IPCS, Chennai

INTERNSHIP REPORT

Submitted by

GOKUL A

in partial fulfillment for the award of the

degree of

BACHELOR OF ENGINEERING

in

ELECTRICAL AND ELECTRONICS ENGINEERING

EASWARI ENGINEERING COLLEGE,
(An Autonomous Institution),
CHENNAI.

ANNA UNIVERSITY: CHENNAI 600 025

December 2022

INTERNSHIP COMPLETION CERTIFICATE

@IPCS

Ref No - IPCS/CHN/IPT/570   5/08/2022

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Mr. GOKUL A** Roll Number **310620105011**   student of
Easwari Engineering College has done his internship in the field of Industrial Automation
using Schneider PLC and SCADA from 20th July 2022 to 5th August 2022 in our organization.

During this period of his internship program with us, he was found to be punctual, diligent
and inquisitive.

We wish him all the best in his future endeavors.

For IPCS Global,

AUTHORIZED SIGNATORY

Industrial and Marine Automation | Training on PLC, SCADA, CCTV, BMS & Embedded | Digital Marketing | Corporate Training

IPCS GLOBAL

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CERTIFICATE OF EVALUATION

COLLEGE NAME: SRM EASWARI ENGINEERING COLLEGE
BRANCH & SEMESTER: EEE, 5 th SEMESTER

S.No.	Name of the Student	Title of the Internship
1	Gokul A	INDUSTRIAL AUTOMATION using SCHNEIDER PLC AND SCADA

The report of the internship work submitted by the above student in partial fulfillment for the award of Bachelor of Engineering Degree in Electrical and Electronics Engineering of Anna university were evaluated and confirmed to be a report of the work done by the above student.

The viva voce examination of the internship undergone was held on 06/11/2022

EXAMINER 1   **EXAMINER 2**   **EXAMINER 2**

INTERNSHIP REPORT

DOMAIN: Industrial Automation
COMPANY NAME: IPCS Global
DATE: 20-07-2022 to 05-08-2022

TOPICS COVERED

- ➢ Introduction to Industrial Automation
- ➢ Relay and its Operation
- ➢ Introduction to Schneider PLC
- ➢ Components of PLC
- ➢ Programming Languages
- ➢ Benefits & Applications of PLC
- ➢ Introduction of SCADA
- ➢ INTOUCH Software
- ➢ Mini Simulation
- ➢ Conclusion

1. INTRODUCTION TO INDUSTRIAL AUTOMATION

AUTOMATION:

Automation is the use of control systems and information technologies to reduce the need for human work in the production of goods and services. It's Basically, a set of pre-defined jobs, that is executed systematically and sequentially with the help of Software and Hardware.
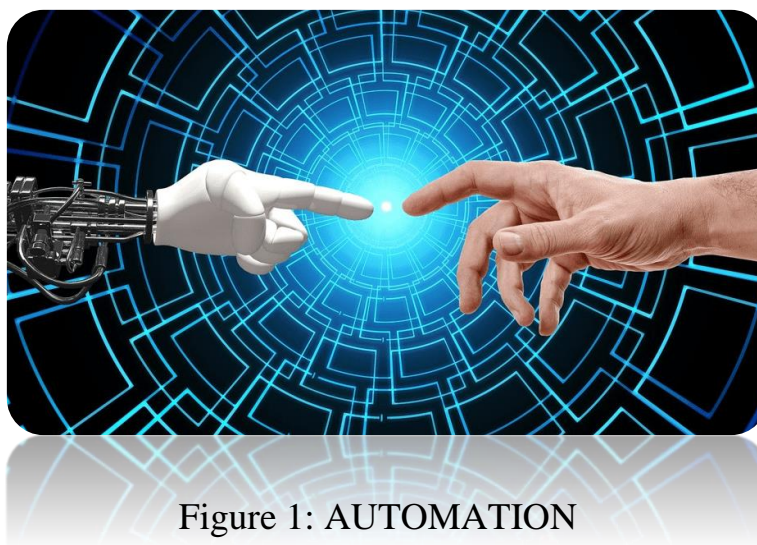

