

STORED PROCEDURES

What is a Stored Procedure?

Collocation of SQL statement and code, you can save and reused in SQL server to perform specific tasks and allow Developer to Encapsulate SQL code and business logic

Types of Stored Procedure



SYSTEM STORED

Statements provided by SQL server use administrative Task (Database Management, troubleshooting, System Configuration)

Example:

sp_rename

```
EXEC sp_rename 'Hostel.hostel_ID', 'Hostel_ID', 'COLUMN';
```

As we use in database University, we change the column name from Hostel.hostel_ID to Hostel_ID by using sp_rename.

USER-DEFINED STORED PROCEDURES (UDPS)

created by user for business need (calculates the total sales for a particular product category)

how to create?

```
CREATE PROCEDURE <<<PROCEDURE_NAME>>>
AS
BEGIN
    ""REQUIRED SQL QUERIES""
END
```

EXTENDED STORED

allow you to execute external functions, such as calling programs or DLL libraries (Dynamic Link Library) written in languages like **C** or **C++**, directly from within the database. They are typically used for operations requiring system access or external services.

CLR (COMMON LANGUAGE RUNTIME) STORED PROCEDURES

CLR stored procedures (Common Language Runtime): it is stored procedure that are written in .NET language. for example, in **C#**. its more security and use in APIs Application

Apply in Practice

STORED PROCEDURES

```
--=====
CREATE PROCEDURE ApproveOrder
    @OrderID INT
AS
BEGIN
    UPDATE Orders
    SET Status = 'Approved'
    WHERE OrderID = @OrderID;

END;

EXEC ApproveOrder @OrderID = 101;

SELECT OrderID, Status
FROM Orders
WHERE OrderID = 101;
```

98 %

Results Messages

	OrderID	Status
1	101	Approved

CREATE PROCEDURE ApproveOrder-- this for define a new Stored Procedure

@OrderID INT-- this parameter (with type Integer) it represent the orderID you went to update

BEGIN, END – Marks the start and end of furcation.

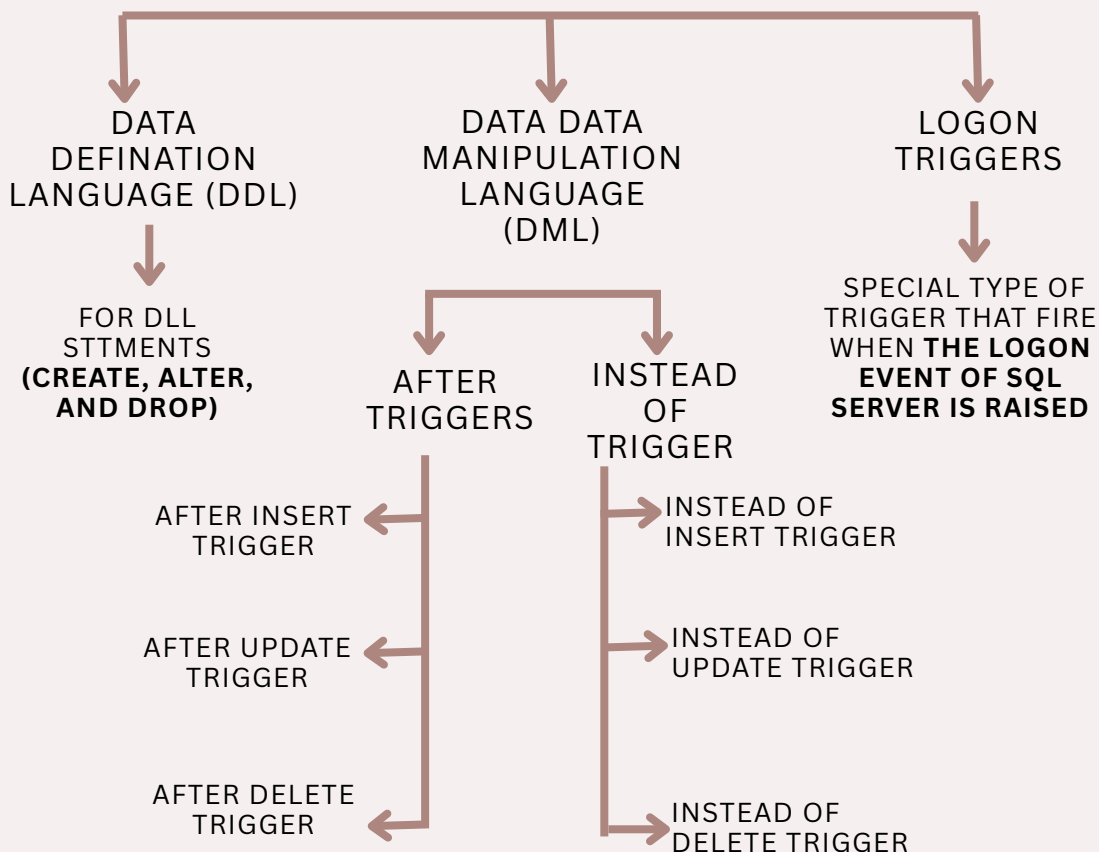
inside the body-- this update the status column in order table to (approved) only for the row where orderID matches the parameter.

