

BAHRIA UNIVERSITY (KARACHI CAMPUS)

Software Design & Architecture (SEN-221)

ASSIGNMENT # 3 – Spring 2023

Problem-Based Learning (PBL) Based on: CLO-4

Class: **BSE-4B** Submission Deadline: **10th Jun 23**

Course Instructor: **ENGR. MAJID KALEEM** Max Marks: **08**

**INSTRUCTIONS:**

You have to complete this assignment in a group; maximum of three (03) students. This assignment is based on the following PBL attributes:

1. The problem should involve **real world scenarios**.
2. The problem should require students to make **reasoned decisions** and to defend them (investigation and critical analysis).
3. If used for a **group activity**, the problem should involve collaboration and group discussions.

* Present your understanding in the class and upload your findings on LMS as an assignment in **.DOCX** format.
* Assignment will be done in a group; however, each member *must* upload it on LMS individually.

Scenario:

Online collaborative applications are software tools or platforms that enable people to work together on shared tasks or projects over the internet, regardless of their physical location. These applications typically provide a range of features and functionalities to support collaboration, such as real-time communication tools, document sharing and editing capabilities, project management tools, and version control systems.

Examples of online collaborative applications include:

1. ***Project management tools*** such as Trello, Asana, and Basecamp that allow teams to manage and track project progress, assign tasks, and collaborate on project-related documents.
2. ***Communication tools*** such as Slack, Microsoft Teams, and Zoom that enable real-time communication and collaboration through text, voice, and video chat.
3. ***Document sharing and editing tools*** such as Google Docs, Dropbox, and OneDrive that allow multiple users to collaborate on documents simultaneously, track changes, and provide feedback.
4. ***Code collaboration tools*** such as GitHub, Bitbucket, and GitLab that enable developers to collaborate on code repositories, manage code versions, and track changes.
5. ***Online collaborative applications*** have become increasingly popular in recent years, as more and more people work remotely or in geographically distributed teams. These applications can help increase productivity, reduce communication barriers, and improve teamwork by providing a centralized platform for collaboration.

Suppose you have designed an online collaborative application. Now want to make sure that the architecture for the application you have selected is correct. For this purpose, you want to apply any of the architecture evaluation techniques.

List down the names and merits & demerits of various *(at least 5)* architecture evaluation techniques and what do you think which architecture evaluation technique is well suited for this type of software application?

**Answer:**

There are several architecture evaluation techniques that can be used to evaluate the architecture of a software application, including the following:

1. **Architecture Tradeoff Analysis Method (ATAM)**: ATAM is a structured approach that helps identify and evaluate the tradeoffs associated with different architectural decisions. It involves defining architectural scenarios, analyzing the risks associated with each scenario, and evaluating the tradeoffs between different scenarios.

**Merits**: A thorough and structured approach that covers a wide range of factors. It can help identify potential issues and tradeoffs early in the development process.

**Demerits**: It can be time-consuming and requires a high level of expertise.

1. **Software Architecture Analysis Method (SAAM)**: SAAM is a method for analyzing software architectures based on the assumptions and constraints of the system. It involves defining a set of scenarios to test the architecture and analyzing the results to identify potential issues and risks.

**Merits**: A structured approach that can identify potential issues and risks early in the development process.

**Demerits**: It can be time-consuming and requires a high level of expertise.

1. **Architecture-Based Design (ABD)**: ABD is a method for evaluating software architectures based on their ability to meet the requirements of the system. It involves defining a set of quality attributes and evaluating the architecture against these attributes.

**Merits**: A straightforward and systematic approach that focuses on the most important quality attributes.

**Demerits**: It may not identify all potential issues and risks.

1. **Scenario-Based Architecture Evaluation (SBAE)**: SBAE is a method for evaluating software architectures based on their ability to meet the requirements of the system. It involves defining a set of scenarios to test the architecture and analyzing the results to identify potential issues and risks.

**Merits**: A structured approach that can identify potential issues and risks early in the development process.

**Demerits**: It may not identify all potential issues and risks.

1. **Software Architecture Review (SAR)**: SAR is a method for evaluating software architectures based on their ability to meet the requirements of the system. It involves reviewing the architecture against a set of criteria to identify potential issues and risks.

**Merits**: A straightforward and systematic approach that focuses on the most important quality attributes.

**Demerits**: It may not identify all potential issues and risks.

Based on the description of an "online collaborative application," I believe that the Architecture Tradeoff Analysis Method (ATAM) would be well suited for evaluating its architecture. ATAM's structured approach can help identify potential issues and tradeoffs early in the development process, which is especially important for a complex application like an online collaborative application.

---Good Luck!---