

Laboratory Exercise 6 (Wk 7)

PLC Siemens – Hot Dog Count

Introduction

Fred and Rudy are making hot dogs at the ballpark. Fred dispenses mustard and Rudy dispenses catsup. A hot dog is not sold without each Fred and Rudy putting both mustard and catsup on the dog. As each pushes the button for their ingredient, a signal is fed to the PLC for the action. Either button may be pushed first. Design a program to count the total number of hot dogs made. Inputs should be wired to contacts and labeled as mustard and catsup. A display is kept in the PLC showing up-to-date counts of hot dogs made by Fred and Rudy.

To complete the lab, enter the program shown later in the lab into the PLC and wire the two inputs.

Watch the count accumulate in the counter as the two buttons are pressed in any order.

The documented listing of the program may be used as the final lab report.

Wire the PLC to the inputs for this lab and to inputs or outputs for other labs per the diagram on the next page.

The next page shows the layout of the PLC on the trainer and the PLC wiring schematic. To wire the two inputs, wire through the two pushbuttons selected so that 24 volts is at the terminals of I/0 and I/1 when the two buttons are pushed.

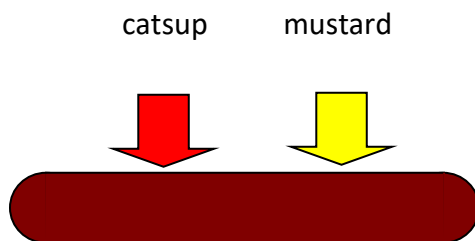


Fig. 6-1

Procedure:

Enter the following 4 rung program in Siemens TIA Portal. Download and wire the inputs.

Demonstrate a working counter to your instructor:

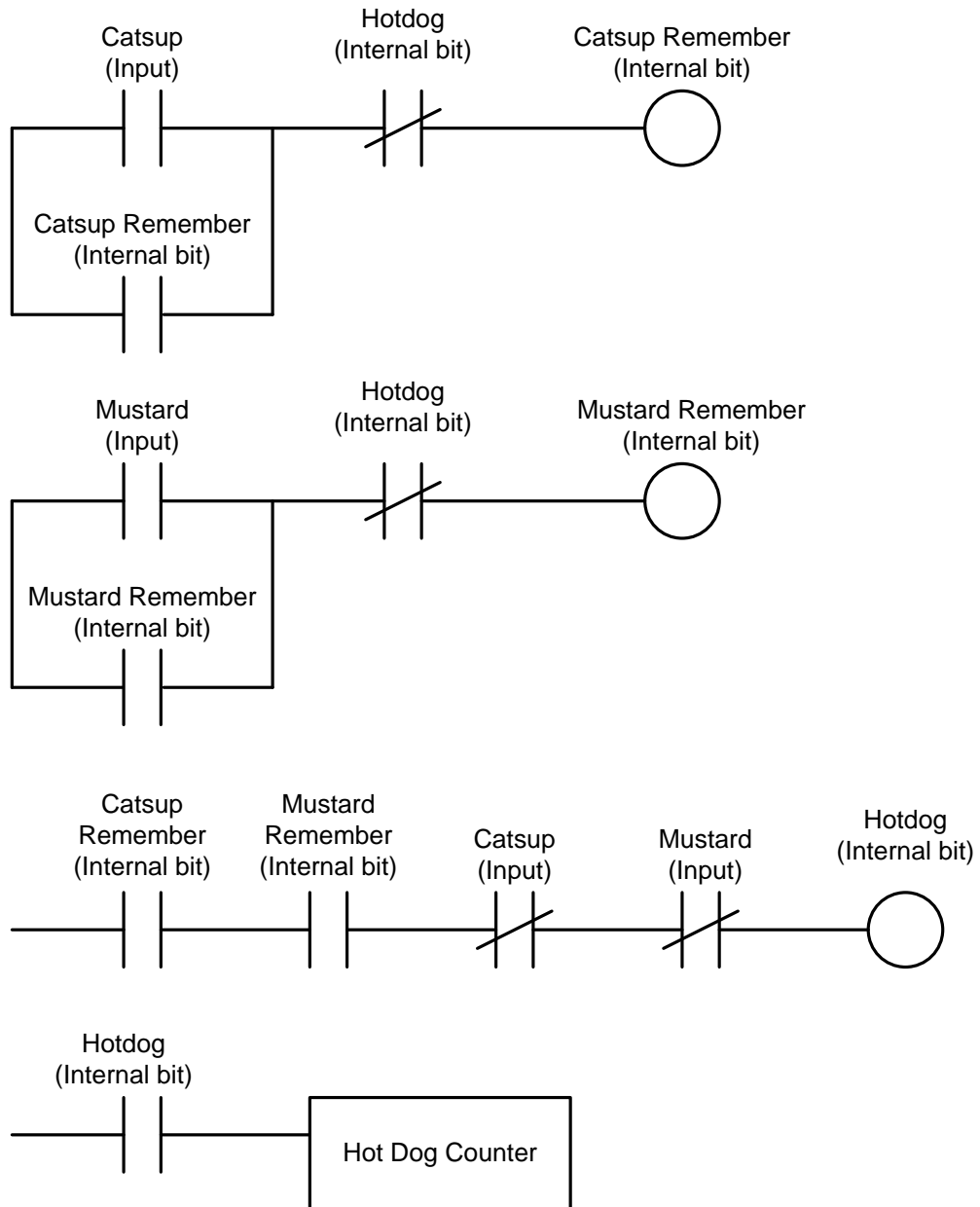


Fig. 6-2 Program to be Entered

The count of hot dogs made is found in the accumulated value of the counter.

