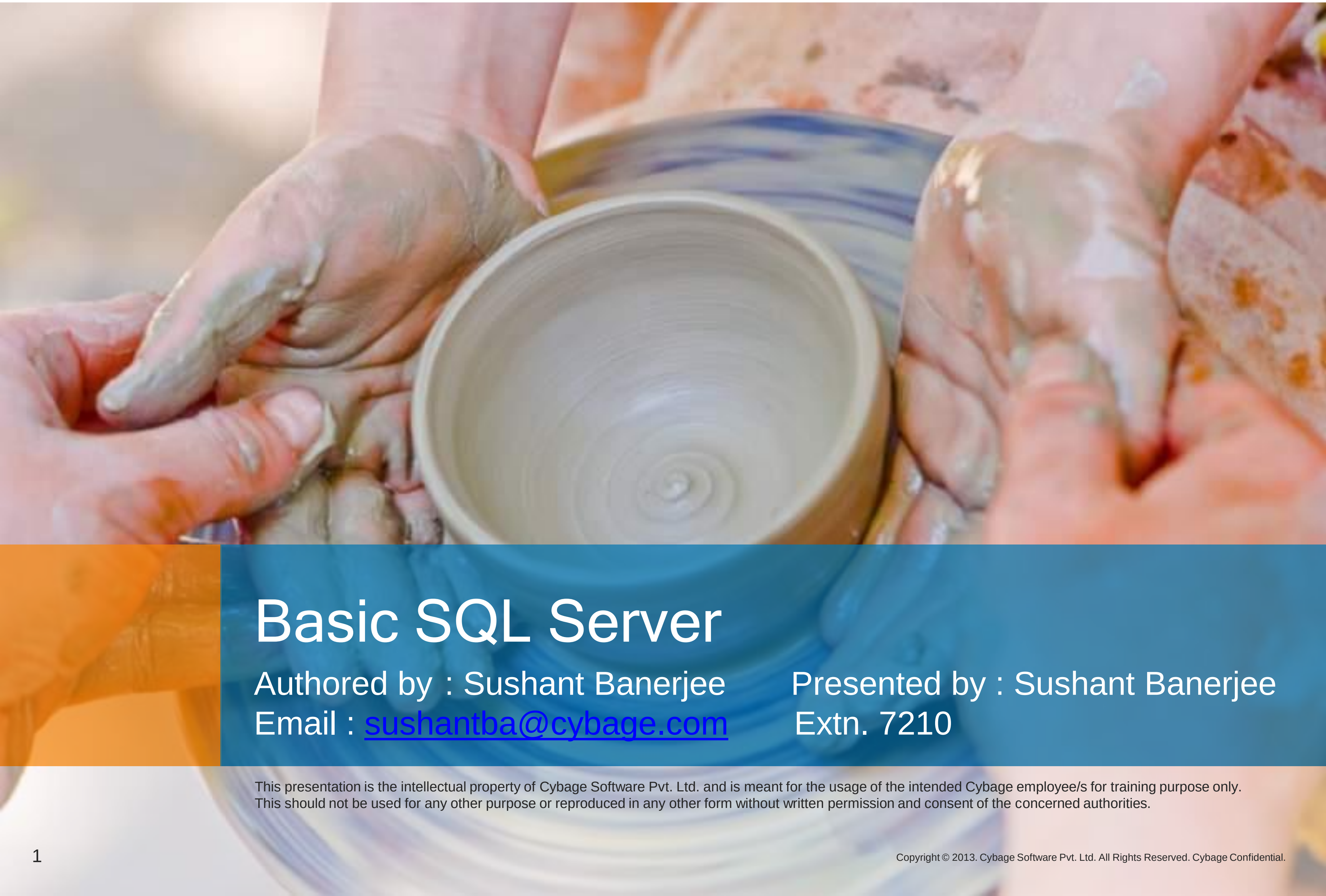

Basic SQL Server

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Agenda

- Query Fundamentals
- Joins
- Subqueries
- Built-in Functions
- String Functions
- DateTime Functions

Query Fundamentals

What is a Query?

