Indexes

Index is a physical object of Data Base. The purpose of index creation is to speed-up the process of retrieving sought data in the table.

Index creates on one or a few fields of a table. The necessity of index creation defines with frequency of information retrieval on data field(s). Besides, it is important to take into consideration the size of a table and imposed restriction on data type of using structure; the restriction can be set on a range of values, it is advisable that the index would have high selectivity.

You can create index with the following SQL-command:
CREATE [UNIQUE] **INDEX** Index_Name **ON** Table_Name
(column [[ASC] | DESC] [, column [[ASC] | DESC]] …);
- **UNIQUE** prevents insertion or updating of duplicate values into indexed column (or columns);
- **Index_Name** is the name of index should be unique in Data Base;
- **Table_Name** is the name of Data Base table;
- **[ASC] | DESC]**, sorts columns in ascending/descending order. ASC[ending] is the default order if none is specified.

ATTENTION! The creation of index increases the size of Data Base!

Index can slow down the productivity of a Data Base if it was created on volatile data of a table field(s). Because the data modification inserts not only into the table but in indexes also. Besides corrective action upsets index balance and that causes less efficiency. That is why you should remove all indexes before numerous modifications of some table, which were created for speeding up the process of data retrieval of that table.

ATTENTION! For optimization of SQL – query, you can previously rebuild index with command <SET STATISTIC>.

You can remove an index from Data Base with the following SQL - command:
DROP INDEX Index_Name;

Indexes can be divided on 2 types: cluster and non-cluster.

Cluster index
In fact, this type of indexes is not an index at all. Clusterization is a physical ordering of records into a table.

Non-clustered Index
This type of indexes is certain structures that provide fast-access retrieval of data in a table. There are some types of non-clustered indexes. The usage of index types depends on the problem and imposed restrictions on data structure of indexed fields.

BitMap Index creating on the fields of a table that has small selectivity. For example, the data of field that has only a few different values (gender (male, female); the names of days of the week (Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday); the name of months (January, February, March, April, May, June, July, August, September, October, November, December); etc). Bitmap vector creates on every new value of index in indexed field. The value of bitmap vector is "**0**" if values of data in the field and index are not equal and "**1**" otherwise.

Hash – Index is a specific type of non-clustered index. One or more Hash–functions make hashing the fields of a table. Hash-functions generate the value of **Hash-Key** on every data in the field. Well-neat hash-function reduces the volume of scanned information into a table. Although sometimes it is very difficult to find relevant Hash–Function.
In present time hash-index has no practical application.

Tree(-type) Indexes* (B- index, R-index and others) This type of index regards as an acyclic graph, i.e. a tree.
It can have the following properties:

- **equilibration** means that the path length from the root of a tree to any leaf could be different at the most then only one rib;
- **ramification** secures the availability of descendant with nodes of tree;

Tree search is realizing on basis of graph algorithms of breadth or depth first search.

(*) Reader should be aware of Theory of Graph