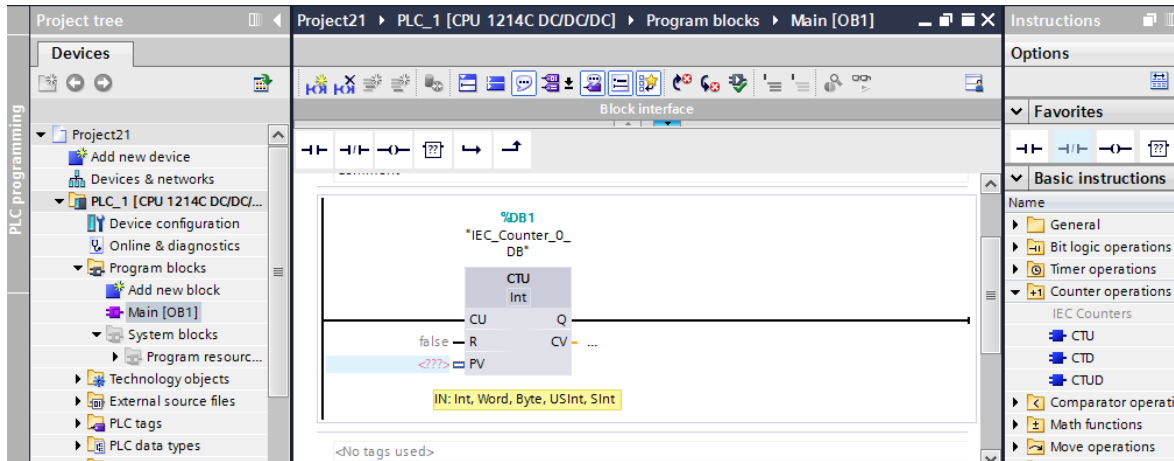


Fig. 6-3

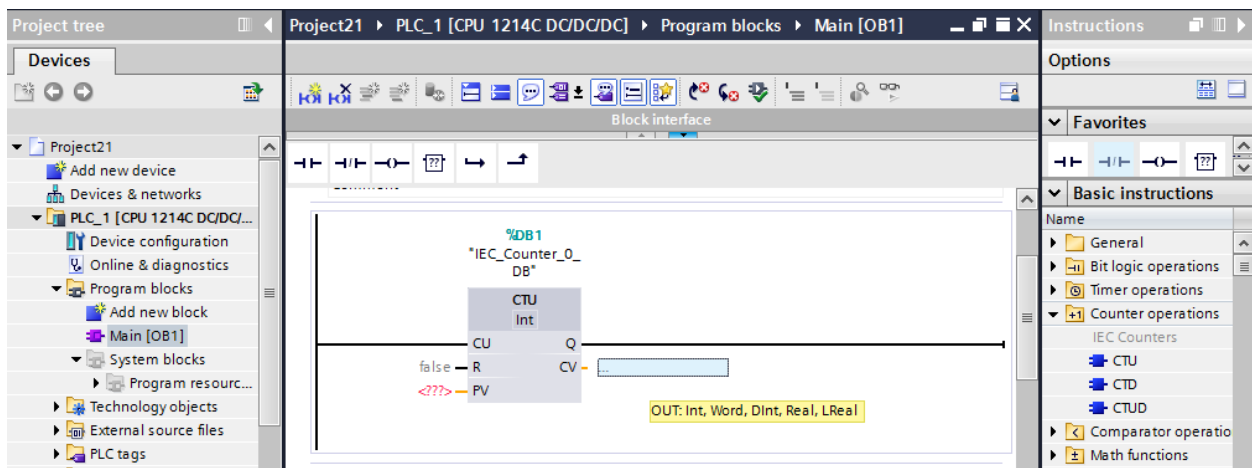


Fig. 6-4 Siemens' help with the CV Variable

In the example above, we see the type of inputs available for PV and CV. In general, PV is short for process variable and CV is short for the controlled variable. For the up-counter, PV is the count preset and CV is the active count. The PV may hold a constant as shown below:

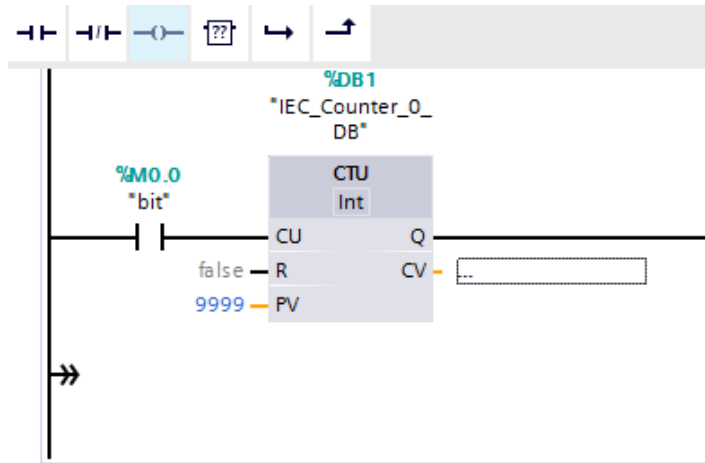
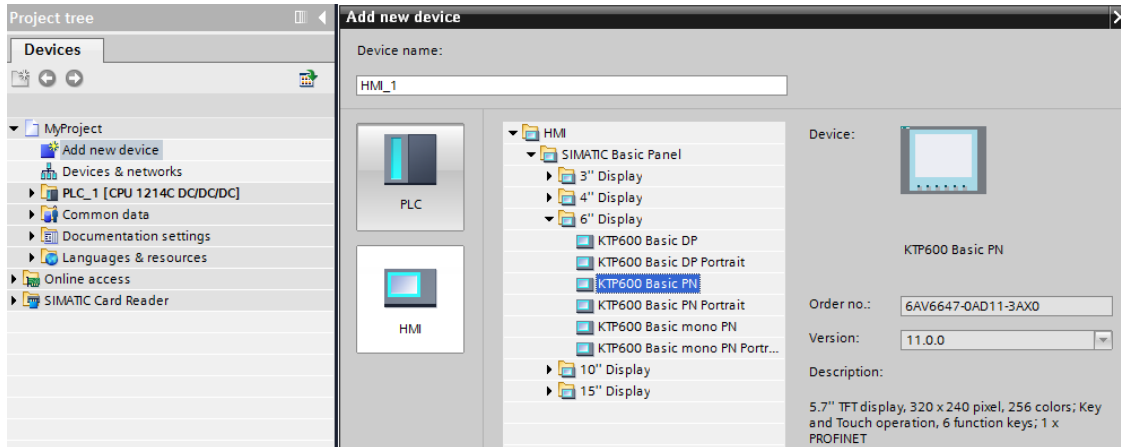


