

Agenda

- Test Execution - Test Execution Life Cycle Process
- Re-Testing
- Result Analysis - Comparing Expected and Actual Values
- Status of the Result
- Design negative test scenarios/cases
- Database Testing



Notes



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Test Execution - Test Execution Life Cycle Process

- **Test Execution is the process of executing the tests written by the tester to check whether the developed code or functions or modules are providing the expected result as per the client requirement or business requirement.**
- **Test Execution comes under one of the phases of the Software Testing Life Cycle (STLC).**

Notes



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Notes



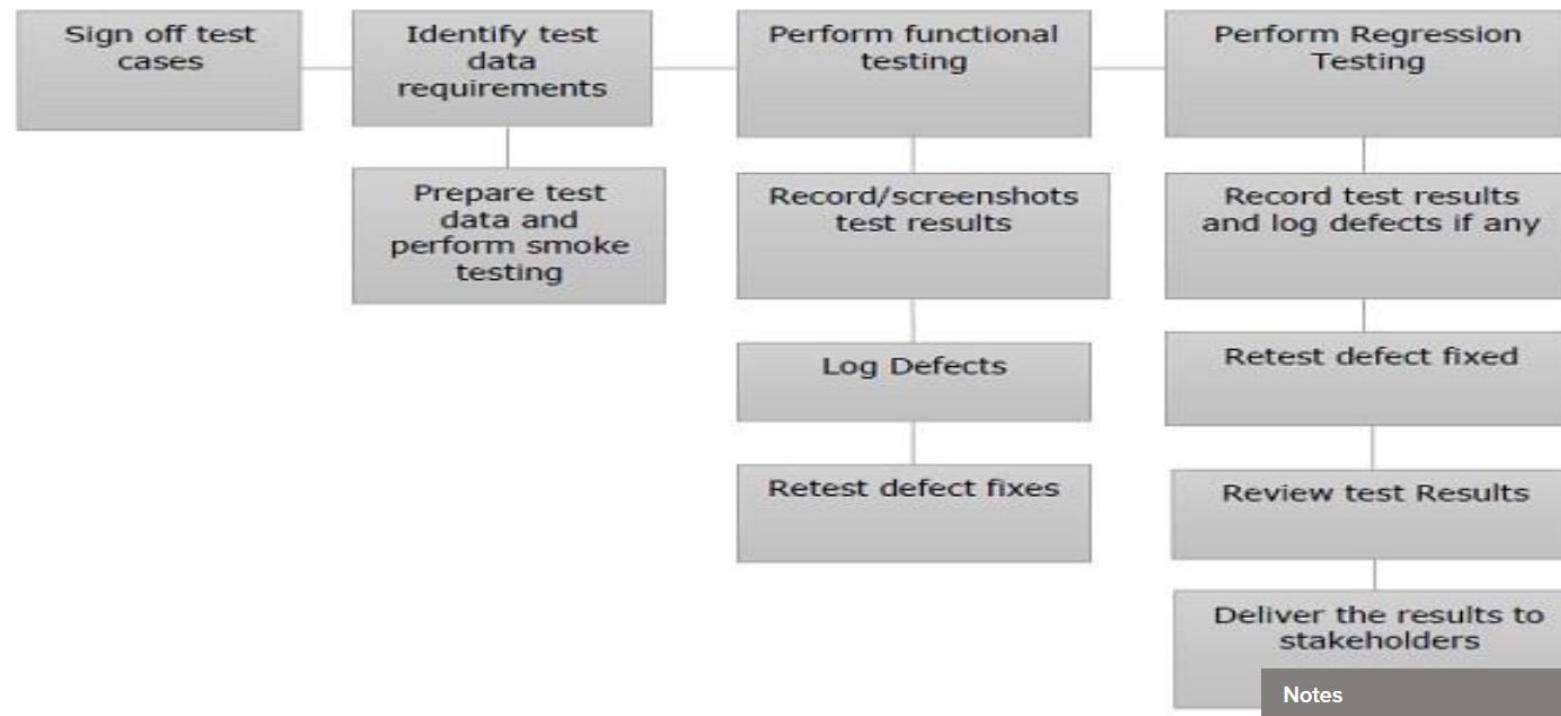
Test Execution - Test Execution Life Cycle Process

Activities for Test Execution

- Defect Finding and Reporting
- Defect Mapping
- Re-Testing
- Regression Testing
- System Integration Testing

Notes

Test Execution - Test Execution Life Cycle Process



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Test Execution - Test Execution Life Cycle Process

Test Execution Process

- 1. Creation of Test Cases**
- 2. Test Cases Execution**
- 3. Validating Test Results**

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Test Execution - Test Execution Life Cycle Process

Test Execution Priorities

- Complexity
- Risk Covered
- Platforms Covered
- Depth
- Breadth

Notes



Test Execution - Test Execution Life Cycle Process

Test Execution States

- **Pass**
- **Fail**
- **Not Run**
- **Partially Executed**
- **Inconclusive**
- **In Progress**
- **Unexpected Result**

Notes



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Test Execution - Test Execution Life Cycle Process

Test Execution Cycle

- Requirement Analysis
- Test Planning
- Test Cases Development Partially Executed
- Test Environment Setup
- Test Execution
- Test Closure

Notes



Test Execution - Test Execution Life Cycle Process



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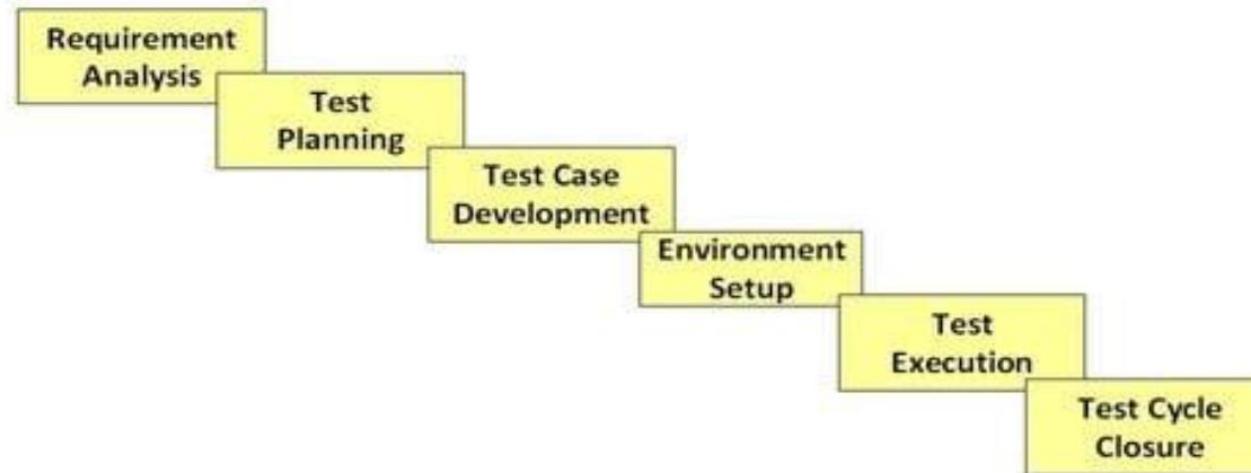


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Test Execution - Test Execution Life Cycle Process



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Guidelines for Test Execution



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Guidelines for Test Execution

- Write the suitable test cases for each module of the function.
- Assign suitable test cases to respective modules or functions.
- Execute both manual testing as well as automated testing for successful results.
- Choose a suitable automated tool for testing the application.
- Choose the correct test environment setup.
- Note down the execution status of each test case and note down the time taken by the system to complete the test cases.
- Report all the success status and the failure status to the development team or to the respective team regularly.
- Track the test status again for the already failed test cases and report it to the team.
- Highly Skilled Testers are required to perform the testing with less or zero failures/defects.
- Continuous testing is required until success test report is achieved.

Notes



Retesting

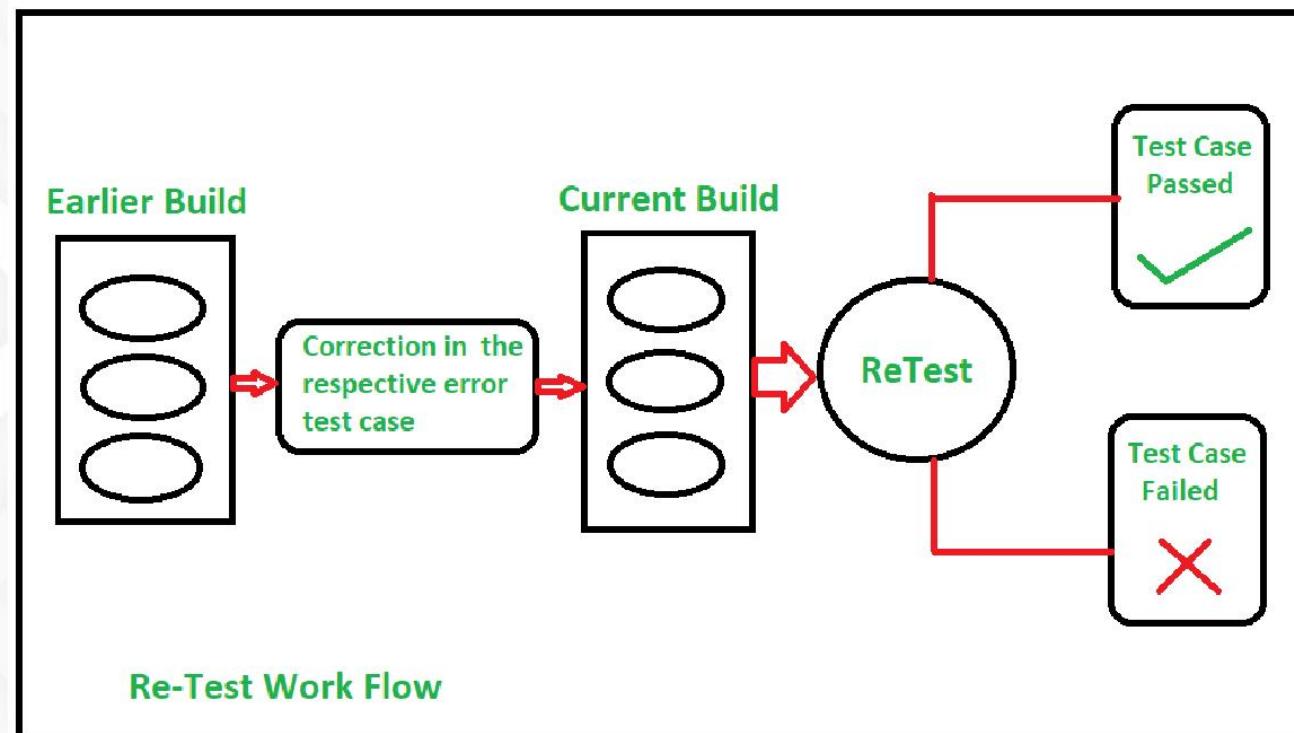
- Retesting is a procedure where we need to check that test cases which are found with some bugs during the execution time.
- Retesting also occurs when the product is already tested and due to some problems, it needs to be tested again. This test is named as retesting.

Characteristics of retesting:

- It is a copy of testing which are done with the same files and processes in a new build.
- Retesting can only be implemented when a particular test cases are involved which are considered as failed tests.
- During execution time whenever any bug is occurred and that test is declined by the developer, in that situation the testers department tests that file and they try to find the actual issue and they also do the retesting of that bug to make sure whether that bug is actual or not.
- Sometimes the whole program needs to be retested to verify the quality of the program.

Notes

Retesting



Notes



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Retesting

Use of Re-testing in Software Testing:

- Retesting is used when there is any specific error or bug which needs to be verified.
- It is used when the bug is rejected by the developers then the testing department tests whether that bug is actual or not.
- It is also used to check the whole system to verify the final functionality.
- It also checks the quality of a specific part of a system.
- When some user demands for retesting of their system.

