	Lehrveranstaltung	**Databases and Information Systems 2020**		
	Aufgabenzettel	**3**		
	STiNE-Gruppe 14	**Simon Weidmann, Aram Yesildeniz**		
	Ausgabe	**12. Mai 2020**	Abgabe	**19. Mai 2020**

4.1 Isolation Levels and SQL

a)

How can you determine the currently set isolation level?

```
SHOW TRANSACTION ISOLATION LEVEL;
```

What is the default isolation level of PostgreSQL?
Read Committed is the default isolation level in PostgreSQL.

How can the isolation level be changed during a session in PostgreSQL?

For current transaction:

```
SET TRANSACTION ISOLATION LEVEL
{ SERIALIZABLE | REPEATABLE READ | READ COMMITTED | READ UNCOMMITTED }
```

For default transaction characteristics:

```
SET SESSION CHARACTERISTICS AS TRANSACTION ISOLATION LEVEL
{ SERIALIZABLE | REPEATABLE READ | READ COMMITTED | READ UNCOMMITTED }
```

b)

```
CREATE TABLE public."OPK"
(
    "ID" integer,
    "NAME" text
);

ALTER TABLE public."OPK"
    OWNER to postgres;
```

c)

```
INSERT INTO public."OPK"(
    "ID", "NAME")
    VALUES (1, 'shaggy');

INSERT INTO public."OPK"(
    "ID", "NAME")
    VALUES (2, 'fred');

INSERT INTO public."OPK"(
    "ID", "NAME")
    VALUES (3, 'velma');

INSERT INTO public."OPK"(
    "ID", "NAME")
    VALUES (4, 'scooby');

INSERT INTO public."OPK"(
    "ID", "NAME")
    VALUES (5, 'daphne');
```

d)

e)

SQL Scripts

Create Database

```
CREATE DATABASE dis
    WITH
    OWNER = postgres
    ENCODING = 'UTF8'
    CONNECTION LIMIT = -1;
```

Create Tables

```
CREATE TABLE public.estate_agent
(
    agent_login text,
    agent_name text,
```

```
    agent_address text,
    agent_password text,
    PRIMARY KEY (agent_login)
);

ALTER TABLE public.estate_agent
    OWNER to postgres;


CREATE TABLE public.estate
(
    estate_id serial,
    city text,
    postal_code integer,
    street text,
    street_number text,
    square_area integer,
    manager text,
    PRIMARY KEY (estate_id),
    CONSTRAINT manager FOREIGN KEY (manager)
        REFERENCES public.estate_agent (agent_login) MATCH SIMPLE
        ON UPDATE NO ACTION
        ON DELETE NO ACTION
        NOT VALID
);

ALTER TABLE public.estate
    OWNER to postgres;


CREATE TABLE public.apartment
(
    floor integer,
    rent text,
    rooms text,
    balcony boolean,
    kitchen boolean,
    CONSTRAINT apartment_pkey PRIMARY KEY (estate_id),
    CONSTRAINT manager FOREIGN KEY (manager)
        REFERENCES public.estate_agent (agent_login) MATCH SIMPLE
        ON UPDATE NO ACTION
        ON DELETE NO ACTION
        NOT VALID
)
```

```
    INHERITS (public.estate);

ALTER TABLE public.apartment
    OWNER to postgres;


CREATE TABLE public.house
(
    floors integer,
    price text,
    garden boolean,
    CONSTRAINT house_pkey PRIMARY KEY (estate_id),
    CONSTRAINT manager FOREIGN KEY (manager)
        REFERENCES public.estate_agent (agent_login) MATCH SIMPLE
        ON UPDATE NO ACTION
        ON DELETE NO ACTION
)
    INHERITS (public.estate)
TABLESPACE pg_default;

ALTER TABLE public.house
    OWNER to postgres;


CREATE TABLE public.person
(
    id serial,
    first_name text,
    last_name text,
    address text,
    PRIMARY KEY (id)
);

ALTER TABLE public.person
    OWNER to postgres;


CREATE TABLE public.contract
(
    contract_number serial,
    contract_date date,
    place text,
    PRIMARY KEY (contract_number)
);
```

```
ALTER TABLE public.contract
    OWNER to postgres;


CREATE TABLE public.tenancy_contract
(
    start_date date,
    duration text,
    additional_costs text,
    person_id integer,
    apartment_id integer,
    CONSTRAINT tenancy_contract_pkey PRIMARY KEY (contract_number),
    CONSTRAINT person_id FOREIGN KEY (person_id)
        REFERENCES public.person (id) MATCH SIMPLE
        ON UPDATE NO ACTION
        ON DELETE NO ACTION
        NOT VALID,
    CONSTRAINT apartment_id FOREIGN KEY (apartment_id)
        REFERENCES public.apartment (estate_id) MATCH SIMPLE
        ON UPDATE NO ACTION
        ON DELETE NO ACTION
        NOT VALID
)
    INHERITS (public.contract);

ALTER TABLE public.tenancy_contract
    OWNER to postgres;


CREATE TABLE public.purchase_contract
(
    installment_amount text,
    intrest_rate text,
    person_id integer,
    house_id integer,
    CONSTRAINT purchase_contract_pkey PRIMARY KEY (contract_number),
    CONSTRAINT person_id FOREIGN KEY (person_id)
        REFERENCES public.person (id) MATCH SIMPLE
        ON UPDATE NO ACTION
        ON DELETE NO ACTION
        NOT VALID,
    CONSTRAINT house_id FOREIGN KEY (house_id)
        REFERENCES public.house (estate_id) MATCH SIMPLE
```

```
        ON UPDATE NO ACTION
        ON DELETE NO ACTION
        NOT VALID
)
    INHERITS (public.contract);

ALTER TABLE public.purchase_contract
    OWNER to postgres;
```