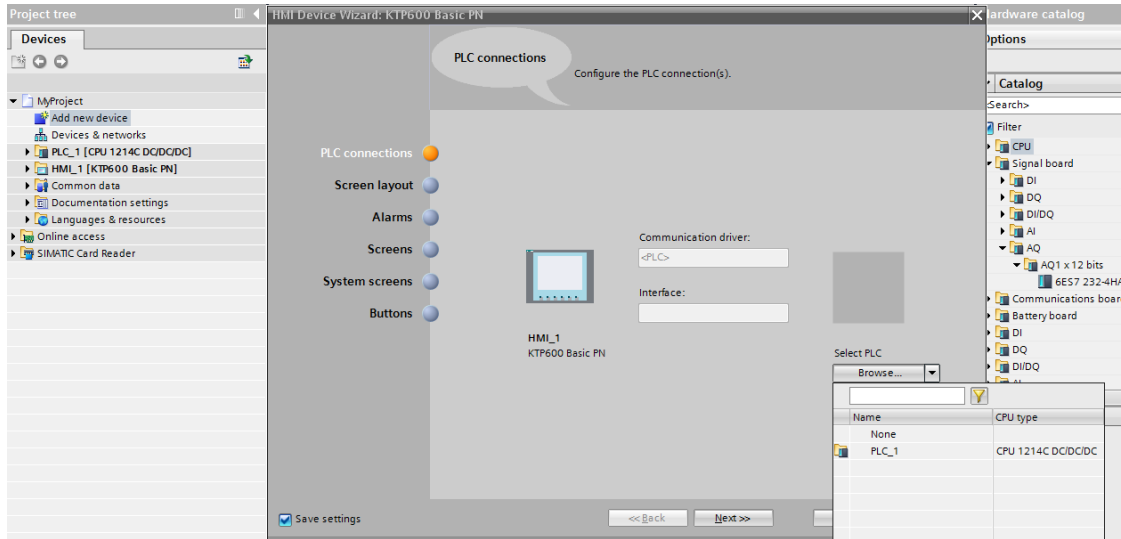
Fig. 6-5 Siemens' CTU Instruction with PV Constant (=9999)

Next, add the HMI screen and provide two buttons (one for catsup, one for mustard) and a count display. The following tutorial will help with addition of these devices. Remember, the inputs from catsup and mustard must be entered as M binary bits instead of I inputs.

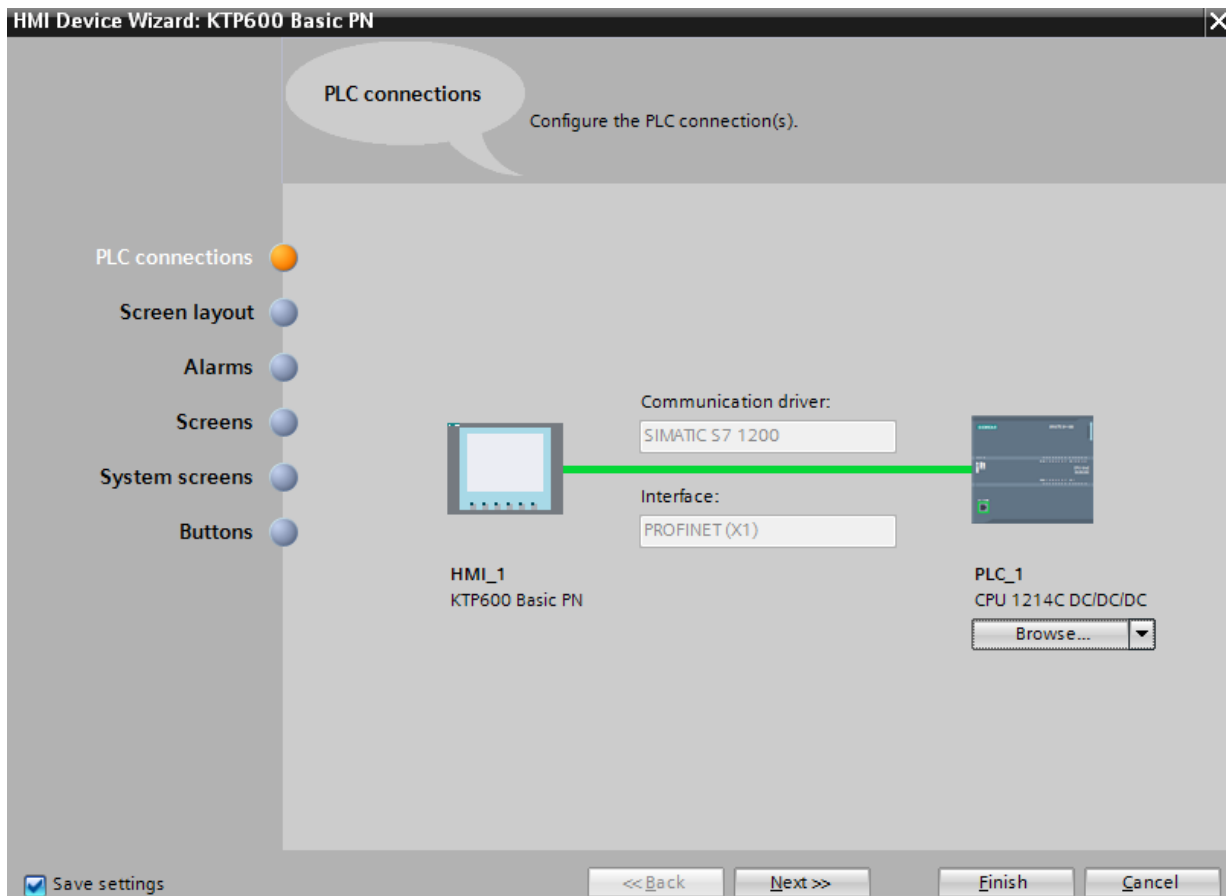
Addition of the HMI used in the labs:



