

实验二报告

一、 观察并回答问题

1. 观察 sakila.mwb 并回答问题

- (1) 图中共有几个 View?
7 个 View.
- (2) 分析以下 3 个视图，回答以下问题：

视图名	关联表	作用
actor_info	film、film_category、film_actor、actor、category	展示演员的编号、姓名及其所出演的按照电影类别分类的所有电影名
film_list	film、film_category、category、film_actor、actor	展示电影的详细信息，包括电影编号、名称、简介、分类、分级、租金、片长、以及出演演员列表
sales_by_store	payment、rental、staff、inventory、store、address、city、country	展示各租赁店的地址、经理及总销售额

2. 观察 sakila-schema.sql 和 sakila-data.sql 并回答问题

我们可以看到 sakila-schema.sql 里的语句是用于创建数据库的结构，包括表、视图、触发器等，而 sakila-data.sql 主要是用于往表写入数据。但 sakila-data.sql 里有这样一个建立触发器的语句：

```
sakila-schema.sql sakila-data.sql x
0 10 20 30 40 50 60 70 80 90
0341 (16037,599,1,5943,'2.99','2005-07-10 17:14:27','2006-02-15 22:24:10'),
0342 (16038,599,2,6800,'5.99','2005-07-12 17:03:56','2006-02-15 22:24:10'),
0343 (16039,599,2,6895,'2.99','2005-07-12 21:23:59','2006-02-15 22:24:10'),
0344 (16040,599,1,8965,'6.99','2005-07-30 03:52:37','2006-02-15 22:24:11'),
0345 (16041,599,2,9630,'2.99','2005-07-31 04:57:07','2006-02-15 22:24:11'),
0346 (16042,599,2,9679,'2.99','2005-07-31 06:41:19','2006-02-15 22:24:11'),
0347 (16043,599,2,11522,'3.99','2005-08-17 00:05:05','2006-02-15 22:24:11'),
0348 (16044,599,1,14233,'1.99','2005-08-21 05:07:08','2006-02-15 22:24:12'),
0349 (16045,599,1,14599,'4.99','2005-08-21 17:43:42','2006-02-15 22:24:12'),
0350 (16046,599,1,14719,'1.99','2005-08-21 21:41:57','2006-02-15 22:24:12'),
0351 (16047,599,2,15590,'8.99','2005-08-23 06:09:44','2006-02-15 22:24:12'),
0352 (16048,599,2,15719,'2.99','2005-08-23 11:08:46','2006-02-15 22:24:13'),
0353 (16049,599,2,15725,'2.99','2005-08-23 11:25:00','2006-02-15 22:24:13'),
0354 COMMIT;
0355
0356 --
0357 -- Trigger to enforce payment_date during INSERT
0358 --
0359
0360 CREATE TRIGGER payment_date BEFORE INSERT ON payment
0361 FOR EACH ROW SET NEW.payment_date = NOW();
0362
0363 --
0364 -- Dumping data for table rental:
0365 --
0366
0367 SET AUTOCOMMIT=0;
0368 INSERT INTO rental VALUES (1,'2005-05-24 22:53:30',367,130,'2005-05-26 22:04:30',1,'2006-02-1
```

请同学们思考，这个触发器是否可以移到 sakila-schema.sql 里去执行？为什么？

不可以。

该触发器涉及到 NOW() 函数，如果移到 sakila-schema.sql 去执行，那么在执行 sakila-data.sql 文件时，该触发器涉及到的表中关于 date 的字段会因 NOW() 函数而变为现在的时间。因此这类触发器应该在表初始化完成后定义。

3. 观察数据库的触发器 customer_create_date 并回答问题

(1) customer_create_date 触发器建在哪个表上？

customer 表。

(2) 这个触发器实现什么功能？

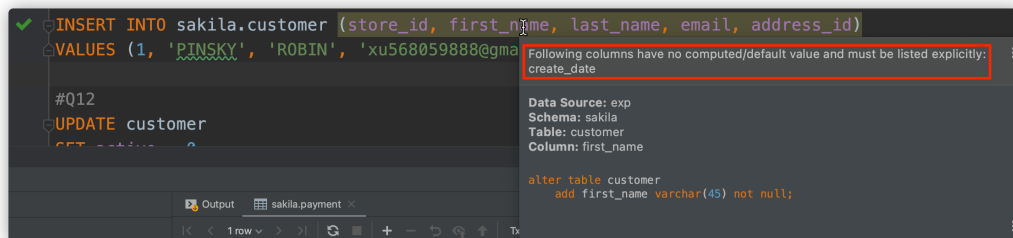
在 customer 表中有新数据插入前，先为 create_time 字段预设为当前时间。

(3) 在这个表上新增一条数据，验证一下触发器是否生效。（截图语句和执行结果）

SQL 语句：

```
INSERT INTO customer (store_id, first_name, last_name, email, address_id)
VALUES (1, 'PINSKY', 'ROBIN', 'xu568059888@gmail.com', 6);
```

