Zaawansowane Bazy Danych

Grupa V, środa godzina 8.30

Projekt uczelni

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1. Schemat bazy danych

a) Założenia

Zaprojektowana baza danych ma pozwalać na zarządzanie wydziałem uczelni, umożliwia powiązanie studenta z grupą dziekańską oraz przedmiotami, na które chodzi oraz na określenie nauczycieli wykładających dany przedmiot i otrzymanych za dane przedmioty ocen.

Interpretacja relacji w bazie:

- teachers – dane wykładowców: id, imię, nazwisko, email, nr telefonu, data zatrudnienia, pensja.
- students – dane studentów: id, imię, nazwisko, nr telefonu, data urodzenia, id grupy.
- subjects – stanowi wykaz wszystkich przedmiotów wraz z informacją o prowadzącym przedmiot.
- buildings– zawiera nazwy budynków, w których znajdują się sale zajęciowe.
- classrooms– zawiera nazwy sal, w których znajdują się zajęcia.
- timetables – łączy studenta ze szczegółami jego zajęć (przedmioty i prowadzący).
- groups – zawiera maksymalną i minimalną możliwą liczbę uczestników grup dziekańskich.
- field_of_study – zawiera nazwy kierunków studiów na wydziale.
- academic_year - łączy oceny końcowe oraz grupę z rokiem akademickim.
- group_types – dane grup dziekańskich: id, nazwa, typ, rok akademicki, kierunek studiów.
- grades – zawiera wystawione oceny (id, nazwa, data wstawienia, przedmiot, student, notatka).
- albums – album studenta; stanowi powiązanie studenta z jego końcowymi ocenami.
- final_grades – zawiera końcowe oceny (id albumu, ocena, przedmiot, rok akademicki).

b) Skrypt tworzący bazę danych

```
if exists(select 1 from master.dbo.sysdatabases where name = 'UNIVERSITY') drop database UNIVERSITY
GO
CREATE DATABASE UNIVERSITY
GO

CREATE TABLE UNIVERSITY..teachers
   ( teacher_id    INT NOT NULL
   , CONSTRAINT     teacher_id_uk UNIQUE (teacher_id)
   , first_name     VARCHAR(20)
   , last_name      VARCHAR(25)
            CONSTRAINT     teacher_last_name_nn  NOT NULL
   , email          VARCHAR(25)
            CONSTRAINT     teacher_email_nn  NOT NULL
   , phone_number   VARCHAR(20)
   , hire_date      DATETIME
   , salary         MONEY
   , CONSTRAINT     teacher_salary_min CHECK (salary > 0)
   , CONSTRAINT     teacher_email_uk UNIQUE (email)
  ,CONSTRAINT PKTeacher_id PRIMARY KEY (teacher_id)
   ) ;

CREATE TABLE UNIVERSITY..students
   ( student_id    INT NOT NULL
          , CONSTRAINT     student_id_uk UNIQUE (student_id)
   , first_name     VARCHAR(20)
   , last_name      VARCHAR(25)
            CONSTRAINT     student_last_name_nn  NOT NULL
   , phone_number   VARCHAR(20)
   , birth_date     DATETIME
            CONSTRAINT     student_birth_date_nn  NOT NULL
          , CONSTRAINT student_id_pk PRIMARY KEY (student_id)
          , group_id    INT
          ) ;

CREATE TABLE UNIVERSITY..subjects
   ( subject_id    INT NOT NULL
          , CONSTRAINT     subject_id_uk UNIQUE (subject_id)
   , subject_name  VARCHAR(30)
          , main_teacher_id      INT
            CONSTRAINT  subject_name_nn  NOT NULL
          , CONSTRAINT PKSubject PRIMARY KEY (subject_id)
          , CONSTRAINT main_teacher_id_fk FOREIGN KEY (main_teacher_id) REFERENCES teachers (teacher_id)
   ) ;

CREATE TABLE UNIVERSITY..buildings
   ( building_id   INT NOT NULL
   , building_name   VARCHAR(20) NOT NULL
          , CONSTRAINT building_id_pk PRIMARY KEY (building_id )

   ) ;
```

```
        CREATE TABLE UNIVERSITY..classrooms
        ( classroom_id    INT NOT NULL
