Can you describe how a relational database works?

A relational database stores data in tables that are linked together by common fields, called keys, allowing efficient data access and manipulation.

What does SQL stand for?

SQL stands for Structured Query Language.

What is the difference between SQL and MS SQL?

SQL is a language for querying databases, while MS SQL (Microsoft SQL Server) is a relational database management system (RDBMS) that uses SQL.

What is T-SQL?

T-SQL stands for Transact-SQL, which is an extension of SQL that adds procedural programming, local variables and supports for error and exception handling.

What are the different types of SQL commands?

SQL commands are categorized into DDL (Data Definition Language), DML (Data Manipulation Language), DCL (Data Control Language), and TCL (Transaction Control Language).

What is a table in the context of a database?

A table is a set of data elements organized using a model of vertical columns and horizontal rows. A table is the simplest form of data storage in a relational database.

How would you create a database in MS SQL Server?

You can create a database using the CREATE DATABASE statement.

What does the SELECT statement do in SQL?

The SELECT statement is used to select data from a database. The data returned is stored in a result table, called the result-set.

Can you describe what a primary key is?

A primary key is a field in a table which uniquely identifies each row/record in a database table. Primary keys must contain unique values

What is a foreign key in MS SQL?

A foreign key is a field (or collection of fields) in one table, that is used to refer to the primary key in another table.

What is a join in SQL? Can you explain different types of joins?

A join clause combines rows from two or more tables based on a related column. Types of joins include inner join, left join, right join, and full outer join.

What is the difference between DELETE and TRUNCATE commands?

DELETE is a DML command and can be rolled back, whereas TRUNCATE is a DDL command and can't be rolled back.

What is a view in MS SQL Server?

A view is a virtual table based on the result-set of an SQL statement.

What are stored procedures? Can you provide an example?

Stored procedures are prepared SQL codes that can be saved and reused. For example, a procedure to select all records from a table.

What are transactions in MS SQL Server?

A transaction is a single unit of work that's made up of one or more tasks, all of which must succeed for the transaction to be deemed successful.

What are CRUD operations?

CRUD stands for Create, Read, Update, and Delete, which are the basic operations performed on database records.

How do you create a new record in a table using SQL?

Use the INSERT INTO statement.

How do you update records in a table?

Use the UPDATE statement

What is a subquery?

A subquery is a query embedded within another query, often used to filter or manipulate data before processing the main query.

How do you sort the result of a query in ascending or descending order?

Use the ORDER BY clause followed by ASC for ascending or DESC for descending order.

What is the difference between WHERE and HAVING clauses?

WHERE filters records before grouping, while HAVING filters records after grouping

How do you find the total number of records in a table?

Use the COUNT function with a SELECT statement

How do you find the average, sum, minimum, or maximum value of a column in a table?

Use the AVG, SUM, MIN, or MAX functions, respectively.

How do you find the distinct values in a column?

Use the DISTINCT keyword in a SELECT statement.

How do you group records by a specific column and perform aggregate functions on each group?

Use the GROUP BY clause followed by the column name.

What is a UNION operation, and when would you use it?

UNION combines the results of two or more SELECT statements into a single result set. Use it to merge data from multiple tables with similar structures.

What is an alias in SQL?

An alias is a temporary name given to a table or column in a query for easier referencing.

What are the fundamental types of databases?

There are four fundamental types:

Relational (RDBMS),

Object-Oriented,

Hierarchical, and

Network databases.

What are the key features of a non-relational (NoSQL) database?

NoSQL databases are typically distributed, schema-less, and designed to handle large amounts of data and traffic

Can you provide an example when a NoSQL database might be more suitable than a relational one?

When dealing with unstructured data or when scalability and high availability are the priority.

Can you provide examples of Database Management Systems (DBMS) for different types of databases?

Examples include: MySQL (Relational), MongoDB (Document/NoSQL), Neo4j (Graph), and Oracle (Object-Oriented and relational). Azure COSMOS (NoSQL)

What is normalization in the context of a relational database? What are its goals?

Normalization is the process of organizing data to minimize redundancy and improve data integrity.

Please explain what is "denormalization" and when might it be applied?

Denormalization is the process of adding redundant data to improve read performance. It's used when read speed is more important than write speed or data storage.

What are the differences between an in-memory and a disk-based database?

In-memory databases store data in RAM, offering faster access but less storage. Disk-based databases store data on a physical disk, offering more storage but slower access.

Can you provide an example of a real-time database (RTDB) and explain its use?

RTDBs are used when time constraints are strict, such as in financial systems or telecommunications. An example is VoltDB.

What is the .Net Framework?

The .Net Framework is a software development framework from Microsoft. It provides a controlled programming environment where software can be developed, installed, and executed mainly on Windows-based operating systems.

What are the main components of the .Net Framework architecture?

The main components are the Common Language Runtime (CLR), .Net Framework Class Library (FCL),

What is the Common Language Runtime (CLR) in .Net?

CLR is the execution engine for .Net applications and provides services such as memory management, thread management, security management, code verification, compilation, and other system services.

What is the .Net Framework Class Library (FCL)?

