# 触发器实验

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计算机科学与技术（超算方向）

## 实验目的

## 实验内容和要求

## 实验环境

|  |  |
| --- | --- |
| 系统 | Windows 10 |
| SQL | MySQL 8.0 |
| 工具 | MySQL workbench |

## 实验过程

#### 实体完整性实验

###### AFTER触发器

1. 在lineitem表上定义一个UPDATE触发器

DELIMITER //

CREATE TRIGGER TRI\_Lineitem\_Price\_UPDATE

AFTER UPDATE ON lineitem

FOR EACH ROW

BEGIN

DECLARE L\_valuediff REAL;

SET L\_valuediff = NEW.extendedprice \* (1 - NEW.discount) \* (1 + NEW.tax) - OLD.extendedprice \* (1 - OLD.discount) \* (1 + OLD.tax);

UPDATE orders SET totalprice = totalprice + L\_valuediff

WHERE orderkey = NEW.orderkey;

END//

1. 在lineitem表上定义一个INSERT触发器

CREATE TRIGGER TRI\_Lineitem\_Price\_INSERT

AFTER INSERT ON lineitem

FOR EACH ROW

BEGIN

DECLARE L\_valuediff REAL;

SET L\_valuediff = NEW.extendedprice \* (1 - NEW.discount) \* (1 + NEW.tax);

UPDATE orders SET totalprice = totalprice + L\_valuediff

WHERE orderkey = NEW.orderkey;

END//

1. 在lineitem表上定义一个DELETE触发器

CREATE TRIGGER TRI\_Lineitem\_Price\_INSERT

AFTER INSERT ON lineitem

FOR EACH ROW

BEGIN

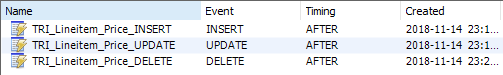
DECLARE L\_valuediff REAL;

SET L\_valuediff = -OLD.extendedprice \* (1 - OLD.discount) \* (1 + OLD.tax);

UPDATE orders SET totalprice = totalprice + L\_valuediff

WHERE orderkey = OLD.orderkey;

END//



1. 验证触发器

SELECT totalprice FROM orders WHERE orderkey=1;



* 1. TRI\_LineItem\_Price\_UPDATE

UPDATE lineitem SET tax = tax + 0.005

WHERE orderkey = 1 AND linenumber = 1;



* 1. TRI\_LineItem\_Price\_INSERT

INSERT INTO lineitem VALUES(1, 1552, 93, 100, 17, 24710.35, 0.04,

0.025, 'N', 'O', '1996-03-13', '1996-02-12', '1996-03-22', 'DELIVER IN PERSON', 'TRUCK', 'egular courts above the');



* 1. TRI\_LineItem\_Price\_DELETE

DELETE FROM lineitem WHERE orderkey=1 AND linenumber=1;



###### BEFORE触发器

* 1. 在lineitem表上定义一个UPDATE触发器

DELIMITER //

CREATE TRIGGER TRI\_Lineitem\_Quantity\_UPDATE

BEFORE UPDATE ON lineitem

FOR EACH ROW

BEGIN

DECLARE L\_valuediff, L\_availqty INTEGER;

SET L\_valuediff = NEW.quantity - OLD.quantity;

SELECT availqty INTO L\_availqty FROM partsupp

        WHERE partkey = NEW.partkey AND suppkey = NEW.suppkey;

    IF (L\_availqty - L\_valuediff >= 0) THEN

        BEGIN

UPDATE partsupp SET availqty = availqty - L\_valuediff

WHERE partkey = NEW.partkey AND suppkey = NEW.suppkey;

        END;

ELSE

        SIGNAL SQLSTATE '45000' SET message\_text='Available quantity is NOT ENOUGH';

END IF;

END//

* 1. 在lineitem表上定义一个INSERT触发器

CREATE TRIGGER TRI\_Quantity\_INSERT

BEFORE INSERT ON lineitem

FOR EACH ROW

BEGIN

DECLARE L\_valuediff, L\_availqty INTEGER;

SET L\_valuediff = NEW.quantity;

SELECT availqty INTO L\_availqty FROM partsupp

WHERE partkey = NEW.partkey AND suppkey = NEW.suppkey;

IF (L\_availqty - L\_valuediff >= 0) THEN

BEGIN

UPDATE partsupp SET availqty = availqty - L\_valuediff

WHERE partkey = NEW.partkey AND suppkey = NEW.suppkey;

END;

ELSE

SIGNAL SQLSTATE '45000' SET message\_text='Available quantity is NOT ENOUGH';

END IF;

END//

* 1. 在lineitem表上定义一个DELETE触发器

CREATE TRIGGER TRI\_Lineitem\_Quantity\_DELETE

BEFORE DELETE ON lineitem

FOR EACH ROW

BEGIN

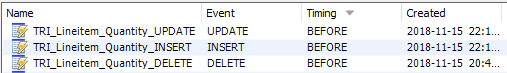
    DECLARE L\_valuediff, L\_availqty INTEGER;

SET L\_valuediff = -OLD.quantity;

UPDATE partsupp SET availqty = availqty - L\_valuediff

        WHERE partkey = OLD.partkey AND suppkey = OLD.suppkey;

END//



* 1. 验证触发器

SELECT L.partkey, L.suppkey, L.quantity, PS.availqty

FROM lineitem L, partsupp PS

WHERE L.partkey = PS.partkey AND L.suppkey = PS.suppkey

    AND L.orderkey = 1 AND L.linenumber=1;



* + 1. TRI\_LineItem\_Quantity \_UPDATE

UPDATE lineitem SET quantity = quantity + 5

WHERE orderkey = 1 AND linenumber = 1;



UPDATE lineitem SET quantity = quantity + 10000

WHERE orderkey = 1 AND linenumber = 1;



* + 1. TRI\_LineItem\_Quantity \_INSERT

INSERT INTO lineitem VALUES(1, 1552, 93, 100, 17, 24710.35, 0.04, 0.025,

'N', 'O', '1996-03-13', '1996-02-12', '1996-03-22', 'DELIVER IN PERSON', 'TRUCK', 'egular courts above the');



INSERT INTO lineitem VALUES(1, 1552, 93, 101, 10000, 24710.35, 0.04, 0.025,

'N', 'O', '1996-03-13', '1996-02-12', '1996-03-22', 'DELIVER IN PERSON',

'TRUCK', 'egular courts above the');



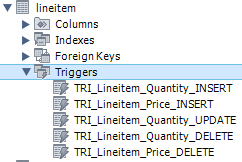
* + 1. TRI\_LineItem\_Quantity\_DELETE

DELETE FROM lineitem WHERE orderkey = 1 AND linenumber = 100;



###### 删除触发器

DROP TRIGGER TRI\_Lineitem\_Price\_UPDATE;



## 实验总结