- Requests data from database
- Mostly SELECT statement is used
- Server returns data in Result Sets
- Manipulating result sets does not change actual table data

Identifiers

- Name of any object
  - Server name
  - Database name
  - Table name
  - Column name etc.

Classes of Identifiers

- Regular Identifiers
  - Follows the rules of identifiers
- Delimited Identifiers
  - Doesn’t follow the rules of identifiers
  - Uses either quotation marks “ “ or brackets [ ]

Rules for Regular Identifier

- The first character must use
  - Characters from A through Z or
  - The underscore (_), at sign (@) or number sign (#)
- The subsequent characters may include
  - Characters from A through Z
  - Dollar sign ($) underscore (_), at sign (@) or number sign (#)
- The identifier must not use T-SQL reserved words.
- Any embedded space or special characters are not allowed.

The SELECT Statement

```
SELECT < Column List >
From < Table Name >
Where < Conditions >
Group By < Column Name >
Having < Condition >
Order By < Column Name >
```

Retrieving Data

- All columns and rows from a table
- Specific columns from a table
- Hide original column name using column alias
- Format result set using character string constant

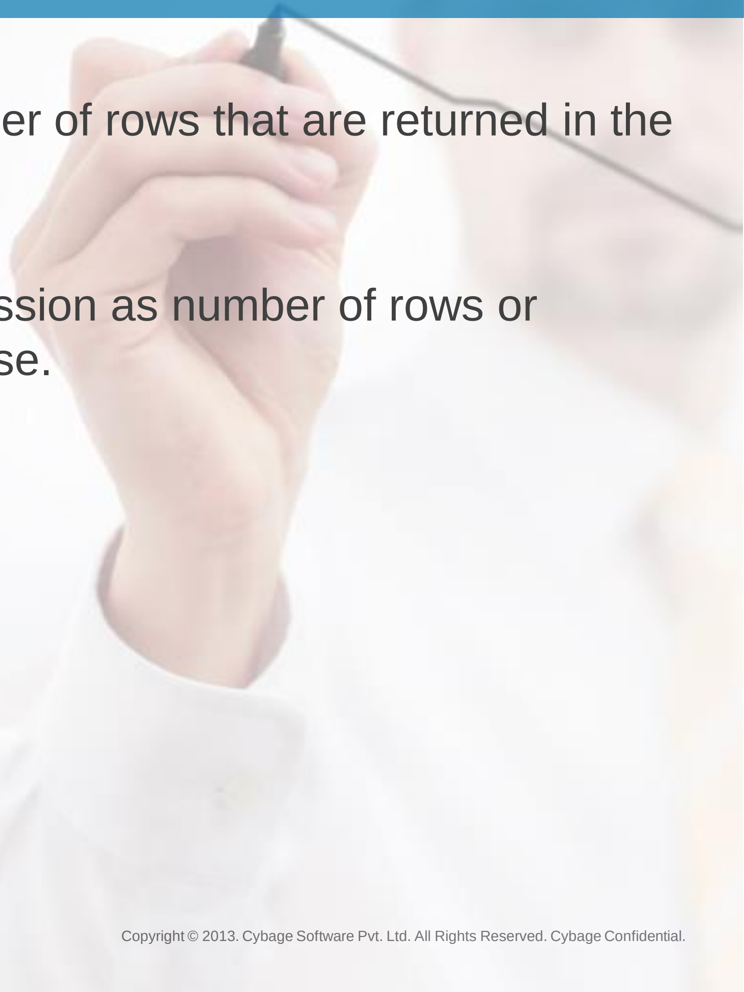
Arithmetic Operators

- Arithmetic operators can be used in expressions.
  - Addition (+)
  - Subtraction (-)
  - Division (/)
  - Multiplication (*)
  - Modulo (%)

DISTINCT Keyword

- Eliminates duplicate rows
- NULL values are also considered

The TOP Clause



- The TOP clause is used to limit number of rows that are returned in the result set.
- You can specify either numeric expression as number of rows or percentage followed by the TOP clause.

The FROM Clause

- Used to specify table names in every SELECT statement.
- FROM clause is not required when the SELECT statement returns data from local or global variables and T-SQL functions.

The WHERE Clause

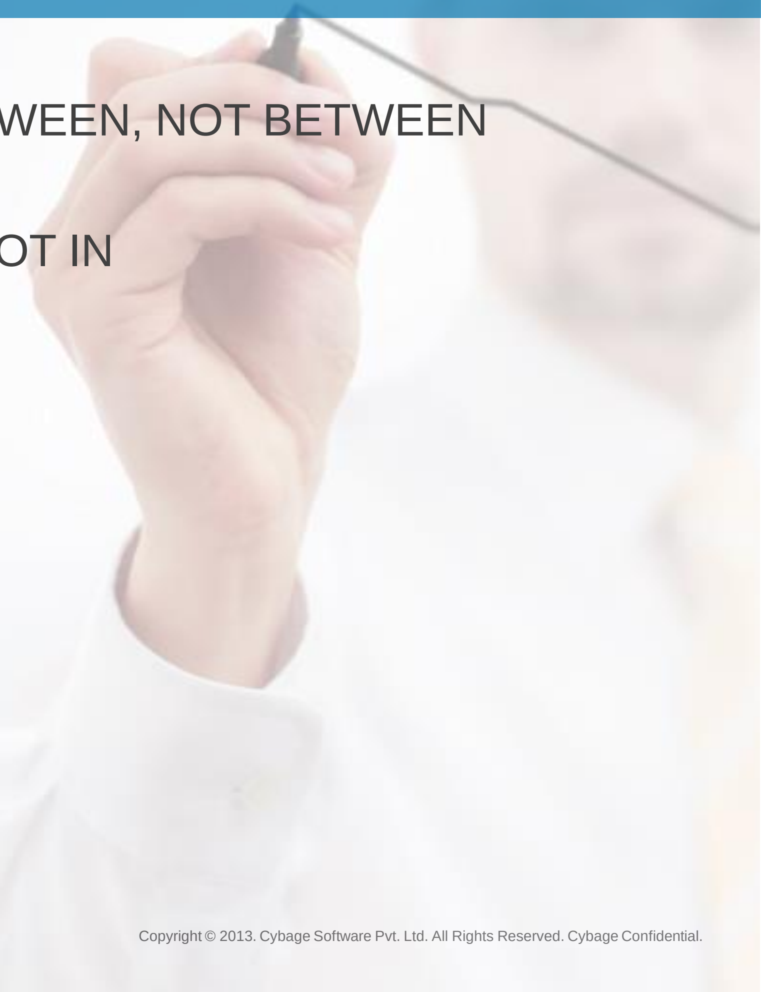
- The WHERE clause is used in the SELECT statement just like a filter.
- You can specify your search conditions in the WHERE clause and only those rows that meet the specified condition will return.
- A search condition may include following:
  - Comparison Operators (= , <, > etc.)
  - Ranges (BETWEEN and NOT BETWEEN)
  - Lists (IN and NOT IN)
  - Pattern Matches (LIKE and NOT LIKE)
  - Null Values (IS NULL and IS NOT NULL)
  - Combination of the conditions (AND, OR, NOT)

Comparison Operators

Operator	Meaning
=	Equal to
>	Greater than
<	Less than
>=	Greater than or equal to
<=	Less than or equal to
< >	Not equal to (ISO compatible)
!>	Not greater than
!<	Not less than
!=	Not equal to

Range and Lists

- Used to specify certain range – BETWEEN, NOT BETWEEN
- Used to specify list of values – IN, NOT IN

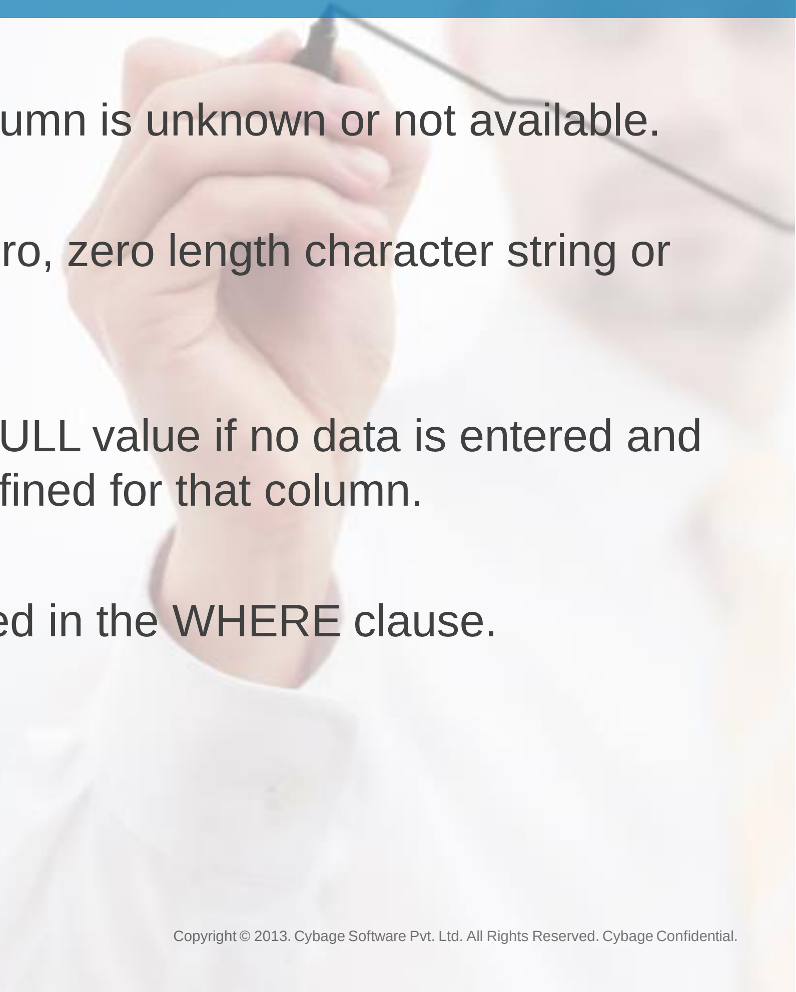


Pattern Matches

- The LIKE keyword is used for pattern matching.
- The pattern may contain character string along with 4 wildcards.

Wildcards	Meaning
%	Any string of zero or more characters.
_	Any single character
[ ]	Any single character within the specified range
[^]	Any single character not within the specified range

NULL Values

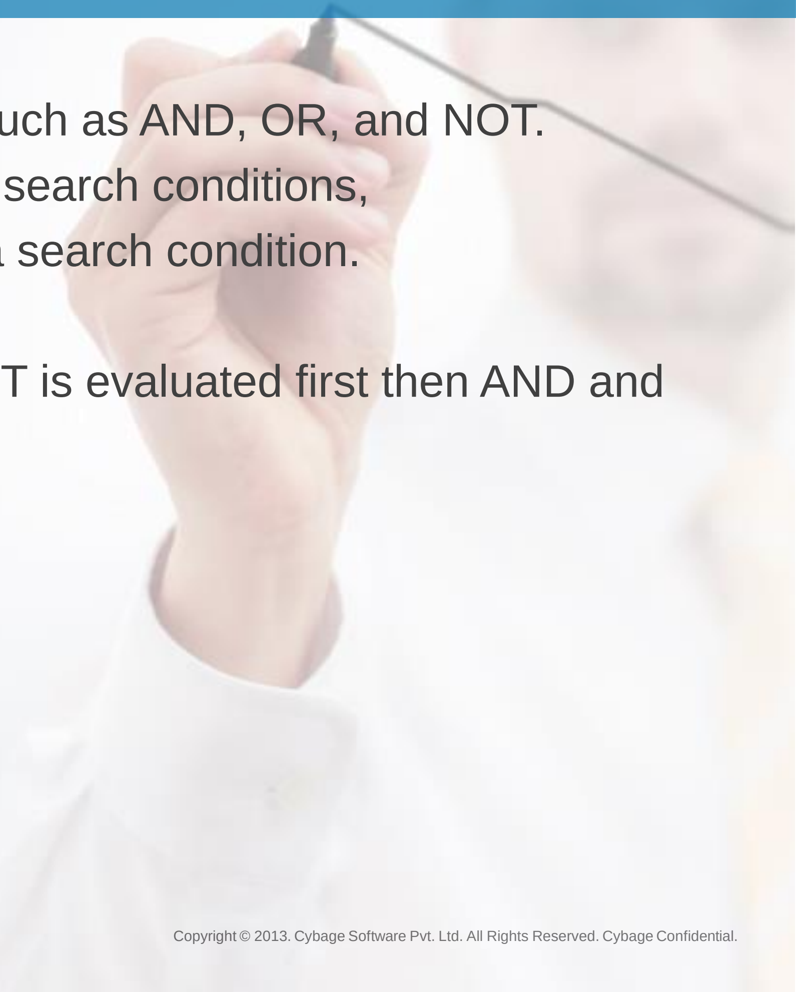


- NULL means data value for the column is unknown or not available.
- NULL does not mean a numeric zero, zero length character string or blank.
- SQL Server automatically enters NULL value if no data is entered and there is no DEFAULT constraint defined for that column.
- IS NULL, IS NOT NULL can be used in the WHERE clause.

Logical Operators

- There are three logical operators such as AND, OR, and NOT.
- AND and OR are used to combine search conditions,
- NOT is used reverse the result of a search condition.

- Logical Operator Precedence - NOT is evaluated first then AND and finally OR.



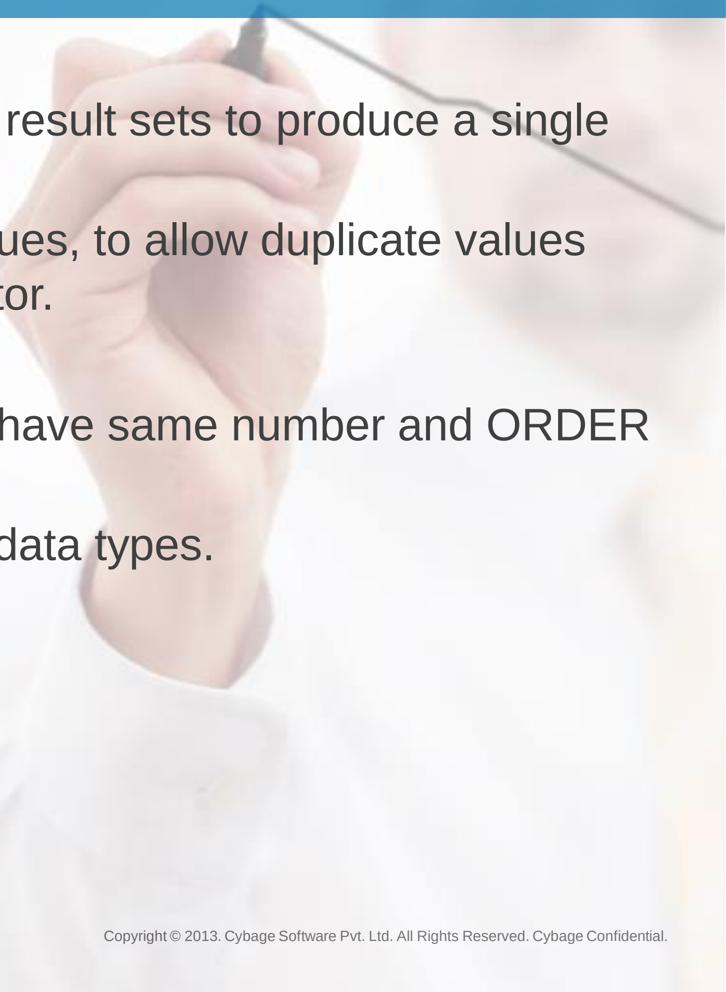
Aggregate Functions

- COUNT
- AVG
- MIN
- MAX
- SUM

Grouping and Sorting

- ORDER BY (default ASC) Clause
- GROUP BY Clause
- HAVING clause is used with the GROUP BY clause to filter groups in the result set.