我们发现，在 DataGrip 中，该条语句会报错，信息如下：



根据提示信息，create_date 没有 default value，在定义时被设置为 not null，故在插入语句中应该对其进行赋值。

我们忽略这个错误，继续执行，发现执行成功，其结果如下图所示：

custo...	store_id	first_name	last_name	email	address_id	active	create_date	last_update
▶ 610	1	PINSKY	ROBIN	xu568059888@gmail.com	6	1	2021-09-24 11:32:02	2021-09-24 11:32:02

发现 create_date 字段非空，其值就是执行插入操作时的时间，因此可以说明触发器生效。

二、设计并实现

根据应用场景，为 Sakila 数据库合理地设计并实现：

1. 设计 1 个视图，至少关联 3 个表；

视图名：order_list

关联表：payment、customer、staff、rental、inventory、film

SQL 语句：

```
CREATE VIEW `order` AS
SELECT `payment_id` AS `OID`,
      CONCAT(`c`.`first_name`, ' ', `c`.`last_name`) AS `customer_name`,
      CONCAT(`s`.`first_name`, ' ', `s`.`last_name`) AS `staff_name`,
      `f`.`title`,
      `p`.`amount` AS `cost`,
      `p`.`payment_date` AS `create_date`
FROM
((((`payment` `p`
JOIN `customer` `c` ON ((`p`.`customer_id` = `c`.`customer_id`)))
JOIN `staff` `s` ON ((`p`.`staff_id` = `s`.`staff_id`)))
JOIN `rental` `r` ON ((`p`.`rental_id` = `r`.`rental_id`)))
JOIN `inventory` `i` ON ((`r`.`inventory_id` = `i`.`inventory_id`)))
JOIN `film` `f` ON ((`i`.`film_id` = `f`.`film_id`)))
ORDER BY `create_date`;
```

视图展示：



OID	customer_name	staff_name	title	cost	create_date
3504	CHARLOTTE HUNTER	Mike Hillyer	BLANKET BEVERLY	2.99	2005-05-24 22:53:30
12377	TOMMY COLLAZO	Jon Stephens	FREAKY POCUS	2.99	2005-05-24 22:54:33
11032	MANUEL MURRELL	Jon Stephens	GRADUATE LORD	3.99	2005-05-24 23:03:39
8987	ANDREW PURDY	Mike Hillyer	LOVE SUICIDES	4.99	2005-05-24 23:04:41
6003	DELORES HANSEN	Mike Hillyer	IDOLS SNATCHERS	6.99	2005-05-24 23:05:21
14728	NELSON CHRISTENSON	Mike Hillyer	MYSTIC TRUMAN	0.99	2005-05-24 23:08:07
7274	CASSANDRA WALTERS	Jon Stephens	SWARM GOLD	1.99	2005-05-24 23:11:53
6440	MINNIE ROMERO	Jon Stephens	LAWLESS VISION	4.99	2005-05-24 23:31:46
3386	ELLEN SIMPSON	Mike Hillyer	MATRIX SNOWMAN	4.99	2005-05-25 00:00:40
10785	DANNY ISOM	Jon Stephens	HANGING DEEP	5.99	2005-05-25 00:02:21
3831	APRIL BURNS	Jon Stephens	WHALE BIKINI	8.99	2005-05-25 00:09:02
7044	DEANNA BYRD	Mike Hillyer	GAMES BOWFING...	4.99	2005-05-25 00:19:27
9014	RAYMOND MCWHORTER	Mike Hillyer	KING EVOLUTION	6.99	2005-05-25 00:22:55
12025	THEODORE CULP	Jon Stephens	MONTEREY LABY...	0.99	2005-05-25 00:31:15
8623	RONALD WEINER	Mike Hillyer	PELICAN COMFO...	9.99	2005-05-25 00:39:22
8554	STEVEN CURLLEY	Mike Hillyer	BOOGIE AMELIE	4.99	2005-05-25 00:43:11
15394	ISAAC OGLESBY	Mike Hillyer	CONTACT ANONY...	2.99	2005-05-25 01:06:36
490	RUTH MARTINEZ	Jon Stephens	ROMAN PUNK	0.99	2005-05-25 01:10:47
12305	RONNIE RICKETTS	Jon Stephens	HOLLOW JEOPAR...	4.99	2005-05-25 01:17:24
5020	ROBERTA HARPER	Jon Stephens	SCISSORHANDS...	2.99	2005-05-25 01:48:41
10499	CRAIG MORRELL	Jon Stephens	APACHE DIVINE	4.99	2005-05-25 01:59:46
13711	RAUL FORTIER	Mike Hillyer	CLOSER BANG	4.99	2005-05-25 02:19:23
11796	BARRY LOVELACE	Jon Stephens	WHALE BIKINI	4.99	2005-05-25 02:40:21
9463	JUAN FRALEY	Mike Hillyer	REDS POCUS	4.99	2005-05-25 02:53:02
1011	PAMELA BAKER	Mike Hillyer	SUN CONFESSIONS	0.99	2005-05-25 03:21:20
10019	BILLY POULIN	Mike Hillyer	WAIT CIDER	3.99	2005-05-25 03:38:50
8167	ROBERT BAUGHMAN	Jon Stephens	EASY GLADIATOR	4.99	2005-05-25 03:41:50
6245	CONSTANCE REID	Mike Hillyer	THIEF PELICAN	4.99	2005-05-25 03:42:37
1203	MARIE TURNER	Mike Hillyer	CHAINSAW UPTO...	0.99	2005-05-25 03:47:12
11598	RAY HOULE	Jon Stephens	SONG HEDWIG	2.99	2005-05-25 04:01:32
9975	FRED WHEAT	Mike Hillyer	WITCHES PANIC	4.99	2005-05-25 04:05:17
6186	JOY GEORGE	Mike Hillyer	STALLION SUND...	0.99	2005-05-25 04:06:21
7347	KAY CALDWELL	Mike Hillyer	GOLDMINE TYCOON	0.99	2005-05-25 04:18:51
45604	EDDIE DUGGAN	Jon Stephens	MICROCOSMOS B...	0.99	2005-05-25 04:19:08

