Summary – Day 11

Stored Procedures:

- A procedure (often called a stored procedure) is a collection of pre-compiled SQL statements stored inside the database. It is a subroutine or a subprogram in the regular computing language. A procedure always contains a name, parameter lists, and SQL statements.
- If we consider the enterprise application, we always need to perform specific tasks such as database clean-up, processing payroll, and many more on the database regularly. Such tasks involve multiple SQL statements for executing each task.
- This process might easy if we group these tasks into a single task. We can fulfil this requirement in MySQL by creating a stored procedure in our database.

Stored Procedure Features:

- Stored Procedure increases the performance of the applications. Once stored procedures are created, they are compiled and stored in the database.
- Stored procedure reduces the traffic between application and database server. Because the application has to send only the stored procedure's name and parameters instead of sending multiple SQL statements.
- Stored procedures are reusable and transparent to any applications.
- A procedure is always secure. The database administrator can grant permissions to applications that access stored procedures in the database without giving any permissions on the database tables.

How to create a procedure?

- The following syntax is used for creating a stored procedure in MySQL. It can return one or more value through parameters or sometimes may not return at all. By default, a procedure is associated with our current database. But we can also create it into another database from the current database by specifying the name as database_name.procedure_name.

```
DELIMITER &&
CREATE PROCEDURE procedure_name [[IN | OUT | INOUT] parameter_name datatype [, parameter datatype]) ]
BEGIN
   Declaration_section
   Executable_section
END &&
DELIMITER ;
```

Parameter Name	Descriptions
procedure_name	It represents the name of the stored procedure.
parameter	It represents the number of parameters. It can be one or more than one.
Declaration_section	It represents the declarations of all variables.
Executable_section	It represents the code for the function execution.

Parameters:

IN parameter:

It is the default mode. It takes a parameter as input, such as an attribute. When we define it, the calling program has to pass an argument to the stored procedure. This parameter's value is always protected.

OUT parameters:

It is used to pass a parameter as output. Its value can be changed inside the stored procedure, and the changed (new) value is passed back to the calling program. It is noted that a procedure cannot access the OUT parameter's initial value when it starts.

INOUT parameters:

It is a combination of IN and OUT parameters. It means the calling program can pass the argument, and the procedure can modify the INOUT parameter, and then passes the new value back to the calling program.

How to call a stored procedure?

We can use the CALL statement to call a stored procedure. This statement returns the values to its caller through its parameters (IN, OUT, or INOUT). The following syntax is used to call the stored procedure in MySQL:

```
CALL procedure_name ( parameter(s))
```

How to show or list stored procedures in MySQL?

When we have several procedures in the MySQL server, it is very important to list all procedures. It is because sometimes the procedure names are the same in many databases. In that case, this query is very useful. We can list all procedure stored on the current MySQL server as follows.

```
SHOW PROCEDURE STATUS [LIKE 'pattern' | WHERE search_condition]
```

How to delete/drop stored procedures in MySQL?

MySQL also allows a command to drop the procedure. When the procedure is dropped, it is removed from the database server also. The following statement is used to drop a stored procedure in MySQL.

```
DROP PROCEDURE [ IF EXISTS ] procedure_name;
```

How to alter the procedure in MySQL?

MySQL does not allow any command to alter the procedure in MySQL. However, it provides a command that is used to change the characteristics of a stored procedure. This command may alter more than one change in the procedure but does not modify the stored procedure's parameters or body. If we want to make such changes, we must drop and re-create the procedure using the DROP PROCEDURE and CREATE PROCEDURE statement.

```
ALTER PROCEDURE procedure_name [characteristics ...]

characteristics: {
    COMMENT 'string'
  | LANGUAGE SQL
  | { CONTAINS SQL | NO SQL | READS SQL DATA | MODIFIES SQL DATA }
  | SQL SECURITY { DEFINER | INVOKER }
}
```

Drawbacks of Using Stored Procedures:

- If we use stored procedures, the memory uses of every connection that uses those stored procedures will increase substantially. Also, if we overuse many logical applications inside stored procedures, the CPU usage will increase. It is because the database server is not well designed for logical operations.
- Stored procedure's constructs are not designed to develop complex and flexible business logic.
- It is difficult to debug stored procedures. Only a few database management systems allow us to debug stored procedures. Unfortunately, MySQL does not provide facilities for debugging stored procedures.
- It is not easy to develop and maintain stored procedures. Developing and maintaining stored procedures are often required a specialized skill set that not all application developers possess. It may lead to problems in both application development and maintenance phases.