FCL is a standard library in .Net that provides a comprehensive set of reusable classes, interfaces, and value types that you can use to develop applications.

What is a namespace in .Net?

A namespace is a container that holds a set of related classes, interfaces, enumerations, and delegates.

What are assemblies in .Net?

Assemblies are the building blocks of .Net Framework applications. They contain the Intermediate Language code that CLR executes.

What are NuGet packages in .Net?

NuGet is a free and open-source package manager for the .Net ecosystem. NuGet packages contain reusable code that can be used across multiple projects, simplifying the development process

What is the Intermediate Language (IL) in .Net?

When you compile .Net code, it is not compiled to machine code, but to Intermediate Language. This IL is then converted to machine code at the point where the software is installed or at runtime by Just-In-Time (JIT) compilation.

What is Just-In-Time (JIT) compilation in .Net?

JIT is a part of the runtime execution environment in .Net. During the execution of the program, the JIT compiler translates the IL code into native machine instructions

What is garbage collection in .Net?

Garbage collection is a CLR feature that automatically manages memory. It releases the memory for objects that are no longer being used by the application.

What are .NET class libraries?

.NET class libraries are collections of reusable types, methods, and interfaces that .NET applications can use for development.

How can you add a NuGet package to your .NET project?

You can add a NuGet package to your .NET project by using the NuGet Package Manager in Visual Studio or by using the **dotnet add package** command in the .NET CLI.

Can you create and publish your own NuGet package? If so, how?

Yes, you can create and publish your own NuGet package by creating a .nuspec manifest file, creating the .nupkg file, and then publishing it to nuget.org or your private host using the NuGet CLI.

How do you update a NuGet package in your .NET project?

You can update a NuGet package using the NuGet Package Manager in Visual Studio or by using the **dotnet add package** command with the new version in the .NET CLI.

Can you give examples of commonly used .NET class libraries?

Examples of commonly used .NET class libraries include System, System.IO, System.Collections.Generic, System.Linq, System.Net, System.Threading, and System.Xml.

What are the advantages of using .NET class libraries?

.NET class libraries provide pre-written code, which can save development time, reduce the likelihood of bugs, and provide consistency across applications.

What is the purpose of the System.IO namespace in .NET?

The System.IO namespace contains types that allow reading and writing to files and data streams, and types that provide basic file and directory support.

How do you handle exceptions in .NET?

You handle exceptions in .NET using try/catch blocks.

What is a data type in programming?

A data type defines the type of data that a variable can store, such as integer, float, string, etc.

What are the main data structures in programming?

The main data structures are arrays, lists, stacks, queues, hash tables, trees, and graphs.

What is a control flow statement?

Control flow statements determine the order in which instructions in a program are executed. Examples include if-else, switch, for, while, etc.

What is the difference between a compiled language and an interpreted language?

A compiled language is translated into machine code before execution, while an interpreted language is translated line by line during execution.

What is a runtime library?

A runtime library provides a set of built-in functions and resources that can be used by a programming language during its execution.

What are the main responsibilities of a runtime environment in a programming language?

A runtime environment manages memory, handles exceptions, and provides system-level resources to the program.

What is a function or method in programming?

A function or method is a named block of code that performs a specific task and can be called multiple times.

What is object-oriented programming?

Object-oriented programming is a programming paradigm that uses objects – instances of classes – to design and implement applications and software.

What are the four principles of object-oriented programming?

The four principles are encapsulation, inheritance, polymorphism, and abstraction.

What is an exception in programming

An exception is an event that occurs during the execution of a program that disrupts the normal flow of the program's instructions.

What is the difference between an array and a list?

An array is a fixed-size data structure, while a list is a dynamic data structure that can resize itself automatically.

What is multithreading in programming?

Multithreading is a feature that allows concurrent execution of two or more parts of a program for maximum utilization of CPU.

What is an ORM (Object-Relational Mapping)?

An ORM is a programming technique for mapping relational structure in databases into specific programming language.

What is a scope modifier in C#?

A scope modifier, also known as an access modifier, defines the visibility and accessibility of a class, member, or a type. Common scope modifiers in C# include public, private, protected, and internal.

What are nullable types in C#?

Nullable types can represent all the values of an underlying type, and an additional null value. They can be declared with a '?

What is a property in C#?

A property is a member of a class that provides a flexible mechanism to read, write or compute the value of a private field. Properties can be used as if they are public data members.

What is cloud computing?

Cloud computing is the delivery of computing services over the internet rather than having local servers or personal devices handle applications.

What is the Azure platform?

Azure is a cloud computing platform and service provided by Microsoft that allows building, deploying, and managing applications and services through Microsoft-managed data centers.

What is PaaS in cloud computing?

PaaS, or Platform as a Service, is a cloud computing model where a third-party provider delivers hardware and software tools to users over the internet, usually for developing applications.

What is IaaS in cloud computing?

IaaS, or Infrastructure as a Service, is a cloud computing model where a third-party provider hosts and maintains core infrastructure, including hardware, software, servers, and storage.

What is SaaS in cloud computing?

SaaS, or Software as a Service, is a cloud computing model where a third-party provider hosts applications and makes them available to customers over the internet.