         , classroom_name  VARCHAR(20) NOT NULL
        , building_id   INT NOT NULL
        , CONSTRAINT classroom_id_pk PRIMARY KEY (classroom_id )
        , CONSTRAINT FKClassroomBuildings FOREIGN KEY (building_id ) REFERENCES buildings(building_id )
  ) ;

CREATE TABLE UNIVERSITY..timetables
  ( subject_id    INT NOT NULL
  , student_id  INT NOT NULL
        , teacher_id  INT NOT NULL
        , classroom_id    INT NOT NULL
        ,CONSTRAINT FKStudentTimeTable FOREIGN KEY (student_id) REFERENCES students(student_id)
        ,CONSTRAINT FKSubjectTimeTable FOREIGN KEY (subject_id) REFERENCES subjects(subject_id)
        ,CONSTRAINT FKTeacher FOREIGN KEY (teacher_id) REFERENCES teachers(teacher_id)
        ,CONSTRAINT FKTimeTableClassroom FOREIGN KEY (classroom_id) REFERENCES classrooms(classroom_id)
  ) ;

CREATE TABLE UNIVERSITY..groups
  ( group_id    INT NOT NULL
        , min_nr    INT NOT NULL
        , max_nr    INT NOT NULL
        , CONSTRAINT    group_id_uk UNIQUE (group_id)
  ) ;

ALTER TABLE UNIVERSITY..students ADD CONSTRAINT FKStudentGroup FOREIGN KEY (group_id) REFERENCES groups
(group_id);

CREATE TABLE UNIVERSITY..field_of_study
  ( field_of_study_id    INT NOT NULL
        , field_of_study_name  VARCHAR(30)
        , CONSTRAINT field_of_study_id_pk PRIMARY KEY (field_of_study_id )

  ) ;

CREATE TABLE UNIVERSITY..academic_year
  ( academic_year_id INT
        , academic_year_name   Datetime NOT NULL
        , constraint PKAcademicYear PRIMARY key (academic_year_id)
        ) ;
```

```
CREATE TABLE UNIVERSITY..group_types
  ( group_id    INT NOT NULL
        , group_name  VARCHAR(30)
          CONSTRAINT  group_name_nn  NOT NULL
        , group_type   VARCHAR(30)
        , academic_year INT NOT NULL
        , field_of_study_id INT NOT NULL
        , CONSTRAINT FKGroupTypeGroup FOREIGN KEY (group_id) REFERENCES groups (group_id)
        , CONSTRAINT TYPE_check_ CHECK(group_type IN('FULL TIME','PART TIME'))
        , CONSTRAINT FKGroupTypesAcademicYear foreign key (academic_year) references
academic_year(academic_year_id)
  ) ;

ALTER TABLE UNIVERSITY..group_types ADD CONSTRAINT FKGroupTypesFieldOfStudy FOREIGN KEY
(field_of_study_id ) REFERENCES field_of_study(field_of_study_id );


CREATE TABLE UNIVERSITY..grades (
        grade_id int NOT NULL IDENTITY(1,1),
        grade_name  int NOT NULL,
        grade_date DATETIME,
  subject_id  int NOT NULL,
        student_id  int NOT NULL,
        note VARCHAR(30) NOT NULL,
        constraint PKGrade PRIMARY key (grade_id),
        constraint FKSubjectG foreign key (subject_id) references subjects(subject_id),
        constraint FKStudentG foreign key (student_id) references students(student_id),
        CONSTRAINT grade_check_name CHECK(grade_name IN ('1', '2', '3', '4','5','6'))
);

GO

CREATE TABLE UNIVERSITY..albums
  ( album_id INT
        , student_id   INT
        , constraint PKAlbum PRIMARY key (album_id)
        ,constraint FKAlbumsStudent foreign key (student_id) references students(student_id)
        ) ;

CREATE TABLE UNIVERSITY..final_grades (
        album_id int NOT NULL,
        final_grade  int,
  subject_id  int NOT NULL,
        academic_year int NOT NULL,
        constraint FKFinalGradesSubject foreign key (subject_id) references subjects(subject_id),
        constraint FKFinalGradesAlbums foreign key (album_id) references albums(album_id),
