Semester Project 3
Q&A Session

Semester project: Distributed Software Systems with Embedded Elements

Krzysztof Sierszecki
Project Coordinator

Project Plan

Week	Scope	Description	Date	Responsible
Project Kickoff (Weeks 36-37)				
36	3rd Semester	Semester kickoff meeting with Linak	04-09-24	Semester coordinator, Linak representatives
37	Project group	Group forming & work agreement	11-09-24	Groups, supervisors
Project Analysis (Weeks 38-41)				
38	Project group	Drafting project ideas		Groups, supervisors
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Semester Project 3

TITLE

Project Analysis

DATE

16. sep. 08.15–11. okt. 23.55

TOPIC

SEMESTER PROJECT

DESCRIPTION

Listen

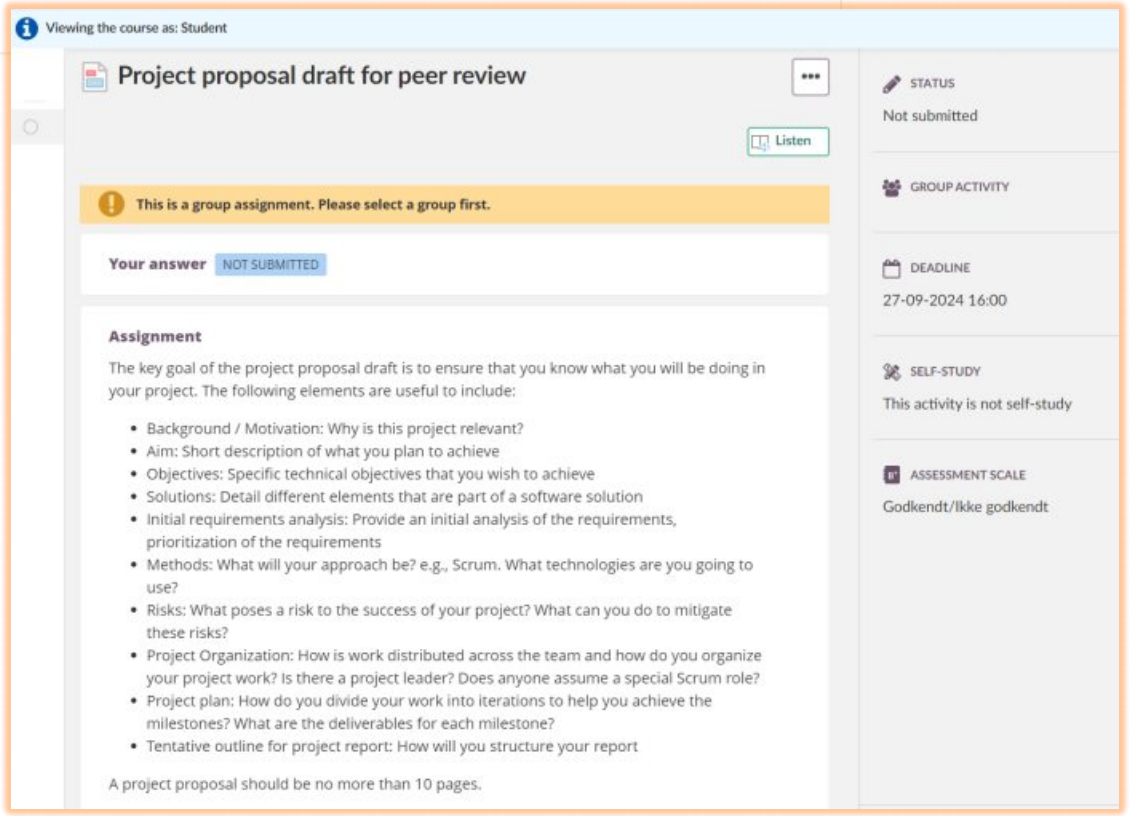
Drafting project ideas, peer reviews, presentation & submission of project proposals

RESOURCES AND ACTIVITIES

0/1

Start

Project proposal draft for peer review

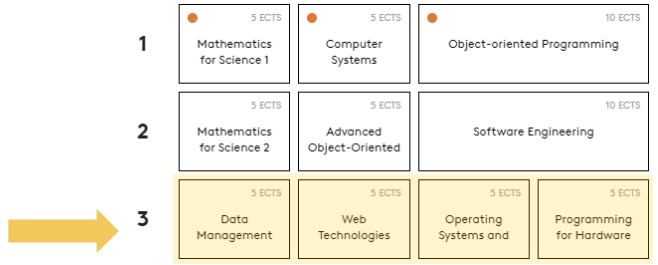


Project Proposal Draft

→ The key goal of the project proposal draft is to ensure that you know what you will be doing in your project