Figure 1: AUTOMATION
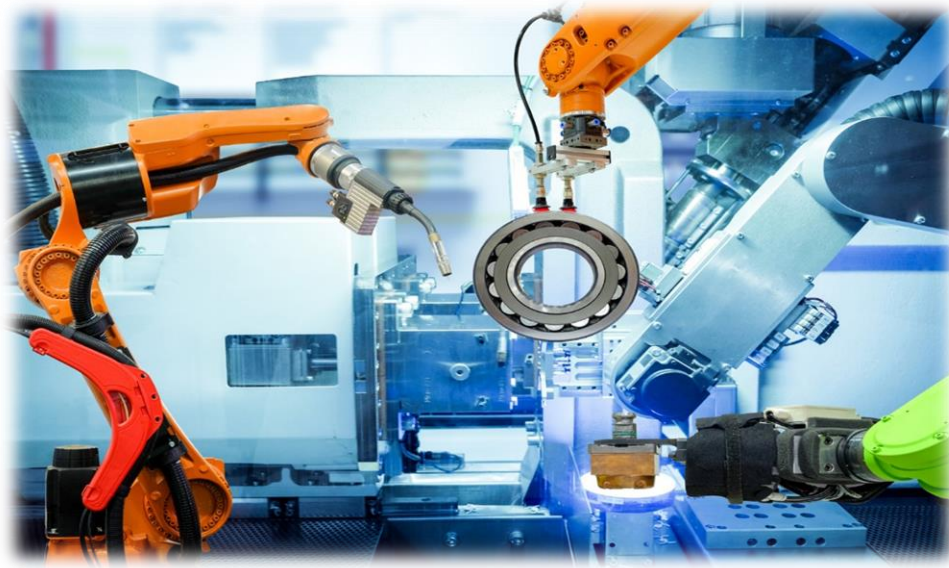
1.1 INDUSTRIAL AUTOMATION

Figure 2: Industrial Automation

Industrial Automation is the replacement with computers and machines to that of human thinking. industrial automation can be defined as the use of set technologies and automatic control devices that results the automatic operation and control of industrial processes without significant human intervention and achieving superior performance than manual control. These automation devices include **PLCs, PCs, PACs,** etc. and technologies include various industrial communication systems.

Industrial Automation include:

- Increased labour productivity.
- Improved product quality.
- Reduced labour or production cost.
- Reduced routine manual tasks.
- Improved safety.

2. INTROUCTION TO RELAY

2.1 WHAT IS RELAY

A Relay is a simple electromechanical switch. While we use normal switches to close or open a circuit manually, a Relay is also a switch that connects or disconnects two circuits. But instead of a manual operation, a relay uses an electrical signal to control an electromagnet, which in turn connects or disconnects another circuit.

Relays can be of different types like electromechanical, solid state. Electromechanical relays are frequently used.
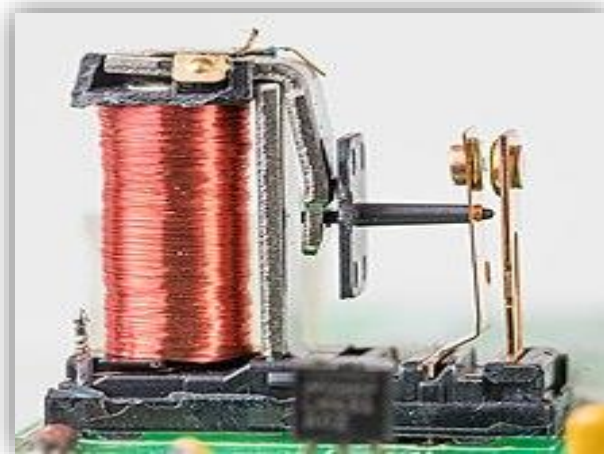
Figure 3: Relay

2.2 WORKING PRINCIPLE:

It works on the principle of an electromagnetic attraction. When the circuit of the relay senses the fault current, it energies the electromagnetic field which produces the temporary magnetic field.

This magnetic field moves the relay armature for opening or closing the connections. The small power relay has only one

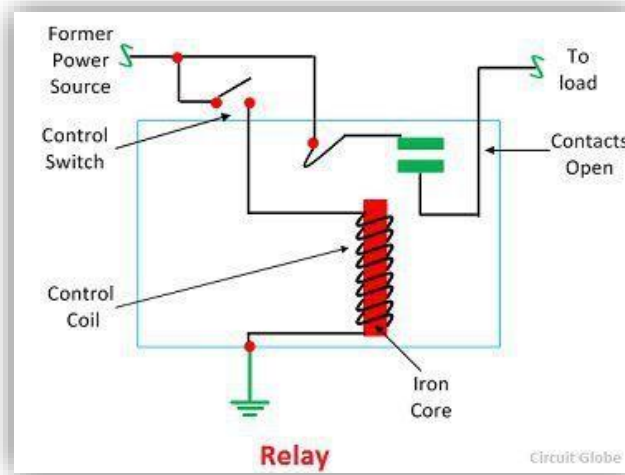contacts, and the high power relay has two contacts for opening the switch.

Figure 4: Structure of Relay

The inner section of the relay is shown in the figure below. It has an iron core which is wound by a control coil. The power supply is given to the coil through the contacts of the load and the control switch. The current flows through the coil produces the magnetic field around it.

Due to this magnetic field, the upper arm of the magnet attracts the lower arm. Hence close the circuit, which makes the current flow through the load. If the contact is already closed, then it moves oppositely and hence open the contacts.

2.3 Relay Applications:

- Lighting control systems
- Telecommunication
- Industrial process controllers
- Traffic control

3. PROGRAMMABLE LOGIC CONTROLLERS (PLC)

PLC stands for Programmable Logic Controller. It is an industrial computer control system that continuously monitors the state of input devices and makes decisions based upon a custom program to control the state of output devices.

PLC plays a monitoring as well as controlling role in designing. It consists of more programming functions like function, counter, memory, etc.

It is used in various industries, chemical industries, steel industries, food processing system, energy sector, oil and gas power plant etc.

Due to development of technology the scope of plc is being increased. It is used for automation of typically industrial electromechanical process.
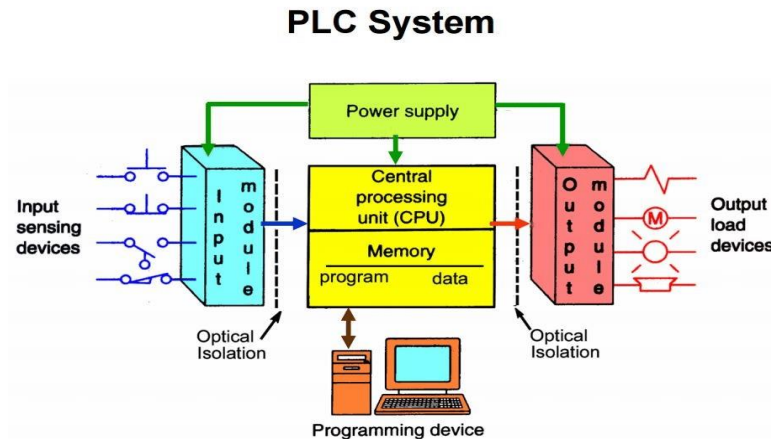
3.1 BLOCK DIAGRAM OF PLC

PLC System

Figure 5: Block Diagram

➢ **Input Modules:** It takes input and convert signal from sensor into logic signal.

➢ **Output Modules:** It convert control instructions as signal that can be used by actuators.

➢ **CPU (central processing unit):** It is the brain of PLC and govern the activities of the entire PLC system.

➢ **Memory:** Memory is the component that stores information, programs and data in a PLC.

➢ **Power supply:** It provides the voltage needed to run the primary PLC components.

➢ **Programming device:** The programming terminal is used for programming the PLC and monitoring/sequencing PLCs operation.

