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INDUSTRIAL AUTOMATION WITH PLC

RULES OF LADDER LOGIC PROGRAMMING

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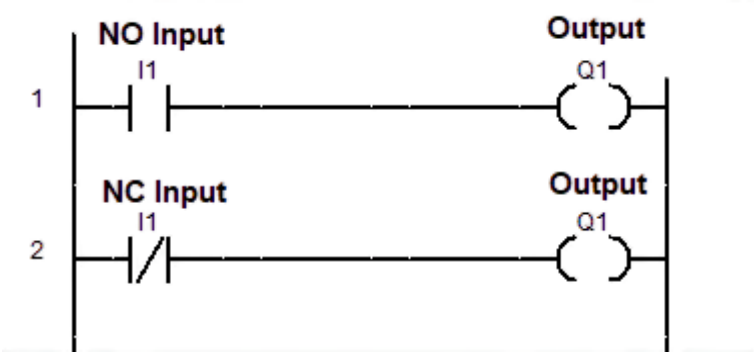
If you want to excel in Programmable Logic Controller (PLC) programming, then you should know about the rules used in PLC programming.

The different rules are applicable to the different types of PLC programming languages. Especially, I am explaining these rules for the PLC Ladder Diagram programming language with the representation of a ladder language program in PLC.

These rules will helpful for writing the PLC programs.

Rules for PLC Ladder Diagram Programming:

Let's start and follow these PLC programming rules on the base of digital inputs and outputs contact.

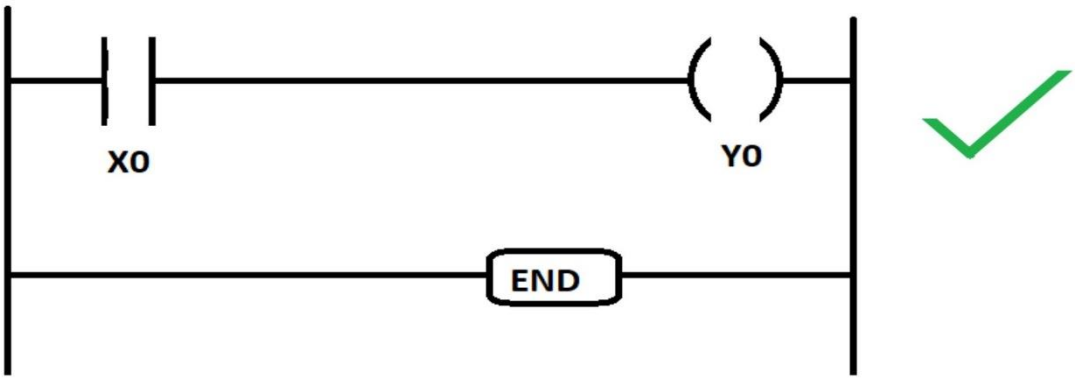


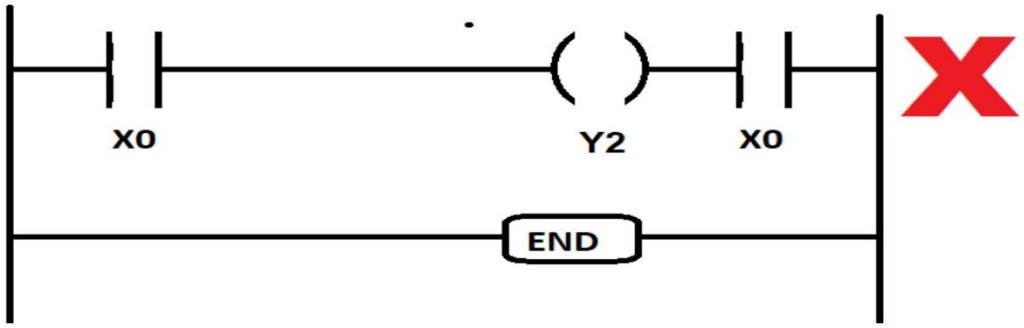
Here, you can see the LD program with input (NO and NC) and output contact.