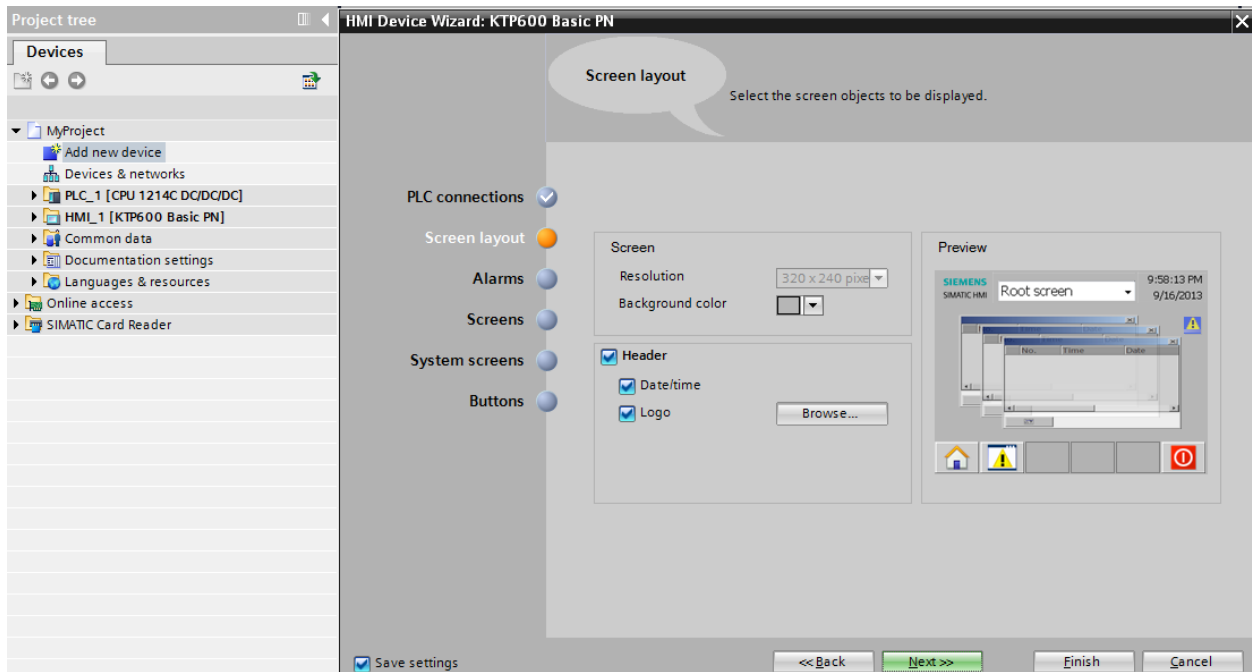
The HMI Device Wizard:



