**1.** PLC VM is the machine that represents the PLC. A programmable logic controller is a device that can be programmed to perform various tasks in manufacturing, hydroelectric power, chemical refineries, etc.

**2.** The Arduino is the machine that is used to connect the PLC to actual hardware. An Arduino is an open-source board with a programmable microcontroller on it. The board makes the microcontroller easy to program and connect to peripherals. In this situation we are not actually programming the Arduino, but we are using The PLC VM to drive the Arduino to control hardware.

**3.** The state of the switches can be observed by observing the led. PB1 is false by default. When it is pressed, the circuit is closed and current flows. PB2 is the opposite. It is true when not pressed and false when processed. The Arduino takes these values and sends them to OpenPLC. The PLC then determines the output based on the input. The led is an indicator of what state the switches are in.

**4.** In order to turn the led, you must press button 1.The button is a switch simple switch. Whenever the button is pressed, components are connected that allow current to pass through. This current passes through the Arduino which serves as an input/output module for OpenPLC. The PLC reacts to this input and then sends an output signal to the Arduino and then to the breadboard. This turns the led on. In order to turn it off, you must press button 2. This sends input to OpenPLC. OpenPLC responds by turning the led off. HMI was not used.