

Interview Questions

 Search this site

Navigation

Introduction

C#, VB.NET, ASP.NET

50 Important Silverlight
Question/Answers

ASP.NET interview Question

asp.net interview questions

ASP.Net Interview Questions
and Answers

C Sharp Interview
Questions/Answers Part-1

C Sharp Interview
Questions/Answers Part-2

CSS Interview Questions

Difference between ADO and
ADO.NET

Difference between AJAX and
Silverlight

Difference between ASP.NET
3.5 and ASP.NET 4.0

Difference between CSS and
Themes

Difference between CTS and
CLS

Difference between
DataContractSerializer and
XMLSerializer

Difference between DataTable
and DataSet

Difference between DataView
and DataTable

Difference between DTS and
SSIS

Difference between
EnableViewState and
ViewStateMode properties

[Data Model](#) >

SQL Server Interview Questions/Answers Part-1

Explain DML, DDL, DCL and TCL statements with examples?

DML: DML stands for Data Manipulation Language. DML is used to retrieve, store, modify, delete, insert and update data in database.

Examples of DML statements: SELECT, UPDATE, INSERT, DELETE statements.

DDL: DDL stands for Data Definition Language. DDL is used to create and modify the structure of database objects.

Examples: CREATE, ALTER, DROP statements.

DCL: DCL stands for Data Control Language. DCL is used to create roles, grant and revoke permissions, establish referential integrity etc.

Examples: GRANT, REVOKE statements

TCL: TCL stands for Transactional Control Language. TCL is used to manage transactions within a database.

Examples: COMMIT, ROLLBACK statements

What is the difference between Drop, Delete and Truncate statements in SQL Server?

Drop, Delete and Truncate - All operations can be rolled back.

Delete is a logged operation, which means deleted rows are written to the transaction log. **Truncate** is not a logged operation, which means deleted rows are not written to the transaction log.

[Difference between Finalize\(\) and Dispose\(\) methods in .NET](#)

[Difference between HttpHandler and HttpModule](#)

[Difference between SOAP and RESTful Webservices](#)

[Difference between STA and MTA](#)

[Difference between Typed DataSet and Untyped DataSet](#)

[Difference between URL and URI](#)

[jQuery Interview Question Answer](#)

[SharePoint Interview question/answers](#)

[Silverlight Interview Questions Answers](#)

[WFC interview question-answer](#)

[What are the Differences between Abstract Class and Interface?](#)

[What are the differences between Structure and Class?](#)

[What is the difference between ref and out parameters?](#)

Data Model

[Difference between SQL Server 2008 and SQL Server 2012](#)

[Difference between SQL Server 2008 R2 and SQL Server 2012](#)

[SQL Server Interview Questions/Answers Part-1](#)

[SQL Server Interview Questions/Answers Part-2](#)

[What's difference between Repository and Dataset](#)

Feedback

Hence, truncate is a little faster than Delete. You can have a where clause in Delete statement where as Truncate statement cannot have a where clause. Truncate will delete all the rows in a Table, but the structure of the table remains. Drop would delete all the rows including the structure of the Table.

What is Cascading referential integrity constraint?

Cascading referential integrity constraints allow you to define the actions Microsoft SQL Server should take when a user attempts to delete or update a key to which an existing foreign keys point.

You can instruct SQL Server to do the following:

1. No Action: This is the default behaviour. No Action specifies that if an attempt is made to delete or update a row with a key referenced by foreign keys in existing rows in other tables, an error is raised and the DELETE or UPDATE is rolled back.

2. Cascade: Specifies that if an attempt is made to delete or update a row with a key referenced by foreign keys in existing rows in other tables, all rows containing those foreign keys are also deleted or updated.

3. Set NULL: Specifies that if an attempt is made to delete or update a row with a key referenced by foreign keys in existing rows in other tables, all rows containing those foreign keys are set to NULL.

4. Set Default: Specifies that if an attempt is made to delete or update a row with a key referenced by foreign keys in existing rows in other tables, all rows containing those foreign keys are set to default values.

Difference between primary key and unique key in SQL Server?

1. A table can have only one primary key. On the other hand a table can have more than one unique key.
2. Primary key column does not accept any null values, where as a unique key column accept one null value.

What is the difference between Having and Where clause?

a WHERE clause is used in the select statement to filter the rows as they are retrieved from the database table. HAVING clause is used in the select statement in conjunction with the Group By clause, to filter the query results after they have been grouped.

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You can use HAVING clause only when you use Group By clause.

What is the use of an Index in SQL Server?

Relational databases like SQL Server use indexes to find data quickly when a query is processed. Creating the proper index can drastically increase the performance of an application.

What is a table scan?

or

What is the impact of table scan on performance?

When a SQL Server has no index to use for searching, the result is similar to the reader who looks at every page in a book to find a word. The SQL engine needs to visit every row in a table. In database terminology we call this behavior a table scan, or just scan. A full table scan of a very large table can adversely affect the performance. Creating proper indexes will allow the database to quickly narrow in on the rows to satisfy the query, and avoid scanning every row in the table.

What is the system stored procedure that can be used to list all the indexes that are created for a specific table?

sp_helpindex is the system stored procedure that can be used to list all the indexes that are created for a specific table.

