

## Store Procedure & Triggers

### Syntax:

```
CREATE TRIGGER trigger name
{BEFORE | AFTER} {INSERT | UPDATE | DELETE}
ON table_name
FOR EACH ROW
BEGIN
    -- SQL statements
END;
```

```
INSERT INTO student_info (stud_id, stud_code, stud_name, subject, marks, phone)
VALUES (22, 122, 'Rohit', 'Science', 88, '9890765432'),
(23, 123, 'Priya', 'English', 92, '9812345678'),
(24, 124, 'Amit', 'Maths', 85, '9876543210'),
(25, 125, 'Neha', 'History', 76, '9123456789'),
(26, 126, 'Arjun', 'Geography', 81, '9988776655'),
(27, 127, 'Meena', 'Maths', 95, '9001122334');
```

stud_id	stud_code	stud_name	subject	marks	phone
11	111	Derek	English	59	4564564560
12	112	Ella	English	91	1231231234
13	113	Fiona	Physics	65	9879879876
14	114	George	Physics	79	3453453451
15	115	Helen	Maths	88	2223334445
16	116	Ian	Science	95	6667778880
17	117	Jane	Biology	57	9998887776
18	118	Kyle	English	73	1112223339
19	119	Liam	Maths	81	8887776665
20	120	Mia	Physics	93	4445556667
21	121	Soumya	Maths	99	9910854433
22	122	Rohit	Science	88	9890765432
23	123	Priya	English	92	9812345678
24	124	Amit	Maths	85	9876543210
25	125	Neha	History	76	9123456789
26	126	Arjun	Geogr...	81	9988776655
27	127	Meena	Maths	95	9001122334

```
115 • SELECT * FROM Audit_log;
```

```
116
```

log_id	action	stud_id	log_time
1	INSERT	21	2025-11-08 14:05:05
2	INSERT	22	2025-11-09 14:18:39
3	INSERT	23	2025-11-09 14:18:39
4	INSERT	24	2025-11-09 14:18:39
5	INSERT	25	2025-11-09 14:18:39
6	INSERT	26	2025-11-09 14:18:39
7	INSERT	27	2025-11-09 14:18:39
8	NULL	NULL	NULL

## AFTER UPDATE

```
DELIMITER $$
CREATE TRIGGER trg_after_update_student
AFTER UPDATE ON Student_info
FOR EACH ROW
BEGIN
    INSERT INTO audit_log(action , stud_id)
    VALUES('UPDATE' , NEW.stud_id);
END $$
DELIMITER ;

SHOW TRIGGERS;
```

Trigger	Event	Table	Statement	Timing	Created	sql_mode	Definer	character_set_client	collation_connection
trg_before_insert_student	INSERT	student_info	BEGIN IF NEW.marks > 100 OR New.marks < 0 ...	BEFORE	2025-11-08 13:50:03.72	ONLY_FULL_GROUP_BY,STRICT_TRANS_TABLE...	root@localhost	utf8mb4	utf8mb4_0900
trg_after_insert_student	INSERT	student_info	BEGIN INSERT INTO audit_log(action , stud_id) ...	AFTER	2025-11-08 14:02:07.00	ONLY_FULL_GROUP_BY,STRICT_TRANS_TABLE...	root@localhost	utf8mb4	utf8mb4_0900
trg_after_update_student	UPDATE	student_info	BEGIN INSERT INTO audit_log(action , stud_id) ...	AFTER	2025-11-09 14:20:54.11	ONLY_FULL_GROUP_BY,STRICT_TRANS_TABLE...	root@localhost	utf8mb4	utf8mb4_0900

```
UPDATE student_info
SET Marks = 95
WHERE stud_id = 4;
```

### BEFORE

stud_id	stud_code	stud_name	subject	marks	phone
1	101	Mark	English	68	3454569357
2	102	Joseph	Physics	70	9876543659
3	103	John	Maths	70	9765326975
4	104	Barack	Maths	92	87069873256
5	105	Rinky	Maths	85	6753159757
6	106	Adam	Science	82	79642256864
7	107	Andrew	Science	83	5674243579
8	108	Brayan	Science	83	7524316576
9	109	Alexandar	Biology	67	2347346438
10	110	Clara	Biology	74	2342342345
11	111	Derek	English	59	4564564560
12	112	Ella	English	91	1231231234
13	113	Fiona	Physics	65	9879879876
14	114	George	Physics	79	3453453451
15	115	Helen	Maths	88	2223334445
16	116	Tan	Science	95	6667778880

