WEEK – 3 DATABASE TECHNOLOGY ASSIGNMNET

1) Explain in detail about in-built functions using SQL with examples.

Built-In Functions in SQL Server:

- Built-In functions are used in <u>SQL SELECT expressions</u> to calculate values and manipulate data. These functions can be used anywhere expressions are allowed. Common uses of functions include changing a name to all upper case. In this article, we'll introduce you to basic concepts.
- All the examples for this lesson are based on Microsoft SQL Server Management Studio and the AdventureWorks2012 database.

What are Built-In Functions?

- In SQL a built-in function is a piece for programming that takes zero or more inputs and returns a value. An example of a built-in function is ABS(), which when given a value calculates the absolute (non-negative) value of the number.
- Some functions, such as ABS() are used to perform calculations, others such as GETDATE() are used to obtain a system value, such as the current data, or others, like LEFT(), are used to manipulate textual data.
- Here is a simple query using the absolute value function.
  SELECT Name,
  ABS(500 - ReorderPoint) ReorderPointDeviation
  FROM   production.Product
  WHERE ABS(500 - ReorderPoint) > 200
- In this query we first calculate the difference between 500 and a product's reorder point. The ABS function is then used to return the result as a positive number.
- There are several things to note regarding functions.
- The inputs to a function are called parameters. Not all function has parameters, and some functions have more than one.
- Parameters are enclosed in parenthesis.

- We use functions in the <u>SELECT</u> clause as well as the <u>WHERE</u> filter condition. A function can be used anywhere in a SELECT statement that you can use an expression.
- Functions are reserved words. I would avoid using them as column or table names. If you do, then expect to qualify your names with brackets [].
- As you learn more about functions you soon find they are vital in being able to calculate and manipulate your query results. We'll dig deeper into specific functions and their uses in future posts, but before we do so, let's talk about the type of data a function can return.

How do Functions Behave?

- Some functions return the same value each time you call them. These are said to be deterministic functions. For a given input, these functions return the same value each time they are called...
- SQRT(), which is used to return the square root of a number, is deterministic. No matter how many times you run
- SELECT SQRT(9)
- It will return, 3.
- Non-deterministic functions' return value may change from execution to execution. GETDATE(), which returns the current date and time, is a good example.
- SELECT GETDATE()
- Returns a different value second by second.
- This is important to keep in mind when writing and troubleshooting queries. If your query contains non-deterministic functions, then you should expect the results to change. If you didn't think of this and you were comparing query results you may think the inconsistent results indicated a major problem, when it was only a non-deterministic function behaving as it should.
- Later, as you start to program SQL, and write your own UDF's (User Defined Functions), and work with indexes, you find that a nondeterministic function limit where you can use incorporate your UDF's into the database.

Function Categories

- There are over a hundred built-in functions in SQL Server. To understand their breadth of application, I would recommend visiting the <u>Built-In Functions (Transact SQL)</u> page on the MDSN site.

- The categories we'll cover next are:
  - <u>Conversion Functions</u>
  - <u>Logical Functions</u>
  - <u>Math Functions</u>
  - <u>String Functions</u>
  - <u>Date Functions</u>

- MySQL has many built-in functions.
- This reference contains string, numeric, date, and some advanced functions in MySQL.

MySQL String Functions

Function	Description
<u>ASCII</u>	Returns the ASCII value for the specific character
<u>CHAR_LENGTH</u>	Returns the length of a string (in characters)
<u>CHARACTER_LENGTH</u>	Returns the length of a string (in characters)
<u>CONCAT</u>	Adds two or more expressions together
<u>CONCAT_WS</u>	Adds two or more expressions together with a separator
<u>FIELD</u>	Returns the index position of a value in a list of values

FIND_IN_SET	Returns the position of a string within a list of strings
FORMAT	Formats a number to a format like "#,###,###.##", rounded to a specified number of decimal places
INSERT	Inserts a string within a string at the specified position and for a certain number of characters
INSTR	Returns the position of the first occurrence of a string in another string
LCASE	Converts a string to lower-case
LEFT	Extracts a number of characters from a string (starting from left)
LENGTH	Returns the length of a string (in bytes)
LOCATE	Returns the position of the first occurrence of a substring in a string
LOWER	Converts a string to lower-case
LPAD	Left-pads a string with another string, to a certain length
LTRIM	Removes leading spaces from a string
MID	Extracts a substring from a string (starting at any position)
POSITION	Returns the position of the first occurrence of a substring in a string
REPEAT	Repeats a string as many times as specified
REPLACE	Replaces all occurrences of a substring within a string, with a new substring
REVERSE	Reverses a string and returns the result

RIGHT	Extracts a number of characters from a string (starting from right)
RPAD	Right-pads a string with another string, to a certain length
RTRIM	Removes trailing spaces from a string
SPACE	Returns a string of the specified number of space characters
STRCMP	Compares two strings
SUBSTR	Extracts a substring from a string (starting at any position)
SUBSTRING	Extracts a substring from a string (starting at any position)
SUBSTRING_INDEX	Returns a substring of a string before a specified number of delimiter occurs
TRIM	Removes leading and trailing spaces from a string
UCASE	Converts a string to upper-case
UPPER	Converts a string to upper-case

MySQL Numeric Functions

Function	Description
ABS	Returns the absolute value of a number
ACOS	Returns the arc cosine of a number
ASIN	Returns the arc sine of a number

