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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**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:
   1. створення таблиць в БД засобами мови SQL. Передбачити обмеження для підтримки цілісності та коректності даних;
   2. зміни в структурах таблиць, обмежень засобами мови SQL (до 10 різних за суттю запитів для декількох таблиць);
   3. видалення окремих елементів таблиць/обмежень або самих таблиць засобами мови SQL (до 10 різних за суттю команд);
   4. 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-ZА-ЯЇҐЄ][a-zа-яїґє]\*(?:-[A-ZА-ЯЇҐЄ][a-zа-яїґє]\*)?$', 'c')),  
 constraint CHK\_Name check (*regexp\_like*(`Name`, '^[A-ZА-ЯЇҐЄ][a-zа-яґїє]\*(?:-[A-ZА-ЯҐЄЇ][a-zа-яґєї]\*)?$', 'c')),  
 constraint CHK\_Patronymic check (*regexp\_like*(Patronymic, '^[A-ZА-ЯЇҐЄ][a-zа-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';

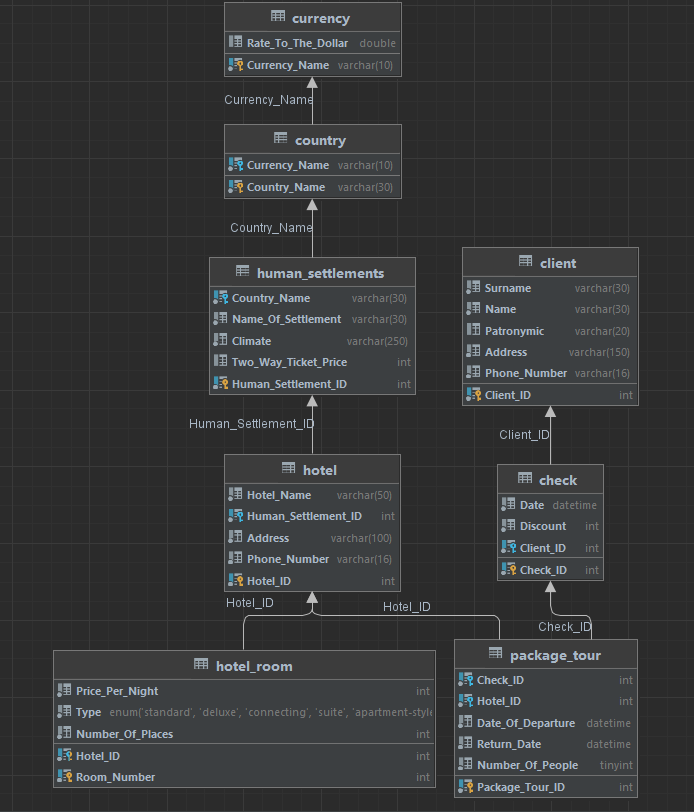
deletion.sql

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



**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