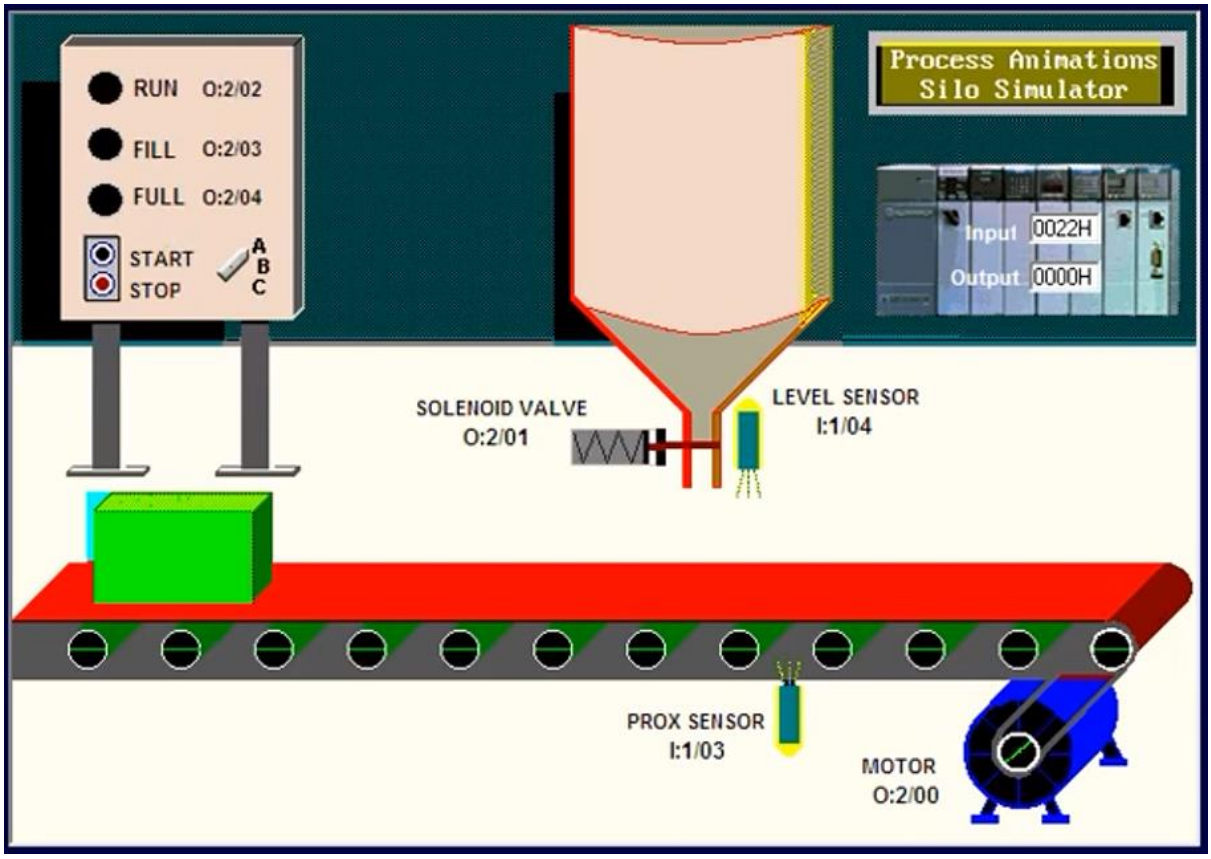
Silo Simulator



I/O Specifications

Inputs

Name	Address	Type	Description
Button_START	I:1/0	Monostable NO	This button when pressed start the conveyor
Button_STOP	I:1/1	Monostable NC	This button when pressed stops the conveyor
Prox_Sensor_ON	I:1/3	Sensor NC	This sensor marks if the box is in position
Level_Sensor	I:1/4	Sensor NC	This sensor when open marks a box being full