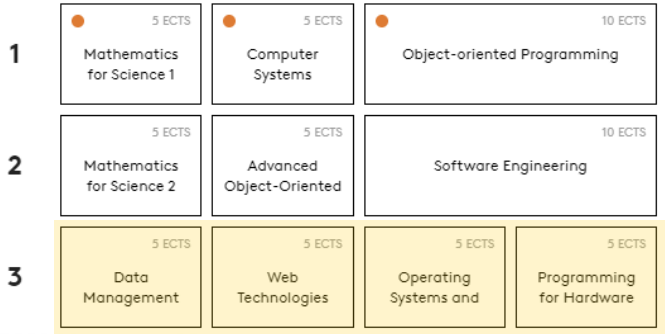
→ The following elements are useful to include:

- → **Background / Motivation**: Why is this project relevant?
- → **Aim**: Short description of what you plan to achieve
- → **Objectives**: Specific technical objectives that you wish to achieve
- → **Solutions**: Detail different elements that are part of a software solution
- → **Initial requirements analysis**: Provide an initial analysis of the requirements, prioritization of the requirements
- → **Methods**: What will your approach be? e.g., Scrum. What technologies are you going to use?
- → **Risks**: What poses a risk to the success of your project? What can you do to mitigate these risks?
- → **Project Organization**: How is work distributed across the team and how do you organize your project work? Is there a project leader? Does anyone assume a special Scrum role?
- → **Project plan**: How do you divide your work into iterations to help you achieve the milestones? What are the deliverables for each milestone?

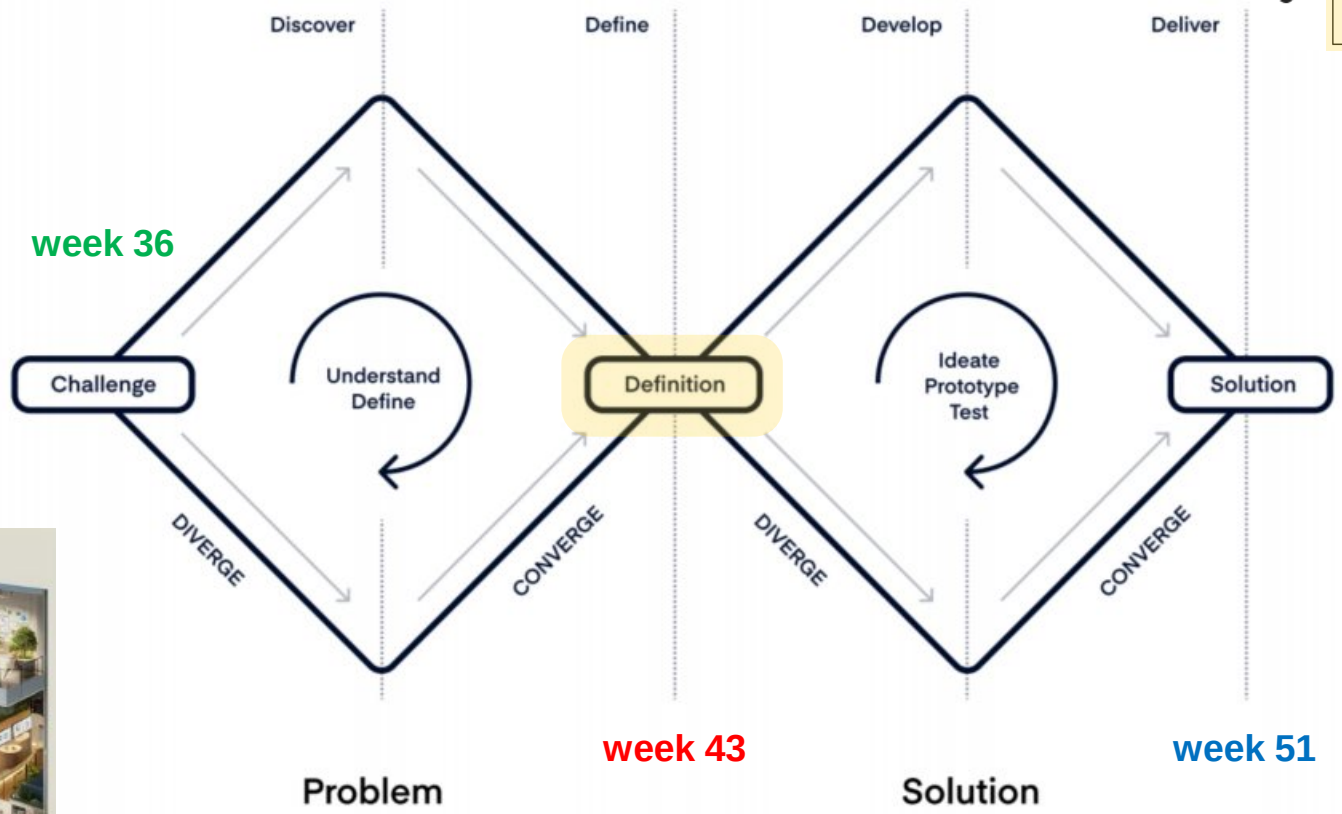


→ A project proposal should be no more than 10 pages
(excluding front page, table of contents and appendices)

