**Why indexes?**  
Indexes are used by queries to find data from tables quickly. Indexes are created on tables and views. Index on a table or a view, is very similar to an index that we find in a book.  
  
If you don't have an index in a book, and I ask you to locate a specific chapter in that book, you will have to look at every page starting from the first page of the book.  
  
On, the other hand, if you have the index, you lookup the page number of the chapter in the index, and then directly go to that page number to locate the chapter.  
  
Obviously, the book index is helping to drastically reduce the time it takes to find the chapter.  
  
In a similar way, Table and View indexes, can help the query to find data quickly.  
  
In fact, the existence of the right indexes, can drastically improve the performance of the query. If there is no index to help the query, then the query engine, checks every row in the table from the beginning to the end. This is called as Table Scan. Table scan is bad for performance.

**An Index can also be created graphically using SQL Server Management Studio**  
1. In the Object Explorer, expand the Databases folder and then specific database you are working with.  
2. Expand the Tables folder  
3. Expand the Table on which you want to create the index  
4. Right click on the Indexes folder and select New Index  
5. In the New Index dialog box, type in a meaningful name  
6. Select the Index Type and specify Unique or Non -Unique Index  
7. Click the Add  
8. Select the columns that you want to add as index key  
9 Click OK  
10. Save the table

**The following are the different types of indexes in SQL Server**  
1. Clustered  
2. Nonclustered  
3. Unique  
4. Filtered  
5. XML  
6. Full Text  
7. Spatial  
8. Columnstore  
9. Index with included columns  
10. Index on computed columns

**A clustered index is 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 last name and first name.

**Non Clustered Index:**  
A nonclustered index is analogous to an index in a textbook. The data is stored in one place, the index in another place. The index will have pointers to the storage location of the data. Since, the nonclustered 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 Chapters at the beginning 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 between Clustered and NonClustered Index:**  
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 non-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 where as a Non Clustered index is stored seperately from the table, additional storage space is required.

**Diadvantages of Indexes:**  
**Additional Disk Space**: Clustered Index does not, require any additional storage. Every Non-Clustered index requires additional space as it is stored separately from the table.The amount of space required will depend on the size of the table, and the number and types of columns used in the index.  
  
**Insert Update and Delete statements can become slow**: When **DML** (Data Manipulation Language) statements (**INSERT, UPDATE, DELETE**) modifies data in a table, the data in all the indexes also needs to be updated. Indexes can help, to search and locate the rows, that we want to delete, but too many indexes to update can actually hurt the performance of data modifications.  
  
**What is a covering query?**  
**If all the columns** that you have requested in the SELECT clause of query, are present in the index, then there is no need to lookup in the table again. The requested columns data can simply be returned from the index.  
  
**A clustered index**, always covers a query, since it contains all of the data in a table. A composite index is an index on two or more columns. Both clustered and nonclustered indexes can be composite indexes. To a certain extent, a composite index, can cover a query.