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Retesting

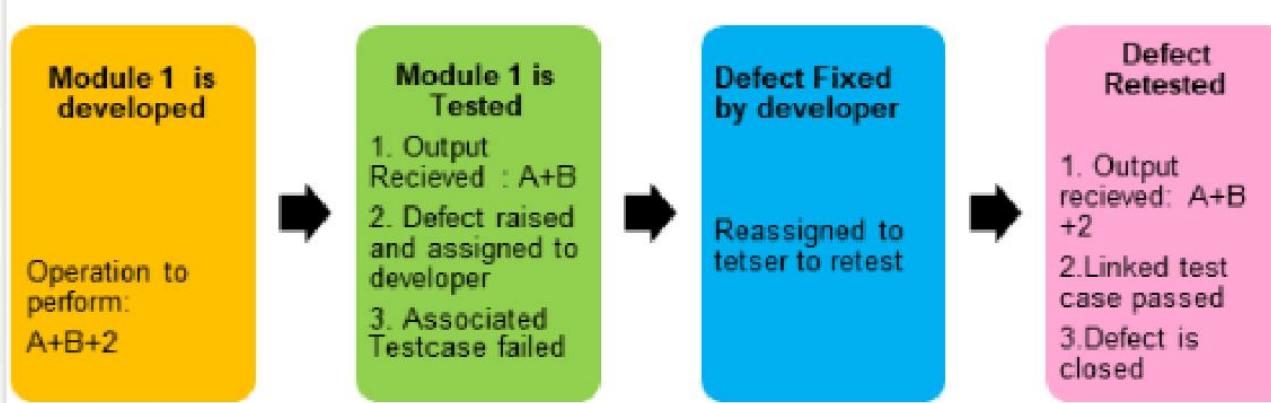
Use of Re-testing in Software Testing:

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- It is also used to check the whole system to verify the final functionality.
- It also checks the quality of a specific part of a system.
- When some user demands for retesting of their system.

Notes

Retesting

Examples of retesting



Notes



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Retesting

Examples of retesting

- Let's take an example of Facebook page, we need an Facebook account for that first we need to sign up for creating an account.
- The user adds every personal details of himself/herself like Name, DOB, Address, School details etc.
- After adding all the details the last step is to click on the “Sign up” button. While clicking on sign up button the user finds that the sign up button is not working. This bug is analyzed by the user and he reports to the developer and developer successfully fixed it.
- After fixing of bug again it is assigned to the tester for rechecking and workflow of the application, during this time the tester will only check the “Sign up” button, this process is known as retesting.

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Retesting

Advantages of Retesting:

- Retesting ensures that the bug is being fixed completely and working successfully according to the user.
- It enhances the quality of the product or application.
- The bug can be fixed in a short period of time as it targets on a particular issue.
- Retesting doesn't require any specific or another software for testing.
- It can perform with the same data and same process with new build for its execution.

Notes



Retesting

Disadvantages of Retesting:

- Retesting needs new build for qualifying verification process of the bug.
- If once the testing process is started then at that time, the test cases of the retesting we can obtain but not previously.
- At the time of testing, the retesting cannot be computerized.
- When the retesting results unsuccessful, it requires more time and efforts for fixing all the issues.

Notes



Result Analysis - Comparing Expected and Actual Values

Definition

Actual Results

You have to describe what you see on the website or the mobile app.

Expected Results

You have to describe what you consider the normal behaviour of the bug to be = the customer's specification/web standards/your analysis.