As per your program, you can arrange programming I/O instructions with the help of different programming rules.

1. Do not connect the input after the output
2. We may connect inputs either in series or in parallel. But we should connect the output coils in parallel only not in series
3. We can repeat the input address n no. of times but not the output. I.e. we should use output address only once in the ladder logic
4. Do not merge the rungs while creating the ladder logic

1. Do not connect the input after the output

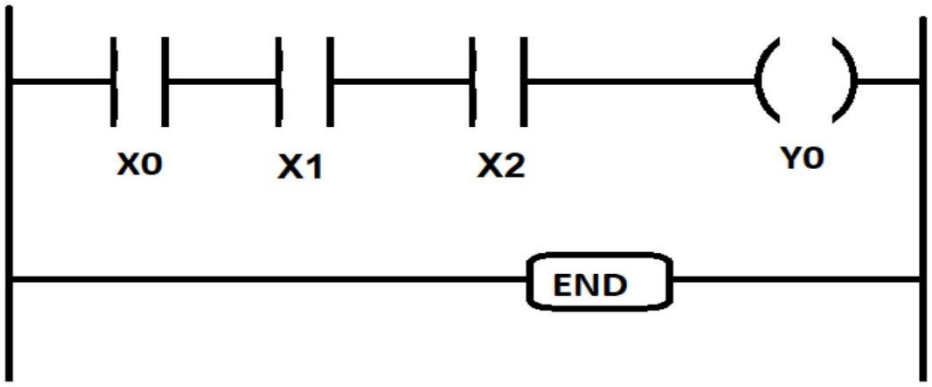


