- Using the Ladder Logic pdf, implement your own OpenPLC Ladder Logic program.

- To exactly correspond to the Modbus register mappings with the tags in the ignition project, use the following variable table as a reference (note the register locations for your own OpenPLC project):

#	Name	Class	Type	Location	Initial Value	Documentation	Debug
0	Fill_State	Local	BOOL	%IX0.0	0		
1	Mix_State	Local	BOOL	%IX0.1	0		
2	Drain_Status	Local	BOOL	%IX0.2	0		
3	Valve_A	Local	BOOL	%QX0.0			
4	Tank_Level	Local	DINT	%MD0	10		
5	Level_Maxed	Local	BOOL	%QX0.1			
6	SR0	Local	SR				
7	Level_Minimum	Local	BOOL	%QX0.2			
8	Mixert_Time_Done	Local	BOOL	%QX0.3			
9	Mixer	Local	BOOL	%QX0.4			
10	Valve_B	Local	BOOL	%QX0.5			
11	SR1	Local	SR				
12	Fill_State_Set_Reset	Local	SR				
13	Fill_State_Trigger	Local	BOOL	%QX0.6			
14	SR2	Local	SR				
15	TON0	Local	TON				
16	SR3	Local	SR				
17	TON1	Local	TON				
18	Tank_Level_Timer_Done	Local	BOOL	%QX0.7			
19	Level_raiser	Local	BOOL	%QX1.0			
20	level_faller	Local	BOOL	%QX1.1			
21	E_Stop	Local	BOOL	%IX0.3	0		
22	Start	Local	BOOL	%IX0.4	1		
23	System_Run	Local	BOOL	%QX1.2			
24	Stop	Local	BOOL	%IX0.5	0		

- Start up the OpenPLC Runtime server
    - **Note: The webpage UI end point that allows users to create their own virtual Modbus TCP slave device and monitor tags is only available for linux systems. To use it for Windows, Ubuntu will need to be installed.**

- In OpenPLC Editor, go to Devices → configuration and establish a connection to the OpenPLC Runtime server (IP address 172.29.77.60). This IP address where the virtual PLC resides.

- Enter the webpage using the base credentials (user: openplc | password: openplc).

- Create the virtual Modbus TCP slave device. Ensure it is configured as such:

Device Name

VirtualPLC

Device Type

Generic Modbus TCP Device

Slave ID

1

IP Address

172.29.77.60

IP Port

502

Discrete Inputs (%IX100.0)

Start Address: 0 **Size:** 16

Coils (%QX100.0)

Start Address: 0 **Size:** 16

Input Registers (%IW100)

Start Address: 0 **Size:** 16

Holding Registers - Read (%IW100)

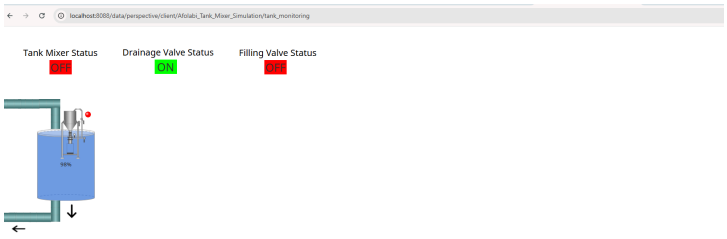
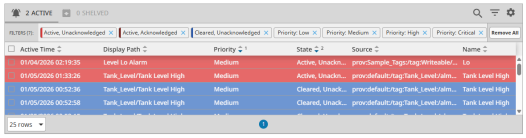
Start Address: 0 **Size:** 16

Holding Registers - Write (%QW100)

Start Address: 0 **Size:** 16

- In the Ignition gateway, navigate to OPC UA → Device Connections. There, create a Modbus TCP device named **OpenPLC_Sim.** Ensure the IP address and Port match what you put in for the virtual device in the OpenPLC Runtime.

- Pull the repo to your local machine and import the Ignition project as a zip file into your local ignition system.

- Note: To view the perspective session live in a browser, launch the perspective session and browse to: http://localhost:8088/data/perspective/client/Afolabi_Tank_Mixer_Simulation/tank_monitoring

snapshot of the launched Perspective Session: