Semester Project 3 Q&A Session



Semester project: Distributed Software Systems with Embedded Elements

Krzysztof Sierszecki

Project Coordinator



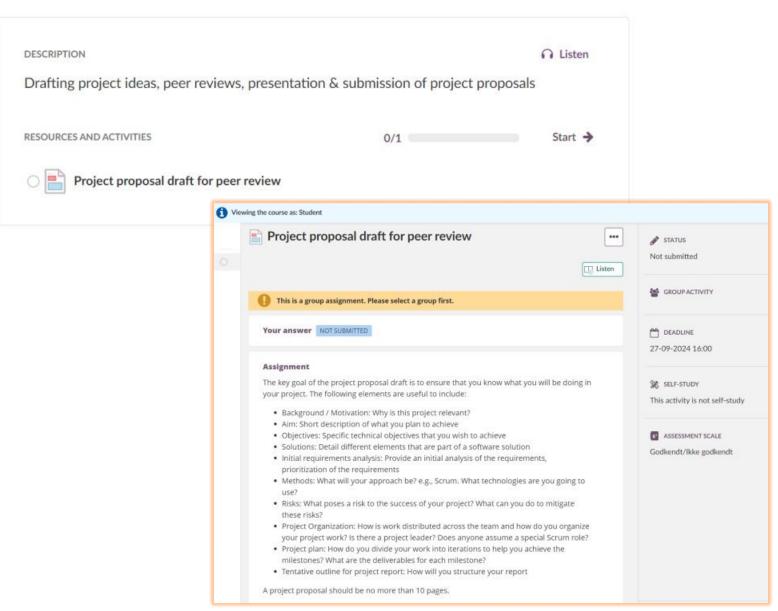
Project Plan

Week	Scope	Description	Date	Responsible		
Project	Project Kickoff (Weeks 36-37)					
36	3 rd 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		
39	Project group	Project proposal ready for peer review	27-09-24	Groups, supervisors		
40	Project group	Peer review feedback	02-10-24	Groups, supervisors		
41	3 rd Semester	Midterm Seminar: presentation of	09-10-24	Groups, supervisors,		
		project proposals		semester coordinator		
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Semester Project 3







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

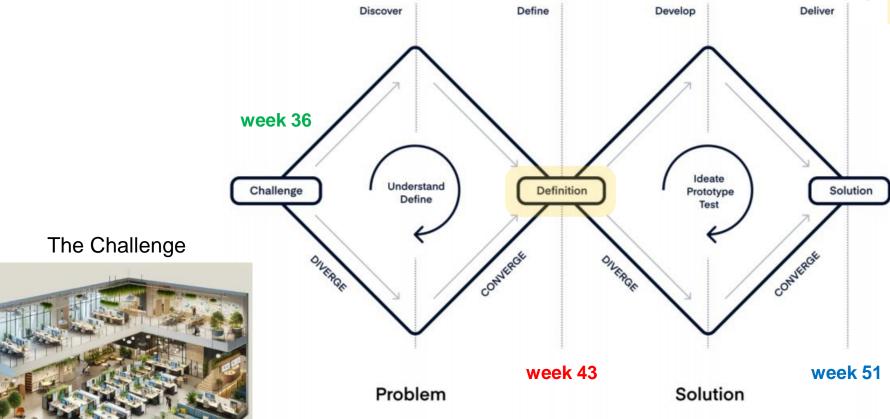


- → **Methods**: What will your approach be? e.g., Scrum. What technologies are you going to use?
- → **Risks**: What poses a risk to the success of your project? What can you do to mitigate these risks?
- → **Project Organization**: How is work distributed across the team and how do you organize your 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)





