Java NIO package:

SQL and RDBMS:

--Front-end developer
--Backend developer
--testers
--devoops
--dba

Java : it is mostly used to develop a business application.

Business application:

Business organizations: the main objective for any business organization is profit.

1. small scale business organizations (grosarry shops, petrol pump, they are running thier services in a limited area.)
2. larger scale business organizations(Banks, railways, ecommerce, travel, insurance): these types of Business organizations are also called Enterprise.

--these BO provides their services to the client/customers, and to computerize
those services whatever application we develop is known as a Business application.

Common and general things in any business application:
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1. storing and maintaing business data is a secure and easily retrievel manner.

2. processing the business data according to the business rules.

3. presenting the data to the user, in user understandable format.

Note: in realtime business application we keep/maintain business data inside RDMBS s/w.

Data and information:

Data: it is a collection of raw and isolated facts.

Information: when we process the data, then we will get meaningfull result,
this result is called as information.

Datastores:

-- it is a store where we can store or keep our business related data.

1. normal books and papers.

2. flat files in computer system (notepad, excel sheet, word files)

disadv of the flat files:
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1. data maintainance.
        data rudundency

data integrity /data inconsistency

2. security
3. data retrieval

etc.

--to overcome these problems we need to store the data inside the DBMS s/w (RDBMS s/w)

Database: It is a organized collection of interrelated data or structured collection of data.

DBMS: It is a type of s/w there we can manage multiple databases.

RDBMS: It is also a s/w which follows the relational model, in this model, the data is stored inside 2 dimentional tables.

RDBMS is an extension of DBMS.

We have different types of RDBMS s/w are there in the market:

Mysql s/w (Oracle corp)
Oracle s/w (Oracle corp)
Postgress s/w
SQL-server (microsoft)
DB2 (IBM)
etc.

Note: every RDBMS s/w is essentially a DBMS s/w but reverse is not true.
ex:
mongodb is a DBMS s/w but it is not a RDBMS.

SQL:

In order to work with RDBMS s/w we need to use SQL (Structured Query language)
--it is an interface by using which we can work with any kind of RDBMS s/w.

Note: whenever we install any RDBMS s/w then at physical level (in harddisk) some databases will be created automatically.

**Each RDBMS s/w has one main component is there which is called as "Database engine", which will execute the sql commands(statments).

--to execute any sql commands with DB-engine we need a client application.

--along with the mysql installation, we get the "mysql command line client", from where we can execute any type of sql statement with database engine.

--we can install some GUI client also for Mysql for example: "Mysql workbench".

sql query:

--sql is a case insensetive language. (but data kept inside the tables are not case insensitive)

sql language is a collection of some predefined commands:

these commands are categorised into following categories:

1. DDL (Data defination language)
(create, alter, drop, truncate, rename)

2. DML (Data manipulation language)
(insert, update, delete)

3. DRL (Data retrieval language)
(select)

4. TCL (Transaction control language)
(commit, rollback, savepoint)

5. DCL (Decision control language)
(grant, revoke)

Note: In realtime application development, Java developers are only allowed to
perform DML, DRL, TCL, other commands are used by the DBA(data base administrator)

```
>show databases;

--it will list out all the databases in our application

>create database sb101db;
>drop database sb101db;  // it will delete the database from the mysql

>create database sb101db;

--after creating the database we need to move inside that database to perform some other operations.

>use sb101db;

>show tables;
```

DDL commands :
(create, alter, drop, truncate, rename)

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1. create:

```
> create table student (roll int, name varchar(12), marks int);

or

>create table student
(
roll int,
name varchar(12),
marks int
);

>show tables;

>desc student;
```

datatypes in mysql:

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1. numeric types:

2. string types

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3. date and time types

1. numeric types:
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tinyint : 1byte
smallint : 2 byte
mediumint : 3 byte
int : 4 byte
bigint: 8 byte

floating point:

float(6, 2): the column can store 6 digit with 2 decimal places.

2 String type:
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1. char : fixed length of string range bt 0 to 255 char.

2. varchar: variable lenght of string bt 1 to 65500, here we must define the max
length.

char(4) vs varchar(4)
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value   char(4)     Storage_required

'a'     ------------> 4 bytes

'ab'             ------------> 4 bytes

'abcdef'     ------------> error, data is too long



value   varchar(4)     Storage_required

'a'     ------------>   1 bytes

'ab'             ------------> 2 bytes

'abcdef'     ------------> error, data is too long


Note: in the term of efficiency, if we r storing with variable lenght of charecter
then we should use varchar, and if the length is always fixed then we should use
char, here char is slightly faster than varchar.


3. date and time:
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a. date : yyyy-mm-dd
b.datetime: yyyy-mm-dd hh:MM:ss



>select * from student; // trying to get all the columns and all the rows.


2. alter :
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```
--it is used to change the structure of the existing table.

this command having 4 sub-commnads:

a. add
b. modify
c. drop
d. change


a. add: it is used to add a new column to the existing table.

ex:

>alter table student add address varchar(15);

b. modify : it is used to change the column data type or its size.

> alter table student modify address varchar(20);

c. drop : to drop a single or multiple columns from a table:
--this command is also used to drop any contraint from a perticular column.

> alter table student drop column address;

d. change: to rename a column;

> alter table student change name sname varchar(12);


3. drop :
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-- to drop/delete the entire table (structure)from the database.

> drop table student;

4. truncate :
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--it is used to truncate/clean all the rows/records from the table permanently.
--here table structures will not be deleted.

Note: all the DDL commands can not be rollback.

5. rename: it is used to rename a table:
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> rename table student to student1;


2. DML (data manipulation language):
(insert, update, delete)
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--these commands works with the data inside a table.


i. insert:
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--it is used to insert the records in the table:

> insert into student values(10,'Ram',850);
```