UNION and UNION ALL Operators



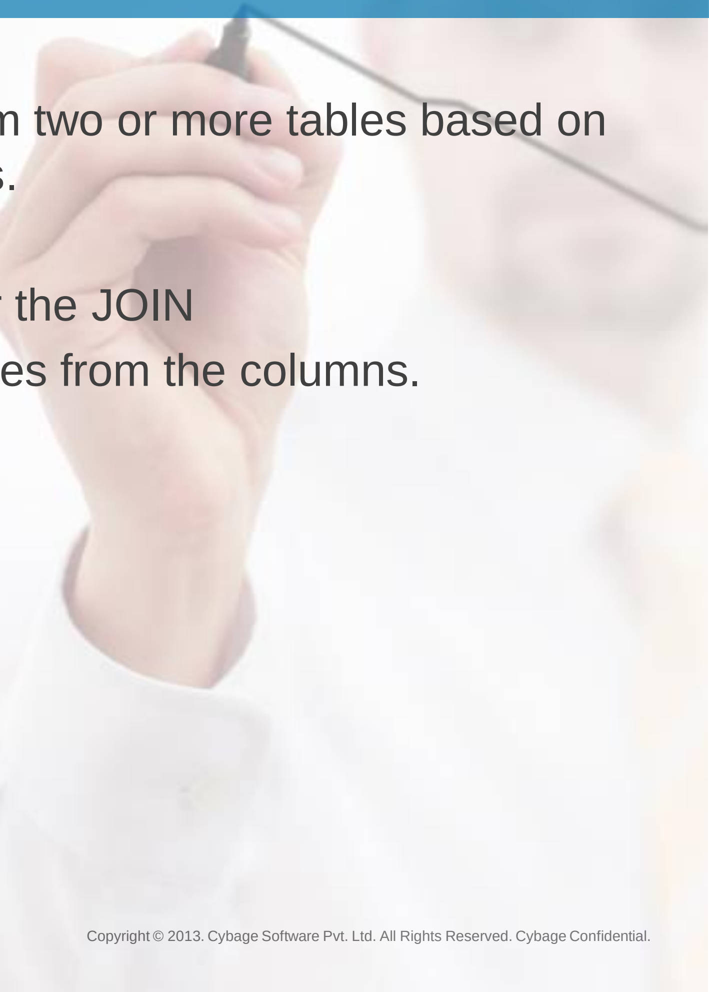
- The UNION operator will combine two result sets to produce a single result set.
- The UNION will select only distinct values, to allow duplicate values using ALL keyword with UNION operator.
- The restrictions to use UNION :
  - Both the SELECT statements must have same number and ORDER of columns.
  - The columns must have the similar data types.

EXCEPT and INTERSECT

- The EXCEPT will compare the result sets of two queries and returns distinct values.
- EXCEPT will return any distinct values from the left query that are not found on the right query.
- INTERSECT returns any distinct values that are returned by both the queries on the left and right sides of the INTERSECT operand.
- The basic rules for combining the result sets of two queries that use EXCEPT or INTERSECT are the following:
  - The number and the order of the columns must be the same in all queries.
  - The data types must be compatible.

Joins and Subqueries

JOINs



- You can use JOINs to retrieve data from two or more tables based on logical relationships between the tables.
- The JOIN condition needs following :
  - The column from each table used for the JOIN
  - A logical operator for comparing values from the columns.

