Lab	Lab 1
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Part c. Write a one page essay where you explain clearly why software architecture is important

Software architecture is important because it deals with the technical aspects like components, the frameworks, the libraries, the databases, the tools for using, etc. And, software architecture is also defined from business decisions.

A good software architecture is to define a solution that will meet all functional, non-functional and technical requirements. A bad architecture will fail to meet the quality. Every time the business changes, a good software architecture is able to adapt the changes. That is why "Architecture is about the important stuff. Whatever that is." (Ralph Johnson)

Software Architecture often cause a lot of problems for software projects. So, a good software architecture should keep it simple and loose coupling. Besides that, as my understanding, there are some reasons that makes a software architecture is important as below.

- A basis for communication: this is the way for communicating between all the stakeholders (customer, user, developer, application architect, project manager, tester, maintenance, system administrator, database administrator, sales, infrastructure architect, hardware expert, trainer, integration architect, support engineer, etc.)
- The earliest decisions: the first decisions is taken at this stage. These early decisions which become very important since some of them might be difficult to change after that.

In summary, software architecture defines all important aspects of a system and the architecture decisions are based on the functional requirements, the qualities, the business constraints and the architecture principles (from Professor's lecture).

Part d. Explain what the difference is between software architecture and software design

> Architecture is Design (Architecture = Design)
> Design could not make to be Architecture (Design #
> Architecture)

- Architecture is designed based on the requirement. The requirement can be a functional requirement (login, SSO, user roles, user permissions, etc.) or non-functional requirement (performance, scalability, availability, security, fail-over, etc.). Then the architecture will apply for System.
    ⇨ Software architecture focuses on architecture styles and architecture patterns of software.
- Software design focuses on different level. The most low level design would be a developer who is implemented a functional requirement and looked at the architecture to know the way how to use the database, how to do testing, how to use caching, how to use the event bus, etc. Technically, developer needs to follow the software architecture to do the right way.

Part e. Explain what makes software architecture so difficult

Software architecture is difficult. Below are some reasons.

- Complexity
    o No physical limitations: software should be easy to change
    o Huge state-space
- Constant change of
    o Business
    o Technology
    ⇨ It should be handled all the changes in the future.
- The architecture is never ideal: we cannot design an ideal architecture, there is always a drawback every decision we make.

Therefore, the work of an architect: make non-optimal decisions in the dark. From that said, you may be proposed a solution in the early stage of software development but you could predict and/or adapt for the future.