Outputs

Name	Address	Type	Description
Motor_ON	O:2/0	Motor Control Forward	This motor moves the belt forward
Valve_Open	O:2/1	Solenoid NC	This valve closes and open
Run_LED_ON	O:2/2	Signal Lamp 24V	This is a lamp that works when the conveyor is working
Fill_LED_ON	O:2/3	Signal Lamp 24V	This is a lamp that indicates when the box is being filled
Full_LED_ON	O:2/4	Signal Lamp 24V	This is a lamp that indicates the box being full

Process description

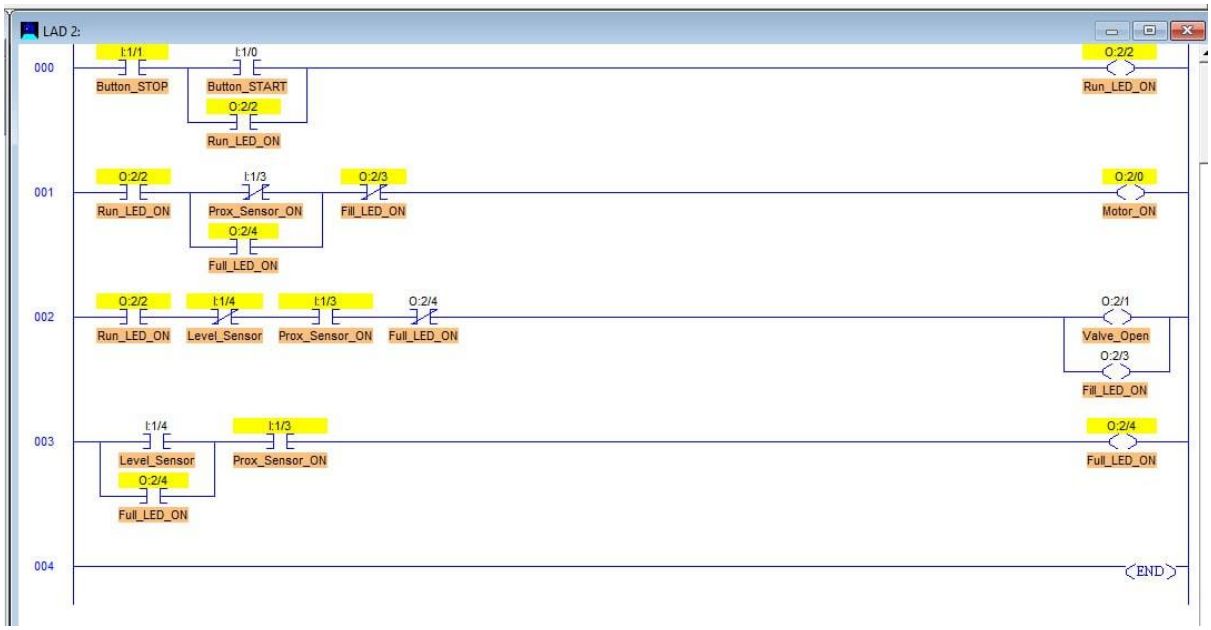
The conveyor belt in this case will meet the following criteria:

- The buttons START and STOP are used to respectively stop and start the conveyor belt.
- The button STOP has an immediate interruption of the belt movement. After the interruption, the conveyor can be started again, by pressing the START button.
- The Proximity and Level sensor will regulate the movement of the box on the belt. If the Proximity sensor is on, then the box will stop in the marked place.
- The Signal lamps indicate the state of the belt (Run_LED), and the box state (Fill_LED; Full_LED).
- The Solenoid valve will open once the Proximity sensor is on and remain open while the Level sensor is not triggered.

The following critical conditions will be taken into account:

- The conveyor may never move in both directions at the same time.
- The conveyor may never be stopped and started at the same time.

Program



Safety / Security concerns

- In case that the Proximity sensor stops working, the conveyor will keep on running and the boxes will be empty all the time.
- In case of malfunction of the Level sensor, the boxes might get overfilled causing problems during production.
- Manipulation of the memory values might disrupt the work of filling system.
- Malfunction of Run_LED might disrupt the opening/closing of the solenoid valve.
- In case of Full_LED, the solenoid valve might not get closed, once the box was filled.
- In case of the STOP button malfunction, the conveyor will not be able to stop.
- In case of Motor malfunction, the conveyor will not be able to move the boxes.