Resolving Ambiguity

- When a same column name is used in more than one table in a join operation, the reference of the column becomes ambiguous.

- TableAlias.ColumnName

- **Fully qualified column names(4 parts name)**
- DatabaseName.SchemaName.TableName.ColumnName

JOINs (contd…)

- INNER JOIN
- OUTER JOIN
  - LEFT OUTER JOIN
  - RIGHT OUTER JOIN
  - FULL JOIN or FULL OUTER JOIN
- CROSS JOINS
- SELF JOINS

Subquery

- A subquery is a query that is nested inside a SELECT, INSERT, UPDATE, or DELETE statement, or inside another subquery.
- Up to 32 levels of nesting is allowed by SQL Server.
- A subquery can be used anywhere an expression is allowed.
- A subquery is also called an inner query or inner select, while the statement containing a subquery is also called an outer query or outer select.
- Many Transact-SQL statements that include subqueries can be alternatively use joins

Types of Subquery

- Using Alias
- Using IN or NOT IN
- In UPDATE, DELETE and INSERT statements
- Using Comparison Operators
- Using ANY, ALL
- Using EXISTS or NOT EXISTS
- In place of an expression

Correlated Subquery

- A correlated subquery depends on the outer query for its evaluation.
- The subquery executes repeatedly, once for each row selected by the outer query.
- For this reason a correlated subquery is also called a repeating subquery.
- A correlated subquery can not evaluate itself independently of the outer query.

Subquery Restrictions

- The select list of a subquery introduced with a comparison operator can include only one expression or column.
- If the WHERE clause of an outer query includes a column name, it must be join-compatible with the column in the subquery select list.
- The **ntext**, **text**, and **image** data types cannot be used in the select list of subqueries.
- Subqueries introduced by an unmodified comparison operator (one not followed by the keyword ANY or ALL) cannot include GROUP BY and HAVING clauses.

Subquery Restrictions (contd…)

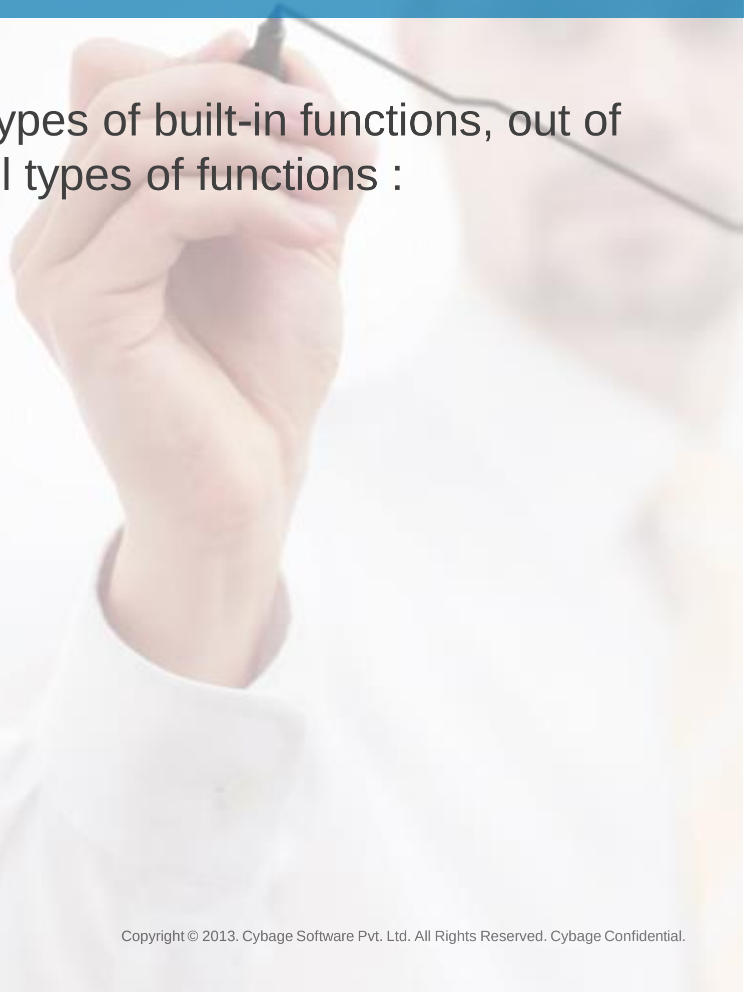
- ORDER BY can only be specified when TOP is also specified.
- A view created by using a subquery cannot be updated.
- A subquery introduced with EXISTS creates an existence test and returns TRUE or FALSE, instead of data.
- The DISTINCT keyword cannot be used with subqueries that include GROUP BY.