Action Output

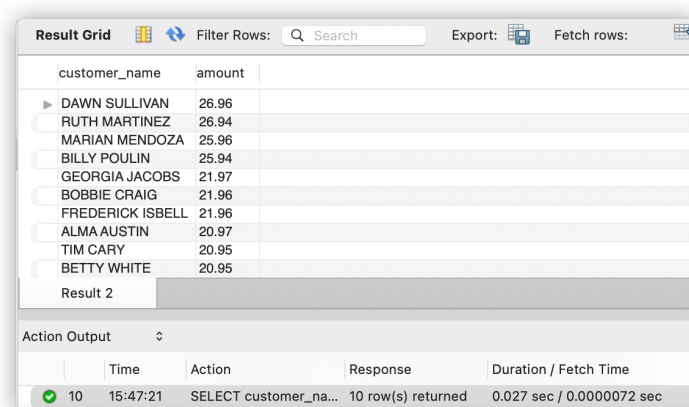
	Time	Action	Response	Duration / Fetch Time
7	15:37:03	SELECT * FROM sakil...	1000 row(s) return...	0.080 sec / 0.0017 sec

使用展示:

① 编写 SQL 语句:

```
SELECT customer_name, SUM(cost) AS amount
FROM `order`
WHERE create_date between '2005-05-24 00:00:00' and '2005-05-30 00:00:00'
GROUP BY customer_name
ORDER BY amount DESC
LIMIT 10;
```

② 结果:



The screenshot shows a database client window with a 'Result Grid' and an 'Action Output' section. The 'Result Grid' displays 10 rows of data with columns 'customer_name' and 'amount'. The 'Action Output' section shows a successful execution of the SQL query, indicating that 10 rows were returned in 0.027 seconds.

customer_name	amount
DAWN SULLIVAN	26.96
RUTH MARTINEZ	26.94
MARIAN MENDOZA	25.96
BILLY POULIN	25.94
GEORGIA JACOBS	21.97
BOBBIE CRAIG	21.96
FREDERICK ISBELL	21.96
ALMA AUSTIN	20.97
TIM CARY	20.95
BETTY WHITE	20.95

Action Output

	Time	Action	Response	Duration / Fetch Time
10	15:47:21	SELECT customer_na...	10 row(s) returned	0.027 sec / 0.0000072 sec

2. 设计 1 个触发器, 需要在报告里体现触发器生效。

触发器功能: 在 payment 表插入数据时, 对 amount 字段的值进行合法性检查。

触发器 SQL 语句:

```
CREATE TRIGGER `ist_amount_check` BEFORE INSERT ON `payment`
FOR EACH ROW
BEGIN
    DECLARE err_msg varchar(16);
    IF NEW.amount < 0
    THEN
        SET err_msg = 'invalid amount!';
        SIGNAL SQLSTATE 'XJW00' SET MESSAGE_TEXT = err_msg;
    END IF;
END;
```

功能展示:

① 首先创建两条 SQL 语句:

```
INSERT INTO rental (rental_date, inventory_id, customer_id, return_date,
staff_id) VALUES ('2021-09-24 16:42:22', 601, 162, '2021-09-24 16:42:34', 1)
```

本条语句用于构造 payment 表中数据所需的 rental_id。

```
INSERT INTO payment (customer_id, staff_id, rental_id, amount,
payment_date)
```

```
VALUES (162, 1, 16050, -2.99, '2021-09-24 16:45:37')
```

本条语句用于构造不合法的 **payment** 插入语句 (**amount** 小于 0)

② 结果:

Action Output				
	Time	Action	Response	Duration / Fetch Time
13	17:23:01	INSERT INTO payment...	Error Code: 1644. invalid amount!	0.0046 sec

说明触发器生效。修改上述插入语句，将 **-2.99** 更改为 **2.99**，得到如下结果:

Action Output				
	Time	Action	Response	Duration / Fetch Time
14	17:24:17	INSERT INTO payment...	1 row(s) affected	0.010 sec

说明插入成功。