Introduction to Programmable Logic Controllers Ex10_visualisations

DTU 31343

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Task 1

A visualisation of the control box with the lights and switches is shown in Figure 1.

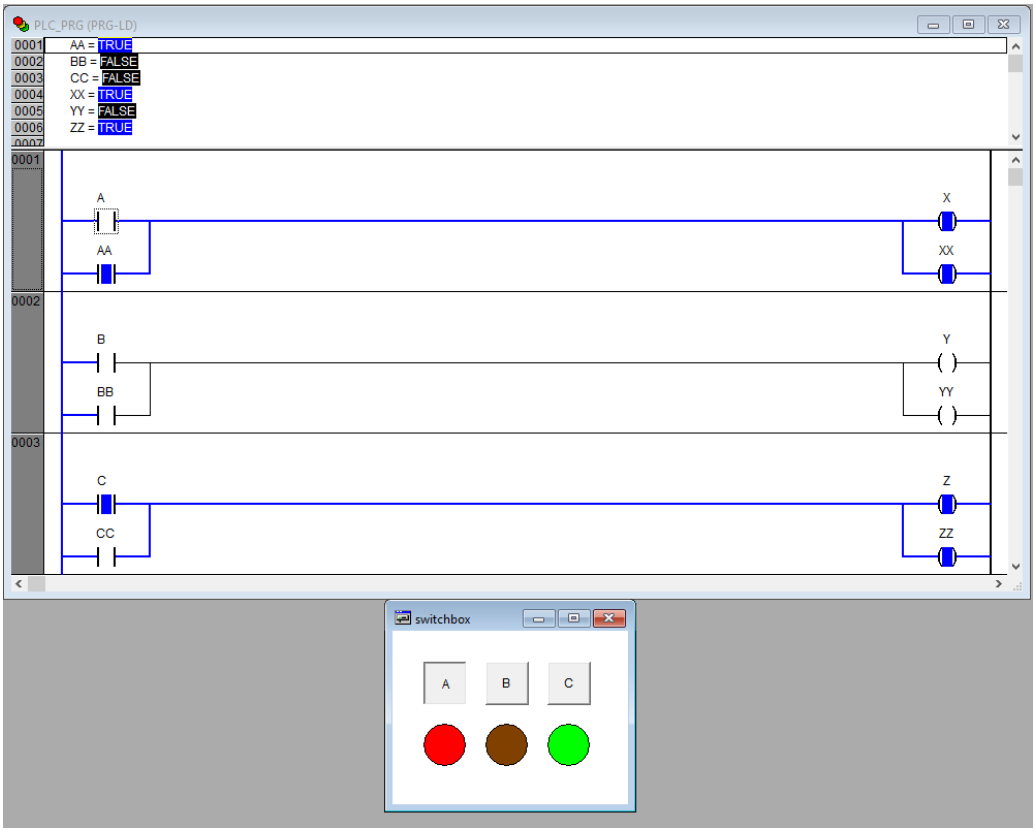

Figure 1: Visualisation of the switchbox and program achieving the desired functionality.

If the visual input is labelled the same as the physical one, then, the visual input has priority over the physical input. In fact, the physical input ends up having no effect on the desired output.

Therefore, to achieve simultaneous functionality between the visualisation and physical control box, the visual inputs and outputs were placed in parallel with the respective physical inputs and outputs as seen in Figure 1.

Task 2

The desired signal was achieved by using the `GEN` function block. The configuration, with the meter displaying the value of Y, and the desired trend element is shown in Figure 2.

