31343 Introduction to Programmable logic Controllers
Exercise 9 : “ex9_visualisations”

Introduction:
The purpose of this exercise is to give an introduction to visualisations with ABBs CoDeSys development tools. Visualisations is an easy way to represent the variables of a PLC program graphically. The user can then interact with various inputs while the PLC is running online.

This is very useful in the development and debugging phase, but also when the final program needs to represent the controlled plant state, to an operator, in a clear way.

CoDeSys has an integrated interface for building various visualisations. These can be ported to run as a stand alone application on a PC, through a web-server or directly on a target PLC with integrated display. This exercise will only demonstrate how to use visualisations from the internal CoDeSys viewer.

Task 1:
Our first visualisation should mimic the behavior of the lights and switches on the control box, connected to the PLC.

- Make a visualisation model of the control box featuring a red, yellow and green circle as lights and three input buttons for the switches.
- What happens if you use a physical input (fx. a switch from the control box) as input variable to a button ? (Is it the physical or virtual input that takes priority ?)
- How could a physical and a virtual (visualisation) input be made to control the same output ?

Task 2:
Build a PLC program that generates the signal $Y = 100 \sin(2\pi\, t / (10\ \mathrm{s}))$, where t is time in seconds. (You can use the “GEN” function block).

- Visualise the output Y with a meter element with a range of ±100.
- Add a plot of Y and $Y^2/100$ using a trend element.
- Save the plot's data to a logfile and explain what the different elements in a line from the logfile represents.

Task 3:
Build a visualisation based on your solution of exercise “ex8_serial”. This should include indicators for both the light and heater state of the room, and the current room temperature should also be displayed. The room light should be controlled by a button on the visualisation instead of the controlbox.

Hand in:
The hand in should include answers to questions and screenshots of your visualisations for all three task. In addition a listing of a typical logfile from task 2 should be included. The hand in should be uploaded to Campusnet in the usual way.