

# **CSC 640 Course Project (HW4) & Documentation (HW5)**

- You are **problem solvers** who use software techniques to build and deliver high-quality software products; we call them **software engineers** .
- You are also leading a software engineering team; you need to teach how to use software engineering rules and tools to build high-quality software products to your team members.

We have a meeting with a client.

- The clients can be your boss, manager, supervisor, stakeholder, or the real client who pays you to build software.

# Client requirements

The client says

- I need a REST API server
  - i. The servers provides student-related information (or any information that you choose to support).
  - ii. I should access the server to get information in the JSON format.

- The REST API server should be high-quality
  - i. It is designed following software design principles.
  - ii. It is easy to read and update the code/documentation.
  - iii. It is easy to find and fix bugs.

# Software Engineer's Response

- As software engineers, we don't say "Yes" on the spot.
- The answer starts with "I think I can do it, but ..."
  - Let me think more about it ...
  - I need to know more about A and B before I give you my answer ...

## Even when you know the solution

- Even when you know you can solve the problem, you should say:
  - It depends on A because of B.
- We need to understand:
  - What technology stack?
  - What programming language?
  - What database?

# From the requirements into questions

- We also need to interpret the requirements into client questions.
  - What is the problem domain?
  - How do we solve the problem in the most efficient way?
  - Why is this problem worth solving?
  - Who are the stakeholders?



# Three client questions

The REST API server should be high-quality (HW4)

1. It is designed following software design principles.
  - We need to understand software design principles (HW2).
2. It is easy to read and update the code/documentation.
  - We need to use tools such as Marp/Hugo/GitHub/Github.io to publish our work (HW5).

3. It is easy to find and fix bugs.

- We need to use high-level programming languages (HW3)

## Software Design (HW2)

- Professional software engineers use these software design principles:
  - OOP APIE & SOLID principles
  - Design Patterns
  - Refactorings

- Professional software engineers do the following to make code easy to read and update:
  - Sense code smell
  - Refactor the code to remove code smell

# High-level Programming Language (HW3)

- We don't use low-level programming languages, such as C or assembly language to solve problems.
- We use high-level programming languages:
  - to abstract our thinking
  - to check possible errors by compilers
  - to automate process

## Delivery (HW4/5)

- We will use GitHub to deliver the product (REST API server) and document to clients.
- We also will use GitHub for software engineering document for the team members.
- We will use Markdown for documentation.
  - We use Marp for presentation.
  - We use Hugo for web pages.

# Think

- Software Engineers prove themselves by solving problems .
- The proof is from the building high quality software .
- The high-quality software must be adaptable to any changes through software design .

# How to survive in the AI age as software engineers

## Revolution and dilemma


- Many junior-level software engineering jobs are gone.
- Senior-level software engineers are hard to find.
- Only 10x programmers (with the help of LLM) can and will survive.



- It is said that LLM writes more than 35% of the code in tech giants.
- It is reported that startups use LLM 90 %+ of their code.
- Many believe it will be 99 %+ in five years.
- **No matter what, the revolution is here and now!**

## My experience

- Making toy-level programs (and tests) is almost a miracle.
- Making a professional-level program is a different story, and it is impossible with vibe-coding (yet).



Fortunately, from the SE perspective, it is a good direction

- Tedious coding/testing labor is gone.
- Instead, we should focus on design.
- We should do the job of senior-level software engineers by using LLMs as junior-level software engineers.

## In this course

- We focus on solving problems to build high-quality software.
- We use software design and high-level programming languages as the guideline.
- As long as you solve problems, and if you prove that, you are not wasting your time.

## Your job is

- Understand any users' requirements and translate them into questions.
- Find the solutions, then design, build, test, and deliver Flutter applications.
- Design the software system that can easily (1) find and fix bugs and (2) respond to users' requests.

## Good Signals

- "I'm happy I can focus more on software design, as I don't need to write tedious code and tests anymore."
- "It's fun to design applications with LLM, and I can guide LLM in producing my code and tests."
- "It's amazing that LLM finds bugs and helps me fix them."
- "It's fun to discuss my MVVM structure with LLM."

## Bad (Dangerous) Signals

- "I don't understand the code/tests that LLM produces, but I finished my homework anyway."
- "I just pushed to github the LLM code produced by LLM, but I just finished my tasks anyway."
- "I have no idea what I'm doing, but I feel like I'm doing something anyway."

OK. Let's start learning how to design and build high quality software using software engineering rules and tools together!