### AFTER

stud_id	stud_code	stud_name	subject	marks	phone
1	101	Mark	English	68	3454569357
2	102	Joseph	Physics	70	9876543659
3	103	John	Maths	70	9765326975
4	104	Barack	Maths	95	87069873256
5	105	Rinky	Maths	85	6753159757
6	106	Adam	Science	82	79642256864
7	107	Andrew	Science	83	5674243579
8	108	Brayan	Science	83	7524316576
9	109	Alexandar	Biology	67	2347346438
10	110	Clara	Biology	74	2342342345
11	111	Derek	English	59	4564564560
12	112	Ella	English	91	1231231234
13	113	Fiona	Physics	65	9879879876
14	114	George	Physics	79	3453453451
15	115	Helen	Maths	88	2223334445
16	116	Tan	Science	95	6667778880

154 • **SELECT \* FROM Audit\_log;**

155

log_id	action	stud_id	log_time
1	INSERT	21	2025-11-08 14:05:05
2	INSERT	22	2025-11-09 14:18:39
3	INSERT	23	2025-11-09 14:18:39
4	INSERT	24	2025-11-09 14:18:39
5	INSERT	25	2025-11-09 14:18:39
6	INSERT	26	2025-11-09 14:18:39
7	INSERT	27	2025-11-09 14:18:39
8	UPDATE	4	2025-11-09 14:25:08
	NULL	NULL	NULL

Let's give +2 grace marks for all Students in Physics Subject.

```
SET SQL_SAFE_UPDATES = 0;
UPDATE student_info
SET Marks = Marks + 2
WHERE subject = 'Physics'; -- 4 records

SELECT * FROM Student_info WHERE Subject = 'Physics';
```

### BEFORE

163 • `SELECT * FROM Student_info WHERE Subject = 'Physics';`

stud_id	stud_code	stud_name	subject	marks	phone
2	102	Joseph	Physics	70	9876543659
13	113	Fiona	Physics	65	9879879876
14	114	George	Physics	79	3453453451
20	120	Mia	Physics	93	4445556667
NULL	NULL	NULL	NULL	NULL	NULL

### AFTER

163 • `SELECT * FROM Student_info WHERE Subject = 'Physics';`

stud_id	stud_code	stud_name	subject	marks	phone
2	102	Joseph	Physics	72	9876543659
13	113	Fiona	Physics	67	9879879876
14	114	George	Physics	81	3453453451
20	120	Mia	Physics	95	4445556667
NULL	NULL	NULL	NULL	NULL	NULL

165 • `SELECT * FROM Audit_Log;`

log_id	action	stud_id	log_time
1	INSERT	21	2025-11-08 14:05:05
2	INSERT	22	2025-11-09 14:18:39
3	INSERT	23	2025-11-09 14:18:39
4	INSERT	24	2025-11-09 14:18:39
5	INSERT	25	2025-11-09 14:18:39
6	INSERT	26	2025-11-09 14:18:39
7	INSERT	27	2025-11-09 14:18:39
8	UPDATE	4	2025-11-09 14:25:08
14	UPDATE	2	2025-11-09 14:33:08
15	UPDATE	13	2025-11-09 14:33:08
16	UPDATE	14	2025-11-09 14:33:08
17	UPDATE	20	2025-11-09 14:33:08
NULL	NULL	NULL	NULL

## AFTER DELETE

```
DELIMITER $$
CREATE TRIGGER trg_after_delete_student
AFTER DELETE ON Student_info
FOR EACH ROW
BEGIN
    INSERT INTO audit_log(action , stud_id)
VALUES('DELETE' , OLD.stud_id);
END $$
DELIMITER ;

SHOW TRIGGERS;
```