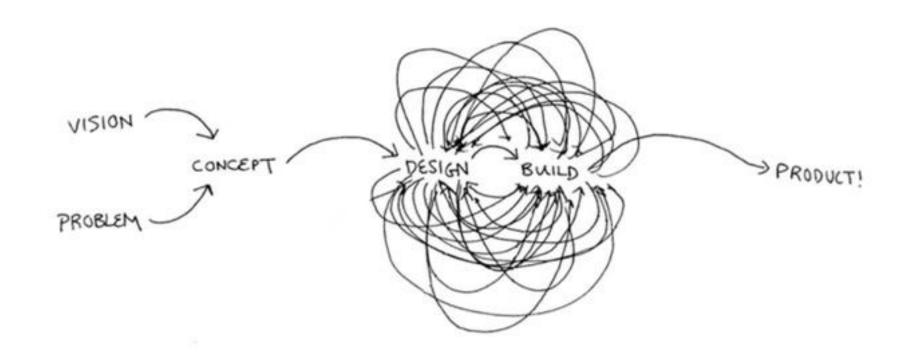
Problem Space vs Solution Space





Solution Foundations

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





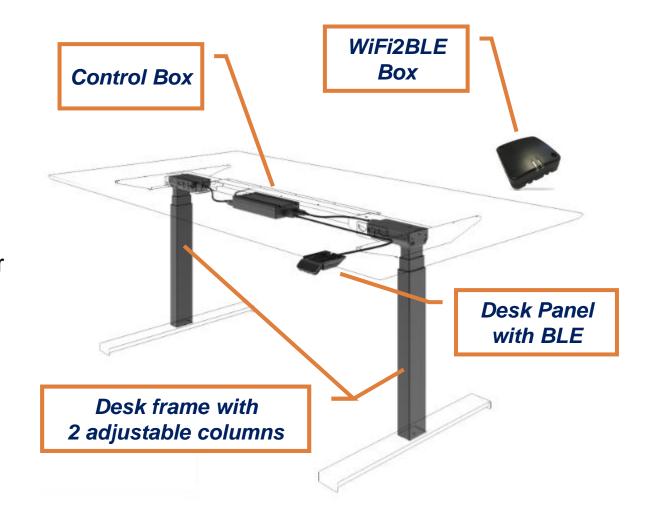
Project Case Study: Desk Usage Supervision

- → 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

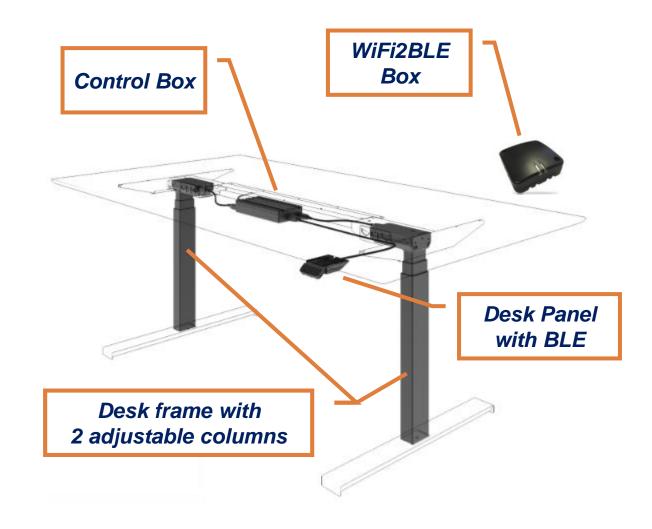
- → Desks columns are controlled by the intelligent Control Box that is connected to the Desk Panel
- → The desk panel accepts user commands to adjust desk height up and down
- → The WiFi2BLE box exposes desk information over a Wi-Fi by translating the desk Bluetooth Low Energy (BLE) protocol to a Web 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





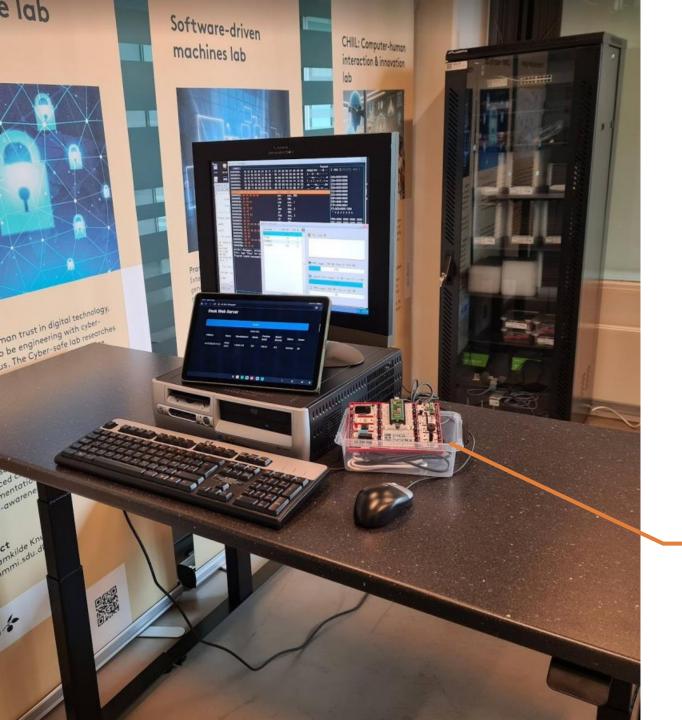
Scenarios

- → 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









Semester Project 3

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

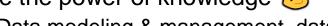
→Learning objectives

- → 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

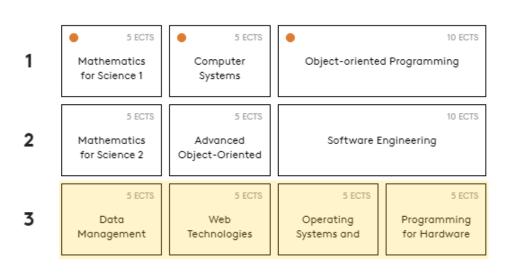


Suggested Project Realizations

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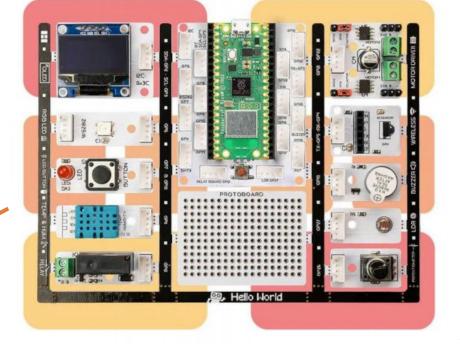
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Part of your distributed application (NOT part of a desk)

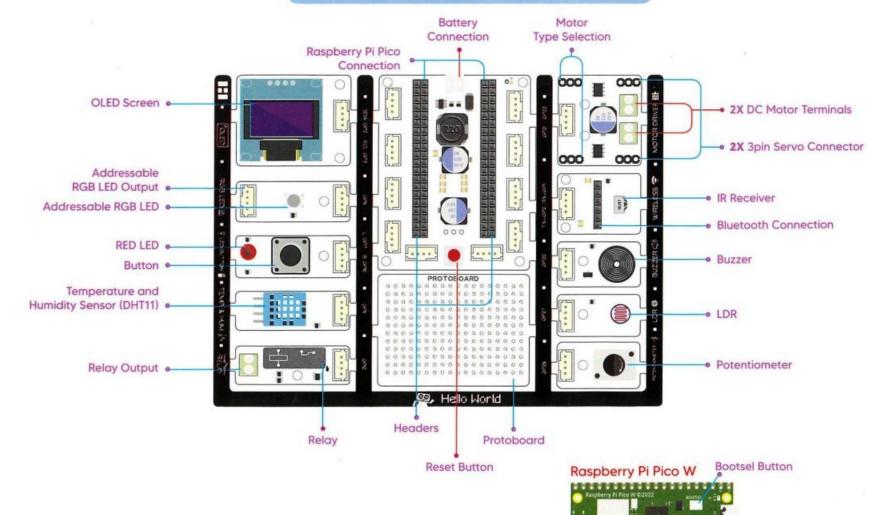






Get to Know The Modules

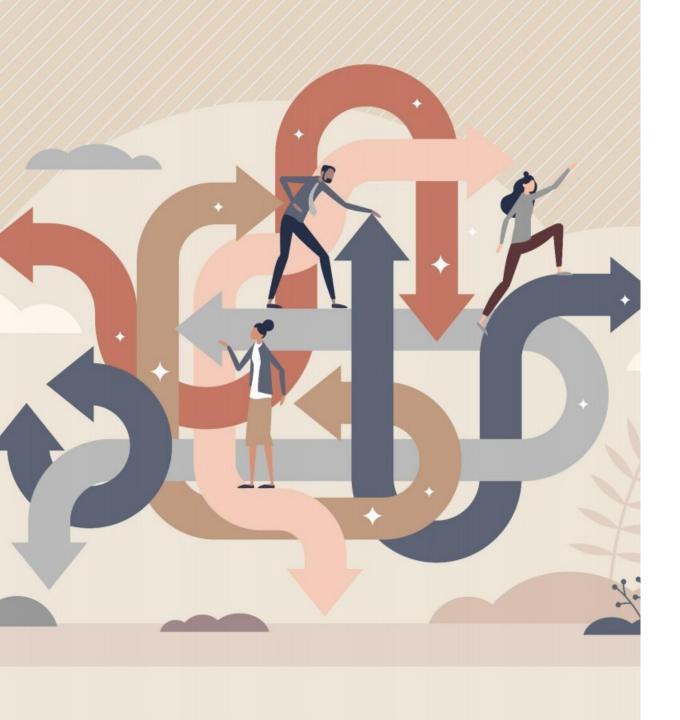
PicoBricks + Pico W



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



USB Connection



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



Inank you 😤



