

Design Thinking and Electronic Prototyping

Week 06



Aalto University
School of Electrical
Engineering

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11.10.2022

Salu records the lecture

You need to also record your attendance!

Login to MyCourses

> DTEP22 > Assignments > Attendance

Write the password (on side screens)



Course Outline – Period I

1. L: Introductions
 2. L: Design Thinking and Context Mapping
 3. L: Electronics for Experience
 4. L: Interactions with Users
 5. L: Problems and Requirements (User Needs)
 - 6. L: Design Concept (Key Design Requirements)**
- SEMESTER BREAK / Exam Week --

Course Outline – Period II

7. L: Prototyping and Testing (25.10.)

8. L: Finalising the Design Concept (8.11.)

Presentation Rehearsals with Susan Gamache (21.-25.11.)

9. Final Presentations (29.11. 10-15, AS2)

Today's learning goals

- Learn to do requirements-interpretation on the basis of both user and electronics knowledge
- Learn to differentiate between key design requirements and secondary requirements

An Example From Story to Requirements

Observation -> Problem

The ladder
froze into
the lake

The habit of lifting the ladder at the
last moment.. Often too late



Image from a user's self-documentation

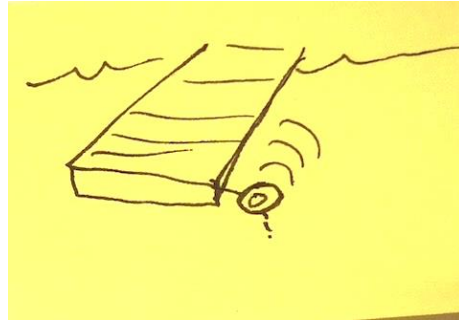
Idea

- **Automatic warning system about the lake freezing over**

A Story



The owner of a summer cabin at a lake, Petra, wants to know if the lake is going to freeze over.



She has a wireless thermometer attached to her dock that measures water temperature.

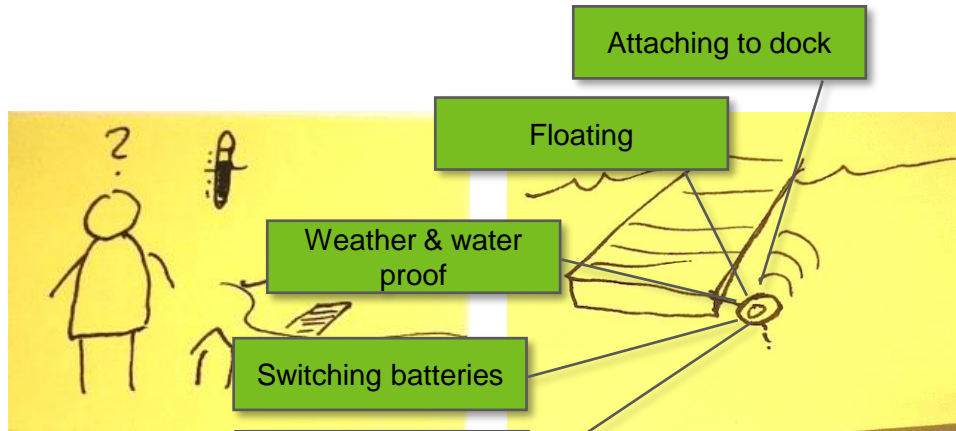


The wireless thermometer sends the temperature data to internet service once a day.



Petra's phone buzzes once the temperature gets down to +5°C. She can see the lake temperature on her mobile phone and goes to remove the ladder.

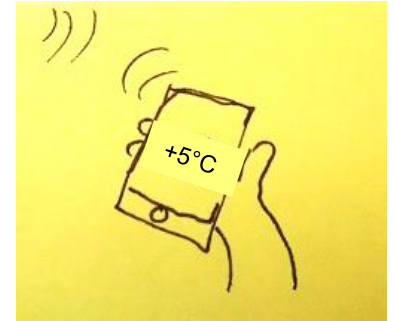
From story to requirements



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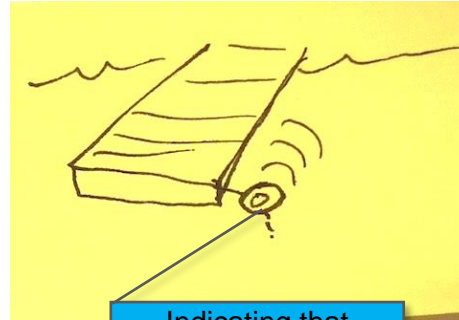


Petra's phone buzzes once the temperature gets down to +5°C. She can see the lake temperature on her mobile phone and goes to remove the ladder.

From story to requirements



The owner of a summer cabin at a lake, Petra, wants to know if the lake is going to freeze over.



She has a thermometer attached to her dock to measure the water temperature.

Indicating that power is on/off

Metering the temperature

Connecting to cloud

Indicating that connection ok/not



The wireless thermometer sends the temperature data to internet service once a day.