Trigger	Event	Table	Statement	Timing	Created	sql_mode	Definer	character_set_client	collation_connection
trg_before_insert_student	INSERT	student_info	BEGIN IF NEW.marks > 100 OR New.marks < 0 ...	BEFORE	2025-11-08 13:50:03.72	ONLY_FULL_GROUP_BY,STRICT_TRANS_TABLE...	root@localhost	utf8mb4	utf8mb4_0900
trg_after_insert_student	INSERT	student_info	BEGIN INSERT INTO audit_log(action , stud_id) ...	AFTER	2025-11-08 14:02:07.00	ONLY_FULL_GROUP_BY,STRICT_TRANS_TABLE...	root@localhost	utf8mb4	utf8mb4_0900
trg_after_update_student	UPDATE	student_info	BEGIN INSERT INTO audit_log(action , stud_id) ...	AFTER	2025-11-09 14:20:54.11	ONLY_FULL_GROUP_BY,STRICT_TRANS_TABLE...	root@localhost	utf8mb4	utf8mb4_0900
trg_after_delete_student	DELETE	student_info	BEGIN INSERT INTO audit_log(action , stud_id) ...	AFTER	2025-11-09 14:42:38.11	ONLY_FULL_GROUP_BY,STRICT_TRANS_TABLE...	root@localhost	utf8mb4	utf8mb4_0900

## BEFORE

182 • DELETE FROM Student\_info WHERE stud\_id = 27;

stud_id	stud_code	stud_name	subject	marks	phone
14	114	George	Physics	81	3453453451
15	115	Helen	Maths	88	2223334445
16	116	Ian	Science	95	6667778880
17	117	Jane	Biology	57	9998887776
18	118	Kyle	English	73	1112223339
19	119	Liam	Maths	81	8887776665
20	120	Mia	Physics	95	4445556667
21	121	Soumya	Maths	99	9910854433
22	122	Rohit	Science	88	9890765432
23	123	Priya	English	92	9812345678
24	124	Amit	Maths	85	9876543210
25	125	Neha	History	76	9123456789
26	126	Arjun	Geogr...	81	9988776655
27	127	Meena	Maths	95	9001122334

## AFTER

stud_id	stud_code	stud_name	subject	marks	phone
13	113	Fiona	Physics	67	9879879876
14	114	George	Physics	81	3453453451
15	115	Helen	Maths	88	2223334445
16	116	Ian	Science	95	6667778880
17	117	Jane	Biology	57	9998887776
18	118	Kyle	English	73	1112223339
19	119	Liam	Maths	81	8887776665
20	120	Mia	Physics	95	4445556667
21	121	Soumya	Maths	99	9910854433
22	122	Rohit	Science	88	9890765432
23	123	Priya	English	92	9812345678
24	124	Amit	Maths	85	9876543210
25	125	Neha	History	76	9123456789
26	126	Arjun	Geogr...	81	9988776655



```
165 • SELECT * FROM Audit_Log;
```

```
166
```

```
167 -- =====
```

Result Grid				
Filter Rows:				
Edit:				
log_id	action	stud_id	log_time	
1	INSERT	21	2025-11-08 14:05:05	
2	INSERT	22	2025-11-09 14:18:39	
3	INSERT	23	2025-11-09 14:18:39	
4	INSERT	24	2025-11-09 14:18:39	
5	INSERT	25	2025-11-09 14:18:39	
6	INSERT	26	2025-11-09 14:18:39	
7	INSERT	27	2025-11-09 14:18:39	
8	UPDATE	4	2025-11-09 14:25:08	
14	UPDATE	2	2025-11-09 14:33:08	
15	UPDATE	13	2025-11-09 14:33:08	
16	UPDATE	14	2025-11-09 14:33:08	
17	UPDATE	20	2025-11-09 14:33:08	
18	DELETE	27	2025-11-09 14:49:01	
	NULL	NULL	NULL	

BEFORE UPDATE

Prevent the marks reductions

INSERT	- new	✓	old	✗
UPDATE	- new	✓	old	✓
DELETE	- new	✗	old	✓

```
198 • SHOW TRIGGERS;
```

Result Grid					
Filter Rows:					
Exports:					
Wrap Cell Contents:					
Trigger	Event	Table	Statement	Timing	
trg_before_insert_student	INSERT	student_info	BEGIN IF NEW.marks > 100 OR New.marks < 0 ...	BEFORE	
trg_after_insert_student	INSERT	student_info	BEGIN INSERT INTO audit_log(action , stud_id) ...	AFTER	
trg_before_update_no_marks_drop	UPDATE	student_info	BEGIN IF NEW.marks < Old.Marks THEN SIGNA...	BEFORE	
trg_after_update_student	UPDATE	student_info	BEGIN INSERT INTO audit_log(action , stud_id) ...	AFTER	
trg_after_delete_student	DELETE	student_info	BEGIN INSERT INTO audit_log(action , stud_id) ...	AFTER	

```
DELIMITER $$
CREATE TRIGGER trg_before_update_no_marks_drop
  BEFORE UPDATE ON Student_info
  FOR EACH ROW
  BEGIN
    IF NEW.marks < Old.Marks THEN
      SIGNAL SQLSTATE '45000'
      SET MESSAGE_TEXT = 'Reducing Marks are not allowed.';
    END IF;
  END $$
DELIMITER ;

SHOW TRIGGERS;
```

```
UPDATE Student_Info
SET Marks = Marks - 2
WHERE Subject = 'Physics'; -- Error Code: 1644. Reducing Marks are not allowed.
```

