Introduction to Programmable Logic Controllers Ex5_sfc

DTU 31343

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IL XOR

An XOR gate was implemented in IL by using the following program (see Figure 1).

Figure 1: IL program for an XOR gate.

Logic Expressions in ST

The truth table was implemented in ST based on the pattern noticed from Ex4_logics summarised:

- The red light must illuminate when switch 3 is activated with any or both of the other switches activated, or when all 3 switches are deactivated,

- The yellow light must stay off when there is no switch activated or when switch 1 and 3 are activated,

- The green light must stay off when all switches are activated, only switch 2 is activated, switch 2 and 3 are activated, or when switch 1 is activated.

The implementation of this was then down to expressing these characteristics in ST as seen in Figure 2.
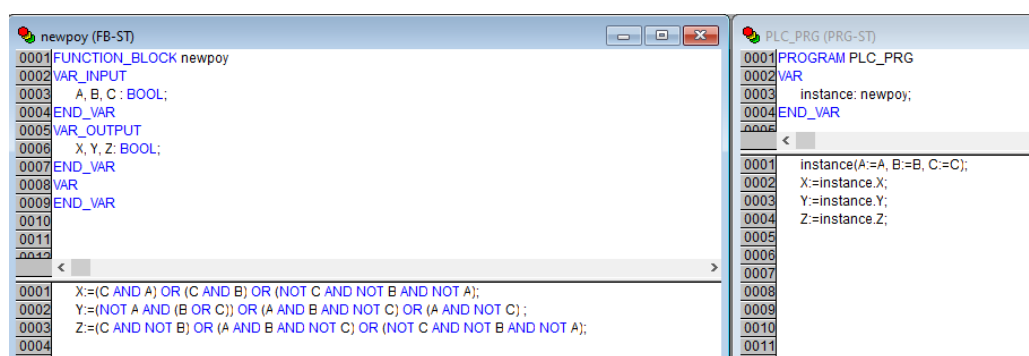

Figure 2: ST program for the given truth table.

Water Tank Sequence

For the water tank sequence, the first state initiated with the start button press, which opened v1 (red light) until LH was activated. LH then deactivated v1, while initialising the second state, where v2 was opened. v2 then remained opened (yellow light) until LL was activated, ending the sequence. To
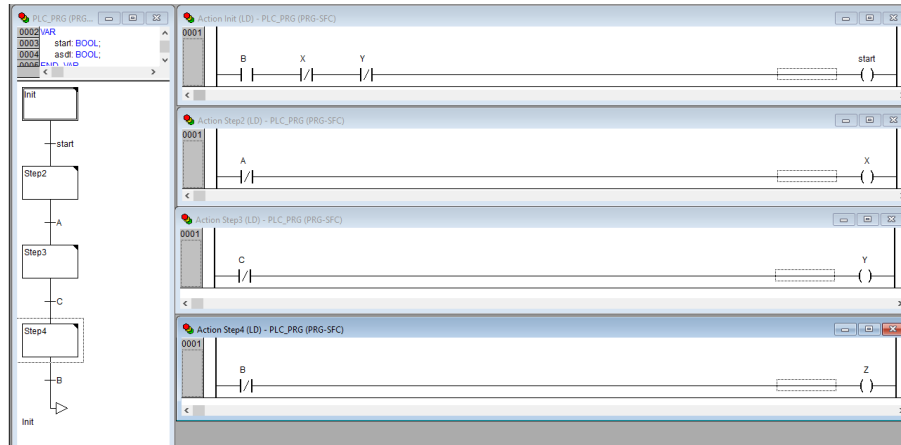
Figure 3: Water tank sequence based on switches as LH and LL.

make the start button unable to interfere with the sequence, its activation was only warranted when v1 and v2 were both inactive (green light). The diagrams to this are shown in Figure 3.

The timers were implemented as depicted in Figure 4, which was based on the same principles, only adding the timers.
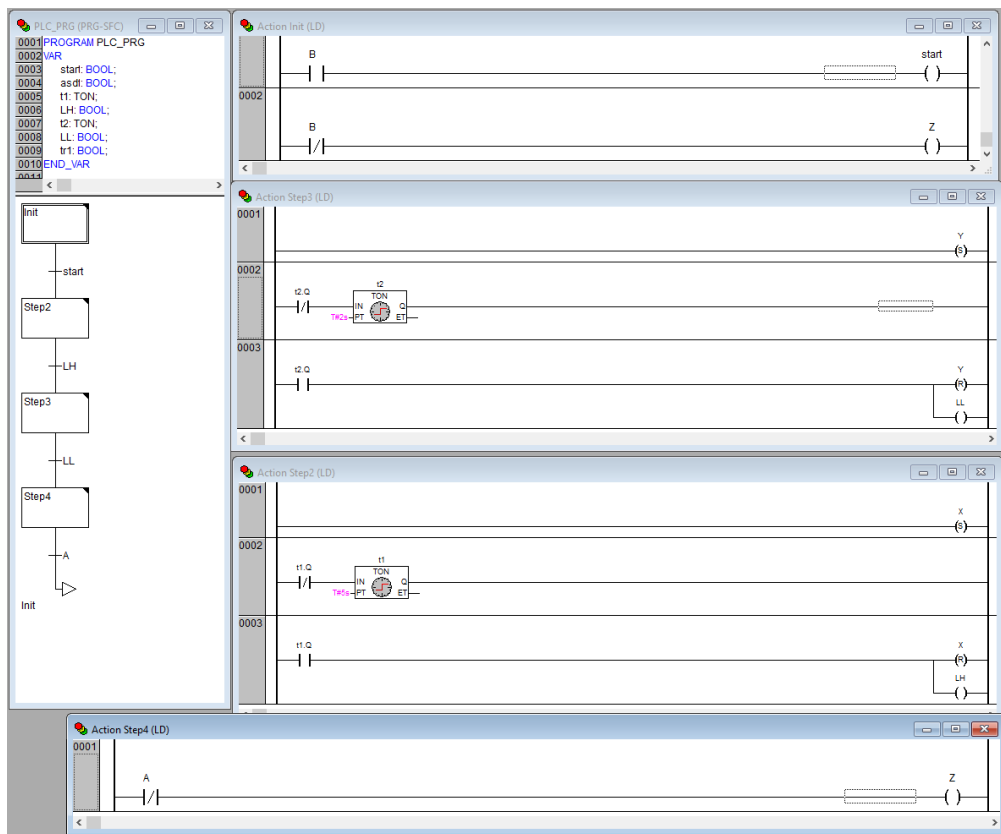

Figure 4: Water tank sequence using timers to switch LH and LL on.

This required the timers to be reset correctly within the SFC. To do this, the information provided in the FAQ was used.

The gates used in Figure 3 that prevented start from being energised were not required, as it was observed that the switches and buttons would only respond when the current state involved them. Therefore, they were not used in the implementation for Figure 4.