**LAB-1**

**d. Write a one page essay where you explain clearly why software architecture is important**

We generally think that architecture is related to art of designing and constructing buildings because we are using this term from buildings and construction. But this is also equally important in programming. Software architecture defines all important properties and aspects of a system. It is also a blueprint or any important stuff that are difficult to change later. It may be any kind of architecture such as software, enterprise, hardware, process and so on. It helps to achieve the quality of software by designing the small individual modules/component and making the system maintainability, reliability, high development and increases performance efficiency. Software architecture ensures the following about the software.

* The software is flexible and simple so that every developer can understand and work independently.
* There should be high cohesion and loose coupling between the components
* It provides the separation of concern

**e. Explain what the difference is between software architecture and software design**

Software design is about designing individual modules or components that implement the required functionality.

Software architecture is about system’s structure that represents the collection of components that accomplish a set of function and an explanation of how it behaves to ensure that is aligns with the business and technology of an organization.

**f. Explain what makes software architecture so difficult.**

The software architecture has become difficult because of following reason.

1. Complexity increases when we add to many features.
2. Constant change of business and technology.

**g. Explain clearly the main differences of software architecture in a traditional waterfall project and software architecture in an agile project.**

Waterfall Project:

It is big upfront architecture. It is suitable for architects where the requirements are well-defined, and a clear plan is devised. The architect is only available at the beginning of the project.

Agile Project:

It is just enough upfront architecture. This architecture is flexible and easily responds to any change. The architect is available during the whole project.

**h. Suppose you need to define the architecture for a large expensive system, and it is important that this system is future proof because this system will be used for at least 20 years. Explain how you can design a future proof system.**

The main points are style of architecture, types of software used, types of technologies used. Using agile architecture, I can prove the architecture in the first iterations.

**i. For each of the following qualities, give at least 1 technique that you know to increase this quality:**

1. Performance : Parallel execution might help to improve performance.

2. Availability : By reducing the fault tolerance

3. Resilience (against failure) : By making system scalable, performant and fault-tolerant;

4. Reusability : design system modularly so we can use module in other system

5. Maintainability : Separation of concerns