

Даалгавар №-6 TRIGGER

- Сонгон авсан өгөгдлийн сан дээр update, delete, insert 3-н төрлийн триггер бичнэ. Нэмэлт нэг триггер бичнэ тэр нь хоёр хүснэгт дамнасан байх шаардлагатай. 2 дэд триггээр бичиж байж хоорондоо холбогдоно.

1. UPDATE TRIGGER

Update trigger бичихээс өмнөх "Movie" хүснэгт

description character varying (255)	language_type character varying (255)	director character varying (255)	duration_time integer	release_date timestamp without time zone	movie_price integer	movie_type character varying (255)	modified_at timestamp without time zone
maash goy kino goy ym gardG	english	John	4	2023-03-25 18:00:00	15000	adal yvdait	2023-03-28 16:51:35.137453
ynziin kino shvv	english	John Harthman	3	2023-03-30 18:00:00	20000	animation	2023-03-28 16:51:35.137453
urt vstei gvn garnaa	english	bella	1	2023-04-25 18:00:00	13000	treller	2023-03-28 16:51:35.137453
omogshood l yychdg kino doo	english	Joy	2	2023-03-25 18:00:00	15000	horror	2023-03-28 16:51:35.137453

Update trigger-ийн зорилго нь мөрийг шинэчлэх бүрд "movie" хүснэгтийн "modified_at" баганыг одоогийн огноо, цагаар автоматаар шинэчлэх. Ингэснээрээ ямар нэгэн байдлаар хүснэгтэнд өөрчлөлт оруулах бүрт "modified_at" багананд timestamp (огноо, цагийн утгыг микросекунд хүртэлх нарийвчлалтайгаар хадгалах боломжтой гэсэн үг) форматын дагуу "movie" хүснэгтийн мөр бүртийн цаг нт хамгийн сүүлд өөрчилснөөр солигдоно.

```
124
125 CREATE OR REPLACE FUNCTION update_movie_modified_at()
126 RETURNS TRIGGER AS $$
127 BEGIN
128     NEW.modified_at = NOW();
129     RETURN NEW;
130 END;
131 $$ LANGUAGE plpgsql;
132
133 CREATE TRIGGER update_movie_modified_at
134 BEFORE UPDATE ON Movie
135 FOR EACH ROW
136 EXECUTE FUNCTION update_movie_modified_at();
137
```

"movie" хүснэгтэнд өөрчлөлт хийж буй нь:

```
Query History  Query
1  UPDATE Movie
2  SET movie_type = 'cartoon'
3  WHERE id = 8;
4
```

UPDATE хийсний дараа тухайн өөрчилсөн өгөгдлийн харгалзах "modified_at" багана дахь хугацааны утга өөрчлөгдсөн байна.

Output Messages Notifications								
description character varying (255)	language_type character varying (255)	director character varying (255)	duration_time integer	release_date timestamp without time zone	movie_price integer	movie_type character varying (255)	modified_at timestamp without time zone	
maash goy kino goy ym gardG	english	John	4	2023-03-25 18:00:00	15000	adal yvdalt	2023-03-28 16:51:35.137453	
ynziin kino shvv	english	John Harthman	3	2023-03-30 18:00:00	20000	animation	2023-03-28 16:51:35.137453	
urt vstei gvn garnaa	english	bella	1	2023-04-25 18:00:00	13000	cartoon	2023-03-28 16:57:49.933853	
omogshood l yvchdg kino doo	english	Joy	2	2023-03-25 18:00:00	15000	horror	2023-03-28 16:51:35.137453	

2. DELETE TRIGGER

Delete trigger бичихээс өмнөх “employee” хүснэгт

Data Output Messages Notifications						
	id [PK] integer	last_name character varying (255)	first_name character varying (255)	phone_number integer	home_adress character varying (255)	salary integer
1	10	bataa	bold	88111111	ih toiruu st	2500000
2	11	dorjoo	dulam	88222222	urt tsagaan st	3500000
3	12	selengee	sender	88333333	jukov st	3000000

Delete trigger бичсэн байдал

```
20
21 CREATE TABLE employee_data (
22     employee_id integer,
23     data text
24 );
25
26 DROP TRIGGER IF EXISTS delete_employee_data_trigger ON employee;
27
28 DELETE FROM employee_data;
29
30 DROP TABLE IF EXISTS employee;
31
32 SELECT * FROM public.employee ORDER BY id ASC;
```

```
Query History Query
1 CREATE OR REPLACE FUNCTION delete_employee_data()
2 RETURNS TRIGGER AS $$
3 BEGIN
4     DELETE FROM employee_data WHERE employee_id = OLD.id;
5     RETURN OLD;
6 END;
7 $$ LANGUAGE plpgsql;
8
9 CREATE TRIGGER delete_employee_data_trigger
10 AFTER DELETE ON employee
11 FOR EACH ROW
12 EXECUTE FUNCTION delete_employee_data();
13
```

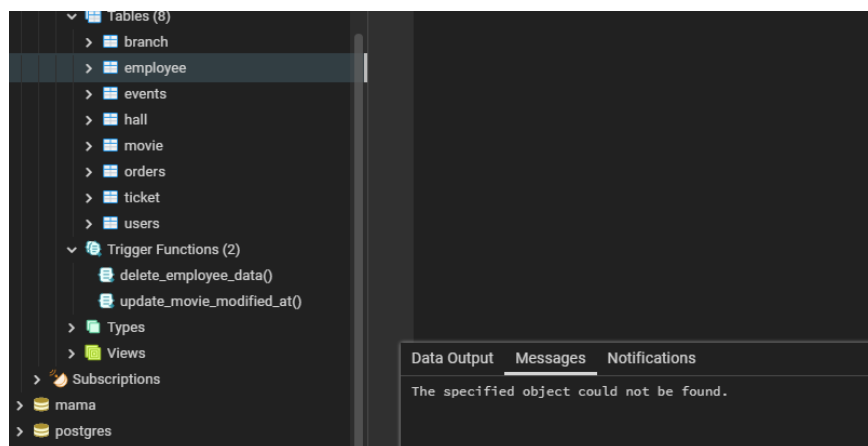
Delete trigger нь ямар ч оролтын параметр авдаггүй бөгөөд ажиллах зарчим нь гэвэл “employee” хүснэгтээс бүртгэл устгах үед “employee_data” хүснэгт дэх харгалзах бүртгэлийг автоматаар устгах замаар “employee_data” болон “employee” хүснэгтүүдийн хооронд лавлагааны нэгдмэл байдлыг хангах явдал юм.

```
16
17 SELECT *FROM public.employee
18 ORDER BY id ASC
```

Data Output Messages Notifications

ERROR: relation "public.employee" does not exist
LINE 1: SELECT *FROM public.employee
 ^
SQL state: 42P01
Character: 14

DELETE trigger ажиллаж дууссаны дараах “employee” хүснэгт:



3. INSERT TRIGGER

INSERT TRIGGER бичихээс өмнө:

Data Output Messages Notifications					
	id [PK] integer	Lname character varying (255)	f_name character varying (255)	phone_number integer	email character varying (255)
1	1	bolormaa	uuganbayar	99708150	bolormaa@gmail.com
2	2	tsetsegmaa	uuganaa	99999999	tsetsegmaa@gmail.com
3	3	khangerel	uugan	88888888	khangerel@gmail.com
4	4	tsend_ayush	osorjamaa	90909090	tsendee@gmail.com
5	5	uuganbayr	turmunkh	98989898	uuganaa@gmail.com

```

Query History  Query
1 CREATE TABLE logs (
2     event_type varchar(50),
3     event_time timestamp,
4     user_id int
5 );
6
7 CREATE OR REPLACE FUNCTION insert_user_into_logs()
8 RETURNS TRIGGER AS $$
9 BEGIN
10     INSERT INTO logs (event_type, event_time, user_id) VALUES ('User Inserted', NOW(), NEW.id);
11     RETURN NEW;
12 END;
13 $$ LANGUAGE plpgsql;
14
15 CREATE TRIGGER insert_user_into_logs_trigger
16 AFTER INSERT ON users
17 FOR EACH ROW
18 EXECUTE FUNCTION insert_user_into_logs();
19
20 INSERT INTO users (id, l_name, f_name, phone_number, email)
21 VALUES (6, 'gunbileg', 'delgerhangai', '99119911', 'gun@gmail.com');
22
23 SELECT * FROM logs;
24
25 SELECT * FROM public.users
26 ORDER BY id ASC

