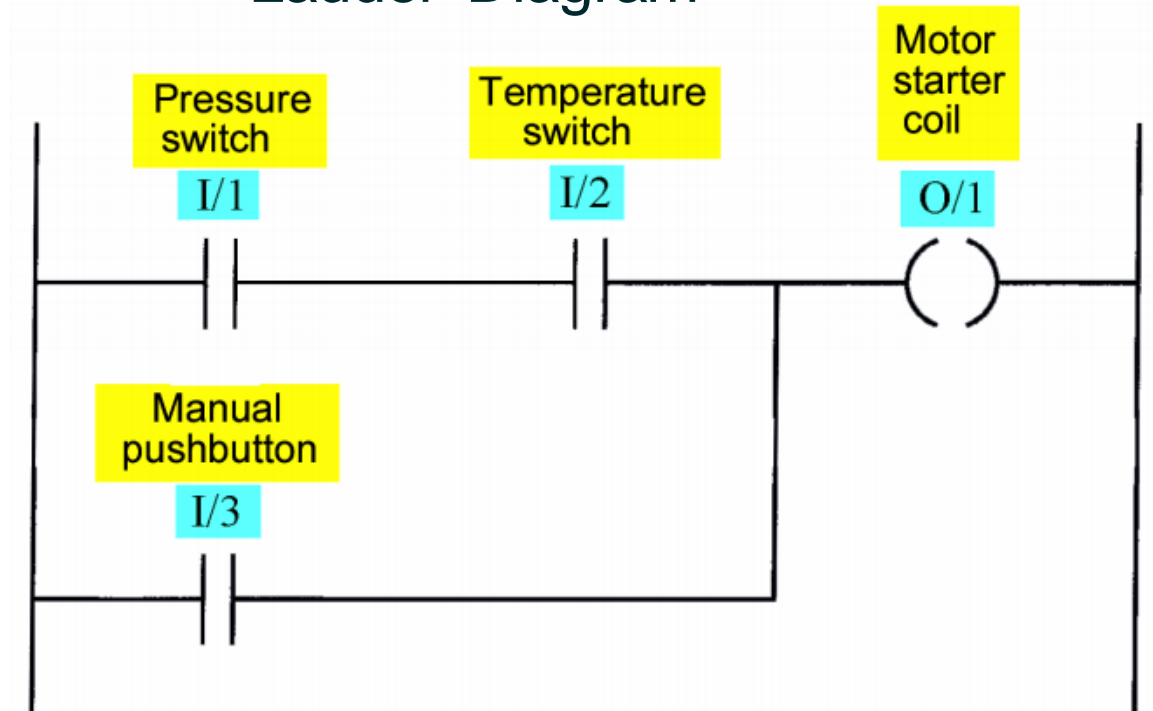# PLC programming languages

- Ladder Diagram

- Functional Block Diagram

- Structured Text

- …

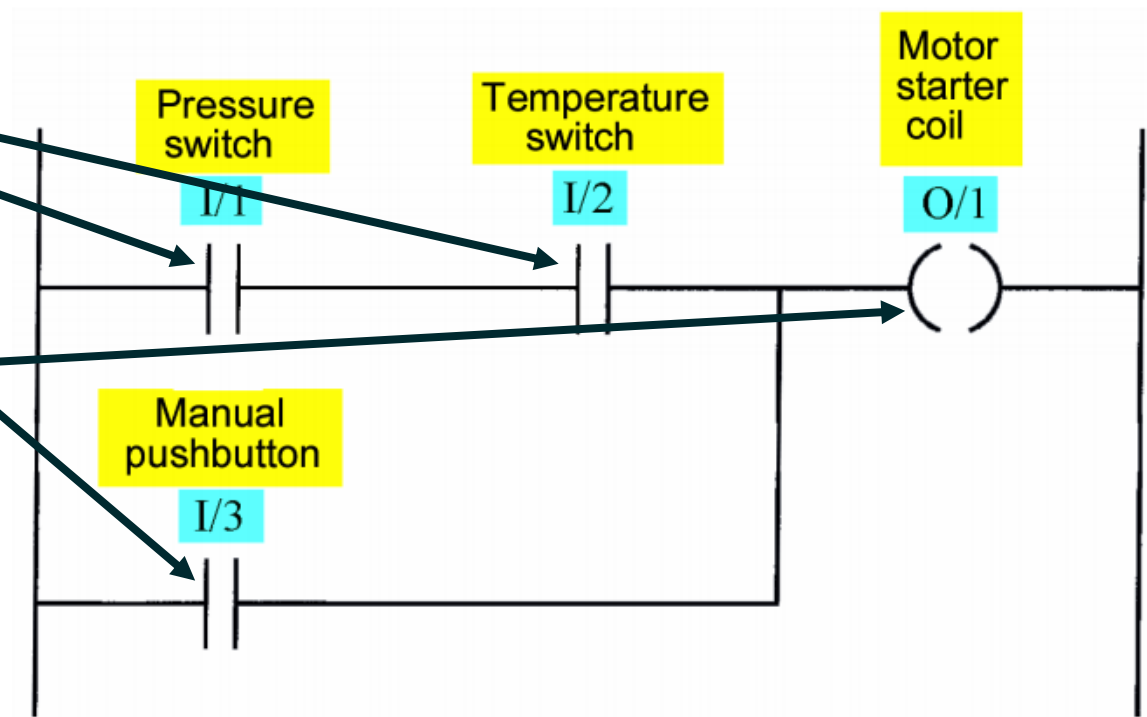# Ladder Diagram

Hard-wired relay circuit

Ladder Diagram

Ladder Diagram components

- Contacts

- Coils

- Rungs

Live demo of PLC Fiddle

https://www.plcfiddle.com/

Exercises

Break and exercises!