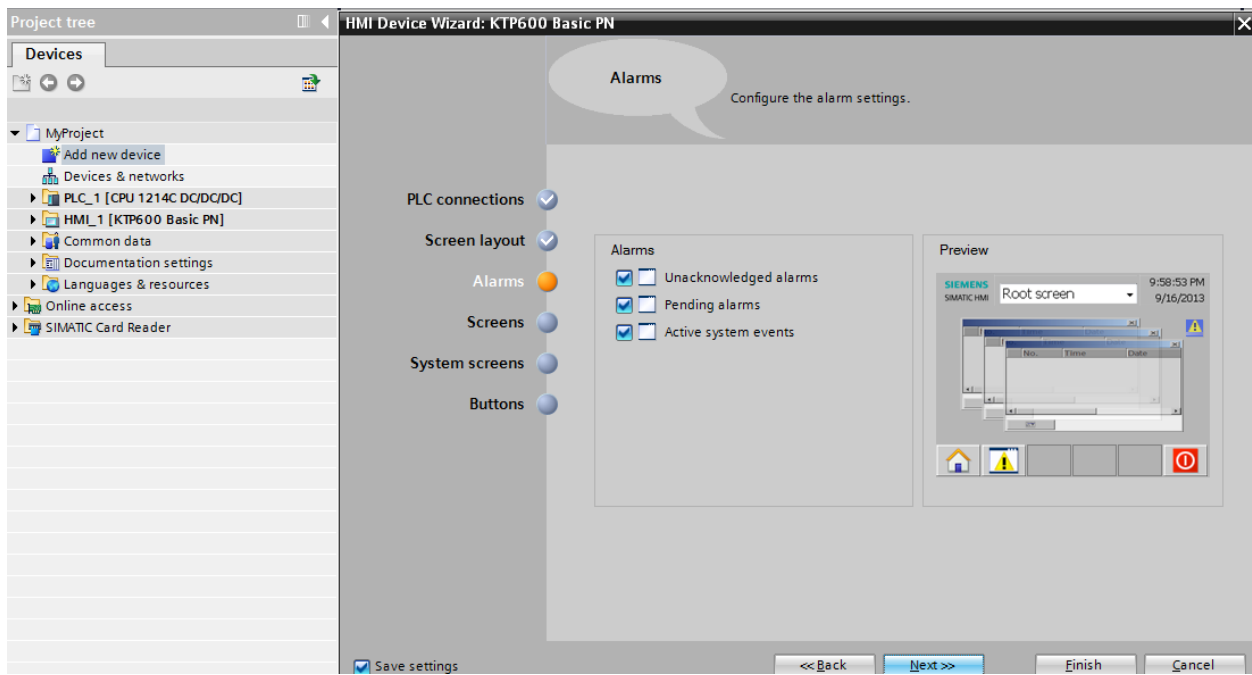
Keep answering Next>>



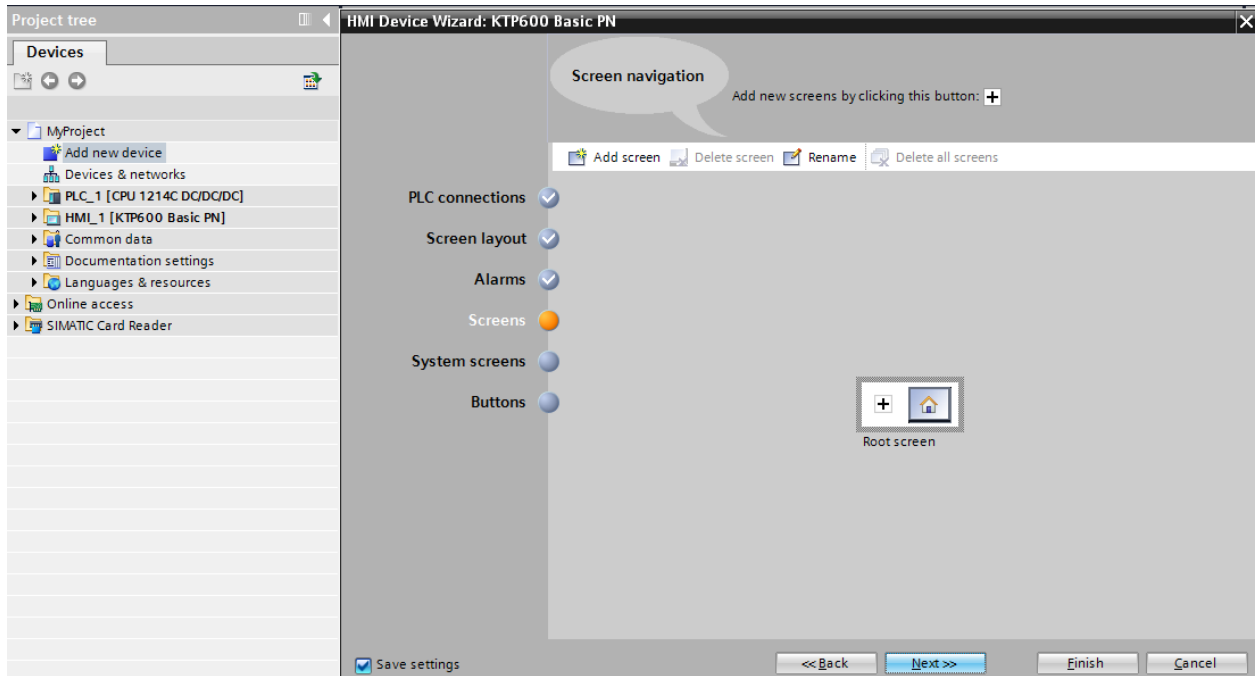
Keep answering Next>>



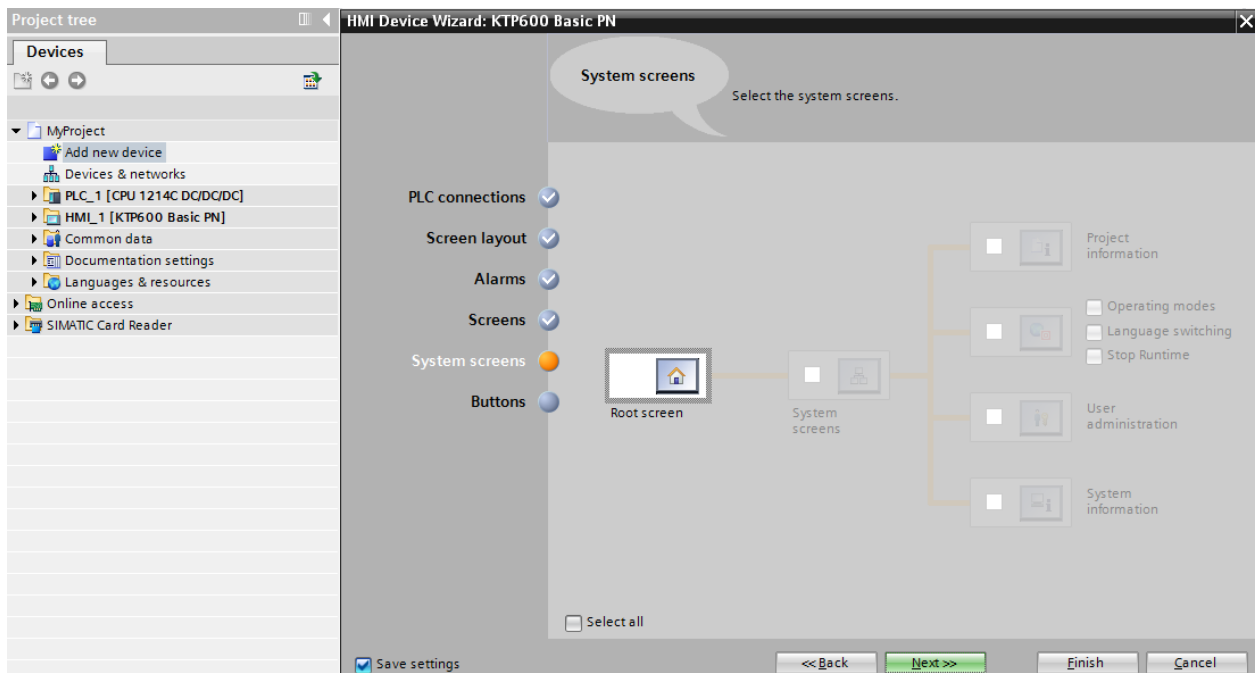
Keep answering Next>>



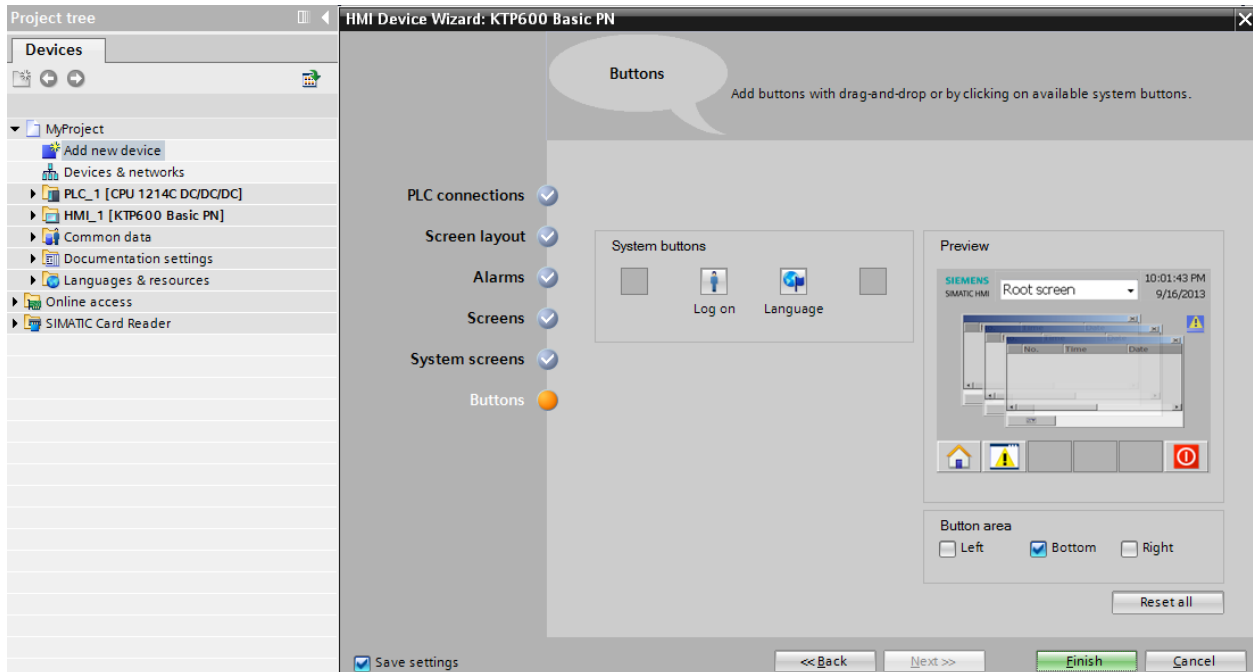
Keep answering Next>>



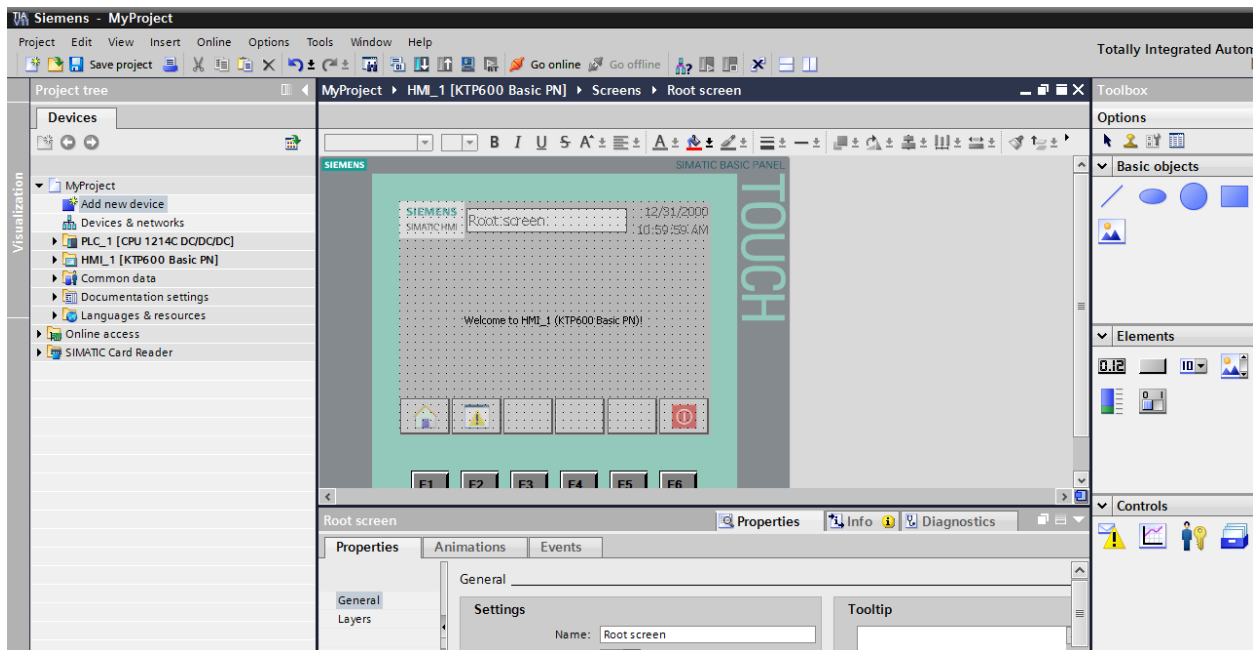
Keep answering Next>>



Keep answering Next>>



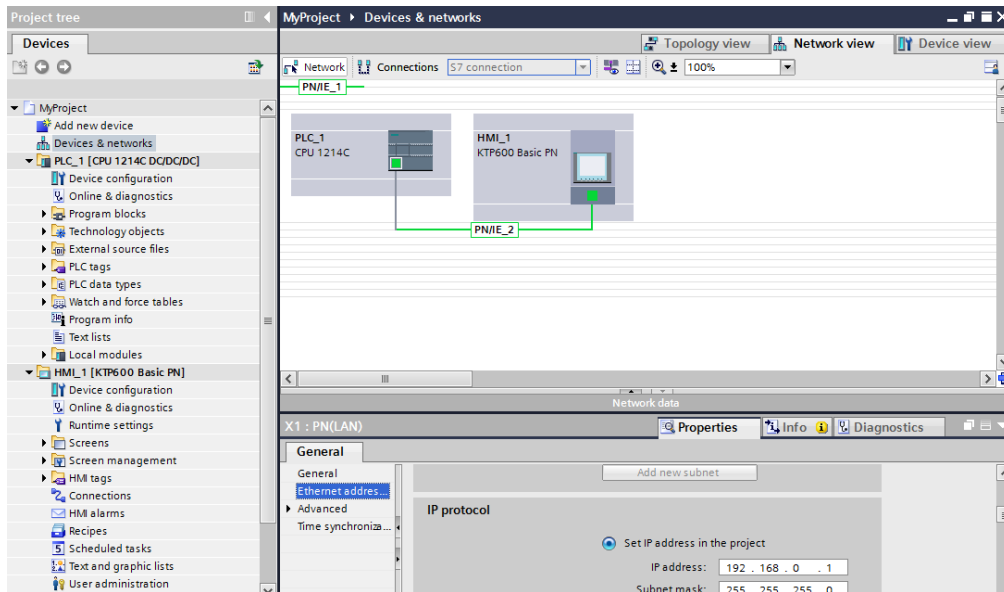
Then Finish



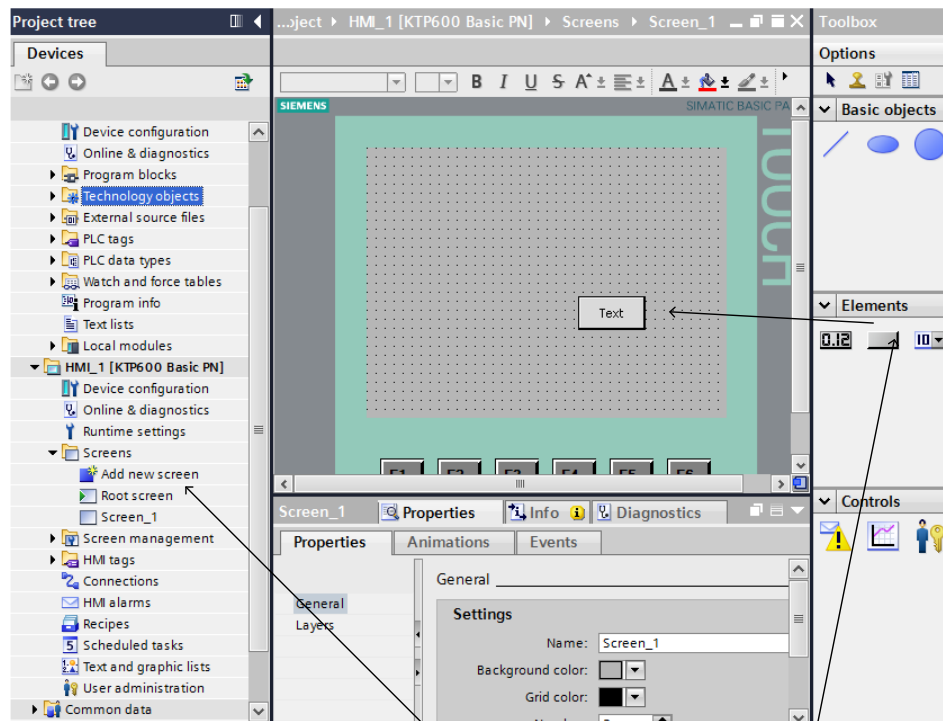
From the Devices and Networks choice in the Project Tree:

Choose Devices & networks:

Set the IP address for the HMI panel as 192.168.0.5 (leave 1-4 for PLCs and computers). Use the same subnet mask 255.255.255.0



and set up both the IP address and Subnet mask for the PLC as well as the HMI. You may need to initialize the IP address of the HMI by setting the IP address up at power-up of the device. If using the actual screen, you have about 1 second to tap on the screen when power is first applied to get to the set-up screen. Set up the IP address of the HMI to 5 (192.168.0.5, 255.255.255.0). Read at the end of Ch. 15 about setting up a simulated HMI panel on the computer screen. You have already done this in prior labs.



To add a new screen, double click on “Add new screen” in the Project Tree.
 To begin a design, select a button from the Elements Toolbox at right. Drag the button onto the screen.

Entering a Button on the Screen and configuring the button to turn on a bit in the PLC Button

The Button object allows you to configure an object that the operator can use in runtime to execute any configurable function.

Button Layout

In the Inspector window, you customize the position, geometry, style, color and font types of the object. You can adapt the following properties in particular:

- Mode: Defines the graphic representation of the object.
- Text / Graphic: Defines whether the Graphic view is static or dynamic.
- Define hotkey: Defines a key, or shortcut that the operator can use to actuate the button.

You can only define a hotkey for HMI devices with keys.

Mode for Button

The button display is defined in Properties > Properties > General > Mode in the Inspector window.

