Міністерство освіти і науки України
Національний технічний університет України «Київський політехнічний інститут імені Ігоря Сікорського»
Факультет інформатики та обчислювальної техніки

Кафедра інформатики та програмної інженерії

Звіт

з лабораторної роботи №2 з
дисципліни «Бази даних»

Варіант 27

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Київ 2022

Лабораторна робота

Мета заняття:

– Створення бази даних шляхом визначення схеми БД та заповнення її тестовими даними

– Навчитися проектувати бази даних, вводити і редагувати структуру таблиць та дані в таблицях

– Вивчити DDL-команди SQL для роботи з таблицями (створення, модифікації та видалення таблиць)

– Вивчити використовувані в SQL засоби для підтримки цілісності даних та їх практичне застосування

Завдання:

При виконанні лабораторної роботи необхідно виконати наступні дії:

1. Створити схему БД згідно з розробленою в роботі No1 ER-моделлю
2. Розробити SQL-скрипти для:
    a. створення таблиць в БД засобами мови SQL. Передбачити обмеження для підтримки цілісності та коректності даних;
    b. зміни в структурах таблиць, обмежень засобами мови SQL (до 10 різних за суттю запитів для декількох таблиць);
    c. видалення окремих елементів таблиць/обмежень або самих таблиць засобами мови SQL (до 10 різних за суттю команд);
    d. встановлення зв’язків між таблицями засобами мови SQL;
3. Згенерувати схему даних засобами СУБД
4. Імпортувати дані в створену БД з використанням засобів СУБД

Хід роботи:

Запити:

creation.sql

```
drop schema travel_agency;

create schema travel_agency;

use travel_agency;

create table Client(
    Client_ID int auto_increment,
    Surname varchar(30) not null,
    `Name` varchar(30) not null,
    Patronymic varchar(20),
    Address varchar(150) not null,
    Phone_Number varchar(16) not null,
    constraint PK_Client primary key (Client_ID),
    constraint CHK_Surname check (regexp_like(Surname, '^[A-ZA-ЯЇҐЄ][a-za-яїґє]*(?:-[A-ZA-ЯЇҐЄ][a-za-яїґє]*)?$', 'c')),
    constraint CHK_Name check (regexp_like(`Name`, '^[A-ZA-ЯЇҐЄ][a-za-яґїє]*(?:-[A-ZA-ЯҐЄЇ][a-za-яґєї]*)?$', 'c')),
    constraint CHK_Patronymic check (regexp_like(Patronymic, '^[A-ZA-ЯЇҐЄ][a-za-яґїє]*$', 'c') or Patronymic is null)
);

create table `Check`(
    Check_ID int auto_increment,
    `Date` datetime not null default now(),
    Discount int not null default 0,
    Client_ID int not null,
    constraint PK_Check primary key (Check_ID),
    constraint FK_Check_Client foreign key (Client_ID)
        references Client(Client_ID),
    constraint CHK_Discount check (Discount >= 0)
);

create table Currency(
    Currency_Name varchar(10) not null,
    Rate_To_The_Dollar double,
    constraint PK_Currency primary key (Currency_Name),
    constraint CHK_Currency_Name check (regexp_like(Currency_Name, '^[A-Z]+$', 'c')),
    constraint CHK_Rate_To_The_Dollar check(Rate_To_The_Dollar > 0)
);

create table Country(
    Country_Name varchar(30) not null,
    Currency_Name varchar(10) not null,
    constraint PK_Country primary key (Country_Name),
    constraint FK_Country_Currency foreign key (Currency_Name) references Currency(Currency_Name),
    constraint CHK_Country_Name check (regexp_like(Country_Name, '^([A-Z][a-z]*[-]?)+$', 'c'))
);

create table Human_Settlements(
    Human_Settlement_ID int auto_increment,
    Country_Name varchar(30) not null,
    Name_Of_Settlement varchar(30) not null,
    Climate varchar(250) not null,
    Two_Way_Ticket_Price int(8),
```

```
    constraint PK_Human_Settlement primary key (Human_Settlement_ID),
    constraint FK_Human_Settlement_Country foreign key (Country_Name)
        references Country(Country_Name),
    constraint CHK_Two_Way_Ticket_Price check(Two_Way_Ticket_Price > 0),
    constraint CHK_Name_Of_Settlement  check (regexp_like(Name_Of_Settlement,
'^([A-Z][a-z]*[ -]?)+$', 'c'))
    );

create table Hotel(
    Hotel_ID int auto_increment,
    Hotel_Name varchar(50) not null,
    Human_Settlement_ID int not null,
    Address varchar(100) not null,
    Phone_Number varchar(16) not null,
    constraint PK_Hotel primary key (Hotel_ID),
    constraint FK_Hotel_Human_Settlement foreign key (Human_Settlement_ID)
        references Human_Settlements(Human_Settlement_ID)
    );

create table Hotel_Room(
    Hotel_ID int not null,
    Room_Number int(10) not null,
    Price_Per_Night int(10) not null,
    Type enum('Standard','Deluxe','Connecting','Suite','Apartment-style') not
null,
    Number_Of_Places int(2) not null,
    constraint PK_Hotel_Room primary key (Hotel_ID, Room_Number),
    constraint FK_Hotel_Room_Hotel foreign key (Hotel_ID)
        references Hotel(Hotel_ID),
    constraint CHK_Price_Per_Night check(Price_Per_Night > 0)
  );

create table Package_Tour(
    Package_Tour_ID int not null auto_increment,
    Check_ID int not null,
    Hotel_ID int not null,
    Date_Of_Departure datetime not null,
    Return_Date datetime not null,
    Number_Of_People tinyint not null,
    constraint PK_Package_Tour primary key (Package_Tour_ID),
    constraint FK_Package_Tour_Check foreign key (Check_ID)
        references `Check`(Check_ID),
    constraint FK_Package_Tour_Hotel foreign key (Hotel_ID)
        references Hotel(Hotel_ID),
    constraint CHK_Number_Of_People check (Number_Of_People > 0)
);
```