TRIGGERS

What is a Trigger?

Trigger is database object which fires when an event occurs in database. Such events can be operations such as: INSERT, UPDATE or DELETE upon a specific table or view. Triggers can also be specified to run before or after running the trigger event depending on the desired action.

Types of Stored Procedure





CLR TRIGGERS

CLR triggers are a special type of triggers based on the CLR (Common Language Runtime) in the .NET framework. CLR integration of triggers has been introduced with SQL Server 2008 and allows for triggers to be coded in one of the .NET languages like C#.

Apply in Practice

TRIGGERS

```
-- create table Order_Status
create table Order_Status (
    StatuesID int identity primary key,
    OrderID int,
    oldStatues VARCHAR(20),
    newStatues VARCHAR(20),
    changeDate DateTime default getDate(),
    FOREIGN KEY (OrderID) REFERENCES Orders (OrderID)
);

SELECT * FROM Order_Status

-- this trigger run after update on the Order table
create trigger trg_OrderStatus
on Orders
After update
as
begin
insert into Order_Status (OrderID, oldStatues, newStatues)
select D.OrderID, D.Status , I.Status
-- inserted and deleted is temporary tables
from inserted I -- contains a nwe vlaue aftre update
JOIN deleted D ON I.OrderID = D.OrderID -- contains a old vlaue aftre update
WHERE D.Status <> I.Status ;
end;

update Orders
set Status = 'Delivered'
where OrderID = 102;
```

100 %

Results Messages

	StatuesID	OrderID	oldStatues	newStatues	changeDate
1	1	102	Preparing	Delivered	2025-05-28 09:32:54.710

Advantages, Disadvantage's of Triggers

Advantages	Disadvantages
<ul style="list-style-type: none">• Protection of data	<ul style="list-style-type: none">• Complex Debugging
<ul style="list-style-type: none">• Inhibits transactions that are not valid	<ul style="list-style-type: none">• Performance Overhead
<ul style="list-style-type: none">• keeps the different tables in sync.	<ul style="list-style-type: none">• Hidden Execution

Difference Between Triggers and Procedures

Parameters	Triggers	Procedures
Syntax	CREATE TRIGGER TRIGGER_NAME	CREATE PROCEDURE PROCEDURE_NAME
Usage	event occurs, a trigger helps to execute an action automatically.	helps to perform a specified task when it is invoked.
Scope	Tied to specific INSERT,UPDATE, DELECTE event	Excutues independently of database Events
complexity	complex logic	simpler logic

Errors and References

Errors

- Msg 137, Level 15, State 2, Line 31

Must declare the scalar variable "@OrderID".

- because we call (EXEC ApproveOrder @OrderID = @OrderID;) that is mean we use the variable @OrderID it outside of its valid scope (EXEC ApproveOrder @OrderID = 101;)

- Msg 156, Level 15, State 1, Procedure trg_OrderStatus, Line 11 [Batch Start Line 78]Incorrect syntax near the keyword 'DELETE'.
 - error in spelling.

references

- https://www.w3schools.com/sql/sql_stored_procedures.asp
 - <https://www.c-sharpcorner.com/UploadFile/ff2f08/clr-stored-procedure-in-sql-server/>
 - <https://www.geeksforgeeks.org/sql-triggers/>
 - <https://www.c-sharpcorner.com/UploadFile/63f5c2/triggers-in-sql-server/>
 - <https://testbook.com/key-differences/difference-between-trigger-and-procedure-in-dms>
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