

1) Imperative Programming:

With imperative programming, we dictate the compiler what we want to happen.

Declarative Programming:

We write code that describes what we want, but we don't write the code in a explaining way.

- 2) First of all, if we have a primary key in a table, then that means we also have an index.

One of the advantages of using index is:

- Read speed increases when column is used in where clause.

Disadvantages of using index are:

- Index's occupies space on memory when it used. Indexes may be a problem if we have too much of them.
- Write speed decreases on insert, update and delete operations.

- 3) Normalization has two main purposes: eliminating data duplication in the database and increasing data consistency. Normalization increases the speed of the database. It reduces the size of the database on the hard disk.

NF 1:

For a database to be NF 1, it must satisfy following conditions:

- Only one value should be defined in each column.
- Each row must be identified by a unique key.
- Repeating columns cannot be found in the same table.

NF 2:

For a database to be NF 2, it must satisfy following conditions:

- Table must be NF 1.

- Relationships must be defined between the main table and the other tables by using the foreign key.

NF 3:

- Table must be NF 2.
 - Non-key columns should not be dependent on another non-key column or have a transitional functional dependency. In other words, each column must be fully dependent on the unique key.
- 4) It may take time to learn ORM theory and technique. ORM libraries are quite complex libraries. ORM queries can deliver poor performance if it is not optimized. Also we don't have full control over it.
 - 5) DSL (Domain Specific Language) is the language used for a specific application domain. A Domain specific language is usually less complex than a general-purpose language, such as Java, C, or Ruby. Generally, DSLs are developed in close coordination with the experts in the field for which the DSL is being designed.
 - 6) It means transactions that operates on more than one database. Its disadvantage is it is more difficult than work with normal database.
 - 7) Thread pool is to keep the number of threads in the system under control and to keep a certain number of created threads for possible future jobs instead of terminating them when the process is finished. When it is created, it creates a certain number of threads and waits for these threads until the assigned process runs. When a process comes, one of the idle threads wakes up and run the process.
 - 8) Scalability means increasing resources to manage the increased workload of a system, network or process. Vertical scalability means adding more power to a machine like CPU, horizontal scalability means using many cheap machines simultaneously.
 - 9) Data replication means distributing same data to different nodes. Sharding means the separation of data held in the database into unique small pieces(shards).