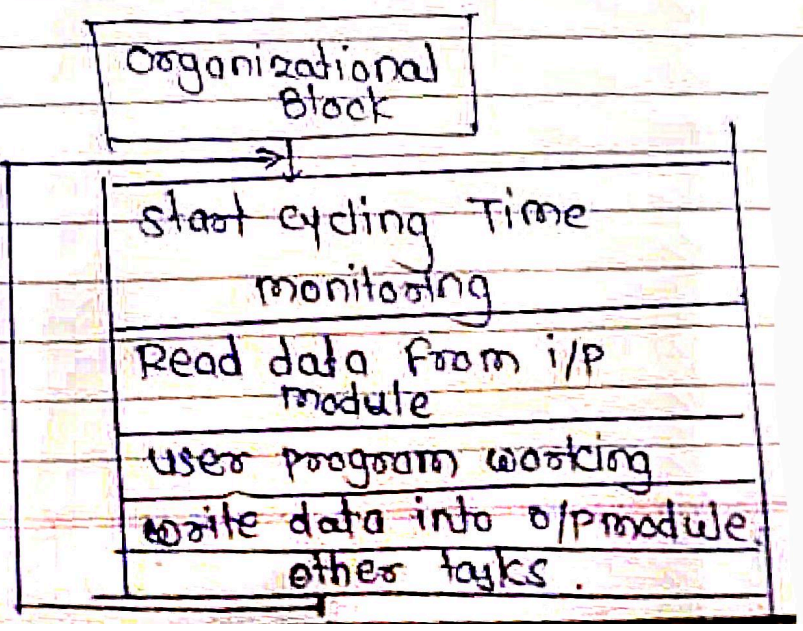
3.8 Draw & explain the programmable logic controller program scan.

→ 1) PLC is a digital computer control system adapted to control the robotic devices and other manufacturing processes.
2) It involves a basic study of Microcontrollers, digital circuits & designing skills.
3) It provides easy, flexible, high-reliability programmable controllers suitable for simple & harsh enviornments.
4) It monitors the state of ~~en~~ input devices, takes decisions & control the output devices.
5) The applications include Robotics, water filling tanks etc.
6) PLC ranges from small devices with few Input / outputs to large devices with thousand of input / outputs.
7) The working of a programmable logic controller can be easily understood as a cyclic scanning method know as the scan cycle

* Block diagram



A PLC Scan Process includes the following steps :-

i) The operating system starts cycling & monitoring of time.

ii) The CPU starts reading the data from the i/p module & checks the status of all the i/p.

iii) The CPU starts executing the user or application program written in relay-ladder logic or any other PLC-programming language.

iv) Next, the CPU performs all the internal diagnosis and communication tasks.

v) According to the program results, it writes the data into the o/p module so that all outputs are updated.

vi) This process continues as long as the PLC is in run mode.

e.g. List any four logical and arithmetic instructions in PLC.

→ ① List of Arithmetic instructions :-

1) Addition : ADD
2) Substraction : SUB
3) Multiplication : MUL
4) Division : DIV
5) Return fraction : MOD
6) Absolute : ABS

1) Addition : ADD

ADD	
IN0	OUT
IN1	

Adds the two values, IN0 with IN1 and stores the resulting value in the OUT.

2) Substraction : SUB

SUB	
IN0	OUT
IN1	

substracts the value of IN1 from IN0 and stores the resulting value in the OUT.

3) Multiplication : MUL

MUL	
IN0	OUT
IN1	

Multiplies the two values, IN0 with IN1 and stores the resultin value in the OUT.

4> Division : DIV

DIV	
IN0	OUT
IN1	

Divides the value of IN1 from IN0 & stores the resulting value in the OUT.

The input and output values must be integer or floating point value in ADD, SUB, MUL and DIV instructions.

(13) List of logical instructions :-

Q.1) "Mechatronics is a synergy of several engineering disciplines" - explain with example.

→

1) Mechatronics is a synergistic combination of precision engineering, electronic control and mechanic systems.

2) It is the science, that exist at the interface among the other five disciplines:
- mechanics
- electronics
- informatics
- automation
- robotics.

3) It is one of the most dynamically developing fields of technology & science. The word

mechatronics = mechanics + electronics + computing

4) Look at any systems which are around us, may be from a washing machine at home to industrial CNC machines. There are no more systems that are engineered with a single discipline knowledge & skills.

5) Fundamentally everything around us is computer controlled through a complex integration of mechanical, electrical & electronic sub-systems.

6) Mechatronics provides an opportunity not only humanization of machines, but also it changes the mindset & the approach to technological issues

7) & most importantly teaching new technologies & ways of acquiring knowledge & skills.