Summary: wrong currency

Actual results : wrong currency is used (pounds)

Expected results : use the right currency (euros)

Notes

Status of the Result



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Status of the Result

Result status	Description	Notes
Passed	A test reaches the end of an automated run, with: - no errors/warnings encountered - all checkpoints are passed.	When a test reaches the end, and no errors and no warnings have occurred; the test does not contain any checkpoints. The test is Passed.
Failed	A test reaches the end of an automated run, with one or few checkpoints are failed.	
Passed with Warnings/Errors	A test reaches the end of an automated run, with: - one or few warnings/errors encountered - all checkpoints are passed.	The most common use case for this result status is as follows: - A test reaches the end of an automated run, one or several warnings occurred, no errors detected, and all checkpoints are passed.

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Status of the Result

Passed with Known Bugs

A test reaches the end of an automated run, with:
- no errors/warnings encountered
- failed checkpoints detected, but they are already marked as known bugs.

Not Finished

A test is started but it is unable to reach the end of an automated run. Note that, the number of automation errors/ warnings, and passed/failed checkpoints do not matter. Specifically:
- A test run which is aborted explicitly because a test case timeout is reached is Not Finished.
- Automation runs which crash unexpectedly are Not Finished.
- Automation errors occur, and they are handled by the following built-in actions:
- terminate
- exit test module
- exit test case

- The legacy status, Aborted Test Cases, in the TA-TFS result status mapping is automatically mapped to Not Finished.
- If the automation playback is stopped, the test module's status is Not Finished and the last test case or the Final section's status is also Not Finished.
- Not Finished supports inheritance. Specifically, if sub-result's status is Not Finished, the master result's status will be Not Finished.
- For exit test module and exit test case, the overall result status, Not Finished, can be reconfigured in the exit status. (For details, please refer to exit test case and exit test module)

Not Run

A test case has not started.

The legacy status, Skipped test case, in the TA-TFSresult status mapping is automatically mapped to Not Run.

Notes



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Lab session : Creation of testcases (positive and negative and test execution)

Notes



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Database testing

A database is an organized collection of data, so that it can be easily accessed and managed.

You can organize data into tables, rows, columns, and index it to make it easier to find relevant information.

The main purpose of the database is to operate a large amount of information by storing, retrieving, and managing data.

There are many databases available like MySQL, Sybase, Oracle, MongoDB, Informix, PostgreSQL, SQL Server, etc.

Modern databases are managed by the database management system (DBMS).

SQL or Structured Query Language is used to operate on the data stored in a database. SQL depends on relational algebra and tuple relational calculus.



Notes

Database testing – Types of databases

- **Relational Database:**

- A relational database (RDB) is a way of structuring information in tables, rows, and columns

- **Distributed Database:**

A distributed database is basically a database that is not limited to one system, it is spread over different sites, i.e., on multiple computers or over a network of computers

- **Cloud Database:**

A cloud database is a database service built and accessed through a cloud platform. It serves many of the same functions as a traditional database with the added flexibility of cloud computing. Users install software on a cloud infrastructure to implement the database.



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Database testing - DBMS

Database Management System(DBMS)

DBMS is a **collection of programs** which enables its users to access database, manipulate data, reporting / representation of data .

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Database Management Systems were first implemented in 1960s

Charles Bachman's Integrated Data Store (**IDS**) is considered the first DBMS in history

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Today, database technologies have **evolved** a lot and correspondingly the functionalities have been increased exponentially

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Database testing - DBMS

- All modern database management systems like SQL, MS SQL Server, IBM DB2, ORACLE, My-SQL, and Microsoft Access are based on RDBMS.
- It is called Relational Database Management System (RDBMS) because it is based on the relational model introduced by E.F. Codd.
- Data is represented in terms of tuples (rows) in RDBMS.
- A relational database is the most commonly used database. It contains several tables, and each table has its primary key.
- Due to a collection of an organized set of tables, data can be accessed easily in RDBMS.



Notes



Database testing - DBMS

- Database Testing is important in software testing because it ensures data values and information received and stored into database are valid or not.
- Database testing helps to save data loss, saves aborted transaction data and no unauthorized access to the information.
- Database is important for any software application hence testers must have good knowledge of SQL for database testing.

Let us consider a Banking application wherein a user makes transactions. Now from Database Testing or DB Testing viewpoint following, things are important:

- The application stores the transaction information in the application database and displays them correctly to the user.
- No information is lost in the process.
- No partially performed or aborted operation information is saved by the application.
- No unauthorized individual is allowed to access the user's information.

Notes



What is SQL?

SQL is Structured Query Language, which is a computer language for storing, manipulating and retrieving data stored in relational database.

SQL is the standard language for Relation Database System. All relational database management systems like MySQL, MS Access, Oracle, Sybase, Informix, postgress and SQL Server use SQL as standard database language

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Why SQL?

- Allows users to access data in relational database management systems.
- Allows users to describe the data.
- Allows users to define the data in database and manipulate that data.
- Allows to embed within other languages using SQL modules, libraries & pre-compilers.
- Allows users to create and drop databases and tables.
- Allows users to create view, stored procedure, functions in a database.
- Allows users to set permissions on tables, procedures and views

Notes



Why SQL?

Database Tables

A database most often contains one or more tables. Each table is identified by a name (e.g. "Customers" or "Orders"). Tables contain records (rows) with data.

Notes



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SQL Syntax

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
1	Alfreds Futterkiste	Maria Anders	Obere Str. 57	Berlin	12209	Germany
2	Ana Trujillo Emparedados y helados	Ana Trujillo	Avda. de la Constitución 2222	México D.F.	05021	Mexico
3	Antonio Moreno Taquería	Antonio Moreno	Mataderos 2312	México D.F.	05023	Mexico
4	Around the Horn	Thomas Hardy	120 Hanover Sq.	London	WA1 1DP	UK
5	Berglunds snabbköp	Christina Berglund	Berguvsvägen 8	Luleå	S-958 22	Sweden

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SQL Syntax

SQL constraints are used to specify rules for the data in a table.

Constraints are used to limit the type of data that can go into a table.

This ensures the accuracy and reliability of the data in the table. If there is any violation between the constraint and the data action, the action is aborted.

Constraints can be column level or table level. Column level constraints apply to a column, and table level constraints apply to the whole table.

Notes

SQL Syntax

The following constraints are commonly used in SQL:

- NOT NULL** - Ensures that a column cannot have a **N**ULL value
- UNIQUE** - Ensures that all values in a column are different
- PRIMARY KEY** - A combination of a NOT NULL and UNIQUE. Uniquely identifies each row in a table
- FOREIGN KEY** - Prevents actions that would destroy links between tables
- CHECK** - Ensures that the values in a column satisfies a specific condition
- DEFAULT** - Sets a default value for a column if no value is specified
- CREATE INDEX** - Used to create and retrieve data from the database very quickly

Notes



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SQL Syntax

SQL NOT NULL Constraint

By default, a column can hold NULL values.

The NOT NULL constraint enforces a column to NOT accept NULL values.

This enforces a field to always contain a value, which means that you cannot insert a new record, or update a record without adding a value to this field.

```
CREATE TABLE Persons (
    ID int NOT NULL,
    LastName varchar(255) NOT NULL,
    FirstName varchar(255) NOT NULL,
    Age int
);
```

Notes



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SQL Syntax

SQL UNIQUE Constraint

The UNIQUE constraint ensures that all values in a column are different.

Both the UNIQUE and PRIMARY KEY constraints provide a guarantee for uniqueness for a column or set of columns.

A PRIMARY KEY constraint automatically has a UNIQUE constraint.

However, you can have many UNIQUE constraints per table, but only one PRIMARY KEY constraint per table.

Notes



SQL Syntax

```
CREATE TABLE Persons (
    ID int NOT NULL UNIQUE,
    LastName varchar(255) NOT NULL,
    FirstName varchar(255),
    Age int
);
```

Notes



SQL Syntax

SQL PRIMARY KEY Constraint

The PRIMARY KEY constraint uniquely identifies each record in a table.

Primary keys must contain UNIQUE values, and cannot contain NULL values.