```

INSERT TRIGGER бичсэнээр би хүснэгтэнд шинэ мөр нэмэх боломжтой

INSERT TRIGGER бичсэний дараа хүснэгтэнд өгөгдөл нэмэгдсэн байдал

Data Output Messages Notifications					
	Id [PK] integer	Lname character varying (255)	f_name character varying (255)	phone_number integer	email character varying (255)
1	1	bolormaa	uuganbayar	99708150	bolormaa@gmail.com
2	2	tsetsegmaa	uuganaa	99999999	tsetsegmaa@gmail.com
3	3	khangerel	uugan	88888888	khangerel@gmail.com
4	4	tsend_ayush	osorjamaa	90909090	tsendee@gmail.com
5	5	uuganbayr	turmunkh	98989898	uuganaa@gmail.com
6	6	gunbileg	delgerhangai	99119911	gun@gmail.com

4. ДАМНАСАН TRIGGER

Би users хүснэгтэнд хэрэглэгчийн phone_number-ийг update хийнэ. Тэгвэл users хүснэгтийн phone_number талбар дахь мэдээлэл солигдоно. Тэгвэл энэ мэдээллийг logs хүснэгтэнд хадгална. Ийм зарчмаар ажилладаг дамнасан триггер

TRIGGER бичихээс өмнөх users болон logs хүснэгтүүдийн мэдээлэл:

Data Output

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	<div><div>id</div><div>[PK] integer</div><div>✎</div></div>	<div><div>user_id</div><div>integer</div><div>✎</div></div>	<div><div>action</div><div>character varying (255)</div><div>✎</div></div>	<div><div>data</div><div>character varying (255)</div><div>✎</div></div>	
--	---	---	--	--	--

Data Output

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	id [PK] integer	Lname character varying (255)	f_name character varying (255)	phone_number integer	email character varying (255)
1	1	bolormaa	uuganbayar	99708150	bolormaa@gmail.com
2	2	tsetsegmaa	uuganaa	99999999	tsetsegmaa@gmail.com
3	3	khangerel	uugan	88888888	khangerel@gmail.com
4	4	tsend_ayush	osorjamaa	90909090	tsendee@gmail.com
5	5	uuganbayr	turmunkh	98989898	uuganaa@gmail.com
6	6	gunbileg	delgerhangai	99119911	gun@gmail.com

Дамнасан TRIGGER бичсэний дараах users болон logs хүснэгтүүдийн мэдээлэл:

37EXECUTE FUNCTION delete_email();

38Data OutputMessagesNotifications

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	id [PK] integer	Lname character varying (255)	f_name character varying (255)	phone_number integer	email character varying (255)
421	1	bolormaa	uuganbayar	11111111	bolormaa@gmail.com

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Data Output

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	id [PK] integer	Lname character varying (255)	f_name character varying (255)	phone_number integer	email character varying (255)
1	1	bolormaa	uuganbayar	11111111	bolormaa@gmail.com
2	2	tsetsegmaa	uuganaa	99999999	tsetsegmaa@gmail.com
3	3	khangerel	uugan	88888888	khangerel@gmail.com
4	4	tsend_ayush	osorjamaa	90909090	tsendee@gmail.com
5	5	uuganbayr	turmunkh	98989898	uuganaa@gmail.com
6	6	gunbileg	delgerhangai	99119911	gun@gmail.com

Logs хүснэгт шинээр үүсгэсэн байдал:

```
1 CREATE TABLE logs (  
2     id SERIAL PRIMARY KEY,  
3     user_id INTEGER REFERENCES users(id),  
4     action VARCHAR(255) NOT NULL,  
5     data VARCHAR(255) NOT NULL  
6 );
```

```
39 CREATE TRIGGER phone_number_updated_trigger  
40 AFTER UPDATE OF phone_number ON users  
41 FOR EACH ROW  
42 EXECUTE FUNCTION update_phone_number();  
43  
44 CREATE TRIGGER email_deleted_trigger  
45 AFTER DELETE ON logs  
46 FOR EACH ROW  
47 EXECUTE FUNCTION delete_email();  
48
```

```
49  
50  
51 UPDATE users SET phone_number = '11111111' WHERE id = 1;  
52 SELECT * FROM logs;  
53 SELECT * FROM users WHERE id = 1;  
54  
55
```

