DB design:

Steps to make DB design:

1-requriment analysis:

- **Data to save**
- **Operation user needs**

2-coceptual design:

- **High level description:**
- **ERD model & EERD model**

3-logical design:

- **Choose DBMS**
- **Convert er model to schema**

4-schema refinement:

- **Make schema better**

5-physical DB design:

- **Performance**

6-app &security

ERD model	EERD model
ERD is a conceptual modeling technique used to represent the entities, attributes, and relationships between entities in a system. It is based on the Entity-Relationship model, ERD uses entities to represent real-world objects or concepts, attributes to represent properties or characteristics of entities, and relationships to represent associations between entities. ERD typically consists of entity boxes, attribute ovals, and relationship lines connecting entities.	Enhanced Entity-Relationship Diagram (EERD): EERD, also known as Extended Entity-Relationship Diagram, is an extension of the ERD model. EERD includes additional concepts and features to represent more complex Key features of EERD include: 1. Subtypes and Supertypes: EERD allows entities to be organized into hierarchies, where a supertype represents a generalized entity, and subtypes represent specialized entities that inherit properties from the supertype. 2. Specialization and Generalization: EERD supports the concept of specialization, where entities can have specific attributes or relationships, and generalization, where common attributes or relationships are grouped into a generalized entity.

Types of NoSQL:

1. **Document Databases:**
   Document databases store and retrieve data in a self-describing, hierarchical format like JSON or XML. They provide flexibility in handling unstructured and semi-structured data. Examples ->MongoDB

2. **Key-Value Stores:**
   Key-value stores store data as a collection of key-value pairs. They offer fast and simple data access and are highly scalable. Examples ->Amazon DynamoDB

3. **Columnar Databases**:
   Columnar databases store data in columns rather than rows, which allows for efficient storage and retrieval of large datasets. Examples -> Apache Cassandra

4. **Graph Databases:**
   Graph databases are designed to represent and store data in the form of nodes, edges, and properties, allowing for efficient traversal and querying of complex relationships.
   Examples ->Amazon Neptune

Power query:

Power Query is a tool in Microsoft Power BI, Excel, and Power Apps that helps you get and transform data from different sources. It allows you to connect to databases, files, websites, and more. With Power Query, you can clean and reshape data by filtering, sorting, grouping, and performing calculations. It has an editor where you can visually build and refine your data transformations, and it supports creating reusable queries and custom functions. Overall, Power Query makes it easier to prepare data for analysis and reporting.

ASW vs MICROSOFT AZURE vs GCP:

	ASW	MICROSOFT AZURE	GCP
	Amazon Web Services (AWS) is a cloud computing platform provided by Amazon.com. It is one of the oldest and most widely adopted cloud platforms. AWS offers a vast array of services for computing, storage, databases, networking, security, analytics, AI/ML, IoT, and more. It provides flexible and scalable solutions for startups, small businesses, and large enterprises	Microsoft Azure is a cloud computing platform provided by Microsoft. It offers a comprehensive suite of cloud services, including infrastructure as a service (IaaS), platform as a service (PaaS), and software as a service (SaaS). Azure provides a wide range of services for computing, storage, networking, databases, analytics, artificial intelligence (AI), machine learning (ML), Internet of Things (IoT), and more. It integrates well with other Microsoft products and services, such as Windows Server, Active Directory, and SQL Server.	Google Cloud Platform (GCP): Google Cloud Platform (GCP) is a cloud computing platform provided by Google. GCP offers services for computing, storage, databases, networking, big data, AI/ML, IoT, and more. It leverages Google's infrastructure and technologies, such as Google Search and Google Maps. GCP emphasizes its strengths in data analytics, machine learning, and AI capabilities.
	• AWS has a vast array of services and a mature ecosystem, making it suitable for a wide range of use	• If you are already using Microsoft technologies, such as Windows	• GCP is known for its strengths in data analytics, machine learning, and AI capabilities. If your project heavily relies

	- cases, from startups to large enterprises. - If you require extensive scalability and high-performance computing capabilities, AWS offers services like Amazon EC2, Amazon S3, and Amazon DynamoDB. - AWS has a strong focus on machine learning and AI with services like Amazon SageMaker, Amazon Rekognition,	Server, Active Directory, or SQL Server, Azure provides seamless integration with these technologies. - If you require a comprehensive suite of enterprise-focused services, such as Azure Active Directory, Azure Machine Learning, or Azure IoT Hub, Azure can meet your needs. - If developing applications using Microsoft's development tools Azure provides excellent support and integration with Visual Studio, .NET, and other Microsoft tools.	on these technologies, GCP offers services like BigQuery, TensorFlow, and Google Cloud AI. If you are using other Google services, such as Google Search or Google Maps, GCP provides seamless integration with these services.

fragmentation:

This fragmentation can occur in two main forms:
File System Fragmentation:

File system fragmentation occurs when files are stored in non-contiguous blocks or clusters on a storage device. As files are created, modified, and deleted, the free space on the disk becomes fragmented, resulting in files being stored in fragmented pieces across different locations. This can lead to decreased performance because the system needs to perform additional disk operations to access scattered parts of files. File system fragmentation can be classified into two types:

- External Fragmentation: This type of fragmentation occurs when free space on the disk is scattered throughout the disk, making it difficult to allocate contiguous blocks for storing new files. It can cause inefficient disk space utilization and slower file access times.
- Internal Fragmentation: Internal fragmentation occurs when the allocated space for a file is larger than the actual size of the file. This wasted space within a file can accumulate over time and reduce the overall storage capacity of the disk.

RTOS:

RTOS (Real-Time Operating System) is a specialized operating system designed for systems that have strict timing requirements. It ensures that tasks or processes are executed within specific deadlines and provides a predictable and deterministic environment for real-time applications.

Two types of RTOS:

1. Hard Real-Time Operating system:

A hard real-time operating system is used when we need to complete tasks by a given deadline. If the task is not completed on time then the system is considered to be failed.

2. Soft Real-Time Operating System

A soft real-time operating system is used where few delays in time duration are acceptable. That is if the given task is taking a few seconds more than the specified time then also no critical damage takes place.