Problem Space vs Solution Space



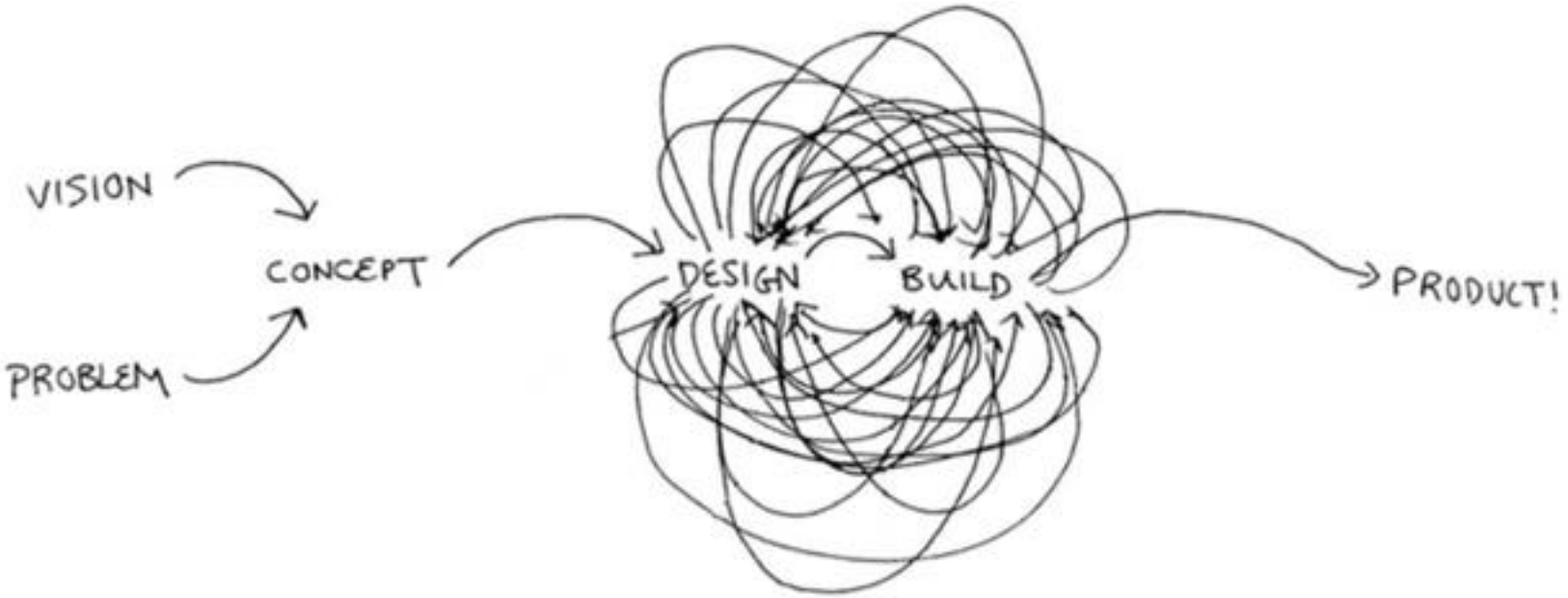
Solution Foundations



The Challenge

[https://www.productboard.com/blog/step-by-step-framework-for-better-product-discovery/]

In practice 😉



The reality 🤭

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Peer Review

→ Peer review: collaborative review of project proposal drafts by project groups – peers of the project
  → We don't follow a scientific peer review: Step by step guide to reviewing a manuscript by Wiley

→ Your review should ultimately help the author improve their project proposal
  → Be polite, honest and clear
  → You should also try to be objective and constructive
  → NOT subjective and destructive

Peer Review of Proposal

→ Each project proposal draft must be reviewed by the assigned supervisor and one other project group (reviewing group)
→ The project group (producing the project proposal draft) decides the review criterion and sends a review invitation to the reviewing group (with cc: to the assigned supervisor)
→ The Project Coordinator sets up a deadline in itslearning for the review feedback, **2 Oct**
→ Both the assigned supervisor and the reviewing group must provide feedback by **2 Oct** to allow time for the producing group to improve the proposal draft and submit the final version on itslearning,**11 Oct**
→ The project proposal may require changes prior to the final deadline
→ Updated proposal is then approved by the assigned group supervisor