        constraint FKFinalGradesAcademicYear foreign key (academic_year) references
academic_year(academic_year_id)
);
```

c) Skrypt wypełniający bazę danych przykładowymi danymi

```
USE UNIVERSITY;
----------------------------------------------------------------------------------------------
INSERT INTO UNIVERSITY..teachers VALUES ( 100, 'Nancy', 'Greenberg', 'NGREENBE', '515.124.4569', CAST('17-AUG-
1994'AS DATETIME), 1700);
INSERT INTO UNIVERSITY..teachers VALUES ( 110, 'Daniel', 'Faviet', 'DFAVIET', '515.124.4169', CAST('16-AUG-1994'AS
DATETIME), 2300);
INSERT INTO UNIVERSITY..teachers VALUES ( 120, 'John', 'Chen', 'JCHEN', '515.124.4269', CAST('28-SEP-1997'AS
DATETIME), 2100);
INSERT INTO UNIVERSITY..teachers VALUES ( 130, 'Luis', 'Popp', 'LPOPP', '515.124.4567', CAST('07-DEC-1999'AS
DATETIME), 2500);
INSERT INTO UNIVERSITY..teachers VALUES ( 140, 'Anastasia', 'Grey', 'AGREY', '515.124.3213', CAST('17-JAN-1999'AS
DATETIME), 2250);
INSERT INTO UNIVERSITY..teachers VALUES ( 150, 'Katniss', 'Everdeen', 'KEVER', 'NULL', CAST('12-FEB-1989'AS
DATETIME), 2670);
INSERT INTO UNIVERSITY..teachers VALUES ( 160, 'Nikogo', 'Nieucze', 'kasuj', 'NULL', CAST('12-FEB-1999'AS
DATETIME), 2670);
UPDATE teachers SET phone_number ='515.124.3222' WHERE teacher_id =150;

SELECT * FROM teachers;
-------------------------------------------------------------------
INSERT INTO UNIVERSITY..groups VALUES (10,1,250);  --id,min, max
INSERT INTO UNIVERSITY..groups VALUES (11,1,250);
INSERT INTO UNIVERSITY..groups VALUES (12,1,250);
INSERT INTO UNIVERSITY..groups VALUES (13,1,250);
INSERT INTO UNIVERSITY..groups VALUES (14,1,250);
INSERT INTO UNIVERSITY..groups VALUES (15,1,250);
INSERT INTO UNIVERSITY..groups VALUES (16,1,250);
INSERT INTO UNIVERSITY..groups VALUES (17,1,250);
INSERT INTO UNIVERSITY..groups VALUES (18,1,250);

INSERT INTO UNIVERSITY..groups VALUES (20,1,250);
INSERT INTO UNIVERSITY..groups VALUES (30,1,250);
INSERT INTO UNIVERSITY..groups VALUES (40,1,250);
SELECT * FROM groups;
-----------------------------------------------------------------------------------------------
INSERT INTO UNIVERSITY..field_of_study VALUES ( 1,'IT');
INSERT INTO UNIVERSITY..field_of_study VALUES ( 2,'Mathematics');
INSERT INTO UNIVERSITY..field_of_study VALUES ( 3,'Physics');

SELECT * FROM field_of_study;
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INSERT INTO UNIVERSITY..academic_year VALUES (1, '2017/11/10');
SELECT * FROM academic_year;
-----------------------------------------------------------------------------------------------
INSERT INTO UNIVERSITY..group_types VALUES ( 10,'10','FULL TIME',1,1);
INSERT INTO UNIVERSITY..group_types VALUES ( 11,'11','FULL TIME',1,1);
INSERT INTO UNIVERSITY..group_types VALUES ( 12,'12','PART TIME',1,1);

INSERT INTO UNIVERSITY..group_types VALUES ( 13,'13','FULL TIME',1,1);
INSERT INTO UNIVERSITY..group_types VALUES ( 14,'14','FULL TIME',1,1);
INSERT INTO UNIVERSITY..group_types VALUES ( 15,'15','PART TIME',1,1);

INSERT INTO UNIVERSITY..group_types VALUES ( 16,'16','FULL TIME',1,1);
INSERT INTO UNIVERSITY..group_types VALUES ( 17,'17','FULL TIME',1,1);
INSERT INTO UNIVERSITY..group_types VALUES ( 18,'18','PART TIME',1,1);

INSERT INTO UNIVERSITY..group_types VALUES ( 20,'20','FULL TIME',1,2);
INSERT INTO UNIVERSITY..group_types VALUES ( 30,'30','FULL TIME',1,3);
INSERT INTO UNIVERSITY..group_types VALUES ( 40,'40','PART TIME',1,3);

SELECT * FROM group_types;
-----------------------------------------------------------------------------------------------
INSERT INTO UNIVERSITY..students VALUES ( 600, 'Susan', 'Mavris', '516.124.4567', CAST('13-DEC-1996'AS
DATETIME),10);
INSERT INTO UNIVERSITY..students VALUES ( 610, 'Hermann', 'Baer', '516.125.4547', CAST('01-JUL-1996'AS
DATETIME),10);
INSERT INTO UNIVERSITY..students VALUES ( 620, 'Shelley', 'Higgins', '513.124.4190', CAST('07-JUN-1997'AS
DATETIME),10);
INSERT INTO UNIVERSITY..students VALUES ( 630, 'William', 'Gietz', '519.128.4257', CAST('22-OCT-1998'AS
DATETIME),10);
INSERT INTO UNIVERSITY..students VALUES ( 640, 'Lilly', 'Collins', '516.125.1247', CAST('01-SEP-1998'AS
DATETIME),10);

INSERT INTO UNIVERSITY..students VALUES ( 650, 'Nastya', 'Kasnikov', '517.145.6747', CAST('19-SEP-1998'AS
DATETIME),11);
INSERT INTO UNIVERSITY..students VALUES ( 660, 'Rodion', 'Raskolnikov', '512.325.5555', CAST('30-MAR-1999'AS
DATETIME),11);
INSERT INTO UNIVERSITY..students VALUES ( 670, 'Harry', 'Potter', '511.225.6666', CAST('05-APR-1999'AS
DATETIME),11);
INSERT INTO UNIVERSITY..students VALUES ( 680, 'Peter', 'Parker', '516.725.7777', CAST('03-MAY-1999'AS
DATETIME),11);

INSERT INTO UNIVERSITY..students VALUES ( 690, 'Alexander', 'Grayson', '546.325.7757', CAST('09-FEB-1998'AS
DATETIME),12);
INSERT INTO UNIVERSITY..students VALUES ( 700, 'Bronagh', 'Murphy', '546.376.7457', CAST('18-OCT-1997'AS
DATETIME),12);
INSERT INTO UNIVERSITY..students VALUES ( 710, 'Tony', 'Stark', '946.325.7370', CAST('11-OCT-1997'AS
DATETIME),12);
INSERT INTO UNIVERSITY..students VALUES ( 720, 'Neal', 'Caffrey', '846.325.8757', CAST('23-JUN-1998'AS
DATETIME),12);
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INSERT INTO UNIVERSITY..students VALUES ( 730, 'Geralt', 'Zrivii', '511.325.7757', CAST('09-JUN-1998'AS
DATETIME),13);
INSERT INTO UNIVERSITY..students VALUES ( 740, 'Jaskier', 'Bard', '512.325.7757', CAST('01-JUL-1998'AS
DATETIME),13);
INSERT INTO UNIVERSITY..students VALUES ( 750, 'Yennefer', 'Vengerberg', '513.325.7755', CAST('01-DEC-1998'AS
DATETIME),13);
INSERT INTO UNIVERSITY..students VALUES ( 760, 'Tris', 'Merigold', '514.325.7757', CAST('19-MAY-1998'AS
DATETIME),13);
INSERT INTO UNIVERSITY..students VALUES ( 770, 'Cirilla', 'Riannon', '516.325.7757', CAST('15-SEP-1998'AS
DATETIME),13);

INSERT INTO UNIVERSITY..students VALUES ( 780, 'Daenerys', 'Targaryen', '516.325.7157', CAST('11-JUN-1997'AS
DATETIME),14);
INSERT INTO UNIVERSITY..students VALUES ( 790, 'Jon', 'Snow', '516.325.7337', CAST('18-AUG-1997'AS
DATETIME),14);
INSERT INTO UNIVERSITY..students VALUES ( 800, 'Arya', 'Stark', '516.325.7227', CAST('20-FEB-1997'AS
DATETIME),14);
INSERT INTO UNIVERSITY..students VALUES ( 810, 'Tyrion', 'Lannister', '516.325.7057', CAST('22-SEP-1997'AS
DATETIME),14);
INSERT INTO UNIVERSITY..students VALUES ( 820, 'Cersei', 'Lannister', '516.325.7887', CAST('05-MAR-1997'AS
DATETIME),14);
INSERT INTO UNIVERSITY..students VALUES ( 830, 'Sansa', 'Stark', '516.325.0007', CAST('09-APR-1997'AS
DATETIME),14);
INSERT INTO UNIVERSITY..students VALUES ( 840, 'Khal', 'Drogo', '516.325.5557', CAST('26-JUL-1997'AS
DATETIME),14);

INSERT INTO UNIVERSITY..students VALUES ( 850, 'Joffrey', 'Baratheon', '516.005.5557', CAST('26-OCT-1996'AS
DATETIME),15);
INSERT INTO UNIVERSITY..students VALUES ( 860, 'Petyr', 'Baelish', '516.895.5557', CAST('22-JUL-1996'AS
DATETIME),15);
INSERT INTO UNIVERSITY..students VALUES ( 870, 'Sandor', 'Clegane', '516.355.5557', CAST('24-SEP-1998'AS
DATETIME),15);
INSERT INTO UNIVERSITY..students VALUES ( 880, 'Melisandre', 'Red', '516.225.5557', CAST('13-JUL-1994'AS
DATETIME),15);
INSERT INTO UNIVERSITY..students VALUES ( 890, 'Margaery', 'Tyrell', '516.995.5557', CAST('07-AUG-1997'AS
DATETIME),15);

INSERT INTO UNIVERSITY..students VALUES ( 900, 'Theon', 'Greyjoy', '516.325.1157', CAST('21-OCT-1997'AS
DATETIME),16);
INSERT INTO UNIVERSITY..students VALUES ( 910, 'Brienne', 'Tarthu', '516.325.5117', CAST('22-DEC-1997'AS
DATETIME),16);
INSERT INTO UNIVERSITY..students VALUES ( 920, 'Jaime', 'Lannister', '516.325.5511', CAST('25-DEC-1997'AS
DATETIME),16);
INSERT INTO UNIVERSITY..students VALUES ( 930, 'Ygritte', 'Wildone', '516.325.1117', CAST('06-JUL-1997'AS
DATETIME),16);

INSERT INTO UNIVERSITY..students VALUES ( 940, 'Robb', 'Stark', '516.325.1122', CAST('05-MAY-1996'AS
DATETIME),17);
INSERT INTO UNIVERSITY..students VALUES ( 950, 'Daario', 'Naharis', '333.325.1117', CAST('06-AUG-1996'AS
DATETIME),17);
INSERT INTO UNIVERSITY..students VALUES ( 960, 'Oberyn', 'Martell', '446.325.1117', CAST('13-DEC-1997'AS
DATETIME),17);
INSERT INTO UNIVERSITY..students VALUES ( 970, 'Patrick', 'Jane', '555.325.1117', CAST('15-SEP-1998'AS
DATETIME),17);
INSERT INTO UNIVERSITY..students VALUES ( 980, 'Teresa', 'Lisbon', '566.325.1117', CAST('24-JUL-1996'AS
DATETIME),17);
```

```
INSERT INTO UNIVERSITY..students VALUES ( 990, 'Grace', 'Van Pelt', '999.325.1117', CAST('06-JUL-1998'AS
DATETIME),18);
INSERT INTO UNIVERSITY..students VALUES ( 1000, 'Kimball', 'Cho', '589.325.1117', CAST('11-AUG-1998'AS
DATETIME),18);
INSERT INTO UNIVERSITY..students VALUES ( 1010, 'Wayne', 'Rigsby', '578.325.1117', CAST('27-FEB-1998'AS
DATETIME),18);
INSERT INTO UNIVERSITY..students VALUES ( 1020, 'Erica', 'Flynn', '515.325.1117', CAST('30-APR-1998'AS DATETIME),18);

INSERT INTO UNIVERSITY..students VALUES ( 1030, 'Sherlock', 'Holmes', '515.742.1117', CAST('30-APR-1998'AS
DATETIME),20);
INSERT INTO UNIVERSITY..students VALUES ( 1040, 'Oliver', 'Queen', '515.722.1117', CAST('30-APR-1997'AS
DATETIME),20);
INSERT INTO UNIVERSITY..students VALUES ( 1050, 'Felicity', 'Smoak', '515.244.1117', CAST('30-APR-1999'AS
DATETIME),20);
INSERT INTO UNIVERSITY..students VALUES ( 1060, 'Roy', 'Harper', '515.888.1117', CAST('30-APR-1996'AS DATETIME),20);
INSERT INTO UNIVERSITY..students VALUES ( 1070, 'Thea', 'Queen', '515.555.1117', CAST('30-APR-1996'AS DATETIME),20);
INSERT INTO UNIVERSITY..students VALUES ( 1080, 'John', 'Diggle', '515.000.1117', CAST('30-APR-1998'AS DATETIME),20);

INSERT INTO UNIVERSITY..students VALUES ( 1090, 'Sara', 'Lance', '515.355.1117', CAST('30-APR-1997'AS DATETIME),30);
INSERT INTO UNIVERSITY..students VALUES ( 1100, 'Malcolm', 'Merlyn', '515.222.1117', CAST('30-APR-1997'AS
DATETIME),30);
INSERT INTO UNIVERSITY..students VALUES ( 1110, 'Slade', 'Wilson', '525.775.1117', CAST('30-APR-1996'AS
DATETIME),30);
INSERT INTO UNIVERSITY..students VALUES ( 1120, 'Isabel', 'Rochev', '515.835.1117', CAST('30-APR-1996'AS
DATETIME),30);
INSERT INTO UNIVERSITY..students VALUES ( 1130, 'Liv', 'Moore', '522.382.1117', CAST('30-APR-1999'AS DATETIME),30);
INSERT INTO UNIVERSITY..students VALUES ( 1140, 'Blaine', 'DeBeers', '555.245.1117', CAST('30-APR-1999'AS
DATETIME),30);

INSERT INTO UNIVERSITY..students VALUES ( 1150, 'Ed', 'Sheeran', '524.177.7217', CAST('20-MAY-1997'AS DATETIME),40);
INSERT INTO UNIVERSITY..students VALUES ( 1160, 'Selena', 'Gomez', '523.137.7217', CAST('22-JUL-1992'AS
DATETIME),40);

SELECT * FROM students;
-----------------------------------------------------------------------------------------------
INSERT INTO UNIVERSITY..subjects VALUES ( 1, 'SYSOPY',100);
INSERT INTO UNIVERSITY..subjects VALUES ( 2, 'ZSBD',110);
INSERT INTO UNIVERSITY..subjects VALUES ( 3, 'TP',120);
INSERT INTO UNIVERSITY..subjects VALUES ( 4, 'WDI',100);
INSERT INTO UNIVERSITY..subjects VALUES ( 5, 'PROKOMP',130);
INSERT INTO UNIVERSITY..subjects VALUES ( 6, 'POBI',130);
INSERT INTO UNIVERSITY..subjects VALUES ( 7, 'ENGLISH',140);
INSERT INTO UNIVERSITY..subjects VALUES ( 8, 'PE',140);
INSERT INTO UNIVERSITY..subjects VALUES ( 9, 'EMBEDDED',120);
INSERT INTO UNIVERSITY..subjects VALUES ( 10, 'CAD',150);

SELECT * FROM subjects;
```

```
INSERT INTO UNIVERSITY..buildings VALUES ( 1, 'B9');
INSERT INTO UNIVERSITY..buildings VALUES ( 2, 'CTI');
INSERT INTO UNIVERSITY..buildings VALUES ( 3, 'B14');

SELECT * FROM buildings;
-----------------------------------------------------------------------------------------
INSERT INTO UNIVERSITY..classrooms VALUES ( 1, 'F10',1);
INSERT INTO UNIVERSITY..classrooms VALUES ( 2, 'AULA',3);
INSERT INTO UNIVERSITY..classrooms VALUES ( 3, 'F.04',3);
INSERT INTO UNIVERSITY..classrooms VALUES ( 4, '409',2);
SELECT * FROM classrooms;
-----------------------------------------------------------------------------------------

INSERT INTO UNIVERSITY..timetables VALUES ( 1, 600, 100,1);
INSERT INTO UNIVERSITY..timetables VALUES ( 2, 600, 110,1);
INSERT INTO UNIVERSITY..timetables VALUES ( 3, 600, 120,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 4, 600, 130,3);

INSERT INTO UNIVERSITY..timetables VALUES ( 1, 610, 100,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 5, 610, 150,3);
INSERT INTO UNIVERSITY..timetables VALUES ( 6, 610, 140,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 7, 610, 130,1);

INSERT INTO UNIVERSITY..timetables VALUES ( 8, 620, 100,1);
INSERT INTO UNIVERSITY..timetables VALUES ( 10, 620, 110,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 9, 620, 120,3);
INSERT INTO UNIVERSITY..timetables VALUES ( 1, 620, 130,2);

INSERT INTO UNIVERSITY..timetables VALUES ( 1, 630, 100,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 2, 630, 110,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 3, 630, 120,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 4, 630, 130,2);

INSERT INTO UNIVERSITY..timetables VALUES (10, 640, 150,1);
INSERT INTO UNIVERSITY..timetables VALUES ( 9, 640, 140,1);
INSERT INTO UNIVERSITY..timetables VALUES ( 3, 640, 130,1);
INSERT INTO UNIVERSITY..timetables VALUES ( 4, 640, 120,1);

INSERT INTO UNIVERSITY..timetables VALUES ( 8, 650, 110,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 7, 650, 100,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 3, 650, 120,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 4, 650, 130,2);

INSERT INTO UNIVERSITY..timetables VALUES ( 6, 660, 150,3);
INSERT INTO UNIVERSITY..timetables VALUES ( 5, 660, 140,3);
INSERT INTO UNIVERSITY..timetables VALUES ( 3, 660, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 4, 660, 120,1);
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```
INSERT INTO UNIVERSITY..timetables VALUES ( 5, 670, 100,1);
INSERT INTO UNIVERSITY..timetables VALUES ( 2, 670, 110,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 3, 670, 120,3);
INSERT INTO UNIVERSITY..timetables VALUES ( 4, 670, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 1, 680, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 1, 690, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 1, 710, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 1, 720, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 1, 730, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 1, 740, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 1, 750, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 2, 760, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 2, 770, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 2, 780, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 2, 790, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 2, 800, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 3, 860, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 4, 870, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 4, 800, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 6, 880, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 7, 890, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 1, 900, 110,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 5, 910, 120,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 8, 920, 120,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 9, 930, 150,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 10, 940, 140,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 1, 950, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 1, 960, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 1, 970, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 1, 980, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 1, 990, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 1, 1000, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 1, 1010, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 1, 1020, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 1, 1040, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 1, 1050, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 1, 1060, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 1, 1070, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 1, 1080, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 1, 1090, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 1, 1100, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 1, 1110, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 1, 1120, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 1, 1130, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 1, 1140, 130,2);
INSERT INTO UNIVERSITY..timetables VALUES ( 1, 1070, 130,2);


SELECT * FROM timetables;
```

```
INSERT INTO UNIVERSITY..grades VALUES (1,'2017/11/10',1,600,'For Homework'); --grade,date,subject,student
INSERT INTO UNIVERSITY..grades VALUES (3,'2017/12/14',1,600,'Test');
INSERT INTO UNIVERSITY..grades VALUES (2,'2018/02/01',5,610, 'Mid test');
INSERT INTO UNIVERSITY..grades VALUES (3,'2017/12/19',8,620,'Speech');
INSERT INTO UNIVERSITY..grades VALUES (4,'2017/11/10',1,630,'For Homework');
INSERT INTO UNIVERSITY..grades VALUES (5,'2017/12/17',10,640,'For Homework');
INSERT INTO UNIVERSITY..grades VALUES (3,'2018/02/01',4,640, 'Mid test');
INSERT INTO UNIVERSITY..grades VALUES (5,'2017/12/03',4,640, 'For Homework');
INSERT INTO UNIVERSITY..grades VALUES (5,'2018/02/01',3,650, 'Mid test');
