Obligatory Exercise 1 for ITI42020 Spring 2023

We want to provide some **energy saving functionality** to the control of The Room.

You should take X3D as your starting point.

Each group should call their system X3Dx where 'x' is the group number. Do this also in the configuration clause.

Our energy saving protocol is like this:

1. When the light of the room is turned off, the temperature should fall a pre-determined amount (e.g. 2 degrees C) from the defined comfort temperature
2. The night starts at some defined time and lasts until another given pre-determined time of day. This will be given in milliseconds. You will be given a small library of time-related functions.
3. At night, the temperature should further fall down another pre-determined amount (say 8 degrees C) from the comfort temperature.
4. Whenever the light in the room is on (i.e. higher than a given luminance value), we define that there are persons in the room and that the temperature should try and reach the defined comfort temperature.

We would like this energy saving protocol to be seen as an optional feature of our thermostat system and should therefore be defined as a separate entity with its own interface to the user.

In this obligatory exercise, we only demand that you test your system with simulation, but we require that the test eventually will run automatically – meaning that you start the test system and it runs all by itself and delivers a verdict on the console.

The groups will be supervised once a week and you should take care to reach the milestones for each supervision.

There are these milestones:

A. Understand and specify
    a. Test specification of the energy saving system in sequence diagram(s) using PlantUML
    b. Architecture (composite structure) of the energy saving system
B. Execution of the energy saving feature
    a. Show a running program that basically performs the energy saving
    b. Demonstrate the system by using mock dialogs
C. Test execution
    a. Combine the functionality of the human and the sensor/actuator simulation into one state machine to eliminate the need to coordinate the temperature and luminance simulation with switch observation and the human input/output. Make a modified test specification as sequence diagram in PlantUML
    b. Implement "I am alive" protocol for the test system (this will ensure that the test system can start off and execute)
    c. Explain how you have tuned the system to let the functional automatic test run fast.

The deadline is 23. February (CET) and the delivery should contain:

I. A **ThingML project** with simulation-based executable model, and **with test specification** given in PlantUML. (Beware of the naming conventions described above)

II. A **report** that explains your work such that it should not be necessary to run or read your model to understand what you have done