→ The pairing of reviewing groups is as follows: 1⇨2, 2⇨3, … , 14⇨15, 15⇨1
  → Group 2 reviews proposal draft of Group 1, …, Group 1 reviews proposal draft of Group 15
  → We have an odd number of groups

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Midterm Seminar on 9-Oct-24

→ Start at 9:00 in **U109**
→ Continue from 10:00 in U101

→ Each group:
  → Creates a very short presentation (2 slides max.)
  → Performs a 5 minutes elevator pitch/speech outlining the project concept and the envisioned solution

→ Detailed plan to be announced

An elevator pitch quickly summarizes an idea, product or service during a short journey in an elevator

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The Problem Space
Challenge

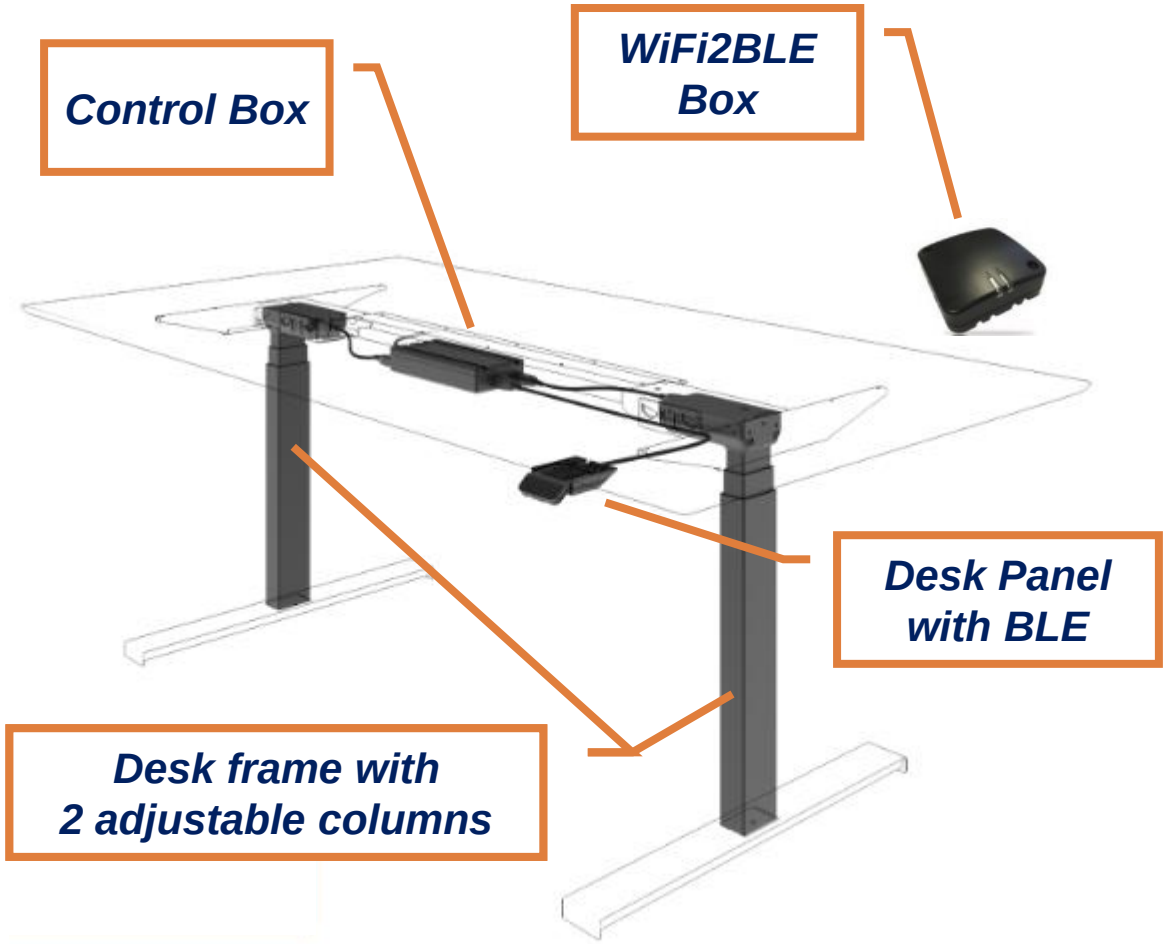
Project Case Study: Desk Usage Supervision

Generated by AI

- → Obtain, visualize and analyze desk usage data for health, occupancy and maintenance
- → Motorized desks are commonly used in office spaces as they can improve user working comfort
- → Greater gains could be achieved by learning from the desk data, for example about the desk moving distance and frequency

