Written Questionnaire

1. Explaining what is design pattern and how we can use design patterns in projects.

   Design pattern is reusable solutions for common problems in software design. We can divide them into three categories. Such as, Creational design patterns (about different ways to create objects), Structural design patterns (about the relationship between objects) and Behavioral design patterns (about the interaction between the objects).

   In software Engineering, Design patterns are used to build a reusable, extensible and maintainable software. Design patterns may help to speed up development process.

2. What is DTO and explain the use of it.

   DTO is object that describing way of sending data for component to the other component over the network. Data Transfer Object design for exchange data between two components (two endpoints).

   DTO use to reduce the amount of data that needs to be send across the distributed systems and also use to encapsulate data.

3. How are you going to store secrets in an application without exposing it to the internet?

   To store secrets in an application we can use credential-less service access using an IAM authenticated API Gateway as a proxy.

   For example when we are adding important details such as database connection URLs and JWT secrets (access tokens), we can add them to a separate file called .env then we will add that .env file to the .gitignore file and we will not expose those important details to the public,

   ```
   MONGO_URI = mongodb+srv://abcdef….
   JWT_SECRET = 12345
   ```

4. What is JWT and how does it work?

   JSON Web Token is an open standard that allows a client and server to exchange security information. JWT is for authorization and JWT has a set of encoded JSON objects, including a set of claims. To ensure that the claims cannot be changed after the token is issued, JWTs are signed using a cryptographic technique.

   JWT claims are used to transmit data between client and server. These claims are dependent according to the use case. JWT string contains three parts, and those parts are separated by three ‘dots’ and serialized using base64. You will obtain two JSON strings after decoding. First one is the header and the payload. Second one is the signature.

In the token, the 3 different parts are separated as below,

- The first one is algorithm and token type – this includes algorithm and data type in JSON format.
- The second one is payload – this includes some data in the JSON format and this data will be changed accordingly.
- The third one is to verify the signature – this enables us to secure access to our APIs by using validation.

5. What is the difference between SQL and NoSQL databases?

   - SQL is commonly used in Relational Database Management Systems and NoSQL is used for Non-relational Database systems.
   - In SQL structured data can be stored in tables, In NoSQL unstructured data can be stored using JSON.
   - SQL Schemas are static, and NoSQL Schemas are dynamic.

   Examples,

   - SQL – MySQL, PostgreSQL
   - NoSQL – MongoDB, Redis

6. Suggest a good state management for frontend application and explain why you recommend it.

   Redux

   Redux gives one JavaScript object that holds the states for the entire application in one location also called as a centralized state. Redux is powerful because it makes your data flow transparent and predictable, easy to debug and preserve page state undo or redo.

   React Hooks and Context API

   With the help of React's Hooks and Context API, we can access state located far down the component tree without having to send props to each individual component along the way. This is also a good and lightweight state management technique that we can use in frontend applications such as React.