3.2 PROGRAMMING LANGUAGES OF PLC

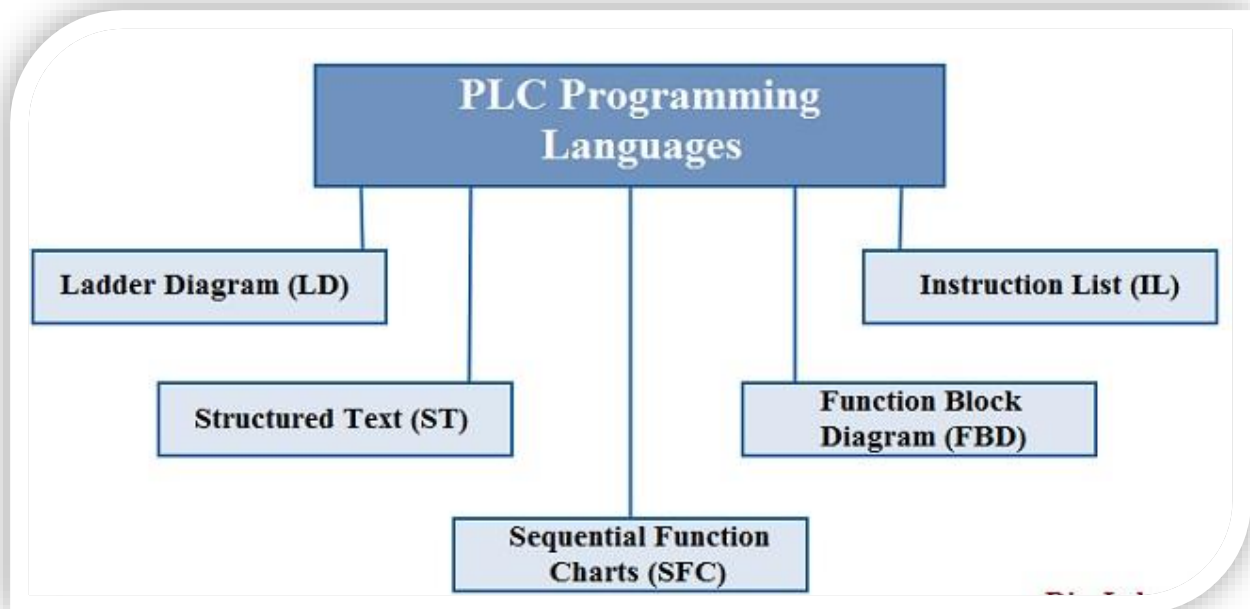The Different types of PLC Programming languages are:

Figure 6: Block diagram

The ladder diagram is the universal programming language of PLC. It has a short abbreviation as '**LD'** and also known as '**Ladder Logic'**. LD is one of the oldest programming languages for PLC.

Ladder Diagram is read from left to right and top to bottom. **Logic** to pick up. For more complex systems, LD can be challenging to interpret, but the online debugging tools make it easy to track down faults, and correct issues.

In the ladder diagram, the programming language that used to create the program to control the PLC system is known as 'Ladder Diagram Language' or 'Ladder Logic Language**'.**
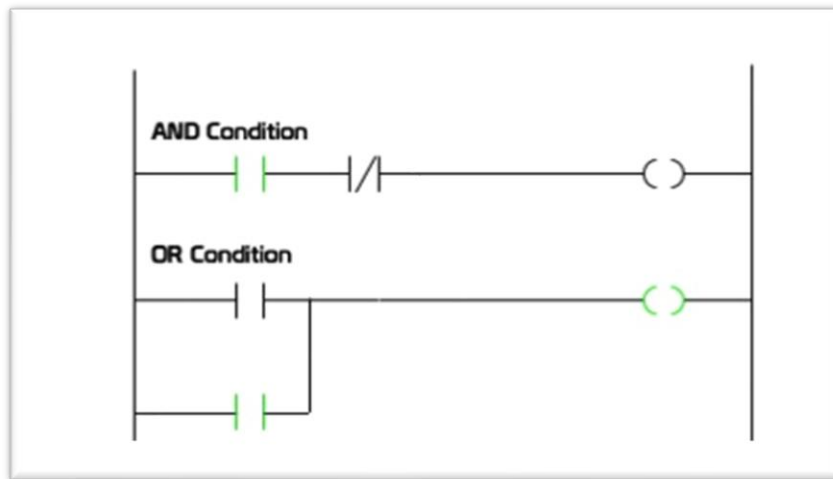
Figure 7: Ladder diagram

3.2.1 DIFFERENT SYMBOLS USED IN LADDER DIAGRAM:

This programming uses different graphic elements. These graphic elements are also called as Symbols.