A table can have only ONE primary key; and in the table, this primary key can consist of single or multiple columns (fields).

```
CREATE TABLE Persons (
    ID int NOT NULL,
    LastName varchar(255) NOT NULL,
    FirstName varchar(255),
    Age int,
    PRIMARY KEY (ID)
);
```

Notes



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SQL Syntax

SQL FOREIGN KEY Constraint

The FOREIGN KEY constraint is used to prevent actions that would destroy links between tables.

A FOREIGN KEY is a field (or collection of fields) in one table, that refers to the PRIMARY KEY in another table.

The table with the foreign key is called the child table, and the table with the primary key is called the referenced or parent table.

```
CREATE TABLE Persons (
    ID int NOT NULL,
    LastName varchar(255) NOT NULL,
    FirstName varchar(255),
    Age int,
    PRIMARY KEY (ID)
);
```

Notes



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SQL Syntax

Persons Table

PersonID	LastName	FirstName	Age
1	Hansen	Ola	30
2	Svendson	Tove	23
3	Pettersen	Kari	20

Orders Table

OrderID	OrderNumber	PersonID
1	77895	3
2	44678	3
3	22456	2
4	24562	1

Notes

A screenshot of a Microsoft Edge browser window. The title bar says "Lumen". The address bar shows a URL from "lumen.u-next.com". The main content area displays two tables: "Persons Table" and "Orders Table". A "Notes" button is visible at the bottom right. The taskbar at the bottom includes icons for search, file explorer, messaging, and other applications. The system tray shows battery level, signal strength, and the date/time "09:42 18-11-2024".

Notice that the "PersonID" column in the "Orders" table points to the "PersonID" column in the "Persons" table.

The "PersonID" column in the "Persons" table is the PRIMARY KEY in the "Persons" table.

The "PersonID" column in the "Orders" table is a FOREIGN KEY in the "Orders" table.

The FOREIGN KEY constraint prevents invalid data from being inserted into the foreign key column, because it has to be one of the values contained in the parent table.

Notes



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SQL Syntax

SQL CHECK Constraint

The CHECK constraint is used to limit the value range that can be placed in a column.

If you define a CHECK constraint on a column it will allow only certain values for this column.

If you define a CHECK constraint on a table it can limit the values in certain based on values in other columns in the row.

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SQL Syntax

```
CREATE TABLE Persons (
    ID int NOT NULL,
    LastName varchar(255) NOT NULL,
    FirstName varchar(255),
    Age int,
    CHECK (Age>=18)
);
```

Notes



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SQL Syntax

SQL DEFAULT Constraint

The DEFAULT constraint is used to set a default value for a column.

The default value will be added to all new records, if no other value is specified.

```
CREATE TABLE Persons (
    ID int NOT NULL,
    LastName varchar(255) NOT NULL,
    FirstName varchar(255),
    Age int,
    City varchar(255) DEFAULT 'Sandnes'
);
```

Notes



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SQL Syntax

SQL CREATE INDEX Statement

The CREATE INDEX statement is used to create indexes in tables.

Indexes are used to retrieve data from the database more quickly than otherwise.

The users cannot see the indexes, they are just used to speed up searches/queries.

```
CREATE INDEX index_name  
ON table_name (column1, column2, ...);
```

```
CREATE INDEX idx_lastname  
ON Persons (LastName);
```

Notes



SQL Syntax



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The SQL SELECT Statement

**The SELECT statement is used to select data from a database.
The data returned is stored in a result table, called the result-set.**

```
SELECT column1, column2, ...
FROM table_name;
```

```
SELECT * FROM table_name;
```

Notes

The SQL WHERE Clause

The WHERE clause is used to filter records.

It is used to extract only those records that fulfill a specified condition.

```
SELECT column1, column2, ...
FROM table_name
WHERE condition;
```

```
SELECT * FROM Customers
WHERE Country='Mexico';
```

Notes



SQL Syntax

```
SELECT column1, column2, ...
FROM table_name
WHERE condition1 AND condition2 AND condition3 ...;

SELECT column1, column2, ...
FROM table_name
WHERE condition1 OR condition2 OR condition3 ...;
```

Notes



SQL Syntax

```
SELECT * FROM Customers  
WHERE Country='Germany' AND City='Berlin';
```

```
SELECT * FROM Customers  
WHERE City='Berlin' OR City='München';
```

Notes



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The SQL AND, OR and NOT Operators

The WHERE clause can be combined with AND, OR, and NOT operators.