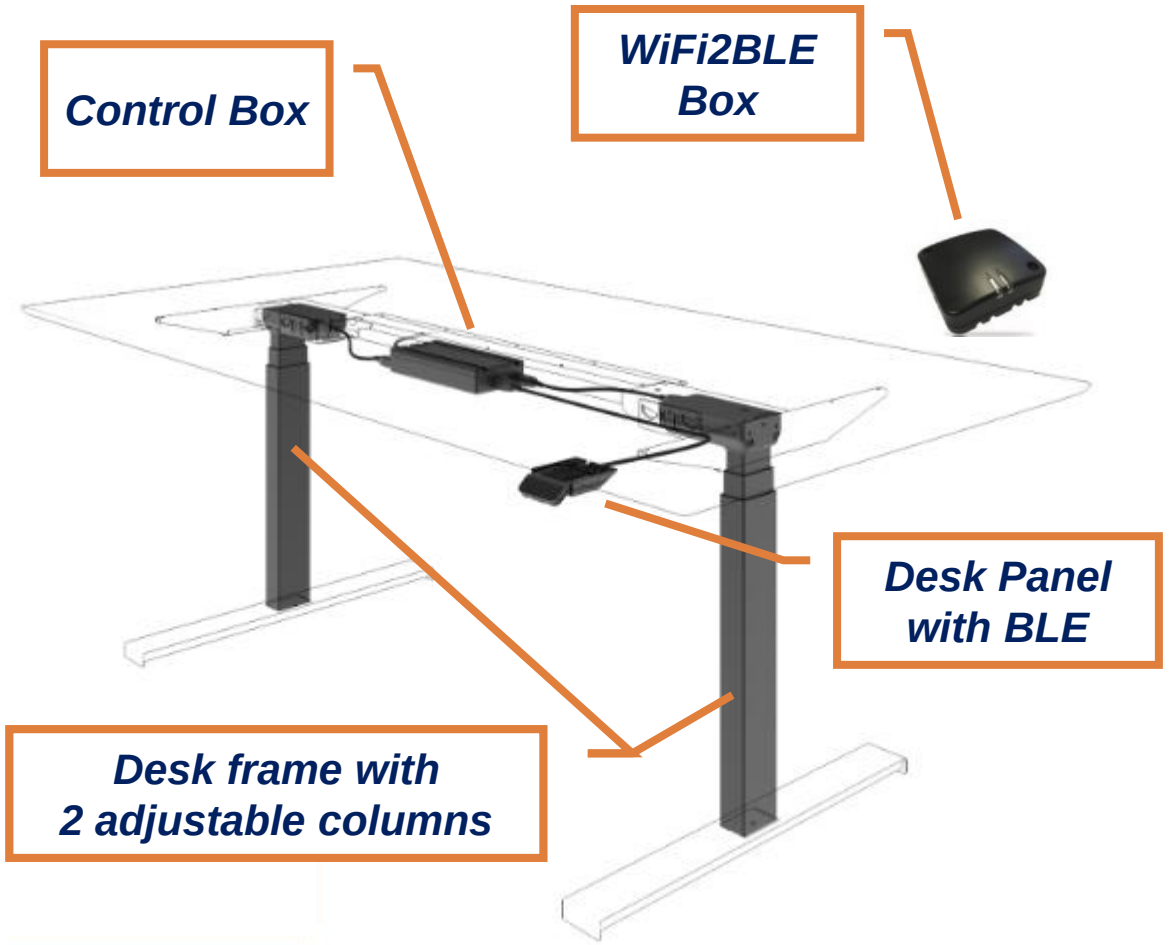
Desk System Operation

- → Desks columns are controlled by the intelligent Control Box that is connected to the Desk Panel
- → The desk panel accepts user commands to adjust desk height up and down
- → The WiFi2BLE box exposes desk information over a Wi-Fi by translating the desk Bluetooth Low Energy (BLE) protocol to a Web API
- → This allows for monitoring and controlling desks remotely
- → Desk Panel has as built-in anti-collision sensor, display, and storage of favorite positions 😯