- Rungs
- Branches
- Inputs and Outputs for PLC programming
- Addressing Inputs and Outputs
- Instructions

RUNGS:

In Ladder diagram, the horizontal lines called Rungs. You can put as many numbers of rungs as per your project requirements. And the vertical lines show the power supply or flow.
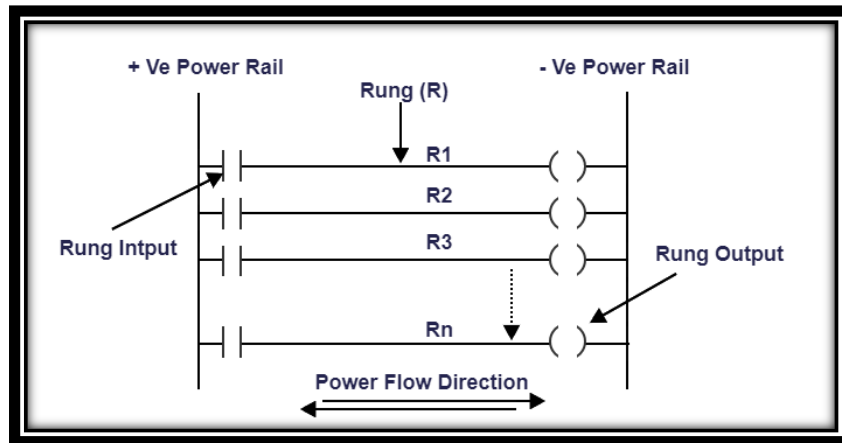
Figure 8: Rungs

BRANCHES:

There are three types of branches. They are as follows.

➢ Nest Branch

➢ Parallel Branch

➢ Series Branch

INPUTS AND OUTPUTS FOR PLC PROGRAMMING:

For writing the program, Inputs and outputs are playing the most important role.

- Inputs refer to the switch or Push Button (PB).
- Output referred to the Coil or Lamp or Load.

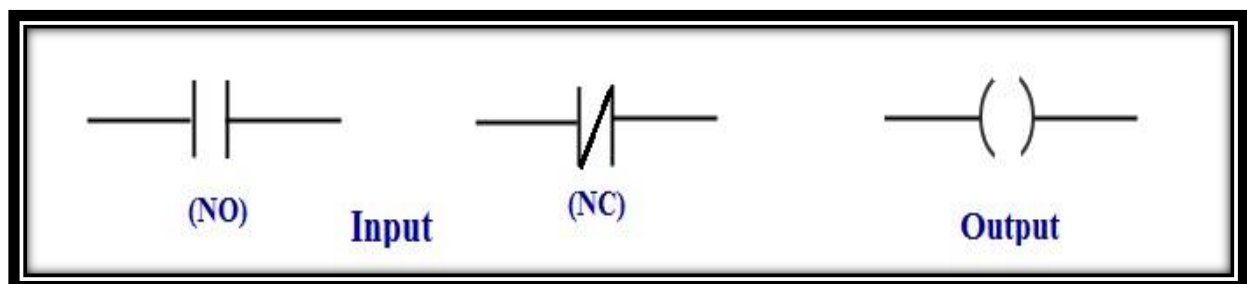Input is Normally Open (NO) Contact or Normally Closed (NC) Contact.

