1) What JWT Token? Share the details of it.

It is used to securely transmit the information from client to server in JSON format.

JWTs can be used to authorize the access to access the resources and services.

JWT Authorization is stateless mechanism for authentication and authorization that eliminates need for sessions and cookies.

JWT is digitally signed using secret key that is known by server.

JWT is not altered or tampered during transmission.

JWT Authorization Process:

1. Authentication: client send credentials will be authenticated.
2. Issuing token: Server sends the JWT token to the client.
3. Sending the token: Client sends the token to the server while accessing the resource.
4. Verifying the token: server verifies the token using the secret key it has.
5. Authorizing the request: Authorizes the request if the credentials are valid.

2) What is System Design?

System design is the process of designing the architecture and components of the software system to meet business requirements.

It involves defining system’s architecture, components, modules and interfaces, Identifying the technologies and tools that will be used to implement the system.

Kafka Architecture:

Kafka is distributed streaming platform designed for high throughput , low latency and fault tolerant real time data processing.

Key components of Kafka Architecture:

1. Brokers:

* Kafka server is called Broker. Multiple kafka servers from a cluster for scalability and fault tolerance.
* Each broker stores data, handles read/write operations and partitions. Brokers are stateless but use Zookeeper for co-ordination, leader election, and metadata management

1. Topics:
   * Topics are logical channels that stores the events (Messages) which are pushed by producers and consumed by consumers.
   * Topics are append-only, Immutable logs of events ensuring the durability and replayability.
2. Partitions:

* Topics are divided into partitions, Kafka stores the events in the partition. Partitions can be stored across the brokers and it enables the parallelism.
* Each partition has the Offset ID which track the position of events processed.
* Multiple consumers can read from different partitions simultaneously.

1. Producers:
   * These are the applications that pushes the events into the Topics.
   * Based on the partition key it sends the event into the partition if not send to the partition in round robin fashion.
2. Consumers:
   * Consumers are the applications which subscribes to the topics to read the messages from the topic.
   * Consumers are formed as consumer group. Each consumer in the consumer group read message from partition.
   * Consumer use offset to read the messages from that point after restart.
3. ZooKeeper(KRaft):
   * ZooKeeper is used to manage the Cluster metadata, co-ordinate the brokers, perform the leader elections and to track the topic configurations, but after kafka 2.8.0 version Kafka uses Kraft instead of ZooKeeper.
4. APIs: Kafka Provides 4 Core APIs.
   * Producer API: Publishes streams of recording to Topics
   * Consumer API: Subscribe to topics and process streams of topics.
   * Connect API: Facilitates integration with external systems (e.g databases, file systems) via source and sink connectors.

**How Kafka guarantees the Ordering in the partition.**

Kafka follows strict ordering within the partition but does not guarantees the ordering across the partitions.