changes.sql

```
use travel_agency;

alter table Human_Settlements modify column Two_Way_Ticket_Price int not null;
alter table Package_Tour add column PackageTourID int not null;
alter table Package_Tour add constraint PK_Package_Tour primary key
Package_Tour(PackageTourID);
alter table Package_Tour rename column Date_Of_Departure to DepartureDate;
alter table Package_Tour drop primary key;
alter table Currency drop constraint CHK_Rate_To_The_Dollar;
alter table Hotel add constraint UNIQUE_Address unique (Address);
alter table Country alter Currency_Name set default 'USD';
```

deletion.sql

```
use travel_agency;

alter table Package_Tour drop primary key;
alter table Currency drop constraint CHK_Rate_To_The_Dollar;
alter table `Check` drop column Discount;
alter table Package_Tour drop foreign key FK_Package_Tour_Hotel;
truncate table package_tour;
drop table Package_Tour;
drop database travel_agency;
```

inserts.sql

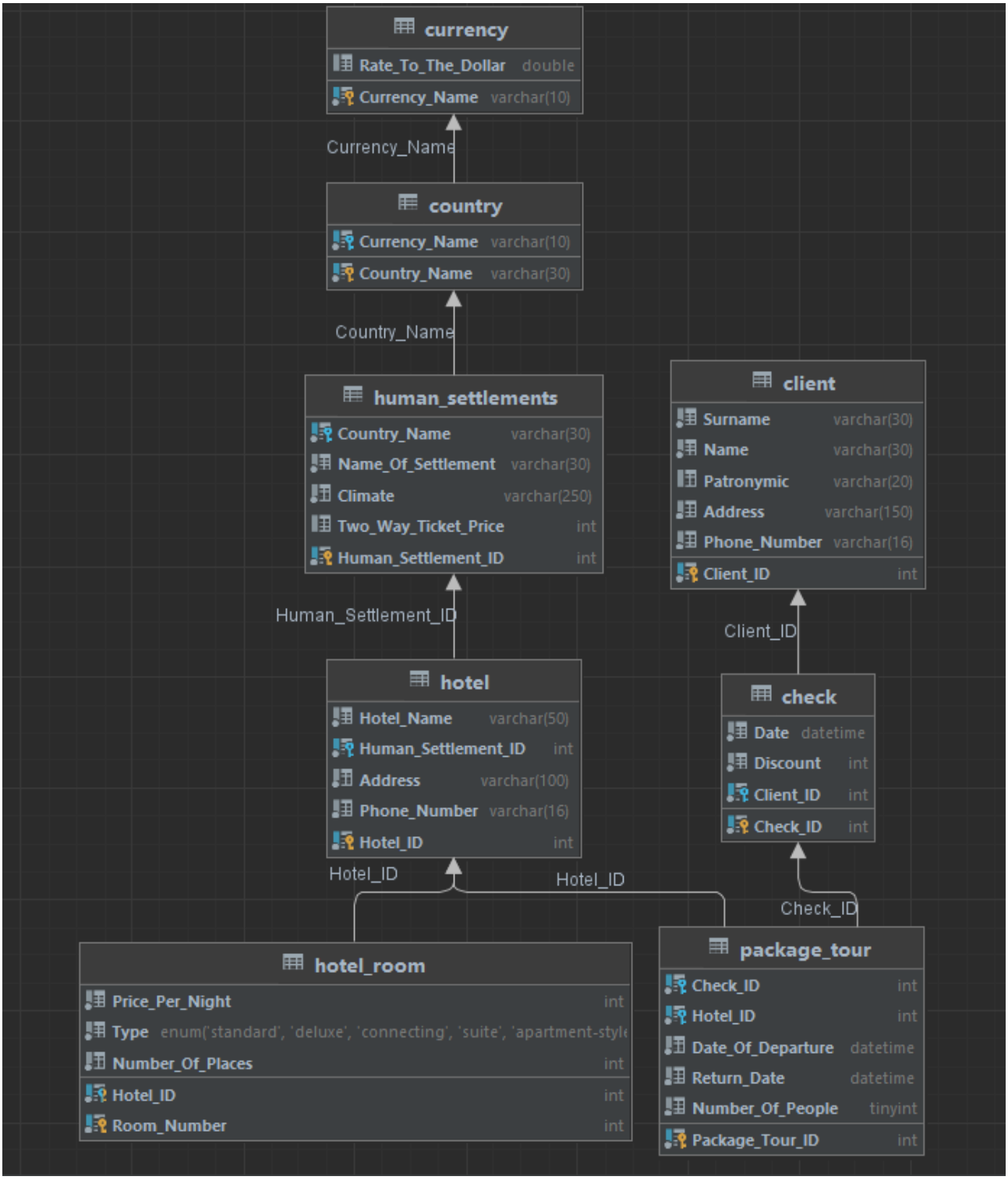
```
use travel_agency;

insert into Currency(Currency_Name, Rate_To_The_Dollar) value ('USD', 1);
insert into Currency(Currency_Name, Rate_To_The_Dollar) value ('EUR', 1.06);
insert into Currency(Currency_Name, Rate_To_The_Dollar) value ('UAH', 0.027);
insert into Currency(Currency_Name, Rate_To_The_Dollar) value ('PLN', 0.23);
insert into Currency(Currency_Name, Rate_To_The_Dollar) value ('AUD', 0.68);
insert into Currency(Currency_Name, Rate_To_The_Dollar) value ('CAD', 0.73);
insert into Currency(Currency_Name, Rate_To_The_Dollar) value ('CHF', 1.07);
insert into Currency(Currency_Name, Rate_To_The_Dollar) value ('GBP', 1.23);
insert into Currency(Currency_Name, Rate_To_The_Dollar) value ('JPY', 0.0073);
insert into Currency(Currency_Name, Rate_To_The_Dollar) value ('INR', 0.012);
insert into Currency(Currency_Name, Rate_To_The_Dollar) value ('CNY', 0.14);
insert into Currency(Currency_Name, Rate_To_The_Dollar) value ('PHP', 0.018);
insert into Currency(Currency_Name, Rate_To_The_Dollar) value ('GEL', 0.38);
insert into Currency(Currency_Name, Rate_To_The_Dollar) value ('MYR', 0.23);
insert into Currency(Currency_Name, Rate_To_The_Dollar) value ('BRL', 0.19);



insert into Country (Country_Name, Currency_Name) value ('USA', 'USD');
insert into Country (Country_Name, Currency_Name) value ('Ukraine', 'UAH');
insert into Country (Country_Name, Currency_Name) value ('Greece', 'EUR');
insert into Country (Country_Name, Currency_Name) value ('Poland', 'PLN');
insert into Country (Country_Name, Currency_Name) value ('Austria', 'EUR');
insert into Country (Country_Name, Currency_Name) value ('Belgium', 'EUR');
insert into Country (Country_Name, Currency_Name) value ('Italy', 'EUR');
insert into Country (Country_Name, Currency_Name) value ('Netherlands', 'EUR');
insert into Country (Country_Name, Currency_Name) value ('Spain', 'EUR');
insert into Country (Country_Name, Currency_Name) value ('Australia', 'AUD');
insert into Country (Country_Name, Currency_Name) value ('Canada','CAD');
insert into Country (Country_Name, Currency_Name) value ('Switzerland', 'CHF');
insert into Country (Country_Name, Currency_Name) value ('Great Britain',
'GBP');
insert into Country (Country_Name, Currency_Name) value ('Japan', 'JPY');
