INDEXES

What are indexes?

Why we use indexes?

Advantage Of indexes?

Indexes are special data structures associated with tables or views that help speed up the query. SQL Server provides two types of indexes: clustered index and non-clustered index.

CREATE INDEX Syntax

CREATE INDEX index_name

ON table_name (column1, column2, ...);

Example Create Index

```
Create Index IX_tblEmp_Sal
On tblEmp(Salary ASC)
```

Execute Index.

```
SELECT *
FROM tblEmp WITH(INDEX(IX_tblEmp_Sal))
```

Drop index

```
drop index  Indexname on tablename
```

SQL Index Types

There are two main index types: Clustered index and Non-Clustered index.

Clustered Index

A clustered index alters the way that the rows are physically stored. When you create a clustered index on a column (or a number of columns), the SQL server sorts the table's rows by that column(s).

It is like a dictionary, where all words are sorted in an alphabetical order. Note, that only one clustered index can be created per table. It alters the way the table is physically stored, it couldn't be otherwise.

OR

A Clustered Index is an analogous to a telephone directory, where the data is arranged by the last name. We just learnt that, a table can have only one clustered index. However, the index can contain multiple columns (a composite index), like the way a telephone directory is organized by the last name and first name.

Table

```
Create table tblEmp
(
EmpID int not null primary key,
Name varchar(20) not null,
Gender varchar(10),
Salary money,
DepartmentID int,
City varchar(20)
)
```

How to create clustered index

```
Create Clustered Index IX_tblEmp_Gender_Salary
on tblEmp(Gender desc,Salary asc)
```

Execute Index

```
SELECT * FROM tblEmp WITH(INDEX(IX_tblEmp_Gender_Salary))
```

Non-Clustered Index

A non-clustered index, on the other hand, does not alter the way the rows are stored in the table. Instead, it creates a completely different object within the table, which contains the column(s) selected for indexing and a pointer back to the table's rows containing the data.

It is like an index in the last pages of a book. All keywords are sorted and contain a reference back to the appropriate page number.

OR

A Non Clustered index is analogous to a index in a textbook. The data is stored in one place, the index in another place. The index will have pointers to the storages location to the data.

Since, the no clustered index is stored separately from the actual data, a table can have more than one non clustered index, just like how a book can have an index by the chapters at the and another index by common terms at the end.

In the index itself, the data is stored in an ascending or descending order of the index key, which doesn't in any way influence the storage of data in the table.

Difference

Useful points to remembers.

1. Only one clustered index per table, where as you can have more than one Non-clustered index.
2. Clustered index is faster than a non-clustered index, because, the clustered index has to refer back to the table, if the selected column is not present in the index.
3. Clustered index determines the storage order of rows in the table, and hence doesn't require additional disk space, but whereas a non-clustered index is stored separately from the table, additional storages space is required.

How to create clustered index

```
Create NonClustered Index IX_tblEmp_Name
On tblEmp (Name)
```

Execute Index

```
SELECT *FROM tblEmp WITH(INDEX(IX_tblEmp_Name))
```

Without Index Query

```
Select * from tblEmp
Order by Name asc
```

Unique Index

What is unique index?

Unique index is used to enforce uniqueness of key values in the index.

```
create table tblEmp
(
EmpID int not null primary key,
Name varchar(20) not null,
Gender varchar(10),
Salary money,
DepartmentID int,
City varchar(20)
)
```

Note: By default, PRIMARY KEY constraint, create a unique clustered index.

Uniqueness is a property of an index, and both CLUSTERED AND NON CLUSTERED index can be UNIQUE.

Create unique non cluster index

```
Create Unique NonClustered Index
UK_NCIX_Nam
on tblEmp (Name)
```

How to execute

```
SELECT *
FROM tblEmp WITH(INDEX(UK_NCIX_Name))
```

How to drop

```
drop index  UK_NCIX_Name on tblEmp
```

Alter Index

```
Alter table tblEmp
ADD City varchar(30)
default 'India'
```

Using Query

```
delete E.City from tblEmp E
where empid= 10
```

Difference between Unique Constraint and Unique Index.

There are two major differences between a unique constraints and unique index. In fact, when you add a unique constraint, a unique index gets created behind the scenes.

Useful points to remembers.

1. By default: A PRIMARYKEY constraint, create a unique clustered index, where a unique constraints creates a unique Non-Clustered index. These defaults can be changed if you wish to.

2. A UNIQUE constraints or a UNIQUE index cannot be created on an existing table, if the table contains duplicate values in the key columns. Obviously, to solve this, remove the key columns from the index definitions or delete or update the duplicate value.

sp_helpindex

Reports information about the indexes created on a table.

Syntax

sp_helpindex (table name)