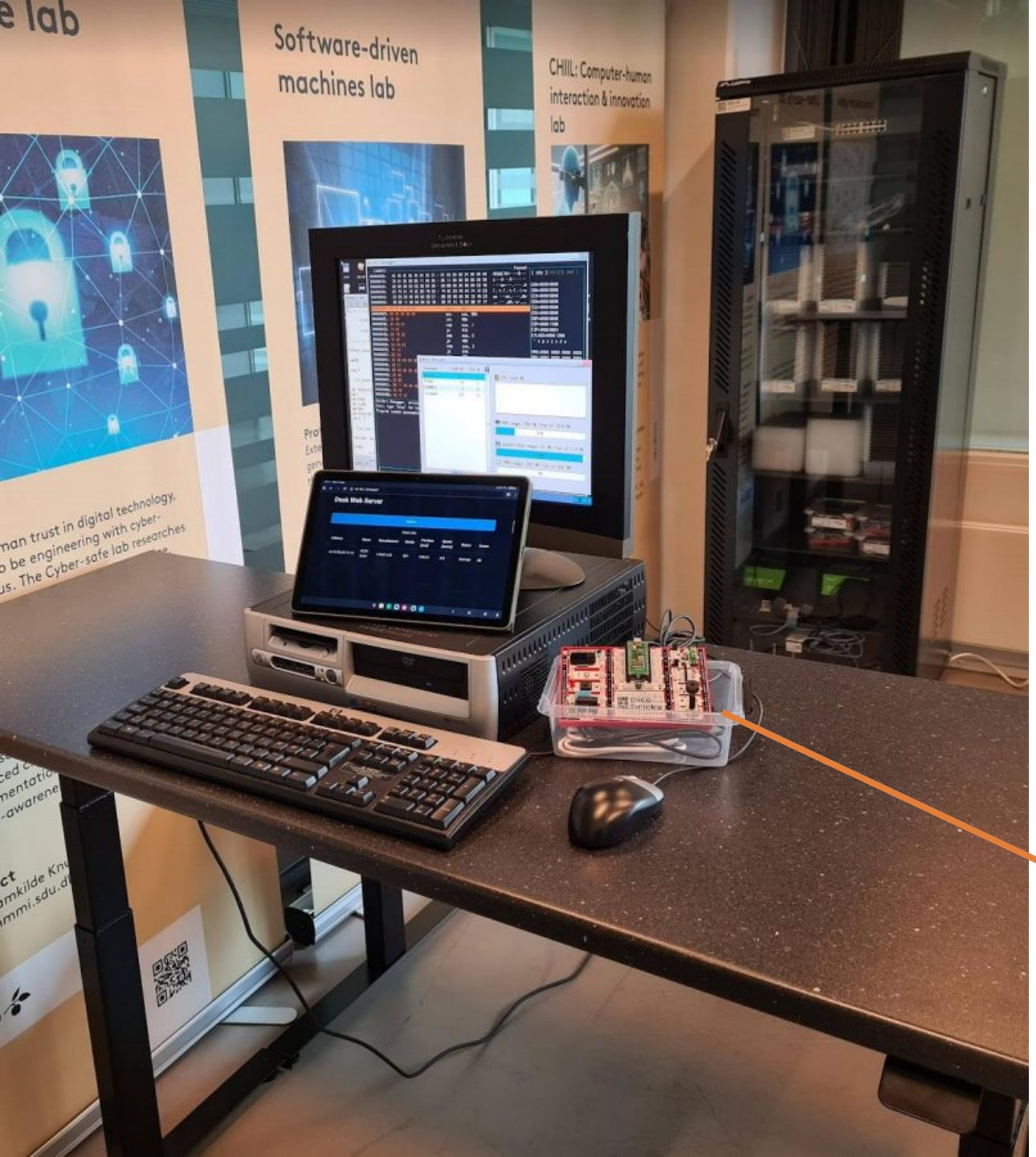
Web API Data

- → Number of desks connected to WiFi2BLE box
- → Desk ID, Name, Manufacturer
- → Position
  - → Get and Set
- → Speed
- → Status
- → Last errors with timestamps
- → Activation counter
- → Sit/stand counter



Scenarios

→ **Well-being of office users**: Monitoring users' behaviors and suggesting healthy habits
→ **Usage reporting**: Visualization of desk data, reporting faulty operation and predicting failures
→ **Office cleaning**: Bringing desktop to upright position temporarily
→ **Uniform desk arrangement**: Setting desks to the same height for within given time frame
→ **Office space rearrangements**: Reconfiguration of live system



The test system

→ Two desks from Linak are still in the A1.07
→ The desks will be available in J-block in the teaching lab soon
→ Web API spec will be available too

→ Waiting to resolve technical and IT issues

→ Contact the project coordinator

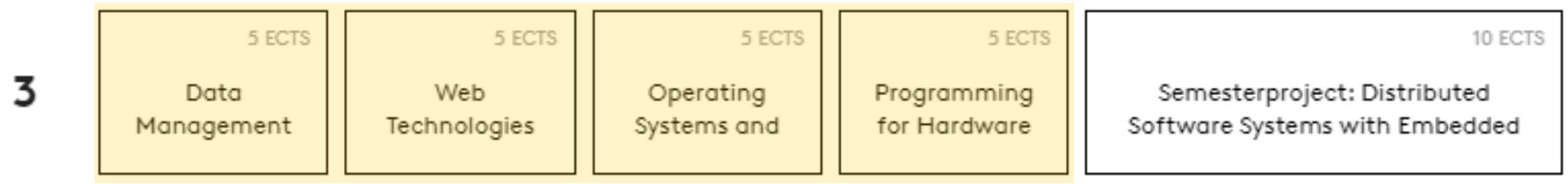
Embedded elements 😉

The Solution Space
Foundation

Project Purpose

→The purpose of the project is to have students gather knowledge on practical application of the concepts that they have been taught in the following courses:

- → **Data Management** (Sadok Ben Yahia)
- → **Web Technologies** (Mubashrah Saddiqa)
- → **Operating Systems and Distributed Systems** (Gaurav Choudhary)
- → **Programming for Hardware Constrained Environments** (Tommy Bjerre Nielsen)



Semester Project Objectives

→In the project the students shall develop a distributed system with embedded elements that incorporates knowledge provided during the 3rd semester courses

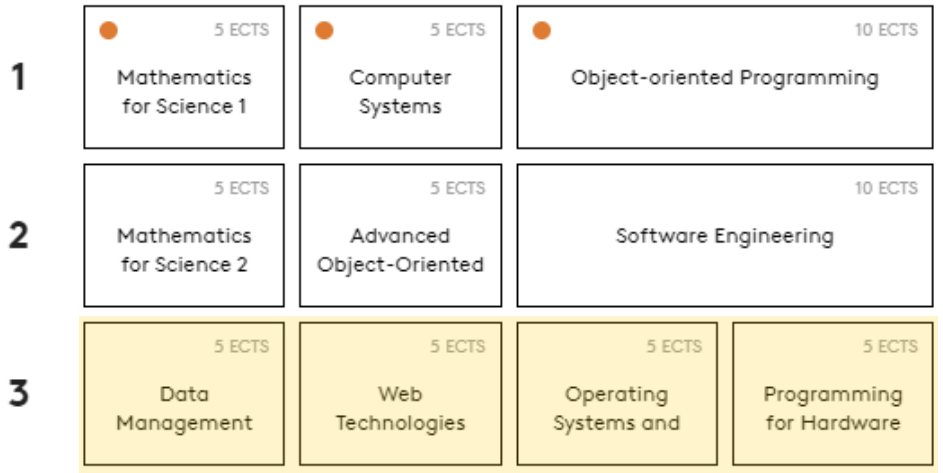
→Learning objectives

- → Analyze requirements for a **distributed software system** with embedded element
- → Design, implement and validate a distributed software system with **embedded elements**
- → Test and verify that the implemented system fulfills the **requirements**
- → Collaborate in **teams** using **modern tools** for software engineering
- → Disseminate **knowledge** in the group and in writing

Suggested Project Realizations

→ Main subsystems
- → Services: data collection, analysis, office & desk management, visualization, reporting
- → Storage: data persistence, data manipulation
- → User interface: user interaction with the system, responsive, desktop & mobile, embedded

→ Use the power of knowledge 💪
- → Data modeling & management, database design
- → Distributed web applications & technology
- → Containers, deployments, micro-services, networking, REST
- → Embedded systems, constrained programming, product integration