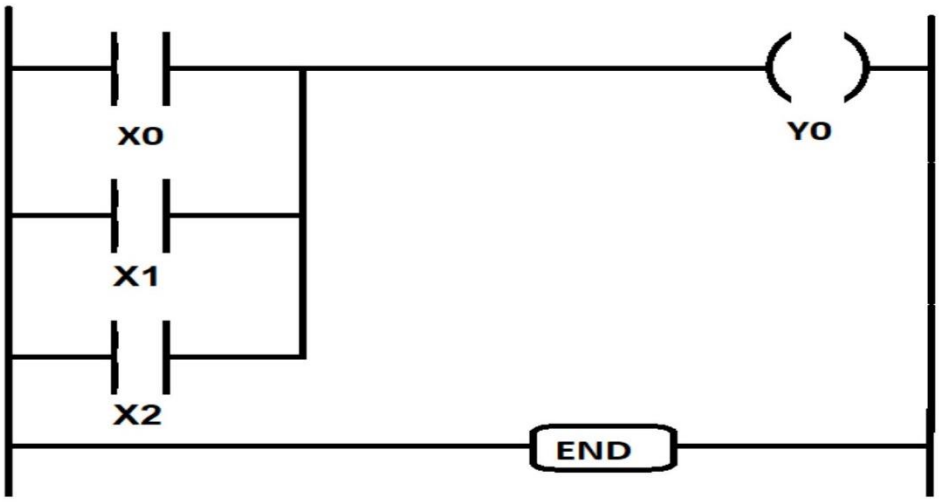


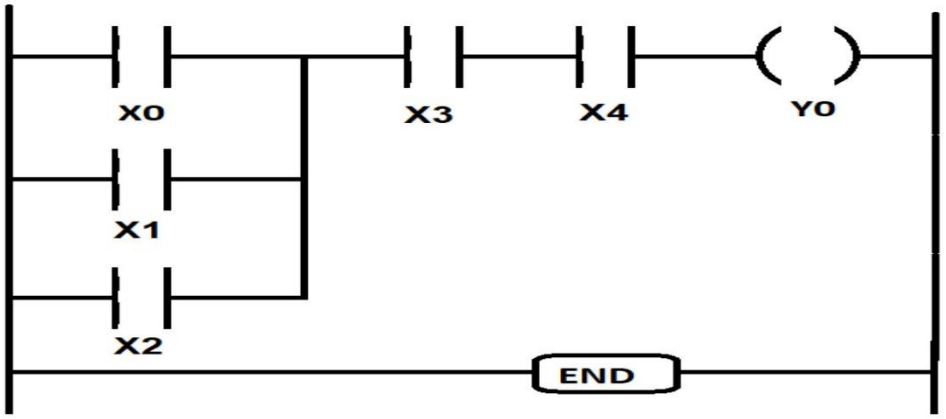
2. Inputs can be used in series as well as parallel to form a connection but outputs (or coil) can be used only in parallel

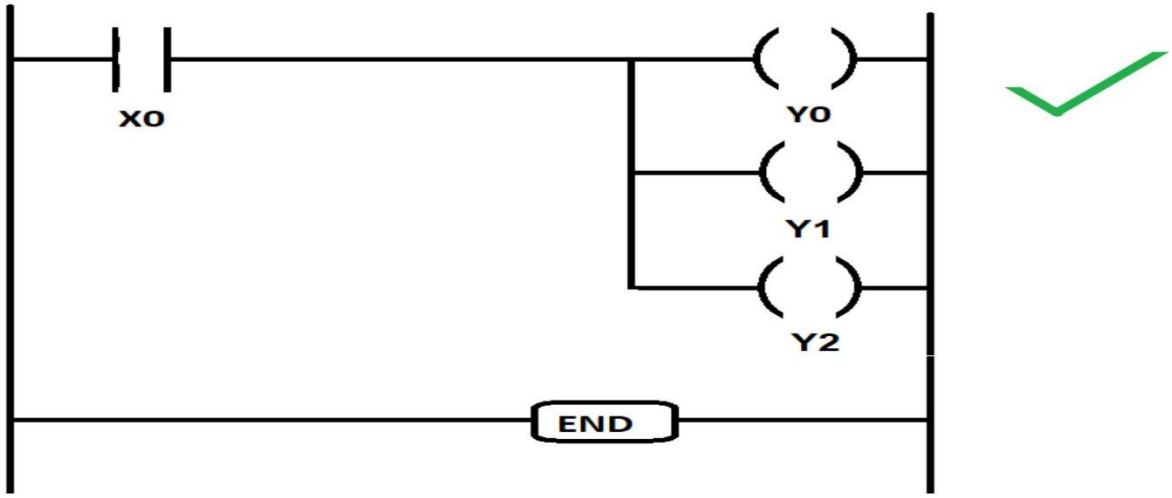
The number of inputs (X0, X1, X2 …Xn) can link with different outputs (Y0, Y1, Y2…Yn) by using series or parallel connection. So we can connect the inputs in series or parallel as per our programming requirement.

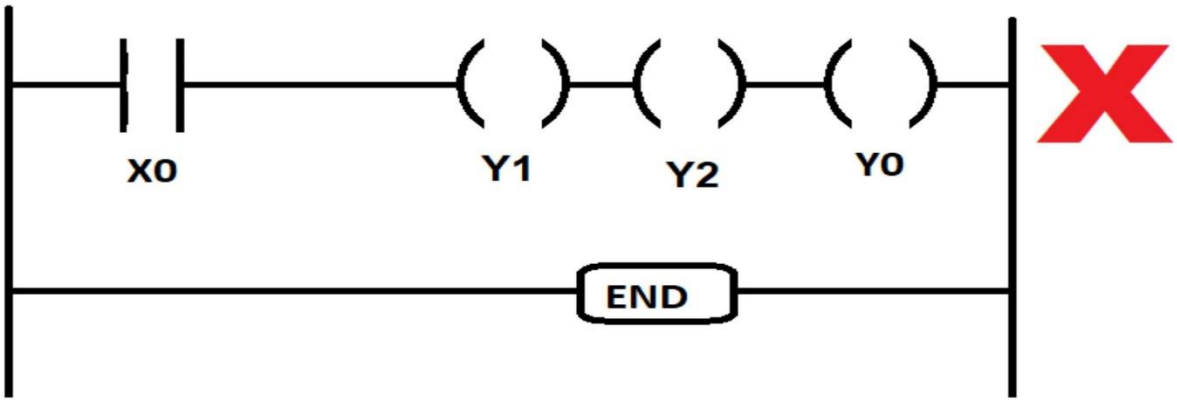
The outputs (Y0, Y1, Y2…Yn) are connected in parallel along with the single input (X0).