insert into Country (Country_Name, Currency_Name) value ('India', 'INR');
insert into Country (Country_Name, Currency_Name) value ('China', 'CNY');
insert into Country (Country_Name, Currency_Name) value ('Philippines', 'PHP');
insert into Country (Country_Name, Currency_Name) value ('Georgia', 'GEL');
insert into Country (Country_Name, Currency_Name) value ('Malaysia', 'MYR');
insert into Country (Country_Name, Currency_Name) value ('Brazil', 'BRL');
```

```
insert into Human_Settlements (Country_Name, Name_Of_Settlement, Climate,
Two_Way_Ticket_Price) value ('USA', 'New York',
                'The climate of New York City features a humid subtropical
variety, with parts of the city transitioning into a humid continental climate.
This gives the city cool, wet winters and hot, humid summers with plentiful
rainfall all year round.', 375);
insert into Human_Settlements (Country_Name, Name_Of_Settlement, Climate,
Two_Way_Ticket_Price) value ('Ukraine', 'Vorokhta',
                'The Carpathian climate is moderately continental. Winter is
mild with lots of snow, spring is rainy, summers not hot, autumn is dry.', 50);
insert into Human_Settlements (Country_Name, Name_Of_Settlement, Climate,
Two_Way_Ticket_Price) value ('Greece', 'Athens',
                'In Athens, the capital of Greece, the climate is Mediterranean,
with mild, moderately rainy winters and hot, sunny summers.', 98);
insert into Human_Settlements (Country_Name, Name_Of_Settlement, Climate,
Two_Way_Ticket_Price) value ('Poland', 'Wroclaw',
                'The climate of Wroclaw is moderately continental, characterized
by cold winters, with temperatures around freezing (0 °C or 32 °F), and quite
warm summers.', 87);
insert into Human_Settlements (Country_Name, Name_Of_Settlement, Climate,
Two_Way_Ticket_Price) value ('Austria', 'Vienna',
                'In Vienna, the summers are warm; the winters are very cold,
snowy, and windy; and it is partly cloudy year round.', 110);
insert into Human_Settlements (Country_Name, Name_Of_Settlement, Climate,
Two_Way_Ticket_Price) value ('Belgium', 'Antwerp',
                'In Antwerp, a city located in the region of Flanders, in the
north of Belgium, the climate is sub-oceanic, humid and rainy, influenced by the
Atlantic Ocean: winters are cold but not freezing, while summers are mild or
pleasantly warm.', 275);
insert into Human_Settlements (Country_Name, Name_Of_Settlement, Climate,
Two_Way_Ticket_Price) value ('Italy', 'Rome',
                'Rome has a Mediterranean climate with cool winters and warm and
hot summers.', 120);
insert into Human_Settlements (Country_Name, Name_Of_Settlement, Climate,
Two_Way_Ticket_Price) value ('Netherlands', 'Amsterdam',
                'Amsterdam has an oceanic climate, similar to that of Great
Britain. The climate in Amsterdam is strongly influenced by the North Sea.',
130);
insert into Human_Settlements (Country_Name, Name_Of_Settlement, Climate,
Two_Way_Ticket_Price) value ('Spain', 'Madrid',
                'Madrid''s climate is one of Europe''s healthiest thanks to the
fresh mountain air flowing into the city from nearly all sides, but its altitude
can also mean significant changes from season to season.', 100);
insert into Human_Settlements (Country_Name, Name_Of_Settlement, Climate,