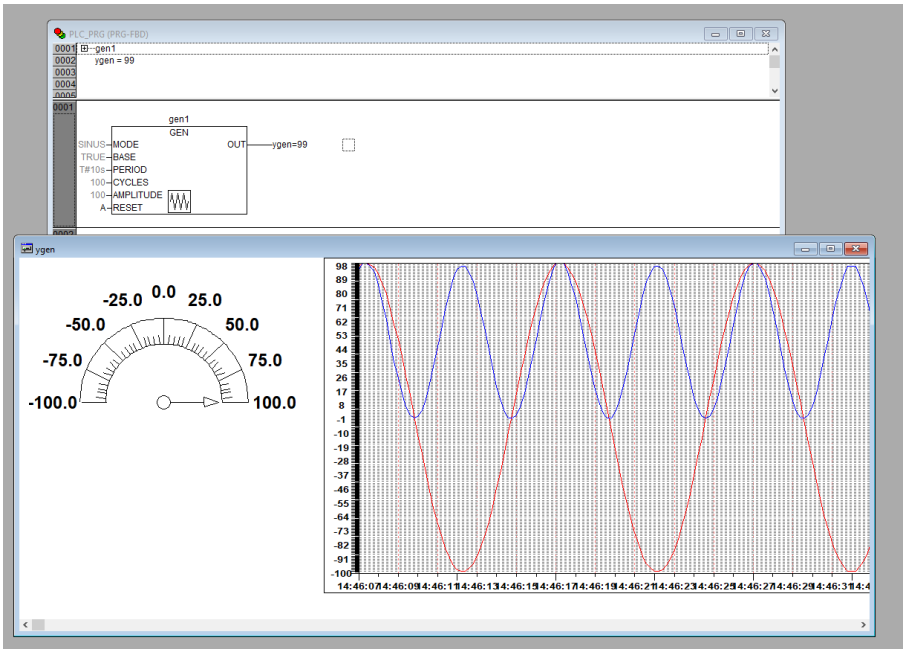

Figure 2: Program, meter, and trend element showing the desired functions as they evolved (red for Y and blue for $Y^2/100$).

The trend element was used to show plots of the functions as they evolved. To visualise $Y^2/100$, the calculation was input directly as a variable in the trend element configuration. The result is shown in Figure 2

Logging capabilities were added to the trend element, and an example can be seen in the file *logfile1.trd*. In the log file, an example of a line in it would look like:

```
1623768365;53165304;15-06-2021;02:46:05;PLC_PRG.ygen;31.000000;
  PLC_PRG.ygen*PLC_PRG.ygen/100;9.000000;
```

The elements in this line mean:

```
unix timestamp in seconds;nanosecond within the second;date;time;variable 1;
  value of variable 1;variable 2;value of variable 2
```

Task 3

The visualisation for the program from Ex8_serial is shown in Figure 3.

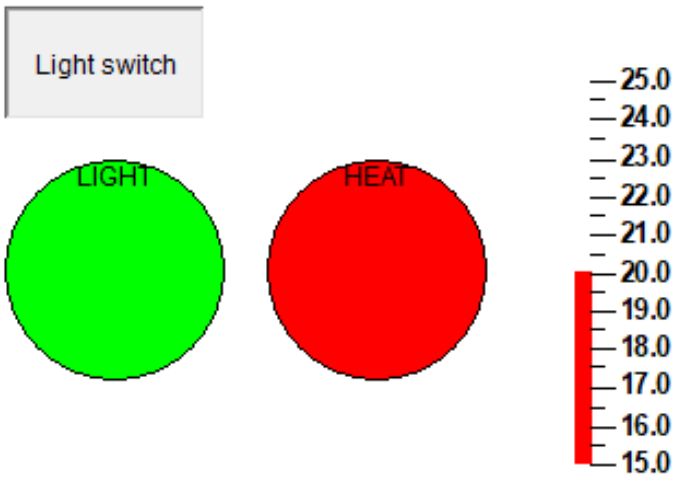

Figure 3: Visualisation of the light with a button and an indicator for the heater being on with a temperature gauge.

In Figure 3, the functionality of the visualisation can be seen. The depressed light switch results in an illuminated colour of the light, and the heating light indicator is illuminated as well, as the temperature is below the desired 21 °C.