X0
X1
X2
Y0
END


X0
X1
X2
Y0
END

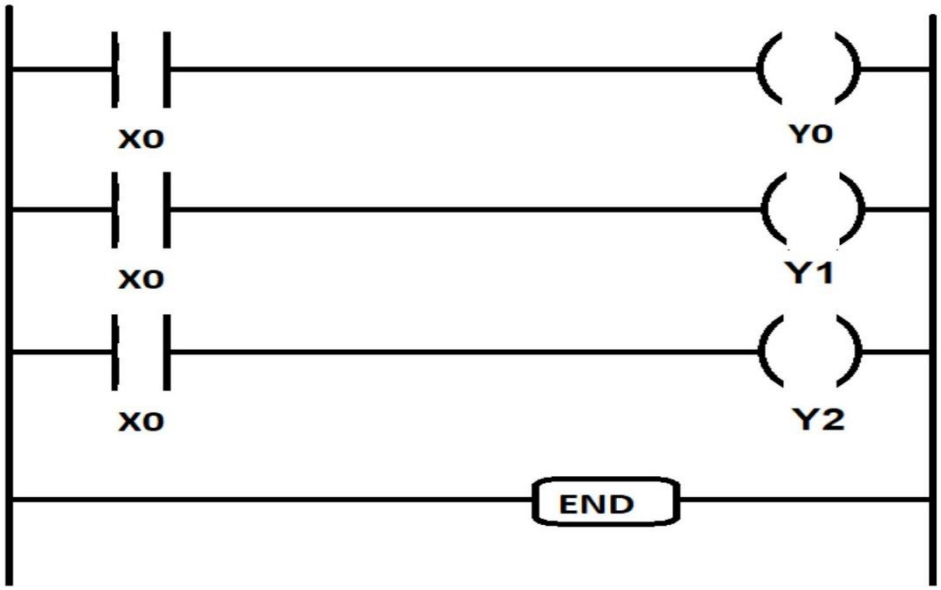

X0
X1
X2
X3
X4
Y0
END

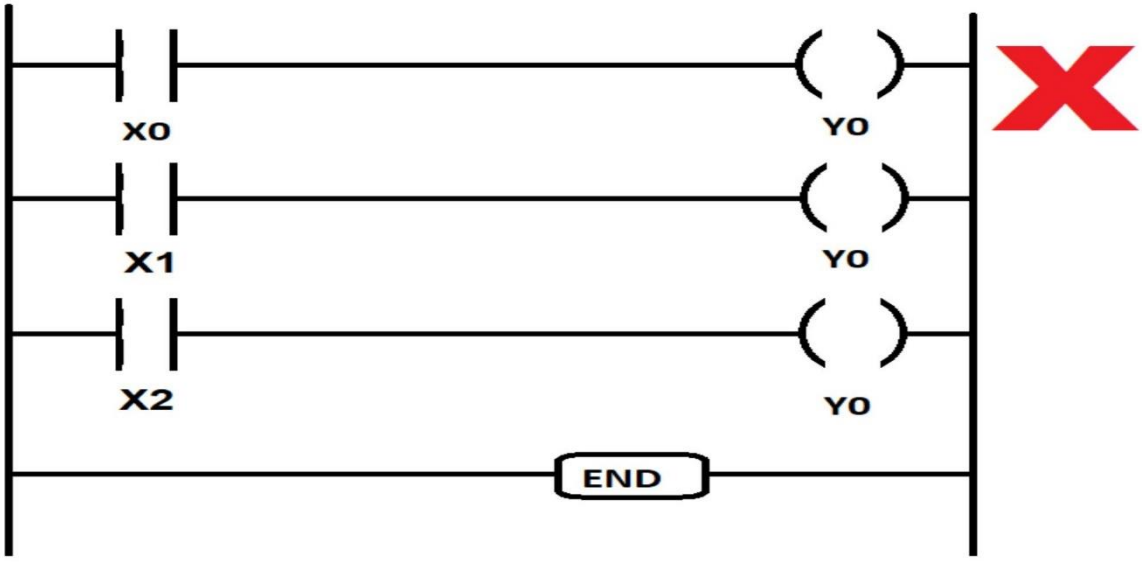




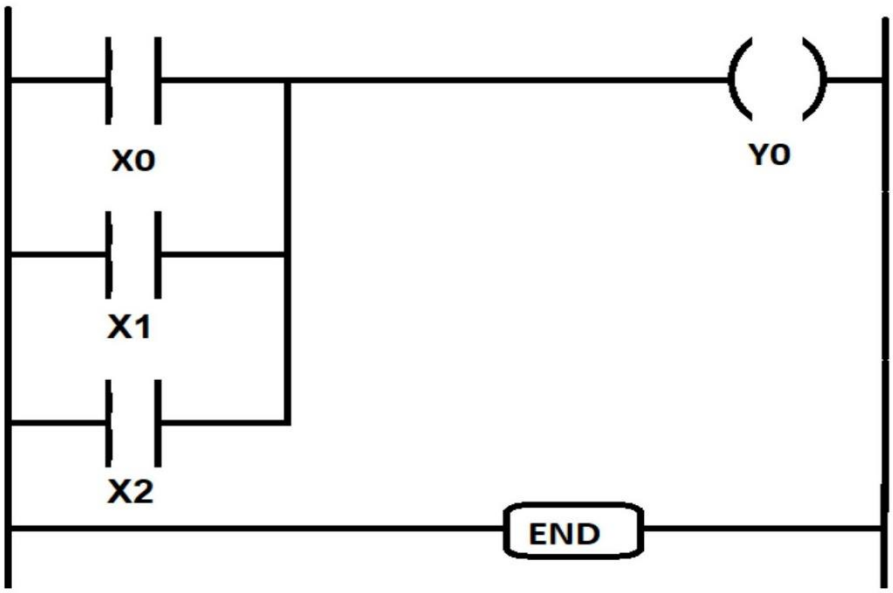
3. One input can be used multiple times in one program and one output cannot be used multiple times in one program, except in Set/Reset and Latch/ Unlatch functions

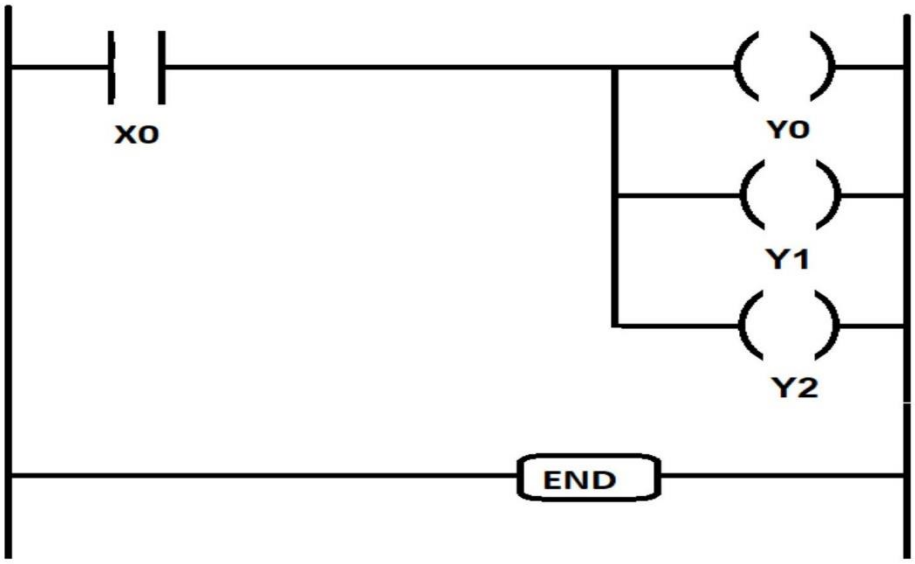
As per the third rule, a single input can be used repeatedly in the different rungs but the output cannot be used multiple times. Only in the function set/reset, the same output address is used. And it can be connected to the same or different inputs.

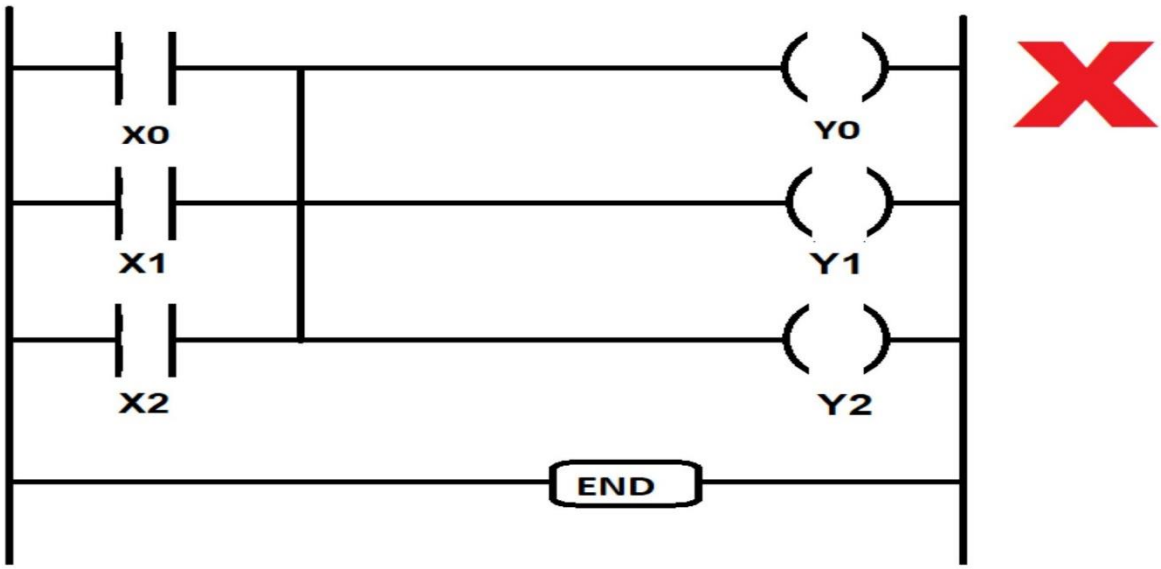

X0
Y0
X0
Y1
X0
Y2
END


X0
Y0
X1
Y0
X2
Y0
END

4. Do not merge the rungs







Along with these 4 rules, we have another rule. That is

5. Input address cannot be used as an output address but output address can be used as input address

The last rule is for the cycling process (i.e. process continuous from start to end).

The same input address can be used as multiple inputs. And it cannot be used as output. The output coil works as the input coil with the use of the latch/unlatch function.

You must and should follow these rules while creating the ladder logic. So, you can write the PLC program in different ways by using multiple PLC programming instructions.

That's it all. Surely, you will find these rules for PLC ladder diagram programing useful when you start actually working on PLC programming.