Two_Way_Ticket_Price) value ('Australia', 'Canberra',
                'In Canberra, the summers are warm, the winters are very cold,
and it is partly cloudy year round.', 2200);
insert into Human_Settlements (Country_Name, Name_Of_Settlement, Climate,
Two_Way_Ticket_Price) value ('Canada', 'Ottawa',
                'In Ottawa, the summers are long, warm, and partly cloudy and
the winters are freezing, snowy, and mostly cloudy.', 1100);
insert into Human_Settlements (Country_Name, Name_Of_Settlement, Climate,
Two_Way_Ticket_Price) value ('Switzerland', 'Bern',
                'The climate of Bern is moderately continental, with cold
winters and warm summers.', 300);
insert into Human_Settlements (Country_Name, Name_Of_Settlement, Climate,
Two_Way_Ticket_Price) value ('Great Britain', 'London',
                'London features a humid temperate oceanic climate. This gives
the city cool winters and warm to hot summers', 107);
insert into Human_Settlements (Country_Name, Name_Of_Settlement, Climate,
Two_Way_Ticket_Price) value ('Japan', 'Tokyo',
                 'In Tokyo, the Japanese capital, the climate is temperate, with
fairly mild, sunny winters and hot, humid and rainy summers.', 1390);
```

```
insert into Human_Settlements (Country_Name, Name_Of_Settlement, Climate,
Two_Way_Ticket_Price) value ('India', 'New Delhi',
                'In New Delhi, the capital of India, the climate is
subtropical, with a very mild and sunny winter, a very hot season from mid-March
to mid-June.', 290);
insert into Human_Settlements (Country_Name, Name_Of_Settlement, Climate,
Two_Way_Ticket_Price) value ('China', 'Shanghai',
                'In Shanghai, the summers are hot, oppressive, wet, and mostly
cloudy and the winters are very cold, windy, and partly cloudy.', 625);
insert into Human_Settlements (Country_Name, Name_Of_Settlement, Climate,
Two_Way_Ticket_Price) value ('Philippines', 'Manila',
                'The climate of Manila is tropical, hot all year round, with a
dry season from January to April and a rainy season from May to December.',
400);
insert into Human_Settlements (Country_Name, Name_Of_Settlement, Climate,
Two_Way_Ticket_Price) value ('Georgia', 'Tbilisi',
                'In Tbilisi, the summers are warm, dry, and mostly clear and
the winters are long, very cold, snowy, and partly cloudy.', 140);
insert into Human_Settlements (Country_Name, Name_Of_Settlement, Climate,
Two_Way_Ticket_Price) value ('Malaysia', 'Kuala Lumpur',
                'Throughout the year it is nice and sunny in Kuala Lumpur. The
only thing to keep in mind is the high humidity in some periods of the year.',
410);
insert into Human_Settlements (Country_Name, Name_Of_Settlement, Climate,
Two_Way_Ticket_Price) value ('Brazil', 'Brasilia',
                'In Brasília, the wet season is overcast, the dry season is
mostly clear, and it is warm year round.', 550);

set global local_infile = true;
load data local infile
'C:/Users/youn1on/Desktop/Labs/3_semester/DB/Lab2/clients.csv'
into table Client
fields terminated by ','
enclosed by '"'
lines terminated by '\n';

load data local infile
'C:/Users/youn1on/Desktop/Labs/3_semester/DB/Lab2/checks.csv'
into table `Check`
fields terminated by ',';

insert into Hotel (Hotel_Name, Human_Settlement_ID, Address, Phone_Number) value
('Continental', 1, '56 Highland Rd.', '+14844731457');
insert into Hotel (Hotel_Name, Human_Settlement_ID, Address, Phone_Number) value
('Kazka', 2, 'Pokrovska 152a', '+380935785167');
insert into Hotel (Hotel_Name, Human_Settlement_ID, Address, Phone_Number) value
('Acropolis', 3, 'Tsimiski 102', '+302112347567');
insert into Hotel (Hotel_Name, Human_Settlement_ID, Address, Phone_Number) value
('Dream4You', 4, 'Księcia Witolda 25', '+48450988778');
insert into Hotel (Hotel_Name, Human_Settlement_ID, Address, Phone_Number) value
('Apollo Hotel', 5, 'Apollogasse 32', '+436755880871');
insert into Hotel (Hotel_Name, Human_Settlement_ID, Address, Phone_Number) value
('Sapphire House Antwerp', 6, 'Lange Nieuwstraat 20-24', '+32466904418');
insert into Hotel (Hotel_Name, Human_Settlement_ID, Address, Phone_Number) value
('Hotel Boutique Nazionale', 7, 'Via Nazionale 66', '+3905231715672');
insert into Hotel (Hotel_Name, Human_Settlement_ID, Address, Phone_Number) value
('Eden Hotel', 8, 'Amstel 144', '+31203698115');
insert into Hotel (Hotel_Name, Human_Settlement_ID, Address, Phone_Number) value
('LaNave', 9, 'Cadarso 19', '+34919931149');
insert into Hotel (Hotel_Name, Human_Settlement_ID, Address, Phone_Number) value
('South Gladstone', 10, '83 Toolooa Street', '+61480053306');
insert into Hotel (Hotel_Name, Human_Settlement_ID, Address, Phone_Number) value
('Les Suites Hotel', 11 , '130 Besserer Street', '+17787600967');
```

```
insert into Hotel (Hotel_Name, Human_Settlement_ID, Address, Phone_Number) value
('Melarose Feng Shui', 12, 'Greifswalder Str. 199', '+41313920190');
insert into Hotel (Hotel_Name, Human_Settlement_ID, Address, Phone_Number) value
('Leonardo Royal London', 13, '10 Godliman Street', '+442045771201');
insert into Hotel (Hotel_Name, Human_Settlement_ID, Address, Phone_Number) value
('Reimi Mondo', 14, 'Higashi 36-jokita', '+81822456416');
insert into Hotel (Hotel_Name, Human_Settlement_ID, Address, Phone_Number) value
('Paramount Hotel', 15, '21, O/s Shahpur Gate', '+9112345678910');
insert into Hotel (Hotel_Name, Human_Settlement_ID, Address, Phone_Number) value
('Four Seasons Hotel Hangzhou', 16, 'Cheng Du Shuang Liu Dong Sheng Jie Dao
89hao Si Ji Hua Yu 10-1-2', '+865718829');
insert into Hotel (Hotel_Name, Human_Settlement_ID, Address, Phone_Number) value
('Henann Resort Aloha Beach', 17, '48 Alona Beach Rd', '+63385029141');
insert into Hotel (Hotel_Name, Human_Settlement_ID, Address, Phone_Number) value
('Hotel IMERETI', 18, 'agmasheneblis gamziri 95a', '+995325425042');
insert into Hotel (Hotel_Name, Human_Settlement_ID, Address, Phone_Number) value
('Legoland Malaysia Hotel', 19, 'B 46 Lrg Rahim Kajai 14 Taman Tun Dr Ismail',
'+601130252602');
insert into Hotel (Hotel_Name, Human_Settlement_ID, Address, Phone_Number) value
('Royal Tulip Brasília Alvorada', 20, 'Rua João das Heras 48',
'+5521910364253');


load data local infile
'C:/Users/youn1on/Desktop/Labs/3_semester/DB/Lab2/rooms.csv'
into table Hotel_Room
fields terminated by ',';

load data local infile
'C:/Users/youn1on/Desktop/Labs/3_semester/DB/Lab2/tours.csv'
into table Package_Tour
fields terminated by ','
enclosed by '"'
lines terminated by '\n';
```