Figure 9: Inputs and Outputs

SIMULATION

The mini simulation is done in schneider electric somachine software using ladder diagram during the internship program.
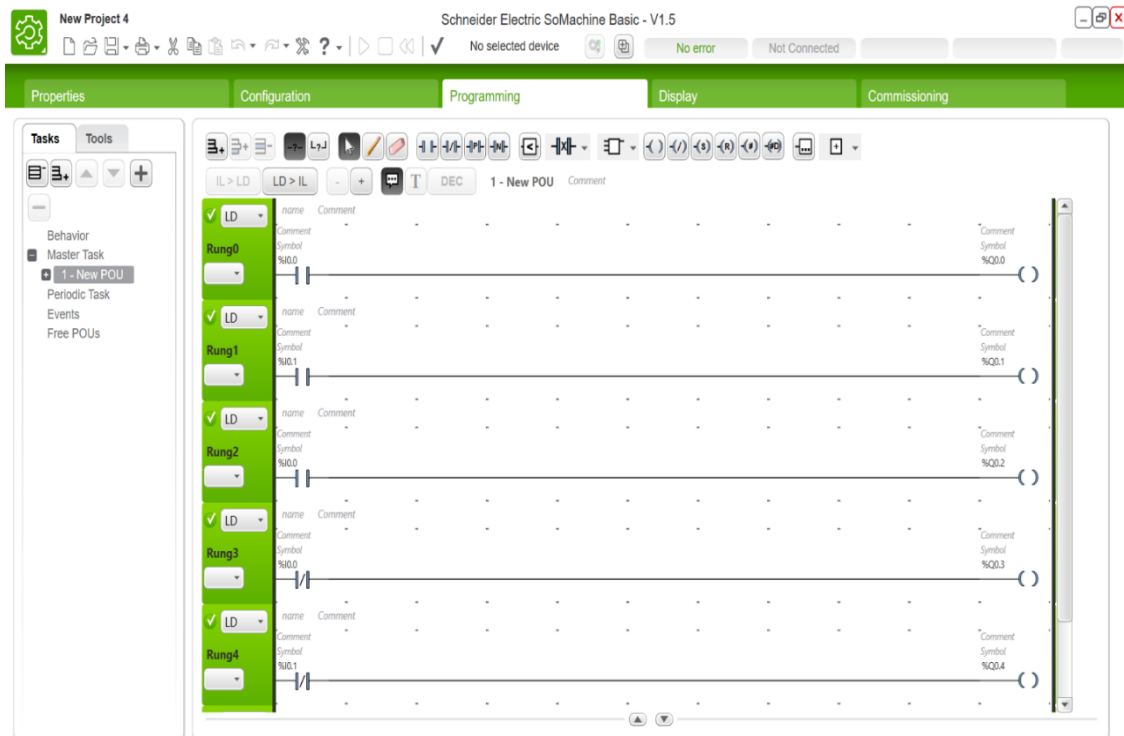

Figure 10: Simulation

3.3 BENEFITS OF PLC:

- High speed data Transfer.
- It saves Installation cost by less space.
- Increased Reliability, flexibility and accuracy.
- Easier to Troubleshoot.
- Handles much more complicated systems.
- Communication Capability.
- Remote control capability.

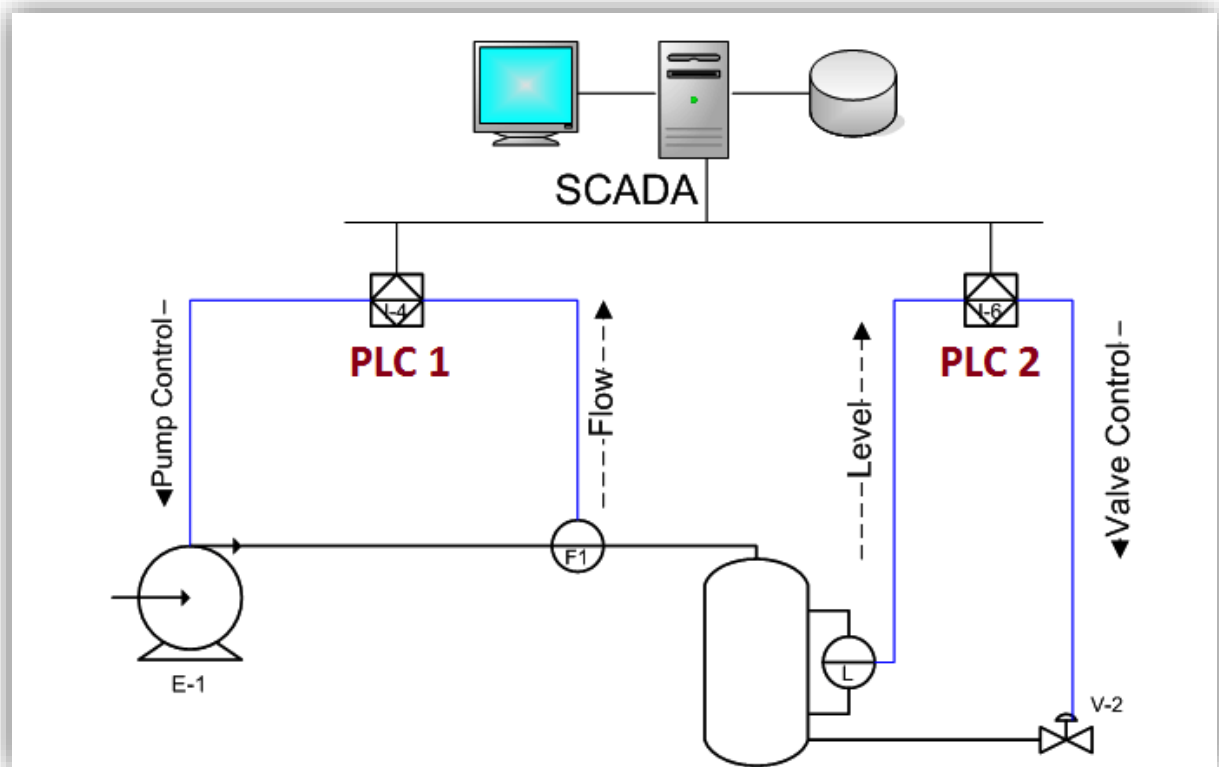## 4. SCADA (Supervisory Control and data Acquisition)