Хавсралт

1. Сонгон авсан өгөдлийн сангаа үүсгэсэн байдал

```
Query  Query History
1  CREATE DATABASE Tengis_movie_booking_system;
2
3  CREATE TABLE users(
4      id INTEGER PRIMARY KEY,
5      l_name VARCHAR(255) NOT NULL,
6      f_name VARCHAR(255) NOT NULL,
7      phone_number INTEGER NOT NULL,
8      email VARCHAR(255) NOT NULL
9  );
10
11 CREATE TABLE movie (
12     id INTEGER PRIMARY KEY,
13     title VARCHAR(255) NOT NULL,
14     description VARCHAR(255) NOT NULL,
15     language_type VARCHAR(255) NOT NULL,
16     director VARCHAR(255) NOT NULL,
17     duration_time INTEGER NOT NULL,
18     release_date TIMESTAMP NOT NULL,
19     movie_price INTEGER NOT NULL,
20     movie_type VARCHAR(255) NOT NULL
21 );
22
23 CREATE TABLE events(
24     id INTEGER PRIMARY KEY,
25     l_name VARCHAR(255) NOT NULL,
26     date TIMESTAMP NOT NULL,
27     time TIMESTAMP NOT NULL,
28     event_location VARCHAR(255) NOT NULL,
29     ticket_type VARCHAR(255) NOT NULL,
30     seat INTEGER NOT NULL,
31     ticket_payment INTEGER NOT NULL,
32     order_code INTEGER NOT NULL,
33     hall_row INTEGER NOT NULL
34 );
35
36 CREATE TABLE ticket(
37     id INTEGER PRIMARY KEY,
38     ticket_type VARCHAR(255) NOT NULL,
39     price INTEGER NOT NULL,
40     quantity INTEGER NOT NULL
41 );
42
43 CREATE TABLE orders(
44     id INTEGER PRIMARY KEY,
45     total_payment INTEGER NOT NULL,
46     order_code INTEGER NOT NULL
47 );
48
```

```

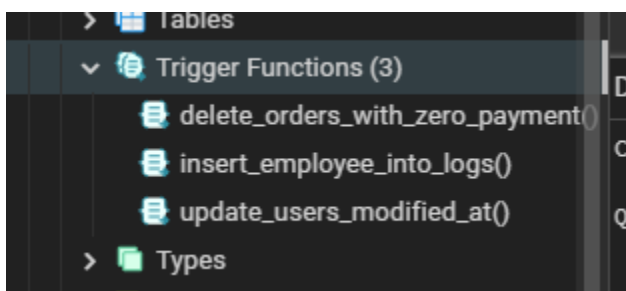
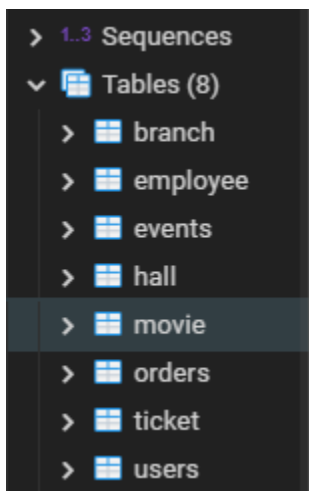
48
49 CREATE TABLE hall(
50     id INTEGER PRIMARY KEY,
51     capacity INTEGER NOT NULL,
52     seat_number INTEGER NOT NULL
53 );
54
55 CREATE TABLE branch(
56     id INTEGER PRIMARY KEY,
57     branch_location VARCHAR(255) NOT NULL,
58     time_table INTEGER NOT NULL,
59     phone_number INTEGER NOT NULL
60 );
61

```

```

62 CREATE TABLE employee(
63     id INTEGER PRIMARY KEY,
64     last_name VARCHAR(255) NOT NULL,
65     first_name VARCHAR(255) NOT NULL,
66     phone_number INTEGER NOT NULL,
67     home_adress VARCHAR(255) NOT NULL,
68     salary INTEGER NOT NULL
69 );
70

