

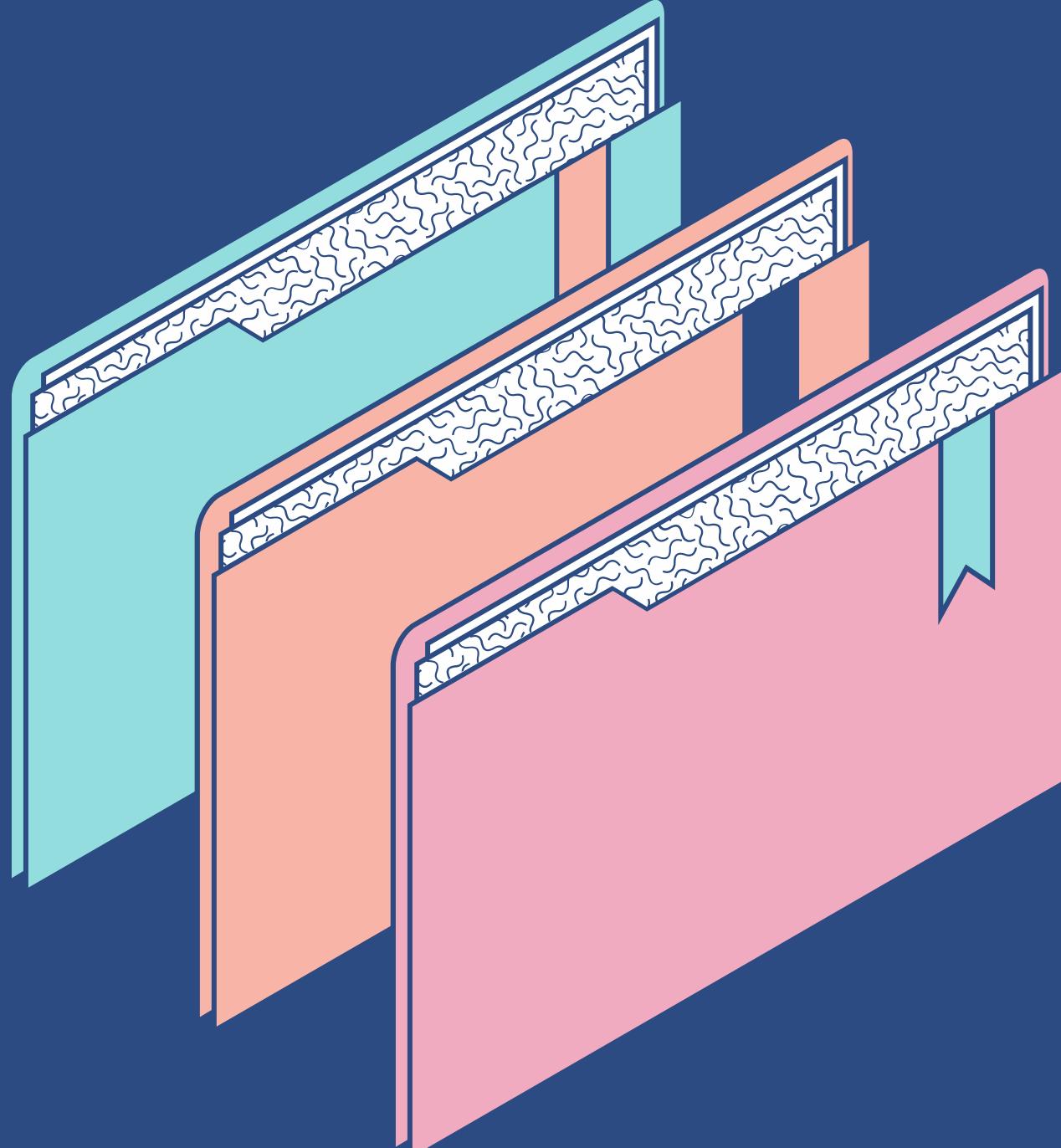


# CODED. Demo

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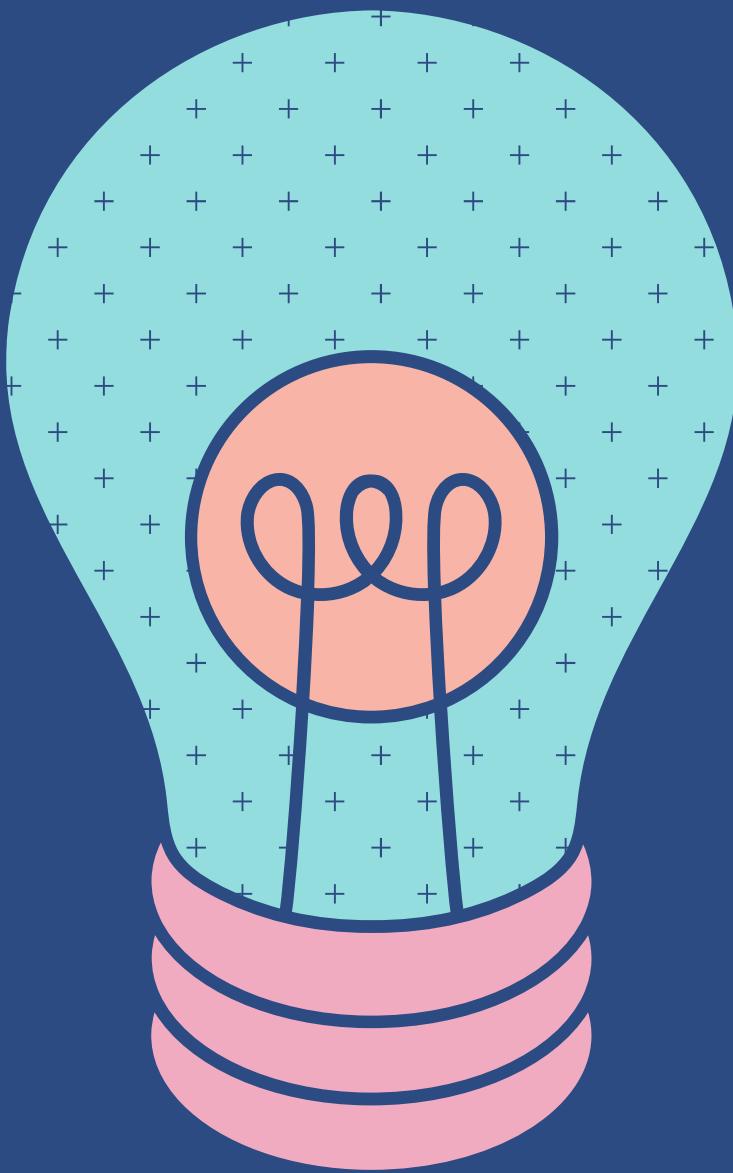
May 10, 2024

# Demo Agenda



PROBLEM DEFINITION  
WHAT IS CODED.  
REAL LAB TESTING  
CURRENT STATUS  
THE ARCHITECTURE  
THE TECHNOLOGIES  
APPLICATION DEMO  
OBSTACLES WE OVERCAME  
LESSONS LEARNED  
BETA TESTING RESULTS  
Q&A

# PROBLEM DEFINITION

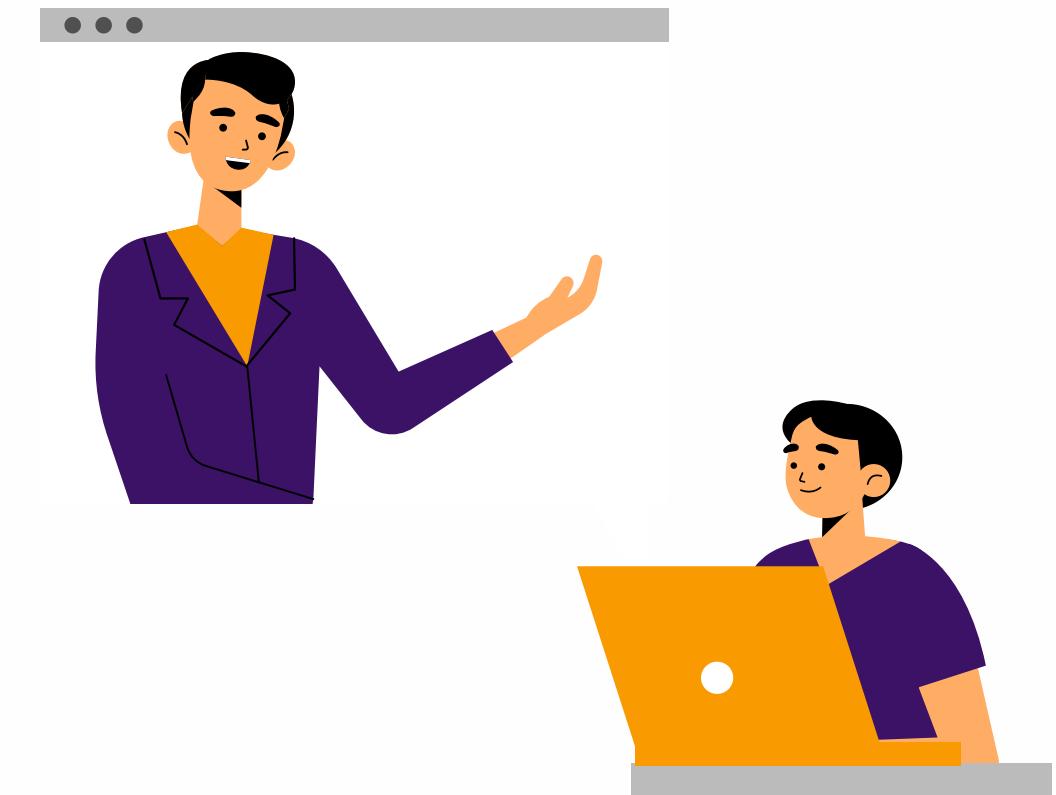




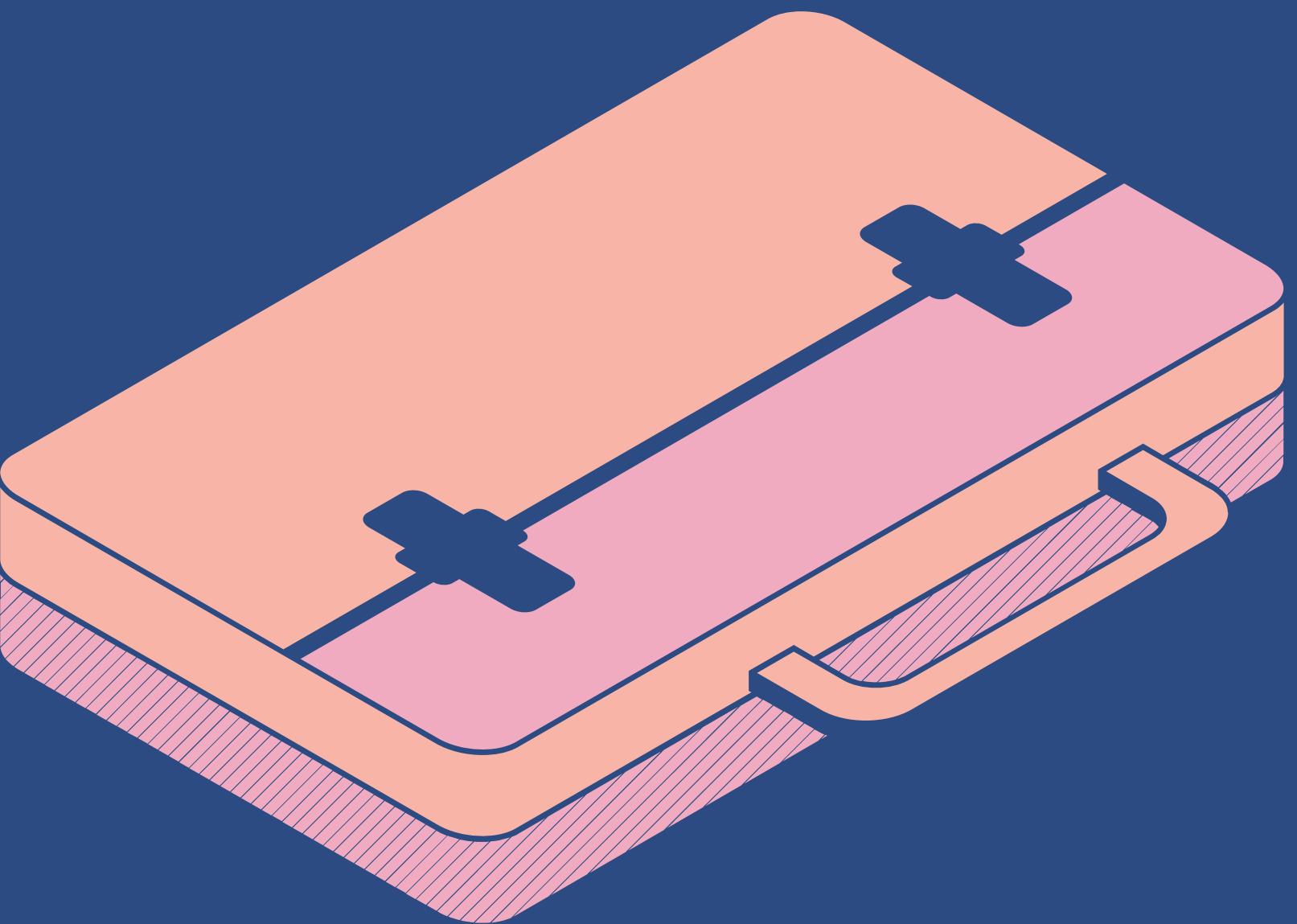
# Bilkent University

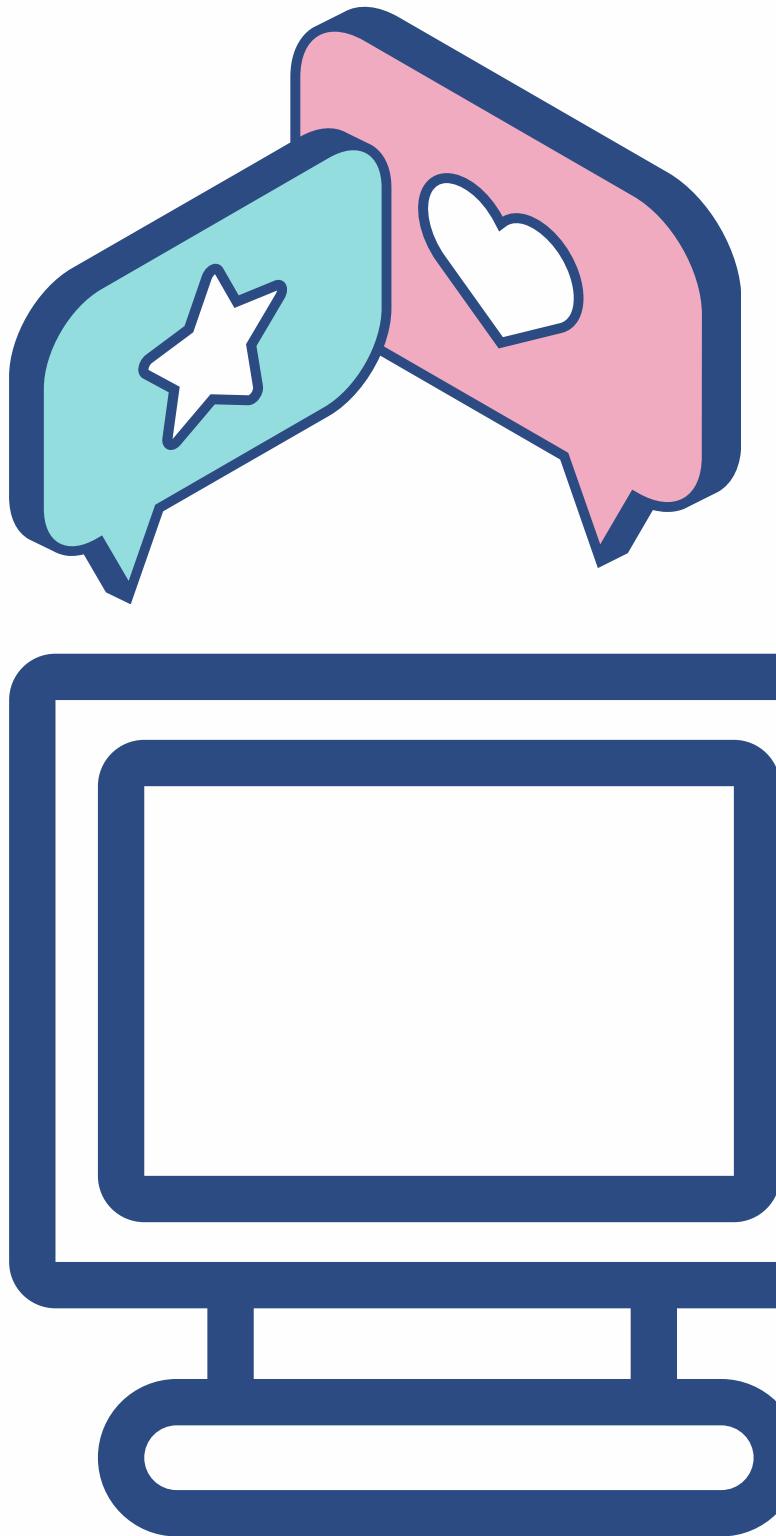
# CS and CTIS departments

- CS and CTIS lab hours - TA's and tutors help
- Not enough tutors
- Tutors are selected among volunteers
  - 1/30 ratio of tutors to students
- Inefficient and unproductive lab sessions from both tutor and student perspectives



# OUR SOLUTION: CODED.





## CODED.

- Web application
- Instructors, TA's, tutors, students
- Chatbot (Generative AI) - Code Analysis - Plagiarism Check - Test Case Runner
- Decreases lab session workload

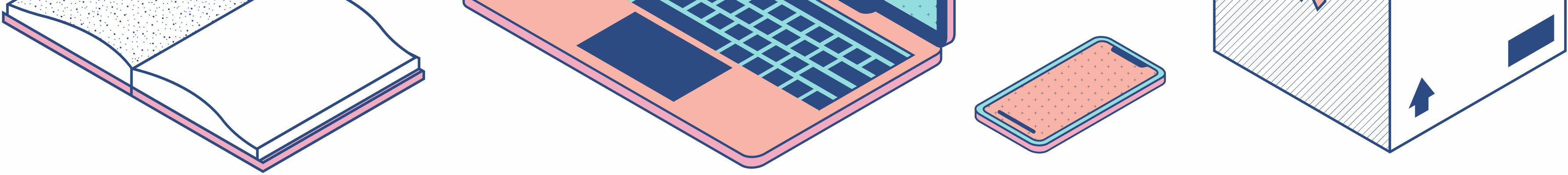


## Chatbot (Generative AI)

- Answers student questions without revealing answers - teaching-based answers
- Does not write code, or give code outputs
- Decreases tutor workload

## Code Analysis

- Locates code smell, errors, bugs, code quality issues, and code security
- Helps students debug faster
- Teaches students to write clean code



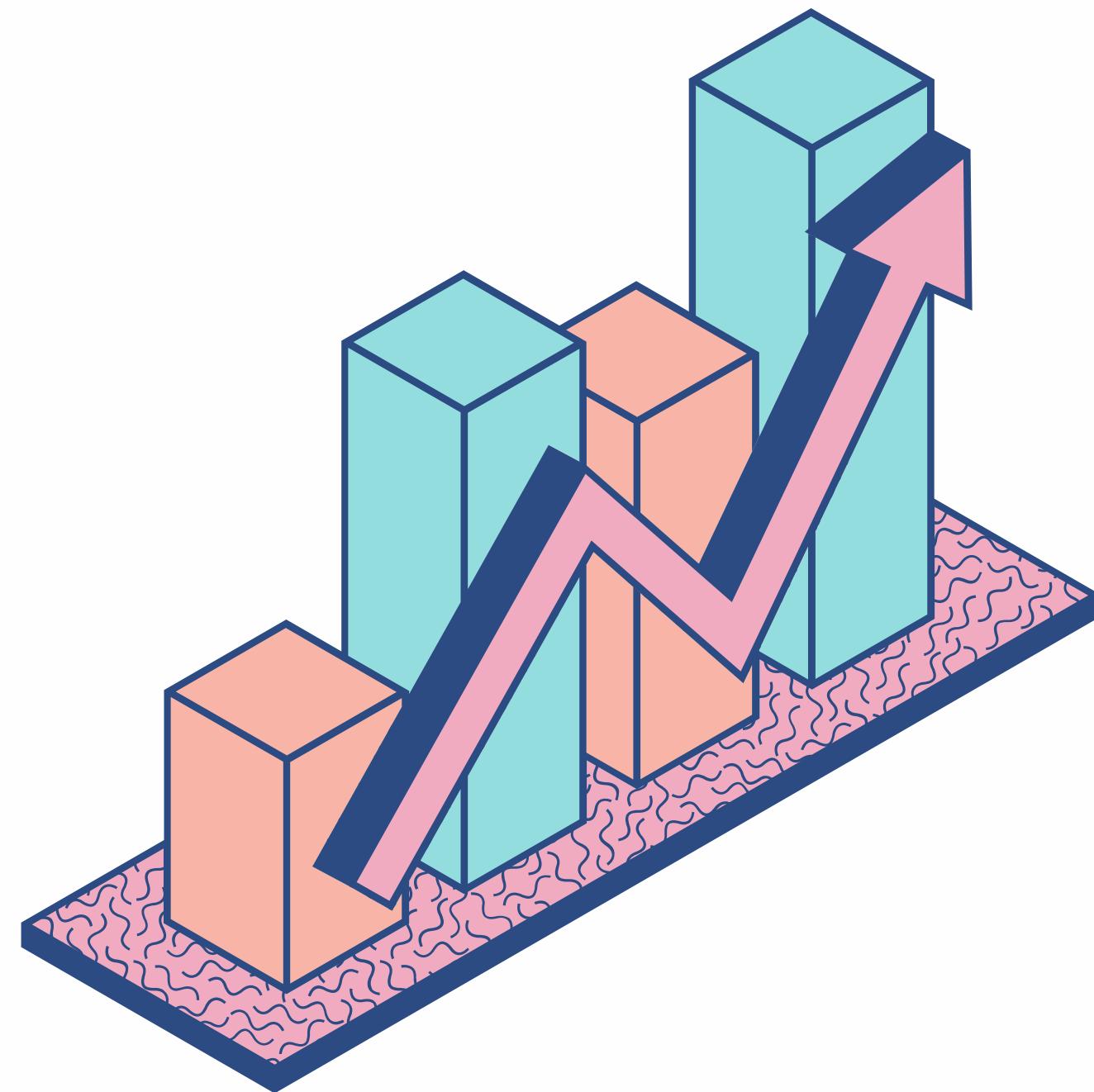
## Plagiarism Check

- Compares code to all codes uploaded to the system
- Plagiarism rate is calculated

## Test Case Runner

- Submission codes are run for the given test cases
- Test cases may be uploaded by the instructor and created by AI

# REAL LIFE TESTING



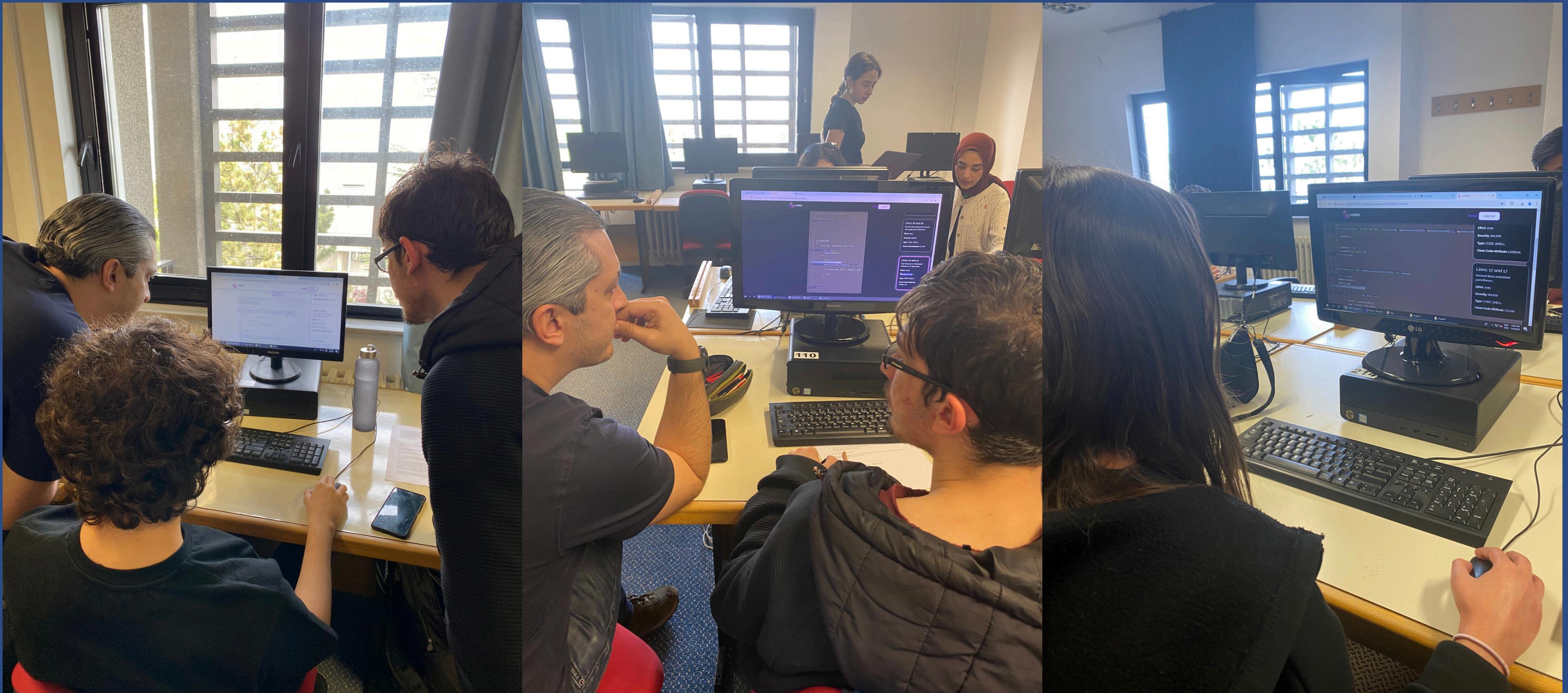
# CS115 - Introduction to Programming in Python (08.05.2024)



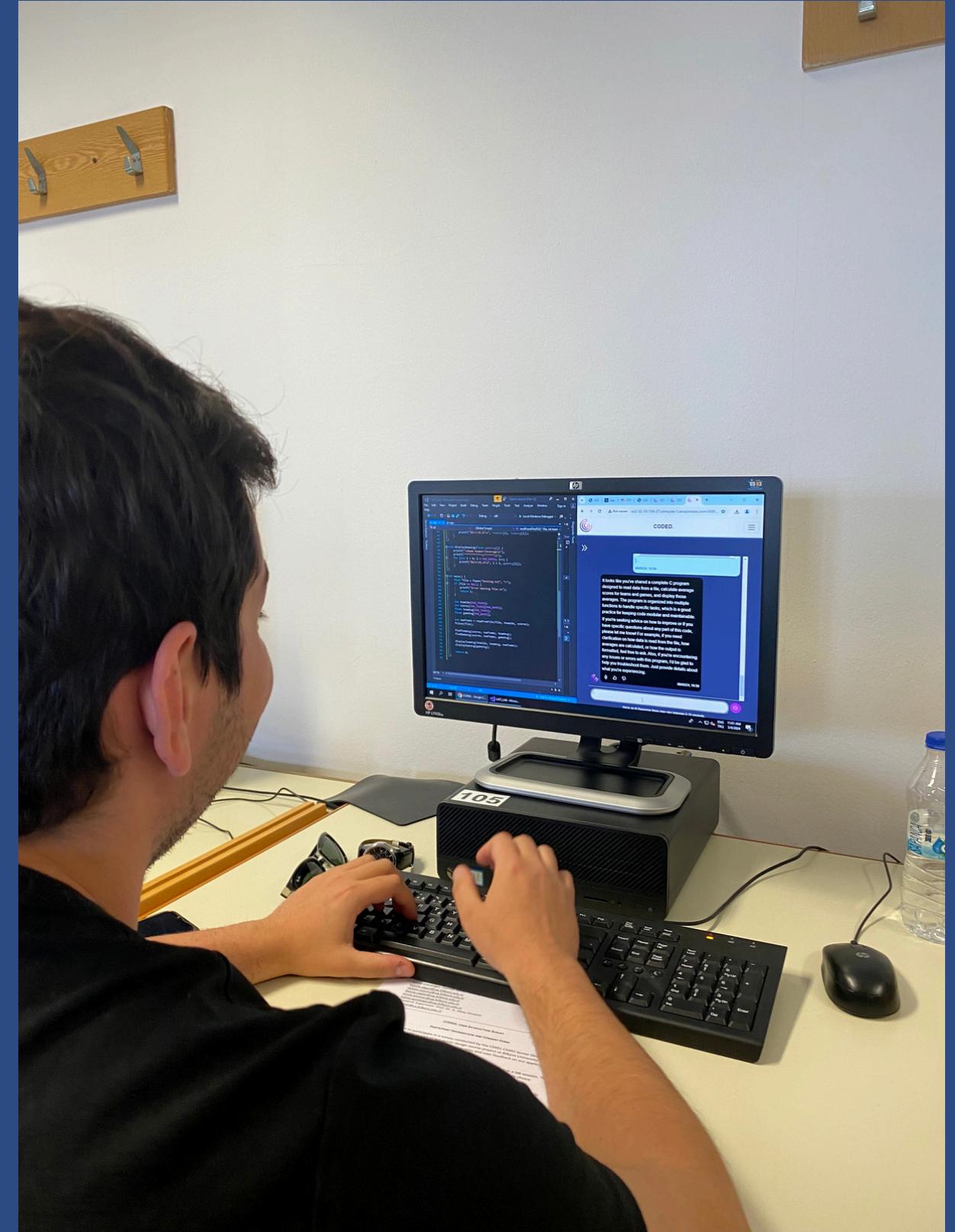
# CS115 - Introduction to Programming in Python (08.05.2024)



# CTIS151 - Introduction to Programming (09.05.2024)



# CTIS151 - Introduction to Programming (09.05.2024)



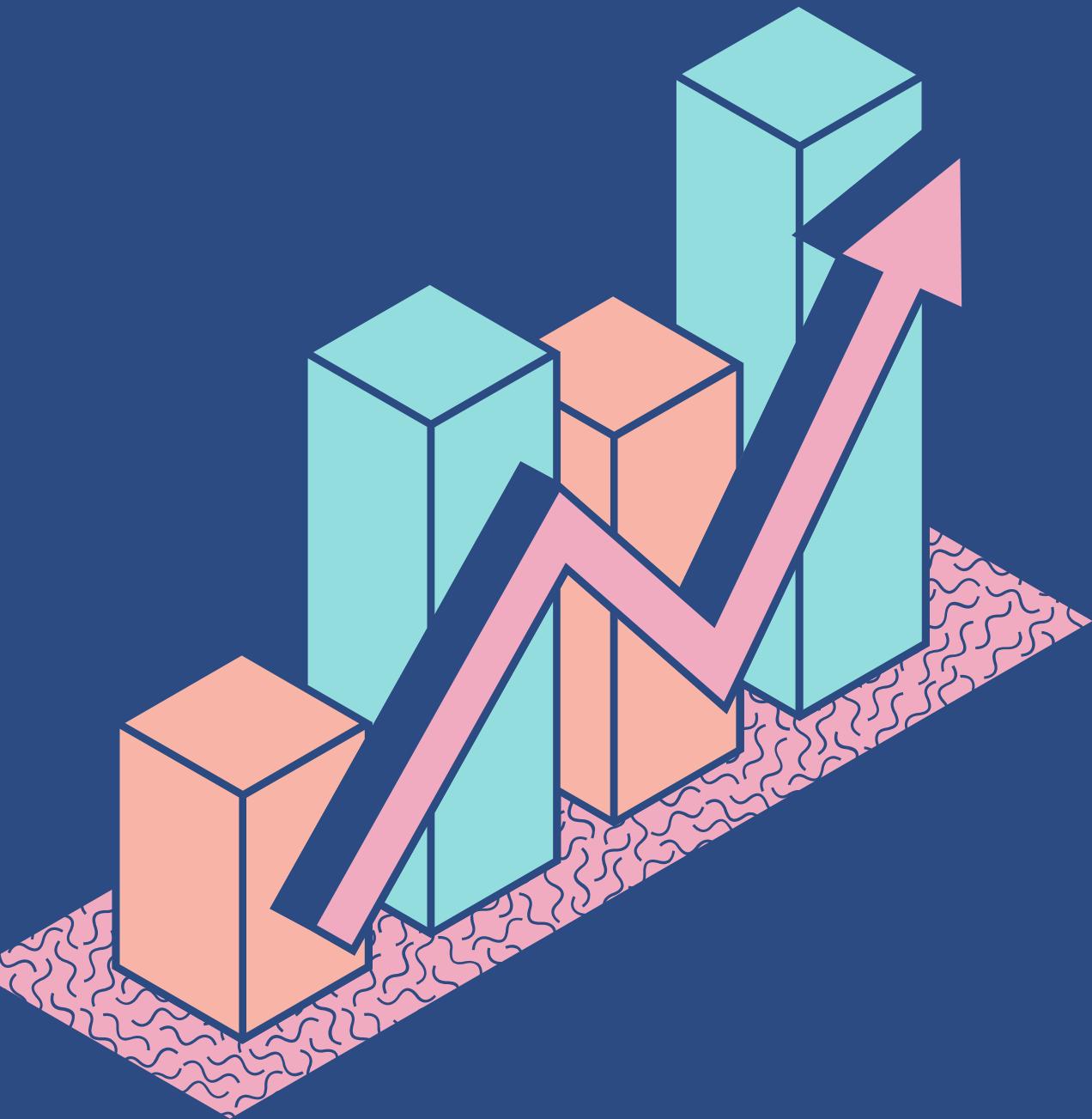
# CTIS152 - Algorithms and Data Structures (03.05.2024)



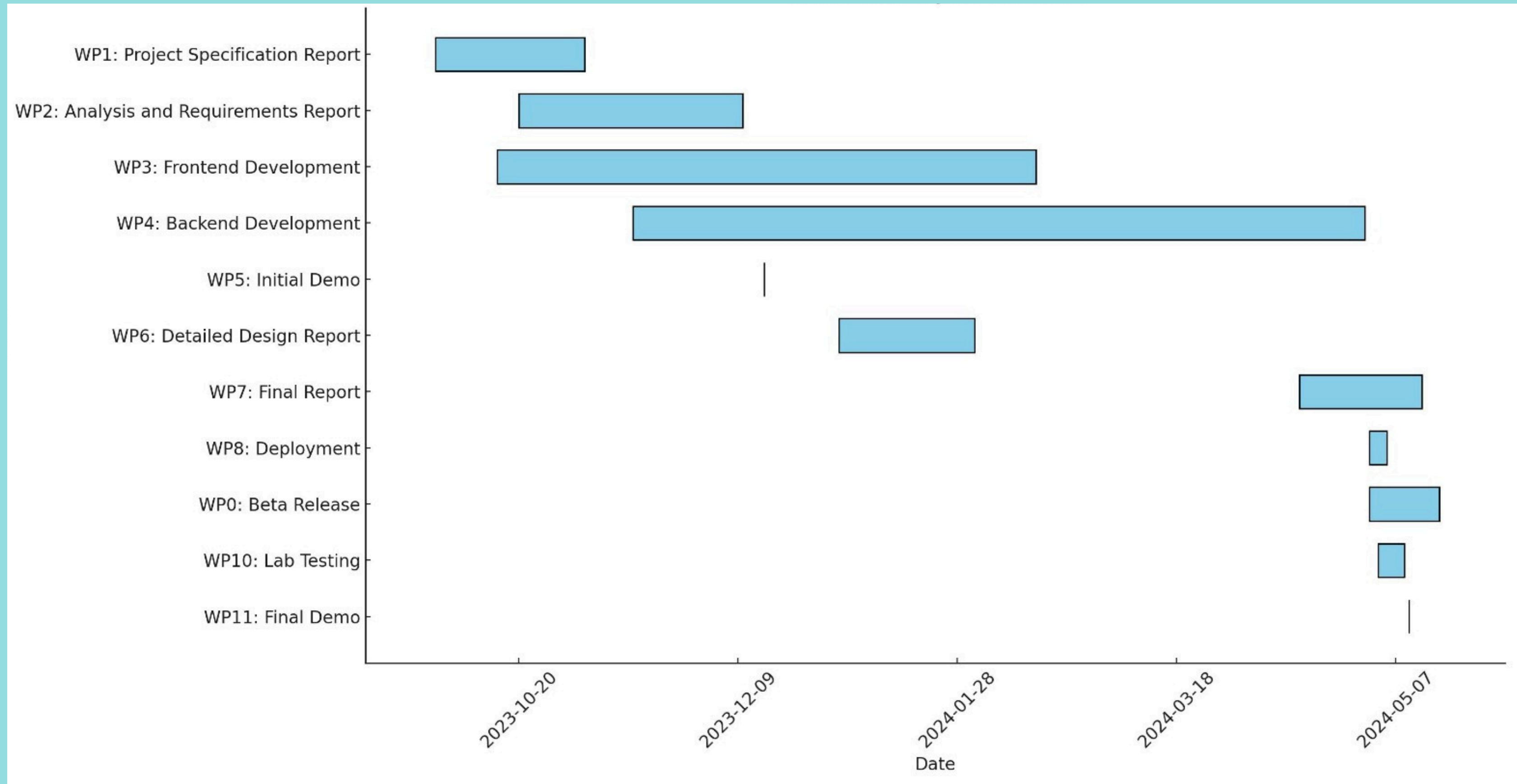
# CTIS152 - Algorithms and Data Structures (03.05.2024)



# CURRENT STATUS

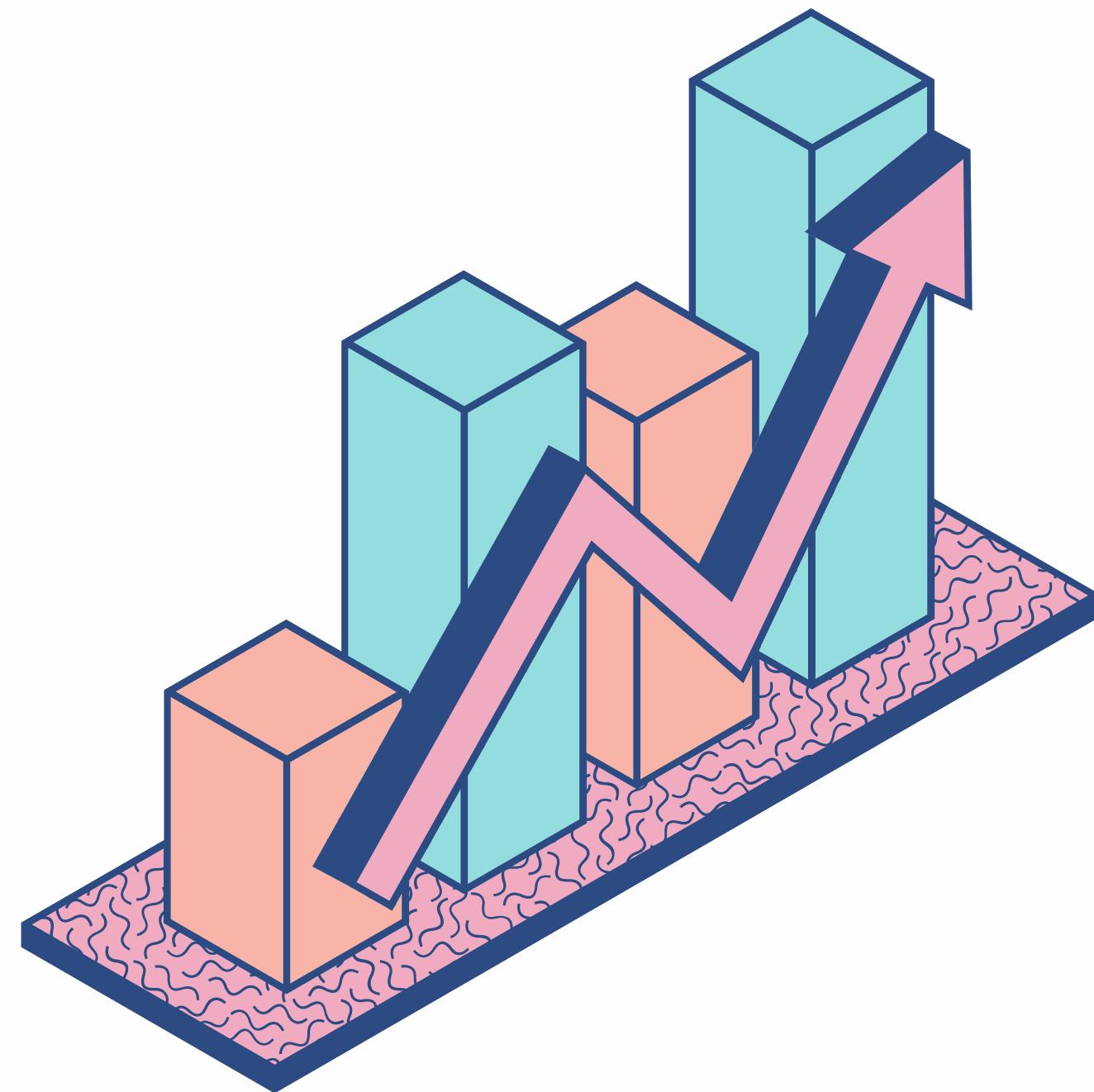


# Current Status and Progress - Gantt Chart

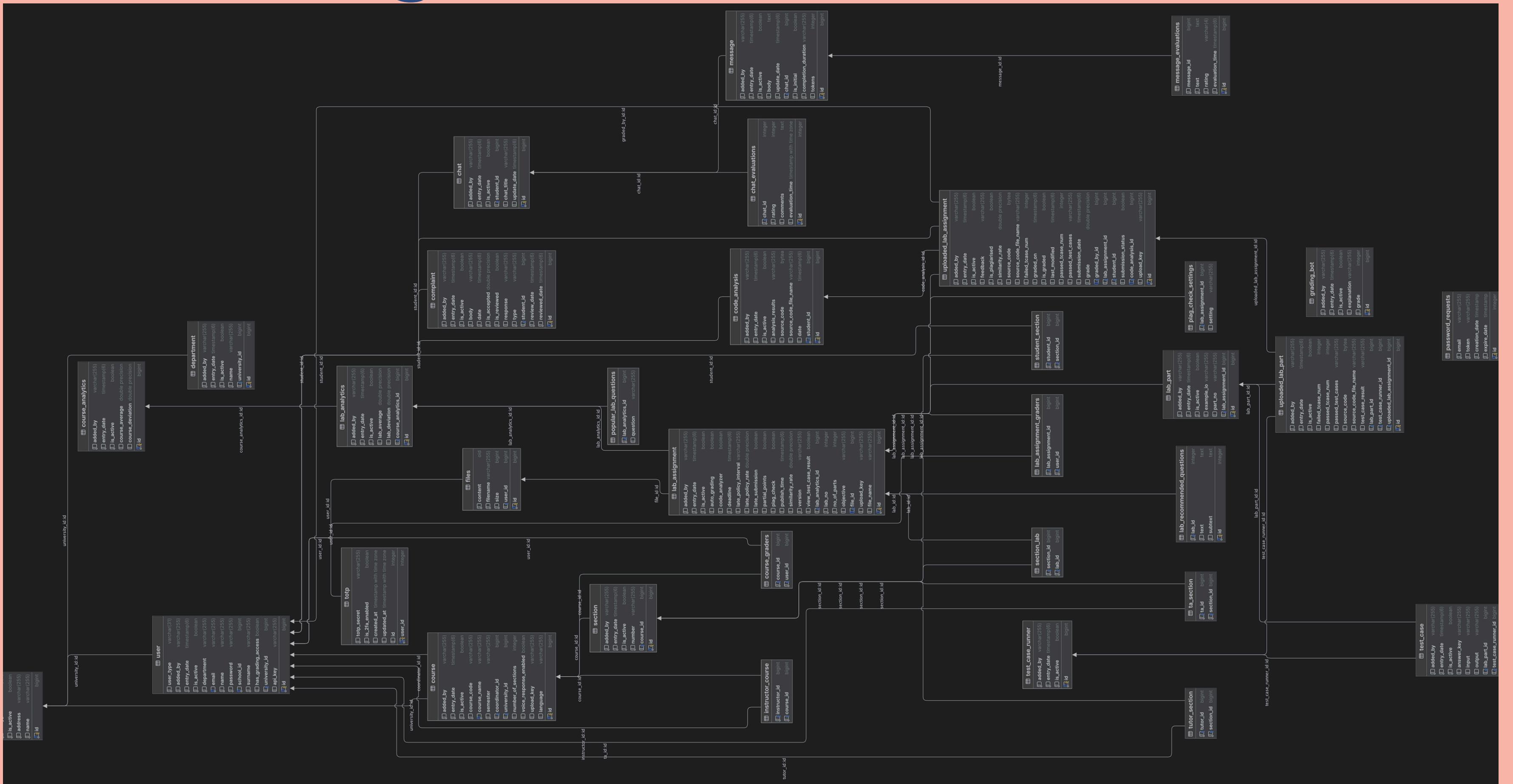




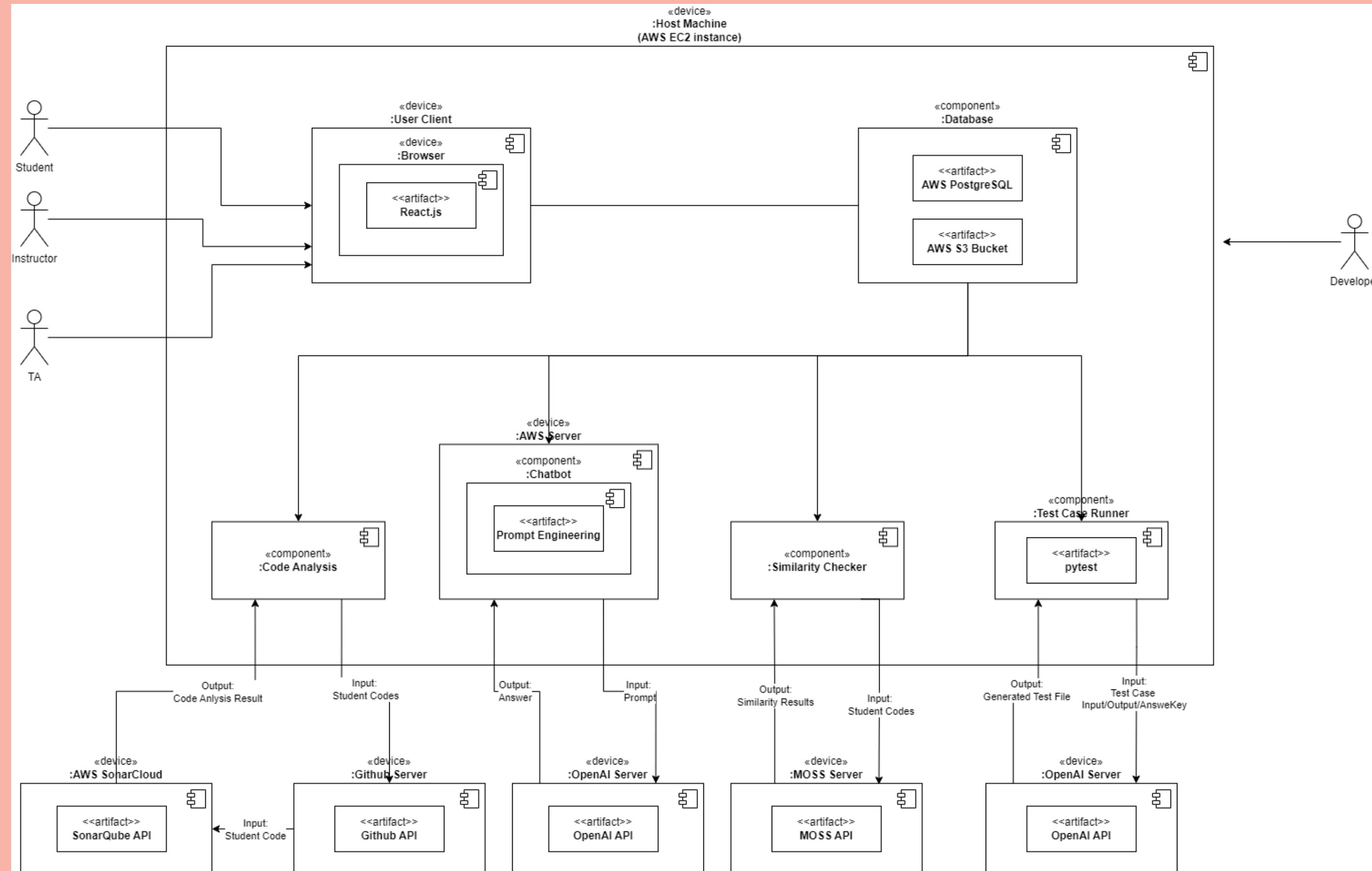
# THE ARCHITECTURE

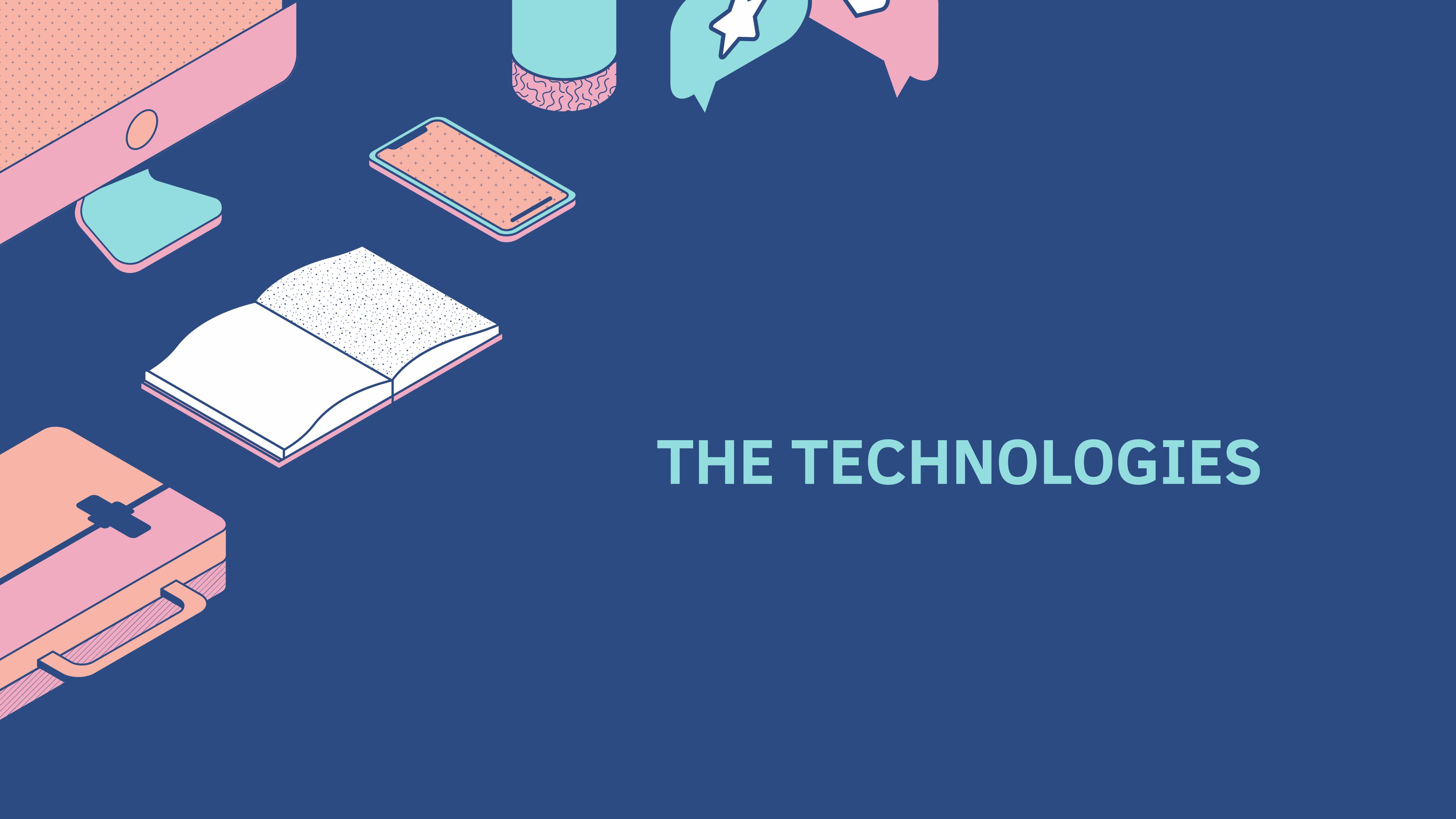


# Database Diagram

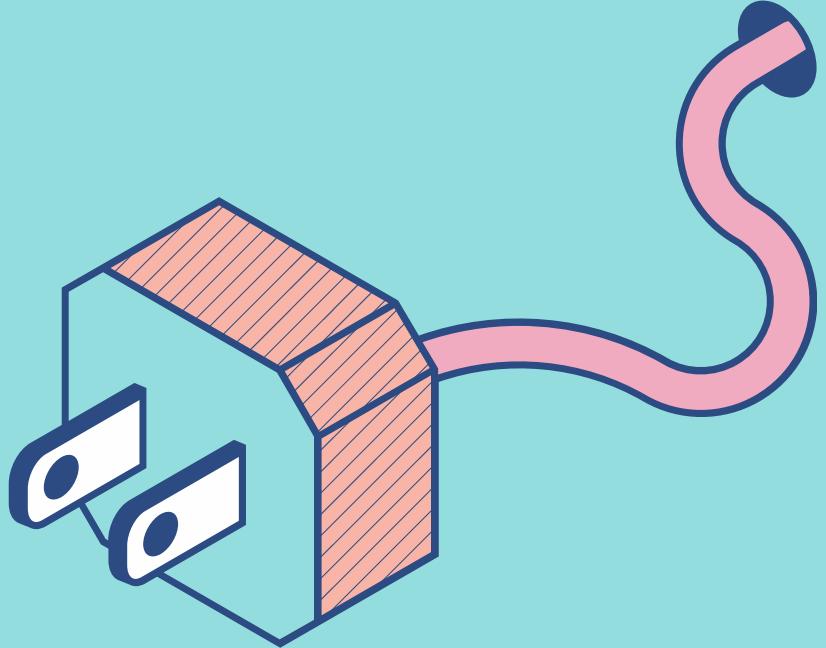


# High Level System Architecture Diagram





# THE TECHNOLOGIES



# BACKEND

## Framework

- SpringBoot

## Chatbot

- OpenAI

## Plagiarism Check

- MOSS

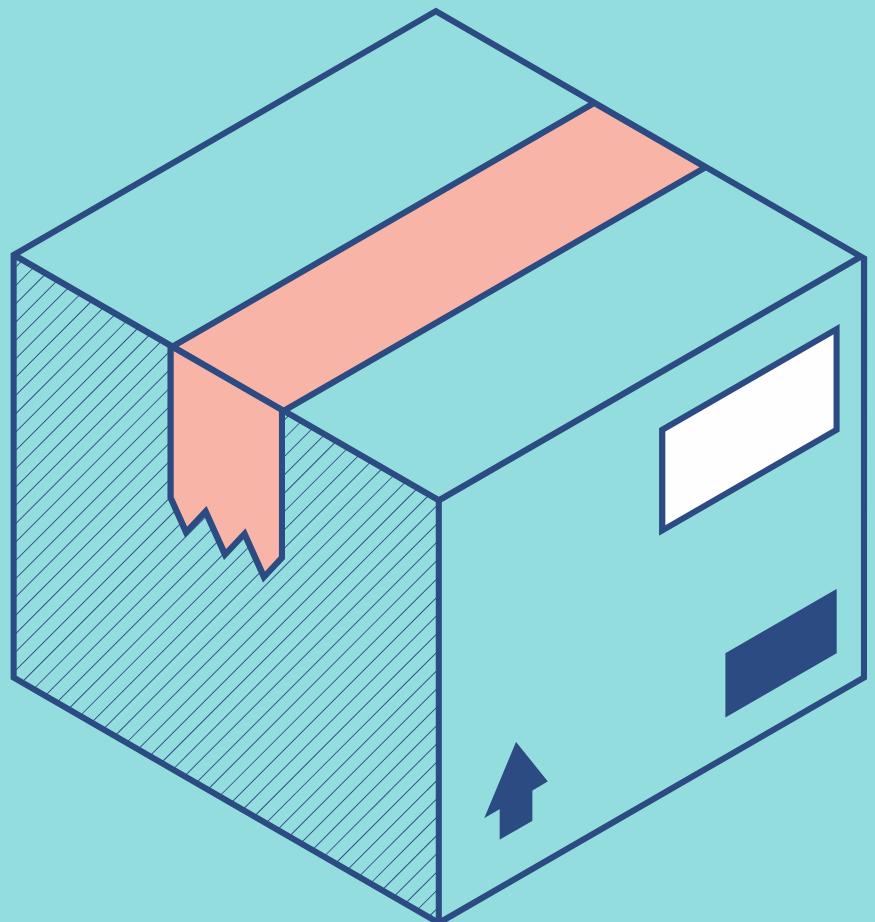
## Code Analysis

- SonarCloud
- GitHub

## Test Case Runner

- pytest





## FRONTEND

- React.js
  - HTML, CSS
- Material UI

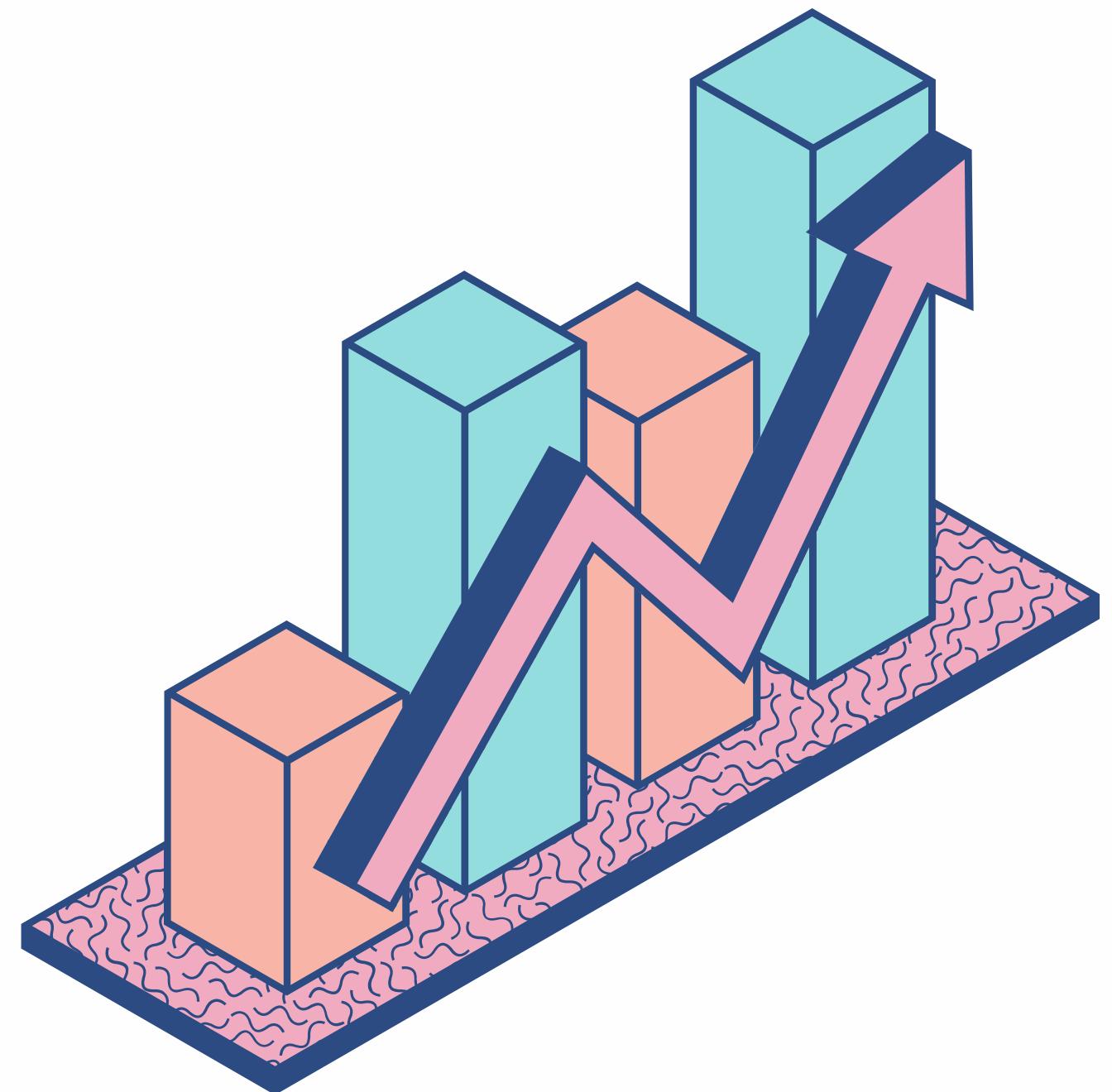
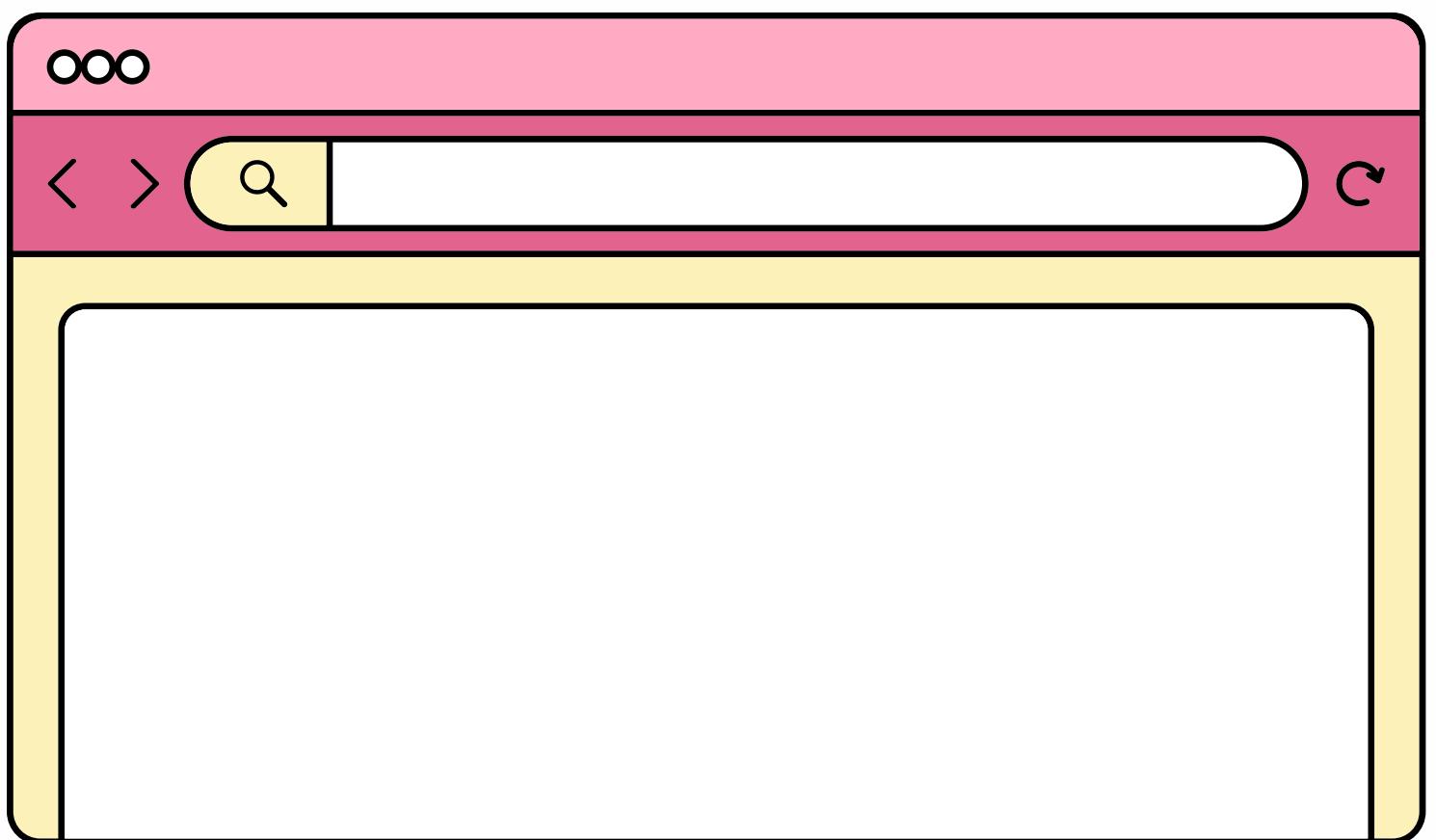
## DEPLOYMENT & DATABASES

- AWS EC2
- AWS PostgreSQL
- AWS S3





# APPLICATION DEMO

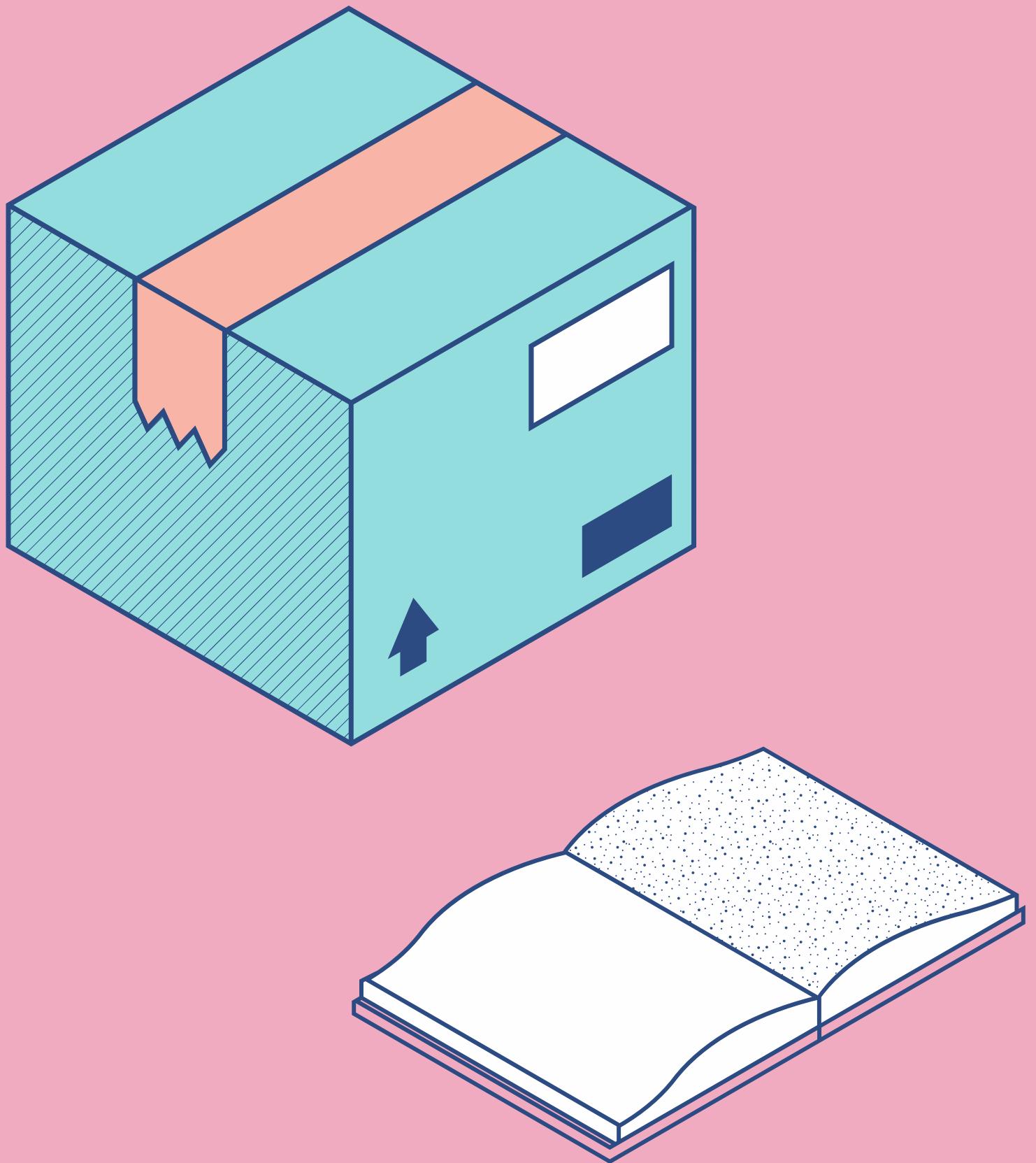


# OBSTACLES WE OVERCAME



# OBSTACLES WE OVERCAME

- ARCHITECTURE DESIGN DIFFICULTIES
  - DATABASE DESIGN
  - CLASS DIAGRAM DESIGN
- IMPLEMENTATION DIFFICULTIES
  - OPENAI RESPONSE TIME
  - SONARQUBE - SONARCLOUD
  - TEST CASE RUNNER
- SERVER DEPLOYMENT PROBLEM

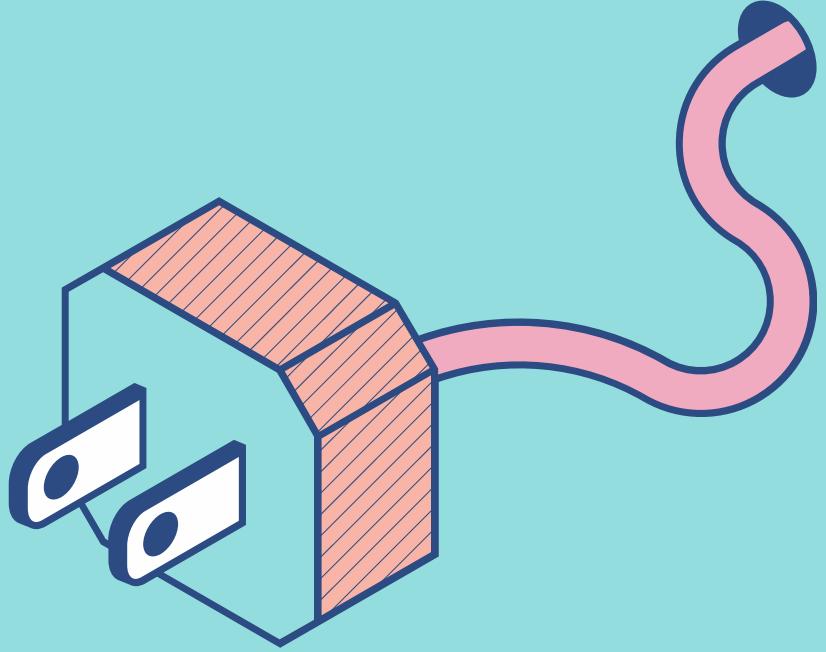
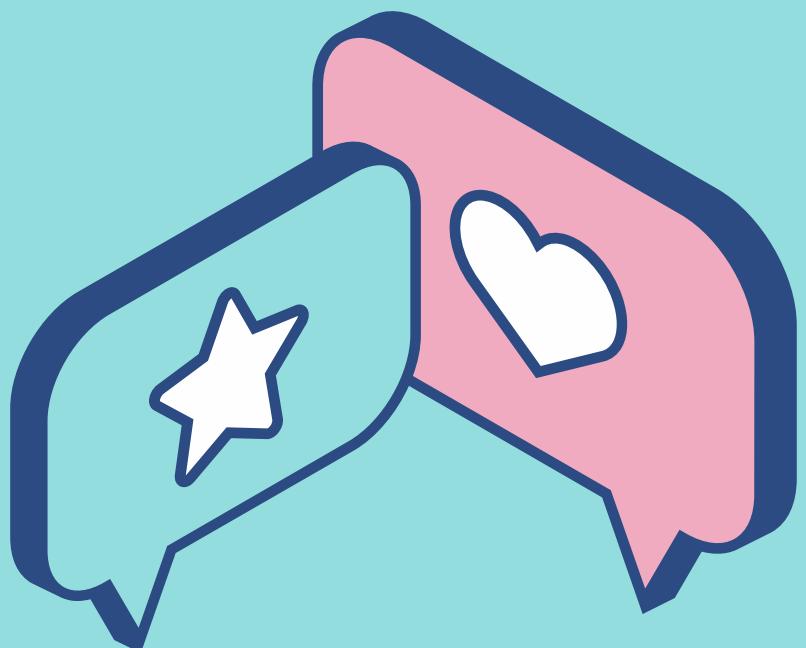


# LESSONS LEARNED



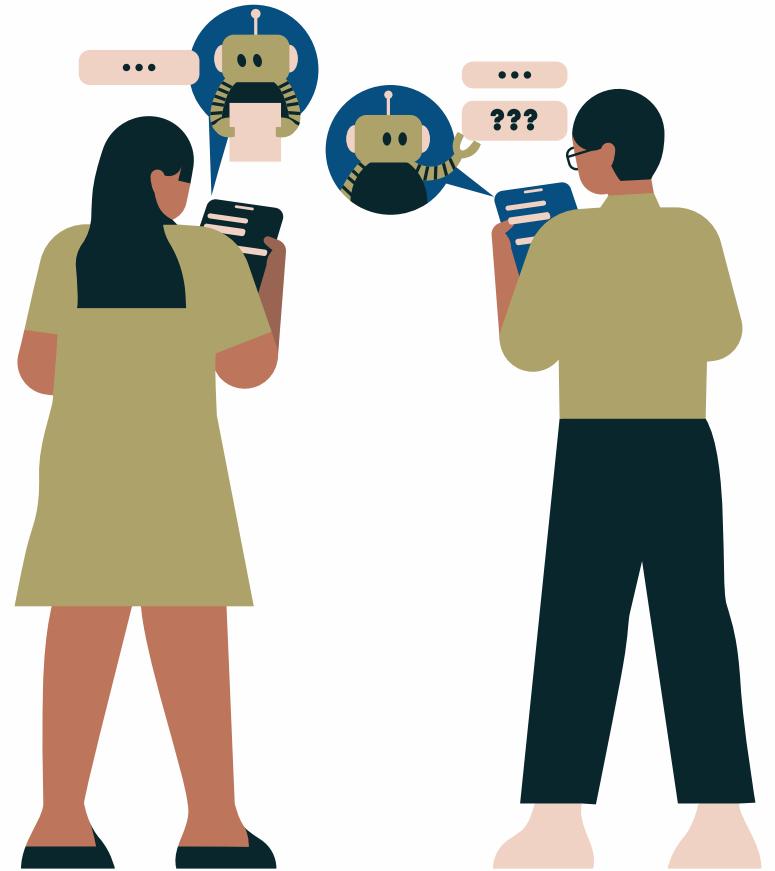
# LESSONS LEARNED

- Importance of Teamwork
- Early planning
- Sticking to the plan
- Weekly progress meetings
- Experimenting with Tools
- Testing with real users
- Making use of the feedback



# BETA TESTING RESULTS





**90.8%**

of participants are satisfied  
with the chatbot's answers.



**86.4%**

of participants find Code  
Analysis tool beneficial.

(\*)According to the survey conducted in Bilkent University.

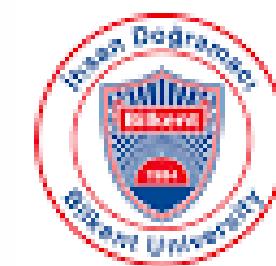
# $\sim$ 2 Seconds

Chatbot's average response time.



(\*)According to response time data in CODED. database.

# SPECIAL THANKS TO



**Bilkent University**  
Faculty of Applied Sciences  
Department of Information Systems and Technologies

# Q&A



**THANK YOU FOR  
YOUR TIME!**