Figure 11: SCADA System

SCADA stands for "Supervisory Control and Data Acquisition".

SCADA is a type of process control system architecture that uses computers, networked data communications and graphical Human Machine Interfaces (HMIs) to enable a high-level process supervisory management and control.

SCADA systems communicate with other devices such as Programmable Logic Controllers (PLCs) and PID Controllers to interact with industrial process plant and equipment.
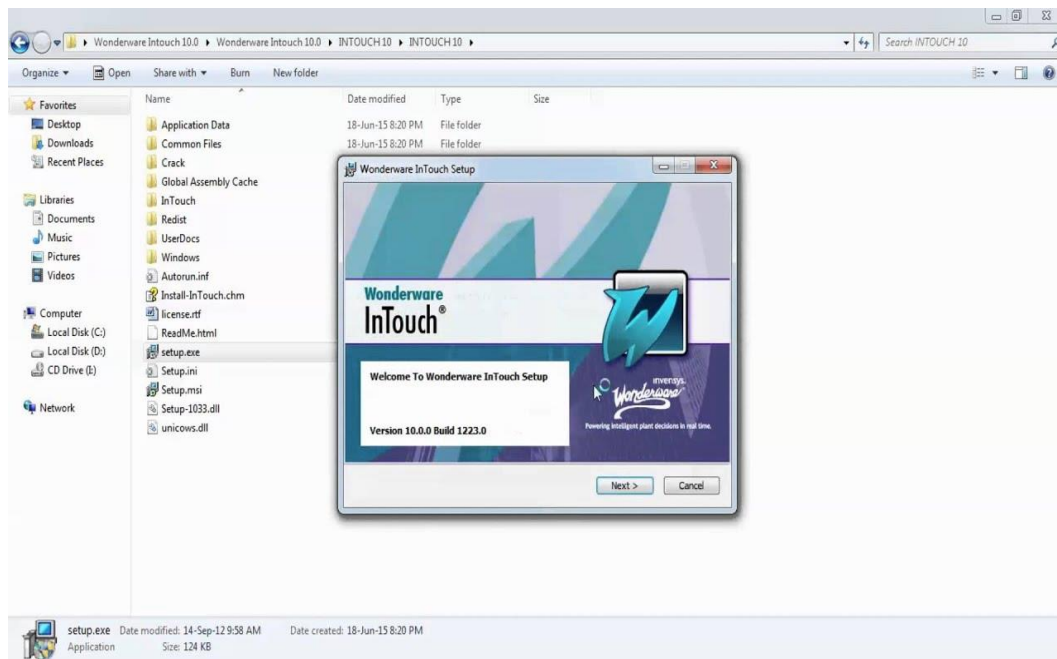
INTOUCH SOFTWARE

Figure 12: INTOUCH Window

Wonderware InTouch provides a single integrated view of all your controls and information resources.

