

The (final) Prototyping Assignment

In the final assignment we are going to design, develop, test, and evaluate a graphical (android-based) user-interface for a programmable (room) week-thermostat.

It is a prototype for a mobile device.

It is not a prototype for a “box on the wall”!

Keep in mind that more than one thermostat could be controlling the same heating system. So when you start the thermostat it is a good idea to retrieve the latest program from the heating system (server). Do not assume that the last week-program you have on the phone is the same as what was last saved on the server.

Basic functionality of the thermostat

The thermostat has the following functions:

- users can define a week program and control the heating system (wirelessly)
- users can save the program on the device and send it to the heating system and also retrieve it from the heating system
- users can monitor the status and temperature and override it temporarily
- users can override the temperature permanently, for a “vacation” setting

The heating system is a “server” (which we provide) with which the thermostat communicates using an api (which we provide as well, both in definition and in implementation). Being realistic the commands you give do not have effect immediately: when you change the desired temperature from 10 degrees to 30 degrees it will take a while for the “room” to reach 30 degrees.

The server not only provides the current temperature but also the current day and time. For the sake of the assignment the server time runs 300 times faster than real time. You can set day and time on the server so that you can run experiments that start at a desired day and time.

Mandatory capabilities and limitations of the thermostat

The capabilities are also limitations!

- the user can set two temperatures, called **day** and **night**, to values between 5 and 30 degrees centigrade, in increments of 0.1°
- these two temperatures apply to all days of the week
- the user can create and update a week-program; each day may have different times for switching between day and night temperature
- each day may have up to five (5) changes from day to night and five changes from night to day (maybe less but not more)
- midnight is always an extra (not counted) switch to the night temperature unless this is programmed to be the start of a day period

- the maximum number of switches (5 + 5) is a fixed maximum (and it is 5 + 5, not 10); unused switches cannot be transferred to another day
- it must be **easy** to override the current temperature temporarily, until the next programmed switch (or midnight, whichever comes first); the temperature can be controlled by increments and decrements of 0.1 degrees
- it must be **easy** to override the current temperature "permanently", that is until the user switches back to the week program; (this is mainly used to go on vacation.)
- it is also recommended (but not mandatory) to provide an interface part to initialize the server (day and) time, and to also display the server (day and) time

Implementation, report and submission

You must hold (and report on) a brainstorming session.

You must create a **Java Android** prototype or an **HTML5** prototype. it must be “functional”: users must be able to enter a week program, review and change it, override the temperature temporarily or permanently and return to the program, etc.: all the required bits of functionality and the mandatory limitations must be adhered to.

You must create and upload a single ZIP archive thermostat-xx.zip (xx replaced by group number) containing:

- a brainstorming report (Word or pdf),
- source and binary code for the Android prototype,
- a readme with simple installation instructions and
- complete end-user documentation (instruction manual) on how to use the thermostat.

Upload the file to Canvas and make sure you can download as well. Make (and keep) a screendump of the confirmation that you submitted. Only one student per group uploads. Share the screendump with your groupmates so they know you did submit.

Do not plan to go on vacation until the end of the exam period as we will be holding evaluation/experiment sessions.