Industrial Automation – Spring 2025

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Exercise Sheet: Week 6

Question 1

Explain which protocols are involved when downloading this exercise sheet as a PDF file from the EPFL course website to your computer or laptop. If you change the way your computer is connected to the Internet from a wired to a wireless connection, which layers in the OSI model will be affected and how? Which layers/protocols will stay the same?

Question 2

It's your first day as an automation engineer in a beverages factory and you are given the task of upgrading the control system for the factory's refrigerated liquid storage tanks. There are three tanks with built-in cooling systems and each tank is controlled by a separate PLC. Since the cooling systems have been purchased from different manufacturers, each PLC is from a different vendor. Each PLC provides a temperature setpoint variable as well as a variable holding the current temperature of the tank. Up to now, three different proprietary software tools on the PC have been used to configure the temperature setpoints of each tank.

Your task is to design the system architecture to control the temperature setpoint for all three tanks simultaneously from within a single software application running on the PC.

a) Which communication protocol from the lecture would you use for this task? Explain why you have chosen this protocol.

b) What will be the role of the PLCs? What will be the role of the PC?

c) What is the communication pattern between the different devices (PLCs, PC)?

d) Now you are also asked to provide a visualization of the current temperature of each tank using a large TFT display with embedded PC. How will you integrate the display into your existing setup?