# Chapter 16    Human-Machine Interface Programming

The basic lab is copied from Chapter 7 as follows:

**Cash Register Update**

Design a simple cash register similar to one found at McDonald's or Burger King.  To do this, determine a menu of five or six items from the restaurant.  Also, include a Total button or a clear button or possibly both.  Also, include a means for backing out of a mistake without starting over from zero.  Display the cost of the total order in the PLC at an address in the data table.  Use floating point math and you are encouraged to do so.

For example:

| | | |
|---|---|---|
| **Whopper Combo** | **Whopper** | **Cancel Last** |
| **Whopper Dbl Combo** | **Fries** | **New Order** |
| **Whopper Jr Combo** | **Drink** | **Total/Tax/ Optional** |

Find the approximate prices from a McDonald's or Burger King for the items chosen.  When an item is entered, its count is incremented automatically by one.  If a button is entered multiple times, the count is incremented to display the total count.  If a mistake is made, the attendant must be able to back up at least one entry and erase the last item or decrement that item by one.

Hints to the base lab:

Notice that counters may be referenced as either Count Up or Count Down.  If the count is counting up, the count is incremented in rung 0000.  If the count is counted down, the count is decremented in rung 0001.  Individual inputs are used to increment each product choice.  However, to decrement the count, a separate button labeled "Cancel Last" is used.  This button must remember the last product chosen and decrement that item.  Use the logic in chapter 7 "Relay Instructions" to remember when a button was pushed.

Use the Count Up/Count Down logic for holding active counts for the various items in the cash

register.

## Make the following changes to the application:

1. Display the total price for the order on the screen. Use Floating Point numbers where possible. Display totals in $xx.xx format.

2. Add a second screen to allow the manager to change base prices for each item. Do not include a password to move from screen to screen.

3. Include a button to add 6.25% tax if not "To Go" for the order.

4. Include a 'live' count of the number of each item ordered.

5. Create means for going from Screen 1 to Screen 2.
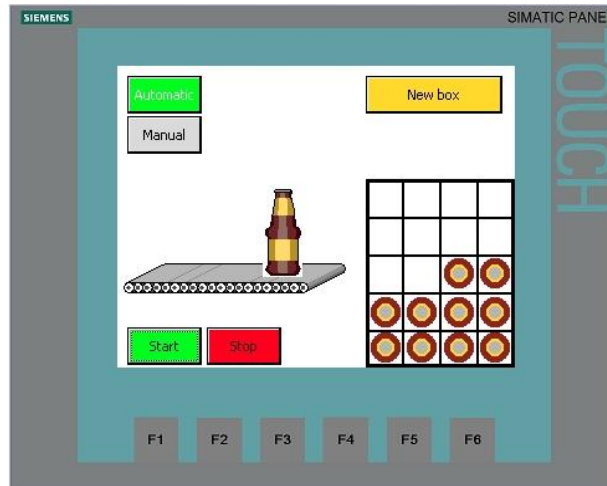
6. Screens should resemble the following:

| Whopper | 1 | |
|---------|---|--|
| Burger | 3 | Order ToGo |
| Fries | 0 | Reset |
| Onion R | 2 | Cancel Last |
| Chicken | 0 | |
| Wh Cmb | 2 | $17.31 |

Price of Whopper

Price of Burger

Price of Fries

Price of Onion Rings

Price of Chicken

Price of Whop Cmbo

**Conveyor with Moving Bottle and Case**

Build the Conveyor application as described in the hybrid text for Siemens. Then build the same application for A-B. Compare the two. You will need to write PLC logic to move the elements and increment counts. You do not need to copy the programs included but should write your own plc program.

Animate the following screen using a PLC program and HMI objects: