CS 319 Object-Oriented Software Engineering
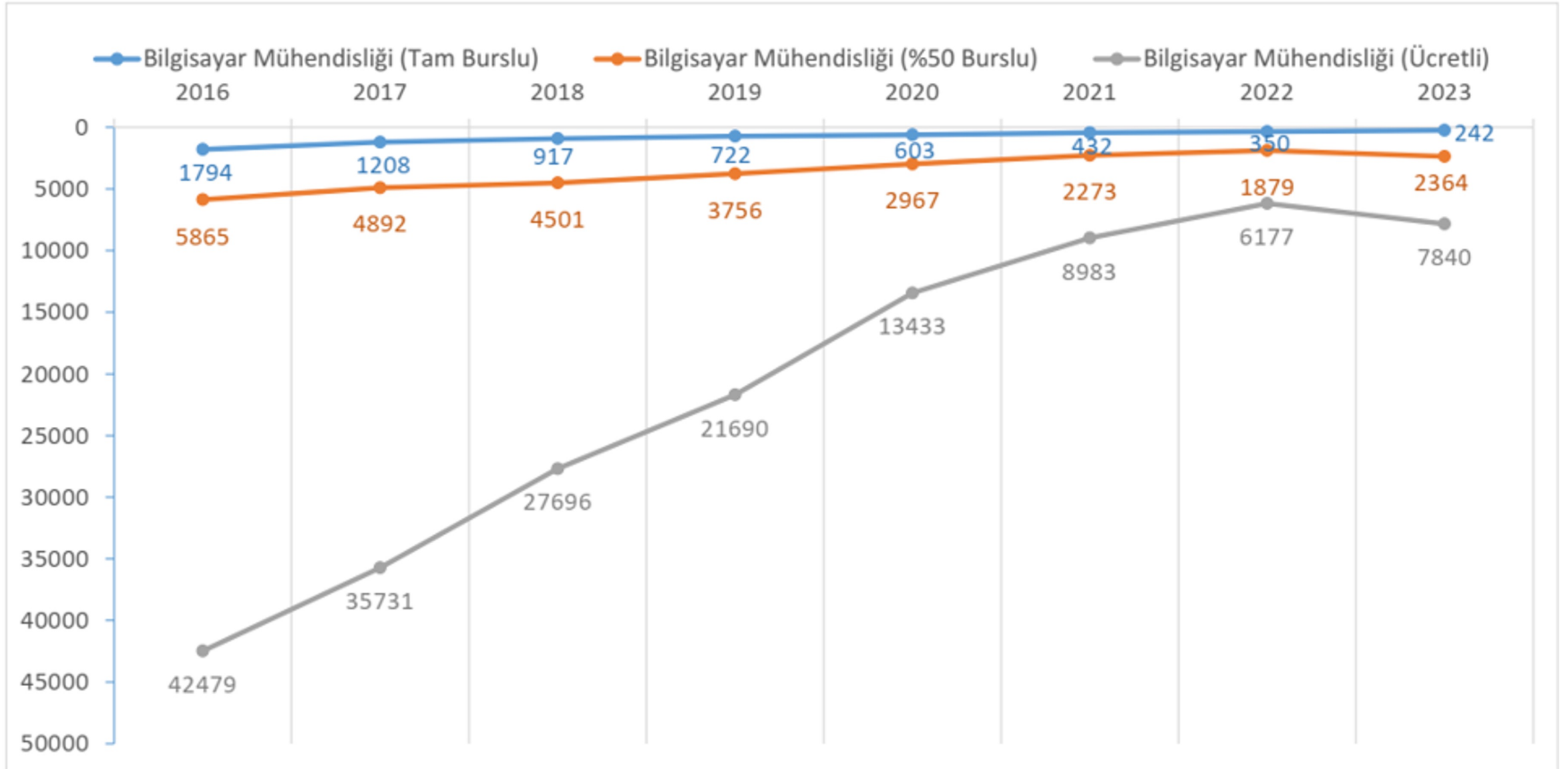## *0 – Introduction*

Eray Tüzün, Phd

e-mail: eraytuzun@cs.bilkent.edu.tr

Bilkent University

Investment Advice ☺️

My assumptions and expectations

Proficient in any programming language, but you have limited experience in analysis or design of a system

CS 201

Wants to be a Software Engineer /wants to learn

Internship experience? (poll)

For Team project
    Being a committed team member

Feedback / Class Participation

Share your thoughts

Ask questions – wave your hand forcefully (~~just unmute your mic and talk~~) to get my attention

If there is something you do not understand –– ASK!

There are no stupid questions!!!!

If you have a relevant comment, experience, anecdote –– SPEAK!

Participation will make the class better!!!!

During Lecture…

- ~~Please open up your webcams~~
- Try to concentrate
- Participate (Ask questions / Interact)
- ~~No recording~~

Logistics

- Github (Code)

- Google docs (Documentation)

- Visual Paradigm (UML models) / PlantUML

- ~~Zoom (for classes and~~ term project group meetings~~)~~

- Polleverywhere (for polls)

- **Slack for peer learning and group formation**
  - Make sure you are already logged in …
  - https://join.slack.com/t/cs319-bilkent/shared_invite/zt-23bmlqwsy-kPYkL-3grCmQmcIyXevbLQ

Your Expectations

What are your expectations of the course?

What do you want to learn?

…

Please go to https://pollev.com/erayt350

And express your opinion…

Granularity of Software

Trivial: <1 month, 1 programmer, 500 LOC

   Ex: Intro programming assignments

Very small: <3 months, 1 programmer, 2000 LOC,

   Ex: Course project

Small: <1 year, 3 programmers, 50K LOC,

   Ex: Mobile App

Medium: 3 years, 10s of programmers, 100K LOC

   Ex: Optimizing compiler

Large: 5 years, 100s of programmers, 1M LOC,

   Ex: MS Word, Excel, Linux, Windows

Very large: 10 years, 1000s of programmers, 10M LOC

   Ex: Tesla, Air traffic control, Telecommunications, space shuttle

Granularity of Software

- https://www.businessinsider.com/how-many-lines-of-code-it-takes-to-run-different-software-2017-2

WEEKS OF PROGRAMMING
CAN SAVE YOU
HOURS OF PLANNING

Programming != Software Engineering

Programmer vs Software Engineer

chat.openai.com/chat

er Vs Softw

Management Syst

e Research Compil

t Register Class Jav

ent Course Registra

e What is the difference between a programmer and a software engineer? I am asking for a friend

The terms "programmer" and "software engineer" are often used interchangeably, but there are some differences in the skillset and responsibilities they typically have. A programmer is a person who writes code, whereas a software engineer focuses on the design, development, testing, and maintenance of software. A software engineer generally has a broader range of skills and may be involved in the full software development life cycle, while a programmer is typically more specialized in writing code.

Analogy with Bridge building

- Over a stream – easy, one person job

- Over river nile … ? (The techniques do not scale)

90143538 © Michel Petit / NPL / Minden Pictures

Large-Scale Software-Engineering

Project involves a team of people – need to manage process, people and artefacts

System takes a long-time to build – need to plan

Systems are complex – need powerful tools, methods and technologies

Need to reuse code/designs/process

❖ > 300 Engineers
❖ > 10.000.000 LOC
❖ > 10 years!

❖ > $100.000.000
❖ > 10.000.000 LOC

https://www.havelsan.com.tr/en/sectors/defense-and-security/air/strategic-c2is/havelsan-ticcs

Effort, Software Size, & Complexity
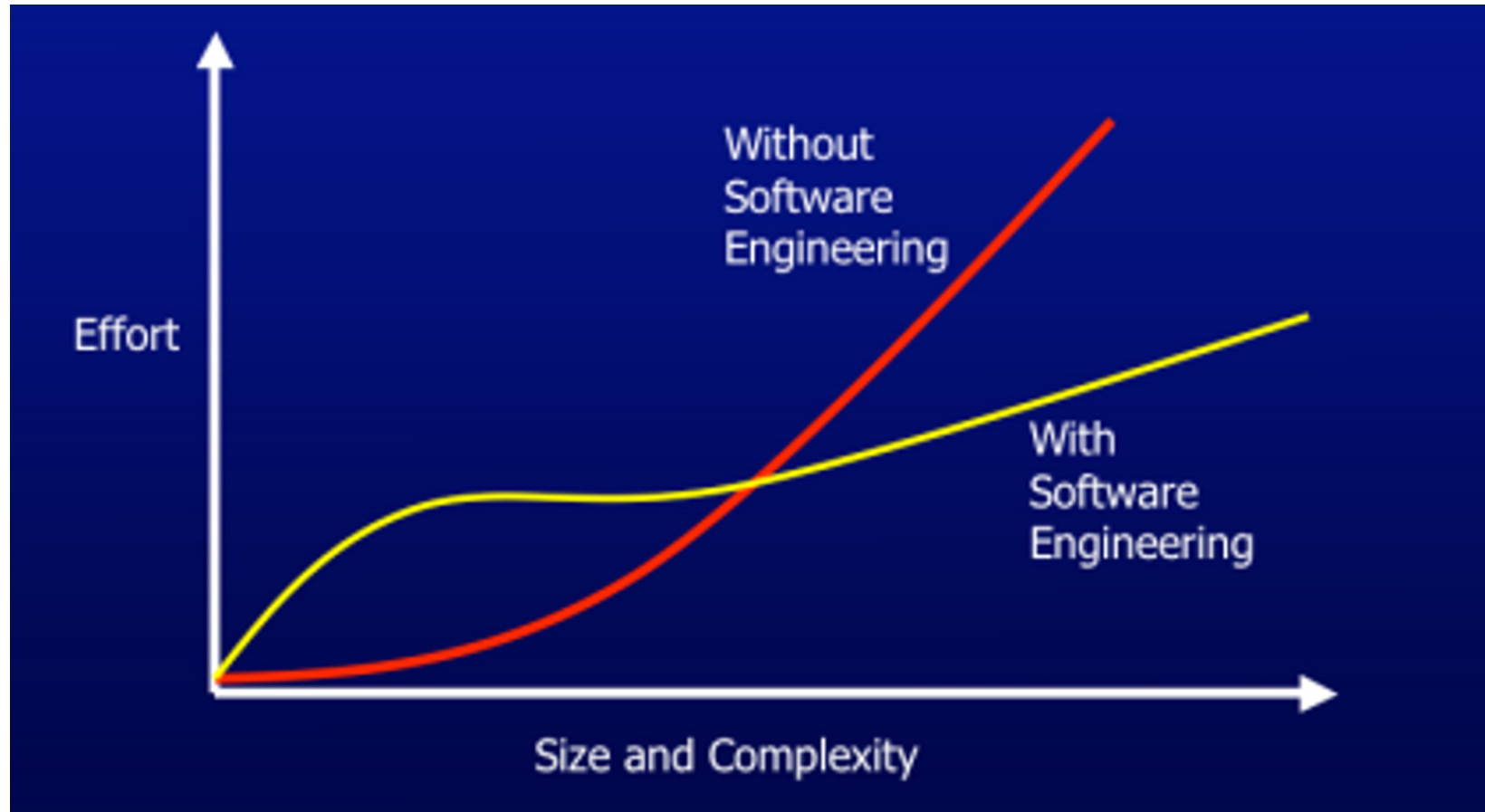
Course Objectives

- Learn basics of the software engineering (SE) process life cycle.

- Learn what the object-oriented (OO) approach to software development is, through OO principles and design patterns.

- Learn UML (Unified Modeling Language) that is part of most CASE (Computer Aided Software Engineering) tools and the benefits of visual modelling / diagramming.

- Practice the application of principles of object-oriented software development through the course group project.

- Develop teamwork and communication skills through the course group project.

What will you really gain from this course?

YourCV ++

- UML
- Git
- Design Patterns
- Analytical Thinking
- Requirements Analysis and Design
- Visual Paradigm
- Slack

Programming vs Software Engineering (Programmer – > Software Engineer)

Building software from scratch

CV writing tips

Working with a group

Outline

Intro to SE (Chapter 1)

Modeling w/ UML (Chapter 2)

Project Organization and Communication (Chapter 3 Sections 3.1 – 3.3)

Requirements Elicitation (Chapter 4)

Requirements Analysis (Chapter 5)

System Design (Chapters 6 & 7)

Object Design (Chapters 8 & 9)

Mapping Models to Code (Chapter 10)

Testing (Chapter 11)

Contact Information

Eray Tüzün

- email: eraytuzun@cs.bilkent.edu.tr

- Office hours: Will be announced later

- Use Slack channels first!

- Talk to your TA first!

- Ask me any questions in the class

Class webpage:
http://www.cs.bilkent.edu.tr/~eraytuzun/teaching/cs319/

Weekly Schedule

Schedule of CS 319-001					
	Mon	**Tue**	**Wed**	**Thu**	**Fri**
08:30 09:20	EE-412				
09:30 10:20	EE-412				
10:30 11:20					
11:30 12:20					
12:30 13:20					
13:30 14:20			EE-412		
14:30 15:20			EE-412 (S)		
15:30 16:20					
16:30 17:20					
17:30 18:20					
18:30 19:20					
19:30 20:20					
20:30 21:20					
21:30 22:20					

* Throughout the semester, we will be using the two-hours blocks, we will be cancelling few of the 2-hour blocks through out the semester.

Textbooks

Recommended - Textbook: Head First Design Patterns, 2nd edition, O'Reilly Media, 2020.

Required - Textbook: Object-Oriented Software Engineering, Using UML, Patterns, and Java, Bernd Bruegge and Allen H. Dutoit, 2010/3rd, Pearson

Grading (Tentative)

	Type	Total Contribution
1	Final:Essay/written	33
2	Project	45
3	Midterm	20
4	Attending project presentations	2

- Those students who fail to get a minimum of 17 out of 65 points will get an FZ
- Attendance is not mandatory except the final week.

Plagiarism

All individual assignments must represent your own work.

No collaboration is permitted during the quizzes, the final examination, the individual labs, and the assignments. Collaboration among team members is permitted for the term project.

Plagiarism is to take and use as one's own, or copy without acknowledgement, the works of another person. The provider of such material can be ruled equally culpable.

Term Project – 2020
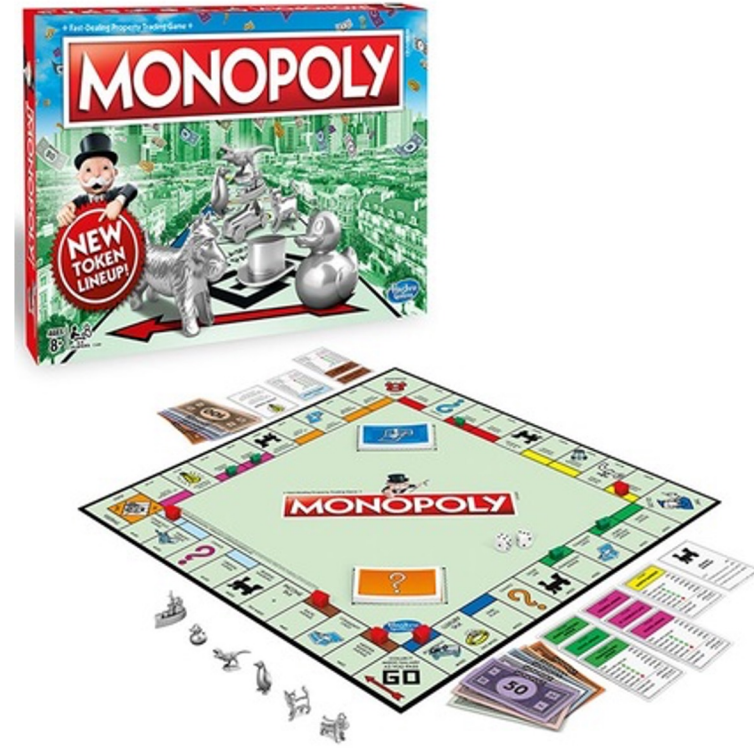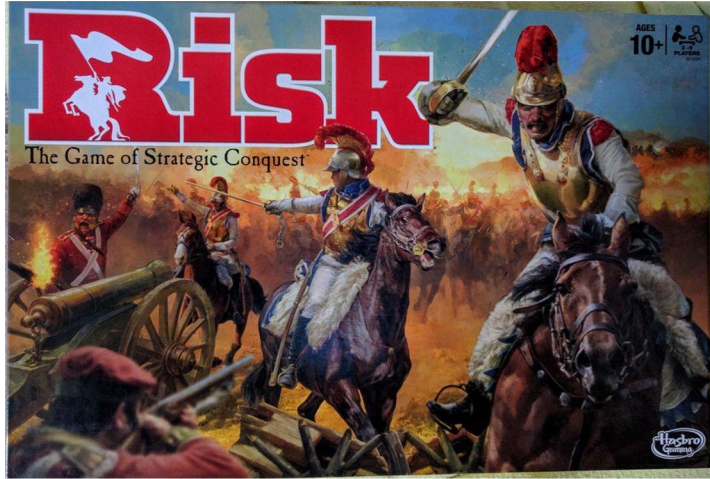
* 5 teams per each game – First come first serve

Term Project 2021

- Classroom helper
  - Group formation
  - Peer review
    - Term project team member assessment
    - Reviewing the other's group work
  - You are expected to extend the requirements after the requirement analysis
  - **Best group's software will be used next semester**.

- Tools
  - Documentation: Google docs
  - Source control: Github

Term Project Fall 2021

- Pandemy Manager for University
  - Managing HES codes/ Vaccine & PCR status
  - Keeping track of quarantine status of students
  - ....
  - You are expected to extend the requirements after the requirement analysis

- Tools
  - Documentation: Google docs
  - Source control: Github

Term Project Fall 2021

- Student Club Manager
  - Managing activities
  - Managing users
  - Announcements, events …
  - ….
  - You are expected to extend the requirements after the requirement analysis

- Tools
  - Documentation: Google docs
  - Source control: Github

Term Project 2022 Spring

- **Gym Management System (For Bilkent University)**
  - Gym reservation
  - Field reservation
  - Scheduling courses

  - …

- **Health Center Management System (For Bilkent University)**
  - Doctor appointments
  - Medical history
  - Handling COVID status, vaccines etc.

  - …

Team Project 2022 Fall

- Erasmus Application Manager

  – https://w3.bilkent.edu.tr/bilkent/outgoing-students/
  – http://www.cs.bilkent.edu.tr/~exchange/
  – http://www.cs.bilkent.edu.tr/~exchange/exchange_faq.html

Customer : Can Alkan and Ayşegül Dündar

Team Project 2023 Spring

- Internship Management System

  - http://www.cs.bilkent.edu.tr/~staj/staj.html
  - http://mf.bilkent.edu.tr/?page_id=844

  Customer : Faculty of Engineering (Dean and Department chairs)

Team Project 2024 Fall

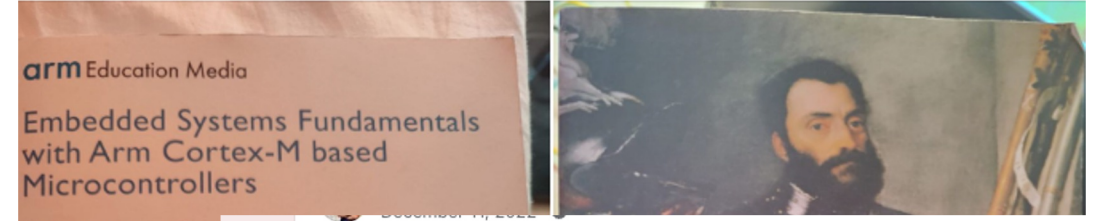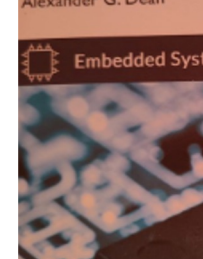# Team Project 2024 Fall

Can Şeker
September 4 at 1:27 AM · 🌐

Hayrına elimdeki phil/hum kitaplarını kullanacak birine vermek istiyorum kütüphanemde boş duracağına, bazı yerlerin altları çizili ufak notlar falan var ama orjinal üçü de. Plato/Republic, Homer/The Illiad ve John Locke/Second Treatise of Goverment. Orjinal olmayan Rousseau's Political Writings ve Hobbes Levatian da var.

1 comment

👍 Like   💬 Comment   ⊙ Send

Write a comment...   😊 ☺ 📷 GIF 🏷

Ağaç Kakmayan
selam
plato
john locke
Rousseau
Hobbes
alabilirim. Bu dönem kullanıp yine ücretsiz şekilde aktarımını da sağlayabilirim

Like   Reply   1w

Burkay Güler
January 30 · 🌐

Selamlar, bana su iki hum112 kitabi lazim. Uygun fiyata satmayi dusunen varsa yazabilir.

- Shakespeare, William. The Tempest. Ed. Stephen Orgel. Oxford: Oxford UP, 2008.
- Shelley, Mary. Frankenstein. Ed. Maurice Hindle. New York: Penguin Classics, 2003.

👍 Like   💬 Comment   ⊙ Send

00:06   4G %80

← 🔵 **Satılık Everest Crystal...** › ⋮
         350 TL

🎫 2020 tarihinden bu yana üye
📍 27090, Şehitkamil TR

Dün

S Fiyatta pazarlık payı var mı?
                                      15:06

150 ye alayım
      15:06

                    kardeşim git başka
                                  15:41 ✓

                          kasa bak
                              15:41 ✓

Evet, halen satılık **Teklifin nedir?** **Üzg**

📍 Mesajını buraya yaz...   💬 👍

◁   ○   □

Team Project 2024 Fall

"CampusConnect: Your University's Social Marketplace"

Welcome to CampusConnect, the exclusive social network designed exclusively for your university community! Whether you're a student, faculty member, or staff, CampusConnect is your go-to platform for all things related to **second-hand sales, lost and found items, borrowing, and donations**, and so much more… *

- Strictly Bilkent only network (Back to local social networks again? Harvard, 2004 Facebook)
- Carefully analyze your competitors; Instagram (Bilkent_itiraf_ediyor), Facebook, LetGo ….
- Your job is to prioritize the needs and requirements.
- We will select the best term project group (among around 35 groups) and help them commercialize their idea in 2024.

* ChatGPT was used to create portions of this slide ☺

Term Project

Working on a team

- Agree on rules
- Agree on a plan
- Start right away
- Meet regularly
- Pull your weight
- Hold each other accountable
- Report problems ASAP

Project grade will be adjusted by 360-degree peer evaluations and contribution report

Key to Success

Ninety percent of your work's outcome will depend on the team you select to work with.

Find the right people

Be a team player

Be nice!

Key to Success

If you are the smartest person in the room, you are in the wrong room.

Tentative Schedule

Week	Activity	Deliverable
1 (W37)	Course Overview , Chapter 1	
2	Chapter 1, Group Formation	Team Selections
3	Chapter 2 UML	D0- Github Readme
4	Chapter 4	
5	Chapter 3	D1- Use Case / NFR / Tech Stack
6	Chapter 5	D2- Sequence / Activity / Class Diagrams / Mockup / wireframes
7	No Class	
8 (W44)	Midterm	
9	Chapter 6	D3- Early Prototype
10	Chapter 7	D4- Design Goals High Level arch.
11	Chapter 8, Design Patterns (Tutorial)	D5- Class Diagram Design Patterns
12	Chapter 8	
13	Chapter 9, 10	
14	Chapter 11	D6- Source Code / Build Instr. / User Manual / Peer Review
15 (W51)	Final Report and Presentation	D7- Presentations

Term Project

- In at most 1 page, give a rough description of what you intent to implement. Discussion with the TA about your project is highly recommended.

- Come up with a rough scope for your software. Certain changes throughout the semester are welcome and expected.

- Start to form up your teams (More info after the add-drop period)

- The teams will have either 5-6 members. No cross-section groups are allowed.

- Start researching the requirements

Project Description

Submit a Project Description (GitHub Readme)

1. Project title?

2. Team members?

3. [300-word minimum] Description: A brief description of your proposal

- What is the **motivation** ?
- What are the **goals** ?
- What important **problem** will the web app solve?
- What sorts of **features** will the web app have?
- What are the **selling points** of the web app?
- What make this web app **interesting/cool**?

Weekly status reports / worklogs

1. Report on progress and issues

   What you did, what worked, what you learned, where you had trouble, and where you are stuck.

   What did you do last week? (By individual team members)

   Any blockers?

2. Outline your plans and goals for the following week

   What is your plan for next week? (By individual team members)