Mode Description

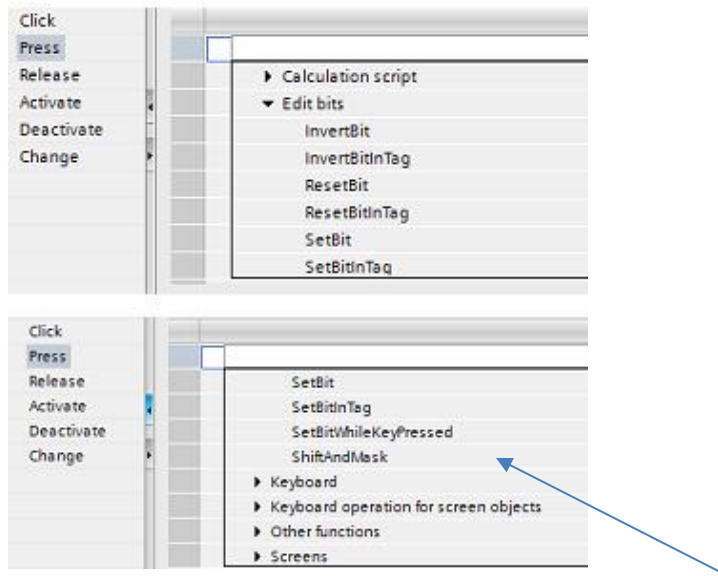
Invisible	The button is not visible in runtime.
Text	The button is displayed with text. This text explains the function of the button.
Graphic	The button is displayed with a graphic. This graphics represents the function of the button.

Depending on the device, Text /Graphic is also available.

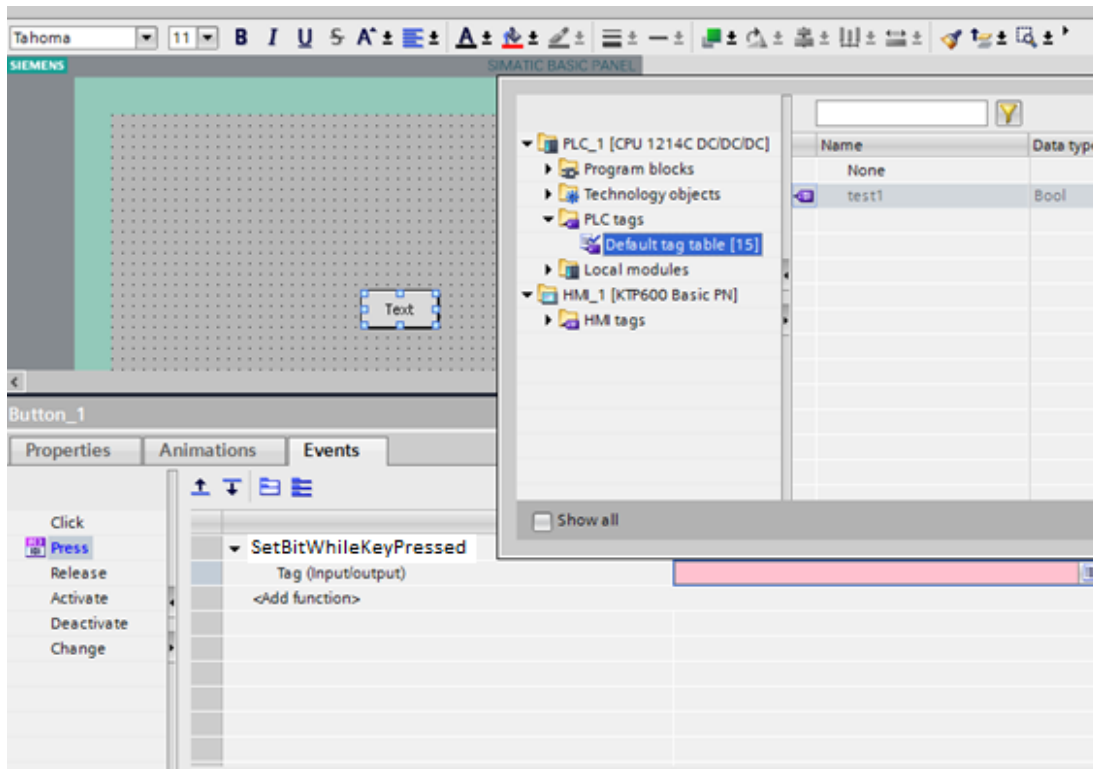
The Mode property settings are used to define whether the display is static or dynamic. The display is defined in Properties > Properties > General > Text or Graphic in the Inspector window. Your options for the type Graphic include the following.

Type	Option	Description
Graphic	Graphic	Graphic OFF is used to specify a graphic that is displayed in the button when the state is "OFF". If you enable Graphic ON, you can enter a graphic for the ON state.
	Graphics list	The graphic in the button depends on the state. The entry from the graphics list corresponding to the state is displayed.

To turn on the bit in the PLC, use Press:



Choose SetBitWhileKeyPressed:



The tag is built in the PLC for an internal bit and referenced to the SetBitWhileKeyPressed function:

There are a number of input types for data entry from the HMI. Use I/O field for displaying the count of hotdogs purchased.

Electrical Engineering Technology

Lab Report Grade Sheet

Name/Date _____

Course: EET 4450

Lab Laboratory Exercise 6 - PLC Siemens – Hot Dog Count

Grading Element	Maximum Points	Your Points
Objective	10%	
Procedure	10%	
Results	20%	
Discussion	20%	
Conclusion	30%	
Spelling/ Grammar	10%	
Total	100%	

Comments: _____

Instructor: _____

Objective, Procedure, Results:

Conclusion

Discuss the results of your lab and show how the objectives were met. If there were substantial differences or similarities between how the two controllers did a specific task, comment on your observations.