Insert Estate Agent

```
INSERT INTO public.estate_agent(
    agent_login, agent_name, agent_address, agent_password)
    VALUES ('testagent', 'testname', 'testaddress', 'testpassword');
```

4.2 Lock Conflicts

a)

b)

c)

d)

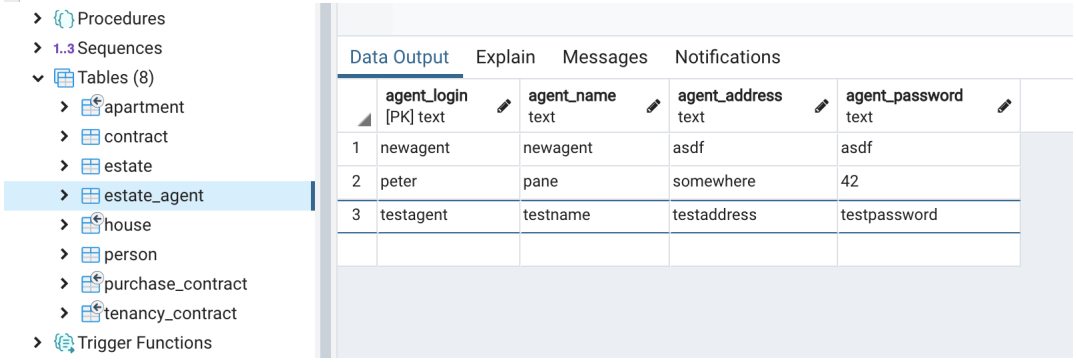
e)

Create an apartment, an estate agent and a tenancy contract with your java application. Validate that they are in the database (e.g. by using a screenshot of application and database).

Create Estate Agent

```
Estate Agent Management:
[1] Create Agent
[2] Update Agent
[3] Delete Agent
[4] Back to Main Menu
Input: 1
Login: peter
Name: pane
Address: somewhere
Password: 42

Agent [peter, pane, somewhere, 42] created.
```



Create Apartment

```
Estate Management. Logged in as [peter]:
[1] Create Estate
[2] Update Estate
[3] Delete Estate
[4] Back to Main Menu
Input: 1
Create new Estate. Only [peter] can perform actions:
[1] Create Apartment
[2] Create House
[3] Back to Estate Menu
Input: 1
City: hamburg
Postalcode: 420202
Street: super street
Street Number: 777
Square Area: 120
Floor: 3
Rent: 1200
Rooms: 5
Balcony (1 = yes): 1
Kitchen (1 = yes): 1

Apartment [13, hamburg, 420202, super street, 777, 120, peter, 3, 1200, 5, true, true] created.
```

	estate_id [PK] integer	city text	postal_code integer	street text	street_number text	square_area integer	manager text	floor integer	rent text	rooms text	balcony boolean	kitchen boolean
1	6	123	123	123	123	123	testagent	12	312	3123	false	false
2	12	1241	124	124	124	124	testagent	124	124	124	false	false
3	13	hamburg	420202	super street	777	120	peter	3	1200	5	true	true

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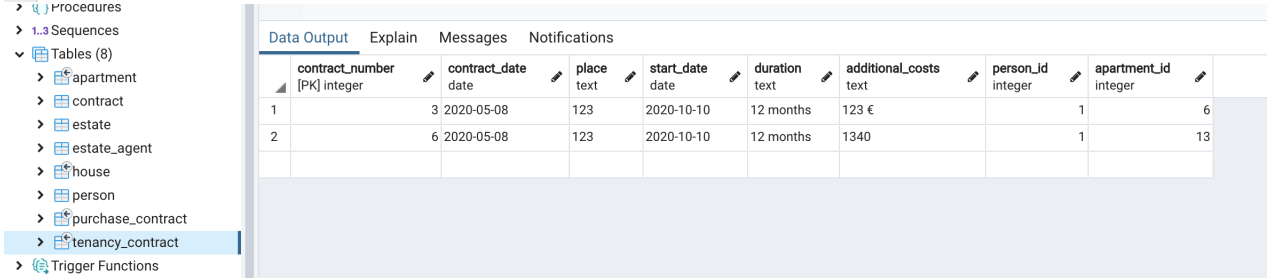
Create Tenancy Contract

```
Contract Menu:
[1] Insert Person
[2] Sign/Create Tenancy Contract
[3] Sign/Create Purchase Contract
[4] Show Contracts
[5] Back
Input: 2
Estate ID: 13
Tenant ID: 1
Start Date (Format DD.MM.YYYY): 10.10.2020
Duration: 12 months
Additional Costs: 1340
Contract Date (Format DD.MM.YYYY): 08.05.2020
Settlement Place: 123
Contract has been saved to database.
```



Create a contract with a non-existing estate. Does it work? Why/Why not?
No it does not work. The foreign key 'apartment-id' in the tenancy contract table needs to be valid. If the entered id is not existing in the corresponding estate table, an exception will be thrown:
ERROR: insert or update on table tenancy-contract violates foreign key constraint person-id
Detail: Key (person-id)=(123) is not present in table person.

Which inheritance model did you choose and why?
Horizontal: Postgresql offers the INHERITS keyword, which enables horizontal partitioning. Therefore we used this keyword because it is intuitive to use easy to implement.

Create an apartment, and let your application crash between inserting the estate information and inserting the apartment information. What is the effect on your database state?
Since it is only possible to create an apartment or house in one go, this use case will not happen. If the application crashes while the user inserts information for the estate he wants to create, the record will not be saved.