## BEFORE DELETE

219 • **SHOW TRIGGERS;**

Trigger	Event	Table	Statement	Timing
trg_before_insert_student	INSERT	student_info	BEGIN IF NEW.marks > 100 OR New.marks < 0 ...	BEFORE
trg_after_insert_student	INSERT	student_info	BEGIN INSERT INTO audit_log(action , stud_id) ...	AFTER
trg_before_update_no_marks_drop	UPDATE	student_info	BEGIN IF NEW.marks < Old.Marks THEN SIGNA...	BEFORE
trg_after_update_student	UPDATE	student_info	BEGIN INSERT INTO audit_log(action , stud_id) ...	AFTER
trg_before_delete_high_performance	DELETE	student_info	BEGIN IF OLD.marks >= 90 THEN SIGNAL SQLS...	BEFORE
trg_after_delete_student	DELETE	student_info	BEGIN INSERT INTO audit_log(action , stud_id) ...	AFTER

```

DELIMITER $$
CREATE TRIGGER trg_before_delete_high_performance
  BEFORE DELETE ON Student_info
  FOR EACH ROW
  BEGIN
    IF OLD.marks >= 90 THEN
      SIGNAL SQLSTATE '45000'
      SET MESSAGE_TEXT = 'Can not Delete High Performing Students Data who are Scoring >=90';
    END IF;
  END $$
DELIMITER ;

SHOW TRIGGERS;

```

221 • **SELECT \* FROM Student\_Info;**

222 • **DELETE FROM Student\_Info WHERE Stud\_id = 1;**

223 • **SELECT \* FROM Audit\_Log;**

log_id	action	stud_id	log_time
1	INSERT	21	2025-11-08 14:05:05
2	INSERT	22	2025-11-09 14:18:39
3	INSERT	23	2025-11-09 14:18:39
4	INSERT	24	2025-11-09 14:18:39
5	INSERT	25	2025-11-09 14:18:39
6	INSERT	26	2025-11-09 14:18:39
7	INSERT	27	2025-11-09 14:18:39
8	UPDATE	4	2025-11-09 14:25:08
14	UPDATE	2	2025-11-09 14:33:08
15	UPDATE	13	2025-11-09 14:33:08
16	UPDATE	14	2025-11-09 14:33:08
17	UPDATE	20	2025-11-09 14:33:08
18	DELETE	27	2025-11-09 14:49:01
19	DELETE	1	2025-11-09 15:05:57

```

DELETE FROM Student_Info WHERE Stud_id = 4;
-- Error Code: 1644. Can not Delete High Performing Students Data who are Scoring >=90

SELECT * FROM Student_info WHERE Subject = 'Physics';

DELETE FROM Student_Info WHERE Subject = 'Physics';
-- Error Code: 1644. Can not Delete High Performing Students Data who are Scoring >=90

```

## Tracker - Marks Changes

INSERT	- new	✓	old	✗
UPDATE	- new	✓	old	✓
DELETE	- new	✗	old	✓

255 • **SHOW TRIGGERS;**

Trigger	Event	Table	Statement	Timing
trg_after_update_student	UPDATE	student_info	BEGIN INSERT INTO audit_log(action , stud_id) ...	AFTER
trg_after_update_marks	UPDATE	student_info	BEGIN IF Old.Marks <> NEW.marks THEN INSE...	AFTER
trg_before_delete_high_performance	DELETE	student_info	BEGIN IF OLD.marks >= 90 THEN SIGNAL SQLS...	BEFORE
trg_after_delete_student	DELETE	student_info	BEGIN INSERT INTO audit_log(action , stud_id) ...	AFTER

```
CREATE TABLE marks_history(
    history_id INT AUTO_INCREMENT PRIMARY KEY,
    stud_id INT ,
    old_marks INT,
    new_marks INT,
    changed_on TIMESTAMP DEFAULT CURRENT_TIMESTAMP
);

DELIMITER $$
CREATE TRIGGER trg_after_update_marks
AFTER UPDATE ON Student_info
FOR EACH ROW
BEGIN
    IF Old.Marks <> NEW.marks THEN
        INSERT INTO marks_history(stud_id , old_marks , new_marks)
        VALUES(OLD.stud_id , OLD.marks , NEW.marks);
    END IF;
END $$
DELIMITER ;
```