```



2. Үүсгэсэн өгөгдлийн санруугаа хэрэглэх жишээ өгөгдлөө оруулж байгаа нь:

```
INSERT INTO users (id, l_name, f_name, phone_number, email)
VALUES (1,'bolormaa', 'uuganbayar', '99708150', 'bolormaa@gmail.com');
INSERT INTO users (id, l_name, f_name, phone_number, email)
VALUES (2, 'tsetsegmaa', 'uuganaa', '99999999', 'tsetsegmaa@gmail.com');
INSERT INTO users (id, l_name, f_name, phone_number, email)
VALUES (3, 'khangerel', 'uugan', '88888888', 'khangerel@gmail.com');
INSERT INTO users (id, l_name, f_name, phone_number, email)
VALUES (4, 'tsend_ayush', 'osorjamaa', '90909090', 'tsendee@gmail.com');
INSERT INTO users (id, l_name, f_name, phone_number, email)
VALUES (5, 'uuganbayr', 'turmunkh', '98989898', 'uuganaa@gmail.com');

INSERT INTO movie (id,title, description, language_type, director, duration_time, release_date, movie_price, movie_type)
VALUES (6, 'avatar_1', 'maash goy kino goy ym gardG', 'english', 'John', 4, '2023-03-25 18:00:00', '15000', 'adal yvdalt');
INSERT INTO movie (id,title, description, language_type, director, duration_time, release_date, movie_price, movie_type)
VALUES (7, 'avatar_2', 'ynziin kino shvv', 'english', 'John Harthman', 3, '2023-03-30 18:00:00', '20000', 'animation');
INSERT INTO movie (id,title, description, language_type, director, duration_time, release_date, movie_price, movie_type)
VALUES (8, 'tangled', 'urt vstei gvn garnaa', 'english', 'bella', 1, '2023-04-25 18:00:00', '13000', 'treller');
INSERT INTO movie (id,title, description, language_type, director, duration_time, release_date, movie_price, movie_type)
VALUES (9, 'zura', 'omogshood l yvchdg kino doo', 'english', 'Joy', 2, '2023-03-25 18:00:00', '15000', 'horror');

INSERT INTO employee (id, last_name,first_name,phone_number, home_adress, salary)
VALUES (10, 'firsajilchin', 'frstajilchinf', '12345678', 'songino hairhan', 2500000);
INSERT INTO employee (id, last_name,first_name,phone_number, home_adress, salary)
VALUES (11, 'secondajilchin', 'secondajilchinf', '91011121', 'chingeltei', 3500000);
INSERT INTO employee (id, last_name,first_name,phone_number, home_adress, salary)
VALUES (12, 'thirdajilchin', 'thirdajilchinf', '13141516', 'bagahangai', 3000000);
```

Data Output Messages Notifications						
	id [PK] integer	lname character varying (255)	f_name character varying (255)	phone_number integer	email character varying (255)	
1	1	bolormaa	uuganbayar	99708150	bolormaa@gmail.com	
2	2	tsetsegmaa	uuganaa	99999999	tsetsegmaa@gmail.com	
3	3	khangerel	uugan	88888888	khangerel@gmail.com	
4	4	tsend_ayush	osorjamaa	90909090	tsendee@gmail.com	
5	5	uuganbayr	turmunkh	98989898	uuganaa@gmail.com	

	id [PK] integer	title character varying (255)	description character varying (255)	language_type character varying (255)	director character varying (255)	duration_time integer	release_date timestamp without time zone	movie_price integer	movie_type character varying (255)
1	6	avatar_1	maash goy kino goy ym gardG	english	John	4	2023-03-25 18:00:00	15000	adal yvdalt
2	7	avatar_2	ynziin kino shvv	english	John Harthman	3	2023-03-30 18:00:00	20000	animation
3	8	tangled	urt vstei gvn garnaa	english	bella	1	2023-04-25 18:00:00	13000	treller
4	9	zura	omogshood l yvchdg kino doo	english	Joy	2	2023-03-25 18:00:00	15000	horror

Data Output Messages Notifications						
	id [PK] integer	last_name character varying (255)	first_name character varying (255)	phone_number integer	home_adress character varying (255)	salary integer
1	10	firsajilchin	frstajilchinf	12345678	songino hairhan	2500000
2	11	secondajilchin	secondajilchinf	91011121	chingeltei	3500000
3	12	thirdajilchin	thirdajilchinf	13141516	bagahangai	3000000