Exercise: Incubator for premature babies.

In these exercises, you will work with problem solving and object-oriented design.

Our job is to design software for an incubator for premature babies. Premature babies are at risk of dehydration, due to water evaporation from their skin. To avoid this, the humidity inside the incubator must be higher than it normally is in the open air.

Image source: https://pri.rn.dk/Sider/12758.aspx#a_Toc329247636

The teacher forms groups of 3 persons, who solves the exercises together.

Exercise 1:
In your group, discuss what functionality is needed to obtain a given humidity inside the incubator and to maintain that humidity.

Exercise 2:
We will have a shared discussion in class and agree on functionality.

Exercise 3:
In your group, create an object-oriented design for a piece of software, which implements the functionality defined in exercise 2.
Use UML diagrams:

- Class diagram(s)
- State diagram(s)
- Sequence diagram(s)

Do not code anything yet!

Exercise 4:
Discuss your design with another group.

- What are the differences?
- What are the similarities?
- Is there something you think is odd?
- Is there something you had not come up with?

Exercise 5:
We will have a shared discussion in class and create a common design.

Exercise 6:

Now you are allowed to code!

Implement the software for the incubator.

Exercise 7:
Discuss in the group: Did you make any changes during the implementation?

Exercise 8:
We will have a shared discussion in class about how you did the implementation and whether the design had to change.

Exercise 9:
Discuss in the group:

What should be tested, in order to make sure the software works (we don't want the babies to die, do we…)?

Is it possible to test your software with unit tests?

Exercise 10:
Make the changes needed (if any) to make the software testable.
Then write the unit tests.

Exercise 11:
We will have a shared discussion in class about what to test and how to implement the tests.