Зображення ЕР-діаграми зробленої засобами СУБД


currency
Rate_To_The_Dollar double
Currency_Name varchar(10)
Currency_Name
country
Currency_Name varchar(10)
Country_Name varchar(30)
Country_Name
human_settlements
Country_Name varchar(30)
Name_Of_Settlement varchar(30)
Climate varchar(250)
Two_Way_Ticket_Price int
Human_Settlement_ID int
Human_Settlement_ID
client
Surname varchar(30)
Name varchar(30)
Patronymic varchar(20)
Address varchar(150)
Phone_Number varchar(16)
Client_ID int
Client_ID
hotel
Hotel_Name varchar(50)
Human_Settlement_ID int
Address varchar(100)
Phone_Number varchar(16)
Hotel_ID int
check
Date datetime
Discount int
Client_ID int
Check_ID int
Hotel_ID
Hotel_ID
Check_ID
hotel_room
Price_Per_Night int
Type enum('standard', 'deluxe', 'connecting', 'suite', 'apartment-style
Number_Of_Places int
Hotel_ID int
Room_Number int
package_tour
Check_ID int
Hotel_ID int
Date_Of_Departure datetime
Return_Date datetime
Number_Of_People tinyint
Package_Tour_ID int

Висновок:

У цій лабораторній роботі я навчилася:

- Створювати бази даних за схемою та заповнювати її даними

- Проектувати БД, вводити і редагувати структуру таблиць та їх дані

- Використовувати DDL-команди SQL для роботи з таблицями

- Використовувати в SQL засоби для підтримки цілісності даних