Intouch enables engineers, supervisors, operators and managers to view and interact with the working of entire operation through graphical representations of their production processes.

The InTouch Scada software consists of two parts:

➢ Development

➢ Execution

4.1 FUNCTIONS OF SCADA:

The important functions of an SCADA are listed below.

1. Data Acquisition
2. Information Display
3. Supervisory Control
4. Alarm Processing
5. Information Storage and Reports
6. Sequence of Event Acquisition
7. Data Calculation
8. Special RTU Processing/Control
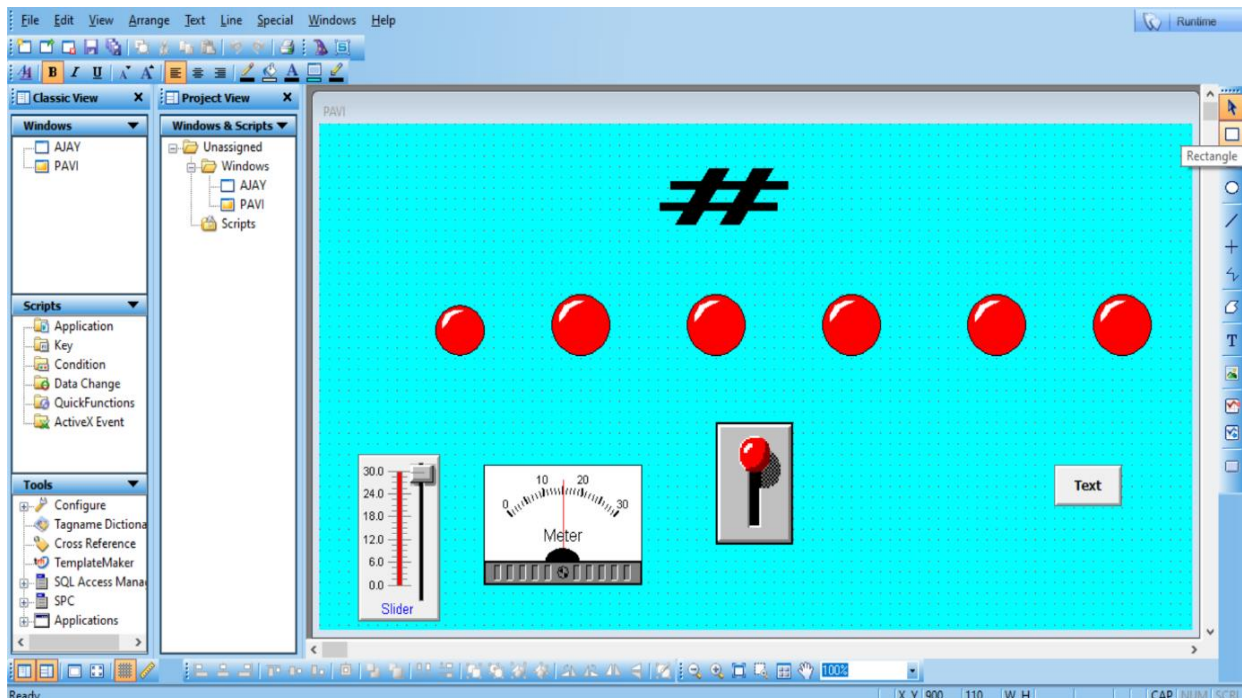
MINI SIMLUATION USING INTOUCH

Figure 13: simulation

4.2 BENEFITS OF SCADA

➢ The computer can record and store a very large amount of data.

➢ Data can be displayed at any time when user require.

➢ The SCADA system provides on board mechanical and graphical information.

➢ The SCADA system ability to operate critical situations.

➢ It provides alarm.

5. DIFFERENCE BETWEEN PLC AND SCADA

PLC	SCADA
PLC Stands for Programmable logic Controller.	SCADA stands for Supervisory Control and data acquisition.
PLC is hardware, a controller, device which can be programmed.	SCADA is a monitoring software used to monitor and control the PLC.
Input & Output are represented in normal open, normally closed and coil contacts.	Input and Output are represented in image.

6. CONCLUSION:

This report has been discussed about the role of industrial automation using PLC and SCADA.