258 • **UPDATE** Student\_Info

259 **SET** Marks = Marks + 1

260 **WHERE** Subject = 'Maths';

261

262 • **SELECT** \* **FROM** Student\_Info;

263

264 • **SELECT** \* **FROM** marks\_history;

history_id	stud_id	old_marks	new_marks	changed_on
1	3	70	71	2025-11-09 15:25:13
2	4	95	96	2025-11-09 15:25:13
3	5	85	86	2025-11-09 15:25:13
4	15	88	89	2025-11-09 15:25:13
5	19	81	82	2025-11-09 15:25:13
6	21	99	100	2025-11-09 15:25:13
7	24	85	86	2025-11-09 15:25:13
*	NULL	NULL	NULL	NULL

266 • `SELECT * FROM audit_log;`

Result Grid				
		Filter Rows:	Edit:	
	log_id	action	stud_id	log_time
	17	UPDATE	20	2025-11-09 14:33:08
	18	DELETE	27	2025-11-09 14:49:01
	19	DELETE	1	2025-11-09 15:05:57
	23	UPDATE	3	2025-11-09 15:25:13
	24	UPDATE	4	2025-11-09 15:25:13
	25	UPDATE	5	2025-11-09 15:25:13
	26	UPDATE	15	2025-11-09 15:25:13
	27	UPDATE	19	2025-11-09 15:25:13
	28	UPDATE	21	2025-11-09 15:25:13
	29	UPDATE	24	2025-11-09 15:25:13
	HULL	HULL	HULL	HULL

STORE PROCEDURE -> IN , INOUT

```

DELIMITER $$
CREATE PROCEDURE increase_marks_by_id(IN in_stud_id INT , INOUT new_marks INT)
BEGIN
    UPDATE Student_Info
    SET marks = marks + new_marks
    WHERE stud_id = in_stud_id;

    SELECT marks into new_marks
    FROM Student_Info
    WHERE stud_id = in_stud_id;
END $$
DELIMITER ;

SET @marks = 5;
CALL increase_marks_by_id(2 , @marks);
SELECT @marks;

```

@marks
77

stud_id	stud_code	stud_name	subject	marks	phone
2	102	Joseph	Physics	77	9876543659
3	103	John	Maths	71	9765326975
4	104	Barack	Maths	96	87069873256
5	105	Rinky	Maths	86	6753159757
6	106	Adam	Science	82	79642256864
7	107	Andrew	Science	83	5674243579
8	108	Brayan	Science	83	7524316576
9	109	Alexandar	Biology	67	2347346438
10	110	Clara	Biology	74	2342342345
11	111	Derek	English	59	4564564560
12	112	Ella	English	91	1231231234
13	113	Fiona	Physics	67	9879879876



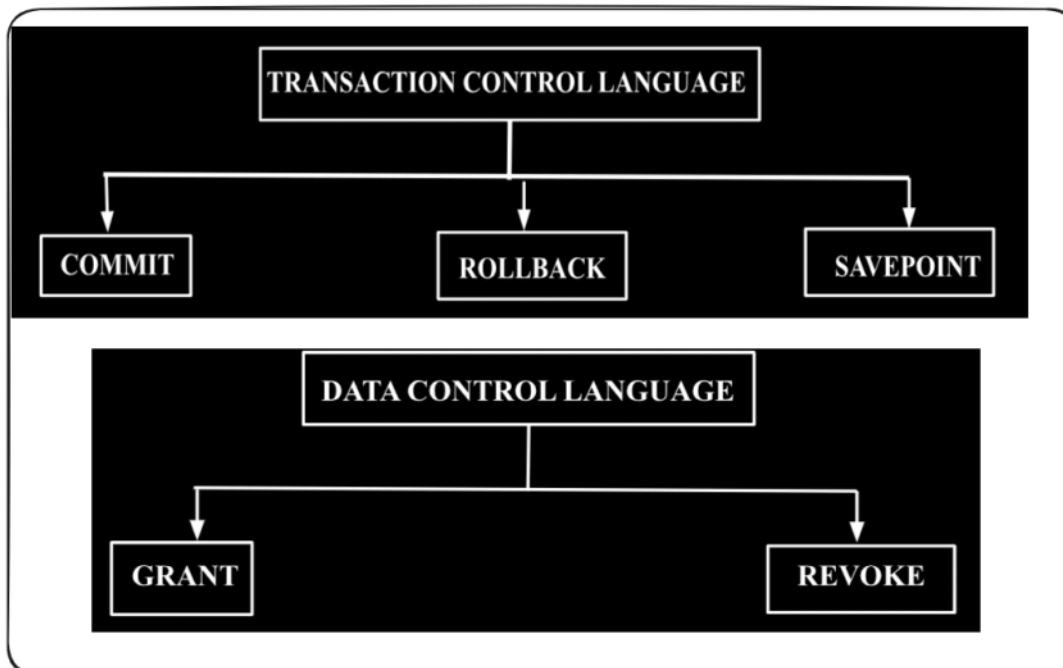
## TCL & DCL Commands

### 🎯 Session Objectives

- ✓ Understand what TCL (Transaction Control Language) is.
- ✓ Learn how to use COMMIT, ROLLBACK, and SAVEPOINT.
- ✓ Explore how TCL enforces ACID properties (Atomicity, Consistency, Isolation, Durability).
- ✓ Understand practical usage with real SQL examples

### SYNTAX:

```
GRANT privilege_name  
ON object_name  
TO {user_name | PUBLIC | role_name}  
[WITH GRANT OPTION];
```



```
-- A[Atomicity] C[Consistency] I[Isolation] D[Durability]

START TRANSACTION;

USE Weekend_Analysis;

DESC Products;

SELECT * FROM Products;

INSERT INTO Products(ProductKey , ProductName, ProductPrice)
VALUES(607, 'Tesla ModelX' , 9999.99);

INSERT INTO Products(ProductKey , ProductName, ProductPrice)
VALUES(608, 'Tesla ModelY' , 9999.99);

INSERT INTO Products(ProductKey , ProductName, ProductPrice)
VALUES(609, 'Tesla ModelZ' , 9999.99);

ROLLBACK;
COMMIT;
```

ProductKey	ProductSubcategoryKey	ProductSKU	ProductName	ModelName	ProductDescription	ProductColor	ProductSize	ProductStyle	ProductCost	ProductPrice
600	1	BK-M188-52	Mountain-500 Black, 52	Mountain-500	Suitable for any type of riding, on or off-road. ...	Black	52	U	294.5797	539.99
601	5	BB-7421	LL Bottom Bracket	LL Bottom Bracket	Chromoly steel.	NA	0	0	23.9716	53.99
602	5	BB-8107	ML Bottom Bracket	ML Bottom Bracket	Aluminum alloy cups; large diameter spindle.	NA	0	0	44.9506	101.24
603	5	BB-9108	HL Bottom Bracket	HL Bottom Bracket	Aluminum alloy cups and a hollow axle.	NA	0	0	53.9416	121.49
604	2	BK-R198-44	Road-750 Black, 44	Road-750	Entry level adult bike; offers a comfortable ride ...	Black	44	U	343.6496	539.99
605	2	BK-R198-48	Road-750 Black, 48	Road-750	Entry level adult bike; offers a comfortable ride ...	Black	48	U	343.6496	539.99
606	2	BK-R198-52	Road-750 Black, 52	Road-750	Entry level adult bike; offers a comfortable ride ...	Black	52	U	343.6496	539.99
607	NA	NA	Tesla ModelX	NA	NA	NA	NA	NA	NA	9999.99
608	NA	NA	Tesla ModelY	NA	NA	NA	NA	NA	NA	9999.99
609	NA	NA	Tesla ModelZ	NA	NA	NA	NA	NA	NA	9999.99

3 Transaction are in buffer zone.

Now Choose

Commit

Rollback

ProductKey	ProductSubcategoryKey	ProductSKU	ProductName	ModelName	ProductDescription	ProductColor	ProductSize	ProductStyle	ProductCost	ProductPrice
597	1	BK-M188-42	Mountain-500 Black, 42	Mountain-500	Suitable for any type of riding, on or off-road. ...	Black	42	U	294.5797	539.99
598	1	BK-M188-44	Mountain-500 Black, 44	Mountain-500	Suitable for any type of riding, on or off-road. ...	Black	44	U	294.5797	539.99
599	1	BK-M188-48	Mountain-500 Black, 48	Mountain-500	Suitable for any type of riding, on or off-road. ...	Black	48	U	294.5797	539.99
600	1	BK-M188-52	Mountain-500 Black, 52	Mountain-500	Suitable for any type of riding, on or off-road. ...	Black	52	U	294.5797	539.99
601	5	BB-7421	LL Bottom Bracket	LL Bottom Bracket	Chromoly steel.	NA	0	0	23.9716	53.99
602	5	BB-8107	ML Bottom Bracket	ML Bottom Bracket	Aluminum alloy cups; large diameter spindle.	NA	0	0	44.9506	101.24
603	5	BB-9108	HL Bottom Bracket	HL Bottom Bracket	Aluminum alloy cups and a hollow axle.	NA	0	0	53.9416	121.49
604	2	BK-R198-44	Road-750 Black, 44	Road-750	Entry level adult bike; offers a comfortable ride ...	Black	44	U	343.6496	539.99
605	2	BK-R198-48	Road-750 Black, 48	Road-750	Entry level adult bike; offers a comfortable ride ...	Black	48	U	343.6496	539.99
606	2	BK-R198-52	Road-750 Black, 52	Road-750	Entry level adult bike; offers a comfortable ride ...	Black	52	U	343.6496	539.99

```
DELETE FROM Products WHERE ProductName = 'Tesla ModelZ';
-- It will reflect the result - because we are not under the 'Start Transaction'
also by default Auto_Commit is 'ON', so nothing will happen on clicking 'Rollback'
as it instantly commit the result.
```

ProductKey	ProductSubcategoryKey	ProductSKU	ProductName	ModelName	ProductDescription
600	1	BK-M188-52	Mountain-500 Black, 52	Mountain-500	Suitable for any type of riding, on or off-road. ...
601	5	BB-7421	LL Bottom Bracket	LL Bottom Bracket	Chromoly steel.
602	5	BB-8107	ML Bottom Bracket	ML Bottom Bracket	Aluminum alloy cups; large diameter spindle.
603	5	BB-9108	HL Bottom Bracket	HL Bottom Bracket	Aluminum alloy cups and a hollow axle.
604	2	BK-R198-44	Road-750 Black, 44	Road-750	Entry level adult bike; offers a comfortable ride ...
605	2	BK-R198-48	Road-750 Black, 48	Road-750	Entry level adult bike; offers a comfortable ride ...
606	2	BK-R198-52	Road-750 Black, 52	Road-750	Entry level adult bike; offers a comfortable ride ...
607	NULL	NULL	Tesla ModelX	NULL	NULL
608	NULL	NULL	Tesla ModelY	NULL	NULL
NULL	NULL	NULL	NULL	NULL	NULL

```

1314 -- AUTO_COMMIT 'OFF'
1315 • SET AUTOCOMMIT = 0; -- 'OFF'
1316 -- SET AUTOCOMMIT = 1 -- 'ON' [By Default]
1317
1318 • DELETE FROM Products WHERE ProductName = 'Tesla ModelY';
1319 -- COMMIT