The AND and OR operators are used to filter records based on more than one condition:

The AND operator displays a record if all the conditions separated by AND are TRUE.

The OR operator displays a record if any of the conditions separated by OR is TRUE.

The NOT operator displays a record if the condition(s) is NOT TRUE.

Notes



SQL Syntax

```
SELECT column1, column2, ...
FROM table_name
WHERE condition1 AND condition2 AND condition3 ...;
```

```
SELECT column1, column2, ...
FROM table_name
WHERE condition1 OR condition2 OR condition3 ...;
```

```
SELECT * FROM Customers
WHERE Country='Germany' AND City='Berlin';
```

```
SELECT * FROM Customers
WHERE City='Berlin' OR City='München';
Try it Yourself»
```

Notes



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SQL Syntax

The SQL ORDER BY Keyword

The ORDER BY keyword is used to sort the result-set in ascending or descending order.

The ORDER BY keyword sorts the records in ascending order by default. To sort the records in descending order, use the DESC keyword.

Notes



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SQL Syntax

```
SELECT column1, column2, ...
FROM table_name
ORDER BY column1, column2, ... ASC|DESC;

SELECT * FROM Customers
ORDER BY Country ASC, CustomerName DESC;
```

Notes



SQL Syntax

The SQL INSERT INTO Statement

The **INSERT INTO** statement is used to insert new records in a table.

```
INSERT INTO table_name (column1, column2, column3, ...)
VALUES (value1, value2, value3, ...);
```

```
INSERT INTO Customers (CustomerName, ContactName, Address, City, PostalCode,
Country)
VALUES ('Cardinal', 'Tom B. Erichsen', 'Skagen
21', 'Stavanger', '4006', 'Norway');
```

Notes



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The SQL INSERT INTO Statement

The **INSERT INTO** statement is used to insert new records in a table.

```
INSERT INTO table_name (column1, column2, column3, ...)
VALUES (value1, value2, value3, ...);
```

```
INSERT INTO Customers (CustomerName, ContactName, Address, City, PostalCode,
Country)
VALUES ('Cardinal', 'Tom B. Erichsen', 'Skagen
21', 'Stavanger', '4006', 'Norway');
```

Notes



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SQL Syntax

The SQL UPDATE Statement

The UPDATE statement is used to modify the existing records in a table.

```
UPDATE table_name  
SET column1 = value1, column2 = value2, ...  
WHERE condition;
```

```
UPDATE Customers  
SET ContactName = 'Alfred Schmidt', City= 'Frankfurt'  
WHERE CustomerID = 1;
```

Notes

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SQL Syntax + 95%

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The SQL DELETE Statement

The DELETE statement is used to delete existing records in a table.

```
DELETE FROM table_name WHERE condition;
```

```
DELETE FROM Customers WHERE CustomerName='Alfreds Futterkiste';
```

Notes

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Notes Ask Doubts Rotate Fit to Width Exit Full Screen

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SQL Syntax

The SQL MIN() and MAX() Functions

The MIN() function returns the smallest value of the selected column.
The MAX() function returns the largest value of the selected column.

```
SELECT MIN(column_name)
FROM table_name
WHERE condition; FROM table_name WHERE condition
;
```

```
SELECT MAX(column_name)
FROM table_name
WHERE condition;
```

Notes



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SQL Syntax

```
SELECT MIN(Price) AS SmallestPrice  
FROM Products;
```

```
SELECT MAX(Price) AS LargestPrice  
FROM Products;
```

Notes



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SQL Syntax

```
SELECT MIN(Price) AS SmallestPrice  
FROM Products;
```

```
SELECT MAX(Price) AS LargestPrice  
FROM Products;
```

Notes



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Thank You

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