Built-in Functions

Built-in Functions

- In SQL Server, built-in functions are basically classified as:
- **Deterministic**
- When a function always returns the same results for a specific set of input values.
- **Nondeterministic**
- When a function may return different results when it is called repeatedly with the same set of input values, for example GETDATE.

Built-in Functions



- SQL Server provides many different types of built-in functions, out of those following are some of the useful types of functions :

- System Functions
- String Functions
- Date and Time Functions
- Conversions Functions
- Aggregate Functions

System Functions

- System functions operate on or report on various system level options and objects.
- Following are some of the useful system functions:

- DB_NAME and DB_ID
- HOST_ID and HOST_NAME
- OBJECT_ID and OBJECT_NAME
- SUSER_ID and SUSER_NAME
- USER_ID and USER_NAME

String Functions

- Following are some commonly used string functions:

- ASCII(), CHAR() and CHARINDEX()
- LEFT() and RIGHT()
- SUBSTRING()
- LEN()
- LOWER() and UPPER()
- LTRIM() and RTRIM()
- REPLACE(), REPLICATE() and REVERSE()
- SPACE() and STUFF()

Date and Time Functions

- GETDATE()
- DAY()
- MONTH()
- YEAR()
- DATEPART()
- DATENAME()
- DATEADD()
- DATEDIFF()

Conversion Functions

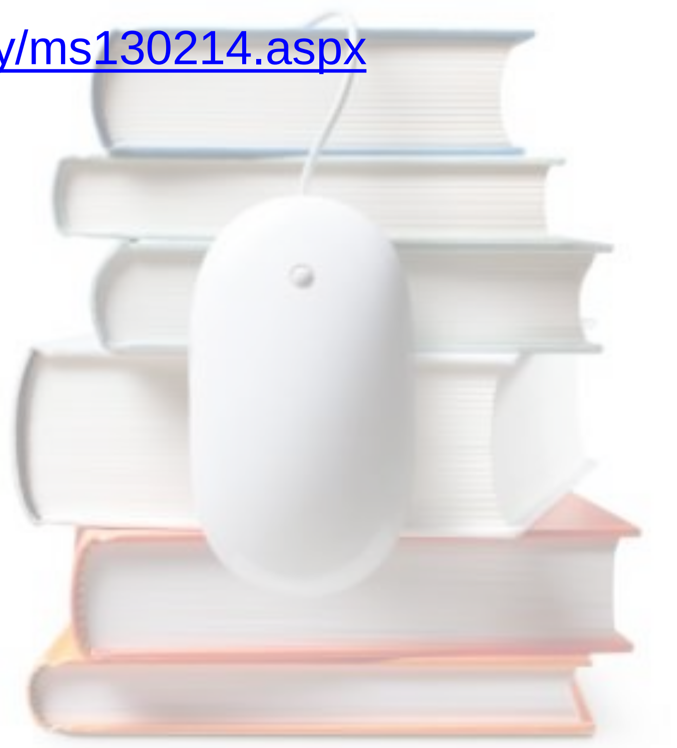
- Use these functions to convert expression from one data type to another data type.

- CAST()
- CONVERT()

Bibliography, Important Links

WWW.MSDN.COM (SQL SERVER 2012 BOOKS ONLINE)

http://msdn.microsoft.com/en-us/library/ms130214.aspx



Any Questions?

Thank you!