```

ProductKey	ProductSubcategoryKey	ProductSKU	ProductName	ModelName	ProductDescription	ProductColor	ProductSize	ProductStyle	ProductCost	ProductPrice
599	1	BK-M188-48	Mountain-500 Black, 48	Mountain-500	Suitable for any type of riding, on or off-road. ...	Black	48	U	294.5797	539.99
600	1	BK-M188-52	Mountain-500 Black, 52	Mountain-500	Suitable for any type of riding, on or off-road. ...	Black	52	U	294.5797	539.99
601	5	BB-7421	LL Bottom Bracket	LL Bottom Bracket	Chromoly steel.	NA	0	0	23.9716	53.99
602	5	BB-8107	ML Bottom Bracket	ML Bottom Bracket	Aluminum alloy cups; large diameter spindle.	NA	0	0	44.9506	101.24
603	5	BB-9108	HL Bottom Bracket	HL Bottom Bracket	Aluminum alloy cups and a hollow axle.	NA	0	0	53.9416	121.49
604	2	BK-R198-44	Road-750 Black, 44	Road-750	Entry level adult bike; offers a comfortable ride ...	Black	44	U	343.6496	539.99
605	2	BK-R198-48	Road-750 Black, 48	Road-750	Entry level adult bike; offers a comfortable ride ...	Black	48	U	343.6496	539.99
606	2	BK-R198-52	Road-750 Black, 52	Road-750	Entry level adult bike; offers a comfortable ride ...	Black	52	U	343.6496	539.99
607	NULL	NULL	Tesla ModelX	NULL	NULL	NULL	NULL	NULL	9999.99	9999.99
608	NULL	NULL	Tesla ModelY	NULL	NULL	NULL	NULL	NULL	9999.99	9999.99

```

1315 • SET AUTOCOMMIT = 0; -- 'OFF'
1316 -- SET AUTOCOMMIT = 1 -- 'ON' [By Default]
1317
1318 • DELETE FROM Products WHERE ProductName = 'Tesla ModelY';
1319 • ROLLBACK;
1320 -- COMMIT

```

ProductKey	ProductSubcategoryKey	ProductSKU	ProductName	ModelName	ProductDescription
601	5	BB-7421	LL Bottom Bracket	LL Bottom Bracket	Chromoly steel.
602	5	BB-8107	ML Bottom Bracket	ML Bottom Bracket	Aluminum alloy cups; large diameter spindle.
603	5	BB-9108	HL Bottom Bracket	HL Bottom Bracket	Aluminum alloy cups and a hollow axle.
604	2	BK-R198-44	Road-750 Black, 44	Road-750	Entry level adult bike; offers a comfortable ride ...
605	2	BK-R198-48	Road-750 Black, 48	Road-750	Entry level adult bike; offers a comfortable ride ...
606	2	BK-R198-52	Road-750 Black, 52	Road-750	Entry level adult bike; offers a comfortable ride ...
607	NULL	NULL	Tesla ModelX	NULL	NULL
608	NULL	NULL	Tesla ModelY	NULL	NULL
NULL	NULL	NULL	NULL	NULL	NULL

```

1318 • DELETE FROM Products WHERE ProductName = 'Tesla ModelY';
1319 • ROLLBACK;
1320 • COMMIT;

```

Permanently Deleted

ProductKey	ProductSubcategoryKey	ProductSKU	ProductName	ModelName	ProductDescription
600	1	BK-M188-52	Mountain-500 Black, 52	Mountain-500	Suitable for any type of riding, on or off-road. ...
601	5	BB-7421	LL Bottom Bracket	LL Bottom Bracket	Chromoly steel.
602	5	BB-8107	ML Bottom Bracket	ML Bottom Bracket	Aluminum alloy cups; large diameter spindle.
603	5	BB-9108	HL Bottom Bracket	HL Bottom Bracket	Aluminum alloy cups and a hollow axle.
604	2	BK-R198-44	Road-750 Black, 44	Road-750	Entry level adult bike; offers a comfortable ride ...
605	2	BK-R198-48	Road-750 Black, 48	Road-750	Entry level adult bike; offers a comfortable ride ...
606	2	BK-R198-52	Road-750 Black, 52	Road-750	Entry level adult bike; offers a comfortable ride ...
607	NULL	NULL	Tesla ModelX	NULL	NULL
NULL	NULL	NULL	NULL	NULL	NULL

```
-- SAVEPOINT
SELECT * FROM Products;
START TRANSACTION;

INSERT INTO Products(ProductKey , ProductName, ProductPrice)
VALUES(607, 'Tesla ModelX' , 9999.99);

SAVEPOINT modelX; 🚩

INSERT INTO Products(ProductKey , ProductName, ProductPrice)
VALUES(608, 'Tesla ModelY' , 9999.99);

SAVEPOINT modelY; 🚩

INSERT INTO Products(ProductKey , ProductName, ProductPrice)
VALUES(609, 'Tesla ModelZ' , 9999.99);

COMMIT;
ROLLBACK TO SAVEPOINT ModelX; -- It remove the ModelY and ModelZ
ROLLBACK TO SAVEPOINT ModelY; -- It remove the ModelZ
ROLLBACK; -- Full Undo
```