For example, to list all the indexes on table tblCustomers, you can use the following command.
EXEC sp_helpindex tblCustomers

[b]What is the purpose of query optimizer in SQL Server?[/b]

An important feature of SQL Server is a component known as the query optimizer. The query optimizer's job is to find the fastest and least resource intensive means of executing incoming queries. An important part of this job is selecting the best index or indexes to perform the task.

What is the first thing you will check for, if the query below is performing very slow?

SELECT * FROM tblProducts ORDER BY UnitPrice ASC

Check if there is an Index created on the UnitPrice column used in the ORDER BY clause. An index on the UnitPrice column can help the above query to find data very quickly. When we ask for a sorted data, the database will try to find an index and avoid sorting the results during

execution of the query. We control sorting of a data by specifying a field, or fields, in an ORDER BY clause, with the sort order as ASC (ascending) or DESC (descending).

With no index, the database will scan the tblProducts table and sort the rows to process the query. However, if there is an index, it can provide the database with a presorted list of prices. The database can simply scan the index from the first entry to the last entry and retrieve the rows in sorted order.

The same index works equally well with the following query, simply by scanning the index in reverse.

```
SELECT * FROM tblProducts ORDER BY UnitPrice DESC
```

What is the significance of an Index on the column used in the GROUP BY clause?

Creating an Index on the column, that is used in the GROUP BY clause, can greatly improve the performance. We use a GROUP BY clause to group records and aggregate values, for example, counting the number of products with the same UnitPrice. To process a query with a GROUP BY clause, the database will often sort the results on the columns included in the GROUP BY.

The following query counts the number of products at each price by grouping together records with the same UnitPrice value.

```
SELECT UnitPrice, Count(*) FROM tblProducts GROUP BY UnitPrice
```

The database can use the index (Index on UNITPRICE column) to retrieve the prices in order. Since matching prices appear in consecutive index entries, the database is able to count the number of products at each price quickly. Indexing a field used in a GROUP BY clause can often speed up a query.

What is the role of an Index in maintaining a Unique column in table?

Columns requiring unique values (such as primary key columns) must have a unique index applied. There are several methods available to create a unique index.

- 1.** Marking a column as a primary key will automatically create a unique index on the column.
- 2.** We can also create a unique index by checking the Create UNIQUE checkbox when creating the index graphically.
- 3.** We can also create a unique index using SQL with the following command:

```
CREATE UNIQUE INDEX IDX_ProductName On Products (ProductName)
```

The above SQL command will not allow any duplicate values in the ProductName column, and an index is the best tool for the database to use to enforce this rule. Each time an application adds or modifies a row in the table, the database needs to search all existing records to ensure none of values in the new data duplicate existing values.

What are the disadvantages of an Index?

There are 2 disadvantages of an Index

1. Increased Disk Space
2. Insert, Update and Delete statements could be slow. In short, all DML statements could be slow.

What are the 2 types of Indexes in SQL Server?

1. Clustered Index
2. Non Clustered Index

How many Clustered and Non Clustered Indexes can you have per table?

Clustered Index - Only one Clustered Index per table. A clustered index contains all of the data for a table in the index, sorted by the index key. Phone Book is an example for Clustered Index.

[b]Non Clustered Index[/b]

 - You can have multiple Non Clustered Indexes per table. Index at the back of a book is an example for Non Clustered Index.

Which Index is faster, Clustered or Non Clustered Index?

Clustered Index is slightly faster than Non Clustered Index. This is because, when a Non Clustered Index is used there is an extra look up from the Non Clustered Index to the table, to fetch the actual rows.

What is a Trigger in SQL Server?

A Trigger is a database object that is attached to a table. In many aspects it is similar to a stored procedure. As a matter of fact, triggers are often referred to as a "special kind of stored procedure." The main difference between a trigger and a stored procedure is that the former is attached to a table and is only fired when an INSERT, UPDATE or DELETE occurs.

What are the two types of Triggers in SQL Server?

1. **After Triggers** : Fired after Insert, Update and Delete operations on a table.
2. **Instead of Triggers**: Fired instead of Insert, Update and Delete operations on a table.

What are the special tables used by Triggers in SQL Server?

Triggers make use of two special tables called inserted and deleted. The inserted table contains the data referenced in an INSERT before it is actually committed to the database. The deleted table contains the data in the underlying table referenced in a DELETE before it is actually removed from the database. When an UPDATE is issued both tables are used. More specifically, the new data referenced in the UPDATE statement is contained in inserted table and the data that is being updated is contained in deleted table.

What is the difference between a User Defined Function (UDF) and a Stored Procedure (SP) in SQL Server?

1. Stored Procedure support deferred name resolution where as functions do not support deferred name resolution.
2. User Defined Function can be used in a select statement where as you cannot use a stored procedure in a select statement.
3. UDF's cannot return Image, Text where as a StoredProcedure can return any datatype.
4. In general User Defined Functions are used for computations where as Stored Procedures are used for performing business logic.
5. UDF should return a value where as Stored Procedure need not.
6. User Defined Functions accept lesser number of input parameters than Stored Procedures. UDF can have upto 1023 input parameters where as a Stored Procedure can have upto 21000 input parameters.
7. Temporary Tables can not be used in a UDF where as a StoredProcedure can use Temporary Tables.
8. UDF can not Execute Dynamic SQL where as a Stored Procedure can execute Dynamic SQL.
9. User Defined Function does not support error handling where as Stored Procedure support error handling. RAISEERROR or @@ERROR are not allowed in UDFs.

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