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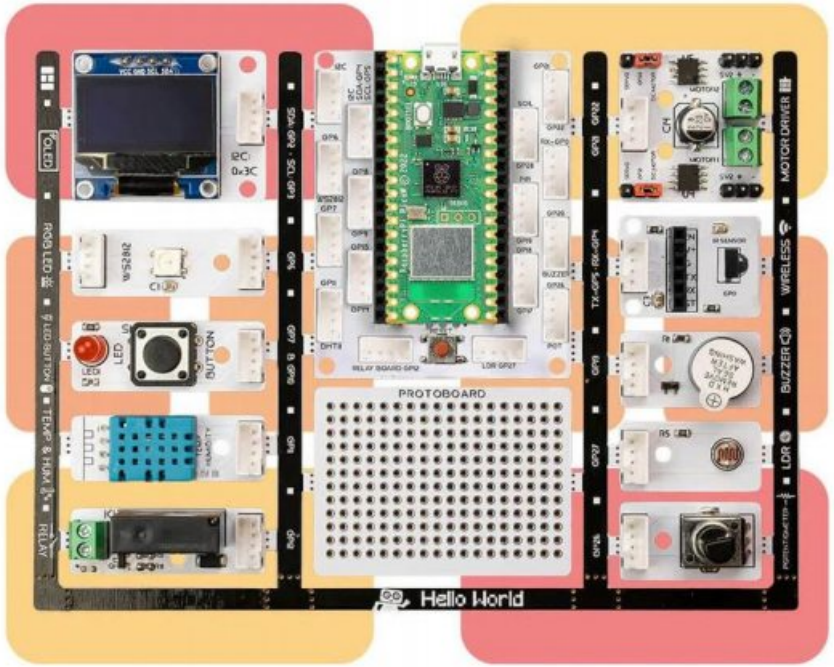
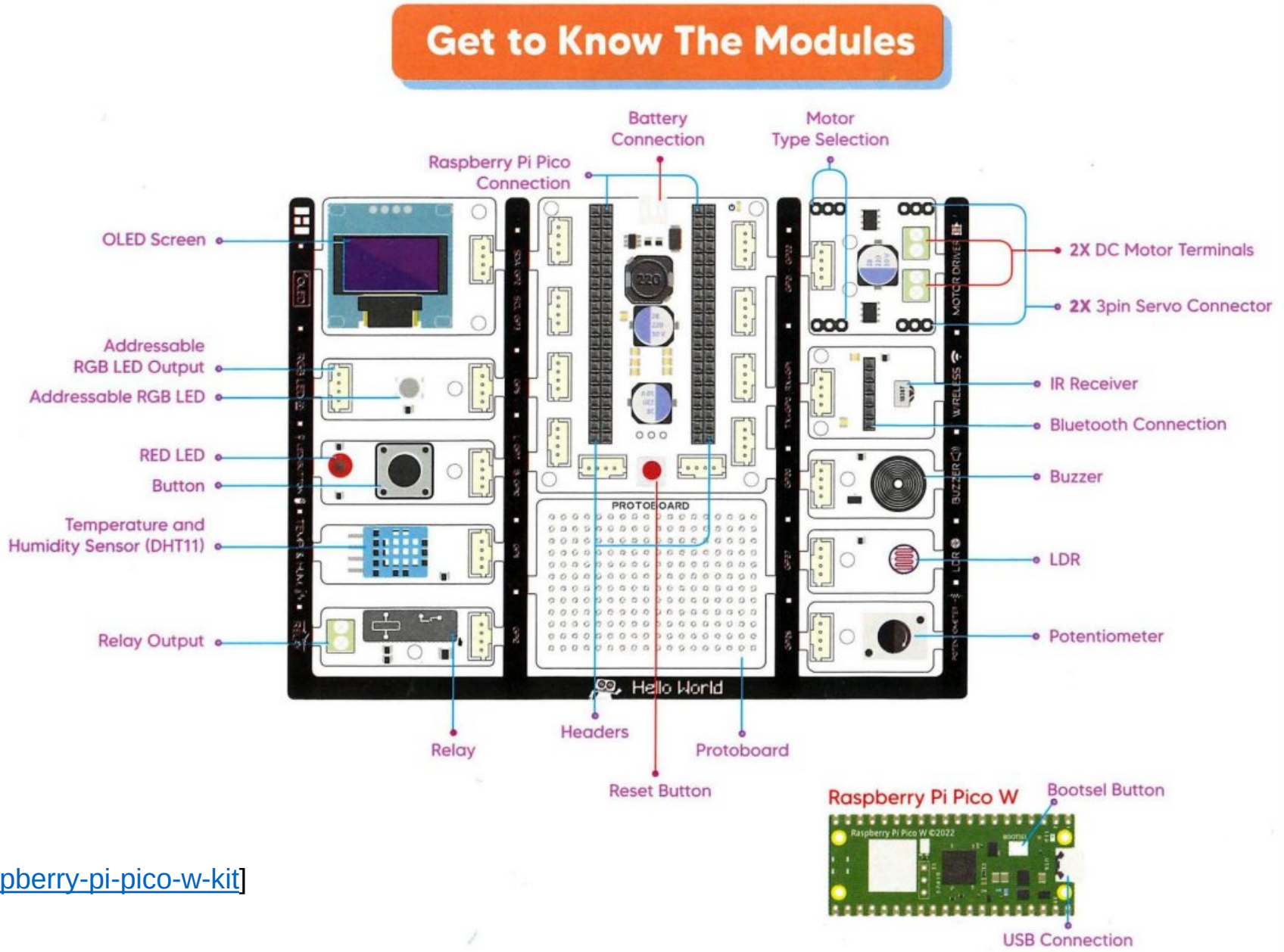
Part of your distributed application
(NOT part of a desk)



PicoBricks + Pico W



[https://picobricks.com/products/raspberry-pi-pico-w-kit]

Problem-oriented Project Work

→ The project work is problem-oriented, which means that it is guided by a problem that the project groups themselves choose and formulates within the framework provided by the project case

→ It is expected that different project groups will have different views and target different problems since certain needs and solutions are unknown in the original case study

→ Thus, the common case study leads to different project results

Thank you