ATAN	Returns the arc tangent of one or two numbers
ATAN2	Returns the arc tangent of two numbers
AVG	Returns the average value of an expression
CEIL	Returns the smallest integer value that is >= to a number
CEILING	Returns the smallest integer value that is >= to a number
COS	Returns the cosine of a number
COT	Returns the cotangent of a number
COUNT	Returns the number of records returned by a select query
DEGREES	Converts a value in radians to degrees
DIV	Used for integer division
EXP	Returns e raised to the power of a specified number
FLOOR	Returns the largest integer value that is <= to a number
GREATEST	Returns the greatest value of the list of arguments
LEAST	Returns the smallest value of the list of arguments
LN	Returns the natural logarithm of a number
LOG	Returns the natural logarithm of a number, or the logarithm of a number to a specified base
LOG10	Returns the natural logarithm of a number to base 10

LOG2	Returns the natural logarithm of a number to base 2
MAX	Returns the maximum value in a set of values
MIN	Returns the minimum value in a set of values
MOD	Returns the remainder of a number divided by another number
PI	Returns the value of PI
POW	Returns the value of a number raised to the power of another number
POWER	Returns the value of a number raised to the power of another number
RADIANS	Converts a degree value into radians
RAND	Returns a random number
ROUND	Rounds a number to a specified number of decimal places
SIGN	Returns the sign of a number
SIN	Returns the sine of a number
SQRT	Returns the square root of a number
SUM	Calculates the sum of a set of values
TAN	Returns the tangent of a number
TRUNCATE	Truncates a number to the specified number of decimal places

MySQL Date Functions

Function	Description
ADDDATE	Adds a time/date interval to a date and then returns the date
ADDTIME	Adds a time interval to a time/datetime and then returns the time/datetime
CURDATE	Returns the current date
CURRENT_DATE	Returns the current date
CURRENT_TIME	Returns the current time
CURRENT_TIMESTAMP	Returns the current date and time
CURTIME	Returns the current time
DATE	Extracts the date part from a datetime expression
DATEDIFF	Returns the number of days between two date values
DATE_ADD	Adds a time/date interval to a date and then returns the date
DATE_FORMAT	Formats a date
DATE_SUB	Subtracts a time/date interval from a date and then returns the date
DAY	Returns the day of the month for a given date

DAYNAME	Returns the weekday name for a given date
DAYOFMONTH	Returns the day of the month for a given date
DAYOFWEEK	Returns the weekday index for a given date
DAYOFYEAR	Returns the day of the year for a given date
EXTRACT	Extracts a part from a given date
FROM_DAYS	Returns a date from a numeric datevalue
HOUR	Returns the hour part for a given date
LAST_DAY	Extracts the last day of the month for a given date
LOCALTIME	Returns the current date and time
LOCALTIMESTAMP	Returns the current date and time
MAKEDATE	Creates and returns a date based on a year and a number of days value
MAKETIME	Creates and returns a time based on an hour, minute, and second value
MICROSECOND	Returns the microsecond part of a time/datetime
MINUTE	Returns the minute part of a time/datetime
MONTH	Returns the month part for a given date
MONTHNAME	Returns the name of the month for a given date
NOW	Returns the current date and time

PERIOD_ADD	Adds a specified number of months to a period
PERIOD_DIFF	Returns the difference between two periods
QUARTER	Returns the quarter of the year for a given date value
SECOND	Returns the seconds part of a time/datetime
SEC_TO_TIME	Returns a time value based on the specified seconds
STR_TO_DATE	Returns a date based on a string and a format
SUBDATE	Subtracts a time/date interval from a date and then returns the date
SUBTIME	Subtracts a time interval from a datetime and then returns the time/datetime
SYSDATE	Returns the current date and time
TIME	Extracts the time part from a given time/datetime
TIME_FORMAT	Formats a time by a specified format
TIME_TO_SEC	Converts a time value into seconds
TIMEDIFF	Returns the difference between two time/datetime expressions
TIMESTAMP	Returns a datetime value based on a date or datetime value
TO_DAYS	Returns the number of days between a date and date "0000-00-00"
WEEK	Returns the week number for a given date
WEEKDAY	Returns the weekday number for a given date

Function	Description
WEEKOFYEAR	Returns the week number for a given date
YEAR	Returns the year part for a given date
YEARWEEK	Returns the year and week number for a given date

MySQL Advanced Functions

Function	Description
BIN	Returns a binary representation of a number
BINARY	Converts a value to a binary string
CASE	Goes through conditions and return a value when the first condition is met
CAST	Converts a value (of any type) into a specified datatype
COALESCE	Returns the first non-null value in a list
CONNECTION_ID	Returns the unique connection ID for the current connection
CONV	Converts a number from one numeric base system to another
CONVERT	Converts a value into the specified datatype or character set
CURRENT_USER	Returns the user name and host name for the MySQL account that the server used to authenticate the current client
DATABASE	Returns the name of the current database
IF	Returns a value if a condition is TRUE, or another value if a condition is

	FALSE
IFNULL	Return a specified value if the expression is NULL, otherwise return the expression
ISNULL	Returns 1 or 0 depending on whether an expression is NULL
LAST_INSERT_ID	Returns the AUTO_INCREMENT id of the last row that has been inserted or updated in a table
NULLIF	Compares two expressions and returns NULL if they are equal. Otherwise, the first expression is returned
SESSION_USER	Returns the current MySQL user name and host name
SYSTEM_USER	Returns the current MySQL user name and host name
USER	Returns the current MySQL user name and host name
VERSION	Returns the current version of the MySQL database