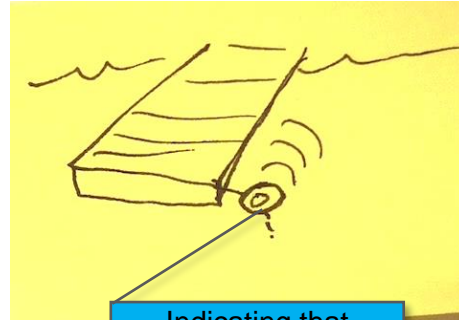


Petra's phone buzzes once the temperature gets down to +5°C. She can see the lake temperature on her mobile phone and goes to remove the ladder.

From story to requirements



The owner of a summer cabin at a lake, Petra, wants to know if the lake is going to freeze over.



She has a thermometer attached to her door to monitor the water temperature.

Indicating that power is on/off

Metering the temperature

Connecting to cloud

Indicating that connection ok/not

UI needed



The wireless thermometer sends the temperature data to internet service once a day.



Petra's phone buzzes once the temperature gets down to +5°C. She can see the lake temperature on her mobile phone and goes to remove the ladder.

A Story

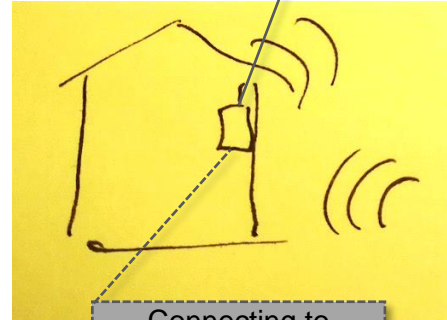


The owner of a summer cabin at a lake, Petra, wants to know if the lake is going to freeze over.



She has a wireless thermometer attached to her dock that measures water temperature.

Mounting



The thermometer sends the temperature data once

Connecting to internet

Setting up access point



Petra's phone buzzes once the temperature gets down to +5°C. She can see the lake temperature on her mobile phone and goes to remove the ladder.

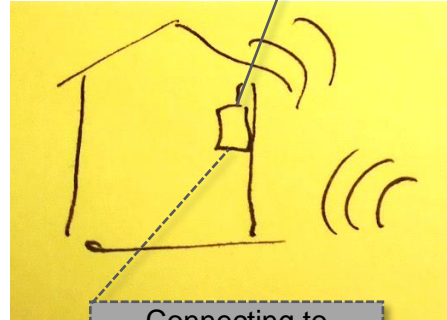
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Mounting

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UI needed

UI needed



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A Story



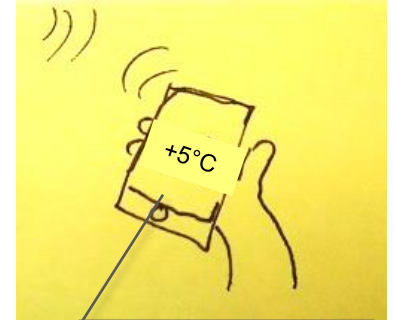
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She has a wireless thermometer attached to her dock that measures water temperature.



The wireless thermometer sends the temperature data to internet service once a day.



Petra finds the app once the temperature gets down to 5°C. She sees the app on the store and goes to the ladder.

Finding the app

Installing the app

Creating an account

Connecting to user account

Showing the measurements

Design requirements

Experiential

- How the product should feel

Structural

- How the product should be physically built

Electrical

- How the electronics should work

Mechanical

- How the product should physically work

Design requirements

Experiential

- Can be easily attached to a dock
- Blends with the environment (Do we need to know more about user's values?)

Structural

- Floats on water
- Is weather and water proof

Electrical

- Measures water temperature
- Sends the temperature to cloud service wirelessly
- Alarms the user

Mechanical

- Container with a removable lid
- On/off switch

Concept

Name: What

Purpose: Why

Design drivers: How

Proof-of-Concept (Demo, Prototype): Evidence

Concept

Name:	MenoMaps
Purpose:	Multi-channel maps for outdoors actives
Design drivers:	Maximize Map Experience
Proof-of-Concept (Demo, Prototype):	

Key Design Requirements

- **What are the most important indicators that you have created the right product?**
- **What are the most important indicators that you have prioritized the functions properly?**
- **What are the most important indicators that people like the how your design feels like?**

This week's tasks

1. **Diary – Deadline on Friday 23:59 (delays, -1pt/day)**

2. **Reading: Chapter 3 + Start of Chapter 4 until p. 140**

- Knowledge in the Head and in the World
 - The Tradeoff Between Knowledge in the World and in the Head
 - Memory in Multiple Heads, Multiple Devices, Natural Mapping
 - Culture and Design: Natural Mappings Can Vary with Culture
- Knowing What to Do
 - Constraints, Discoverability, and Feedback, Four Kinds of Constraints: Physical, Cultural, Semantic, and Logical, Applying Affordances, Signifiers, and Constraints to Everyday Objects

3. **Exercises**

6. UART Bus (7. I2C Bus is very useful too!)

4. **Project**

1. Define the what and why of your concept + key design requirements

Next week: Exam Week

No lecture

No diary

No exercises