INSERT INTO UNIVERSITY..grades VALUES (4,'2018/02/01',3,660, 'Mid test');
INSERT INTO UNIVERSITY..grades VALUES (3,'2018/02/01',3,670, 'Mid test');
INSERT INTO UNIVERSITY..grades VALUES (5,'2018/06/01',5,670, 'For Homework');
INSERT INTO UNIVERSITY..grades VALUES (4,'2018/05/30',3,670, 'Project');

SELECT * FROM grades;
-----------------------------------------------------------------------------------------------
INSERT INTO UNIVERSITY..albums VALUES (1,600);
INSERT INTO UNIVERSITY..albums VALUES (2,610);
INSERT INTO UNIVERSITY..albums VALUES (3,620);
INSERT INTO UNIVERSITY..albums VALUES (4,630);
INSERT INTO UNIVERSITY..albums VALUES (5,640);
INSERT INTO UNIVERSITY..albums VALUES (6,650);
INSERT INTO UNIVERSITY..albums VALUES (7,660);
INSERT INTO UNIVERSITY..albums VALUES (8,670);
INSERT INTO UNIVERSITY..albums VALUES (9,680);
INSERT INTO UNIVERSITY..albums VALUES (10,690);
INSERT INTO UNIVERSITY..albums VALUES (11,700);
INSERT INTO UNIVERSITY..albums VALUES (12,710);
INSERT INTO UNIVERSITY..albums VALUES (13,720);
INSERT INTO UNIVERSITY..albums VALUES (14,730);
INSERT INTO UNIVERSITY..albums VALUES (15,740);
INSERT INTO UNIVERSITY..albums VALUES (16,750);
INSERT INTO UNIVERSITY..albums VALUES (17,760);
INSERT INTO UNIVERSITY..albums VALUES (18,770);
INSERT INTO UNIVERSITY..albums VALUES (19,780);
INSERT INTO UNIVERSITY..albums VALUES (20,790);
INSERT INTO UNIVERSITY..albums VALUES (21,800);
INSERT INTO UNIVERSITY..albums VALUES (22,810);
INSERT INTO UNIVERSITY..albums VALUES (23,820);
INSERT INTO UNIVERSITY..albums VALUES (24,830);
INSERT INTO UNIVERSITY..albums VALUES (25,840);
INSERT INTO UNIVERSITY..albums VALUES (26,850);
INSERT INTO UNIVERSITY..albums VALUES (27,860);
INSERT INTO UNIVERSITY..albums VALUES (28,870);
INSERT INTO UNIVERSITY..albums VALUES (29,880);
INSERT INTO UNIVERSITY..albums VALUES (30,890);
INSERT INTO UNIVERSITY..albums VALUES (31,900);
INSERT INTO UNIVERSITY..albums VALUES (32,910);
INSERT INTO UNIVERSITY..albums VALUES (33,920);
INSERT INTO UNIVERSITY..albums VALUES (34,930);
```

```
INSERT INTO UNIVERSITY..albums VALUES (35,940);
INSERT INTO UNIVERSITY..albums VALUES (36,950);
INSERT INTO UNIVERSITY..albums VALUES (37,960);
INSERT INTO UNIVERSITY..albums VALUES (38,970);
INSERT INTO UNIVERSITY..albums VALUES (39,980);
INSERT INTO UNIVERSITY..albums VALUES (40,990);
INSERT INTO UNIVERSITY..albums VALUES (41,1000);
INSERT INTO UNIVERSITY..albums VALUES (42,1010);
INSERT INTO UNIVERSITY..albums VALUES (43,1020);
INSERT INTO UNIVERSITY..albums VALUES (44,1030);
INSERT INTO UNIVERSITY..albums VALUES (45,1040);
INSERT INTO UNIVERSITY..albums VALUES (46,1050);
INSERT INTO UNIVERSITY..albums VALUES (47,1060);
INSERT INTO UNIVERSITY..albums VALUES (48,1070);
INSERT INTO UNIVERSITY..albums VALUES (49,1080);
INSERT INTO UNIVERSITY..albums VALUES (50,1090);
INSERT INTO UNIVERSITY..albums VALUES (51,1100);
INSERT INTO UNIVERSITY..albums VALUES (52,1110);
INSERT INTO UNIVERSITY..albums VALUES (53,1120);
INSERT INTO UNIVERSITY..albums VALUES (54,1130);
INSERT INTO UNIVERSITY..albums VALUES (55,1140);
INSERT INTO UNIVERSITY..albums VALUES (56,1150);
INSERT INTO UNIVERSITY..albums VALUES (57,1160);

SELECT * FROM albums;
-----------------------------------------------------------------------------------------
INSERT INTO UNIVERSITY..final_grades VALUES (1,5,1,1);
INSERT INTO UNIVERSITY..final_grades VALUES (1,4,3,1);
INSERT INTO UNIVERSITY..final_grades VALUES (1,4,2,1);

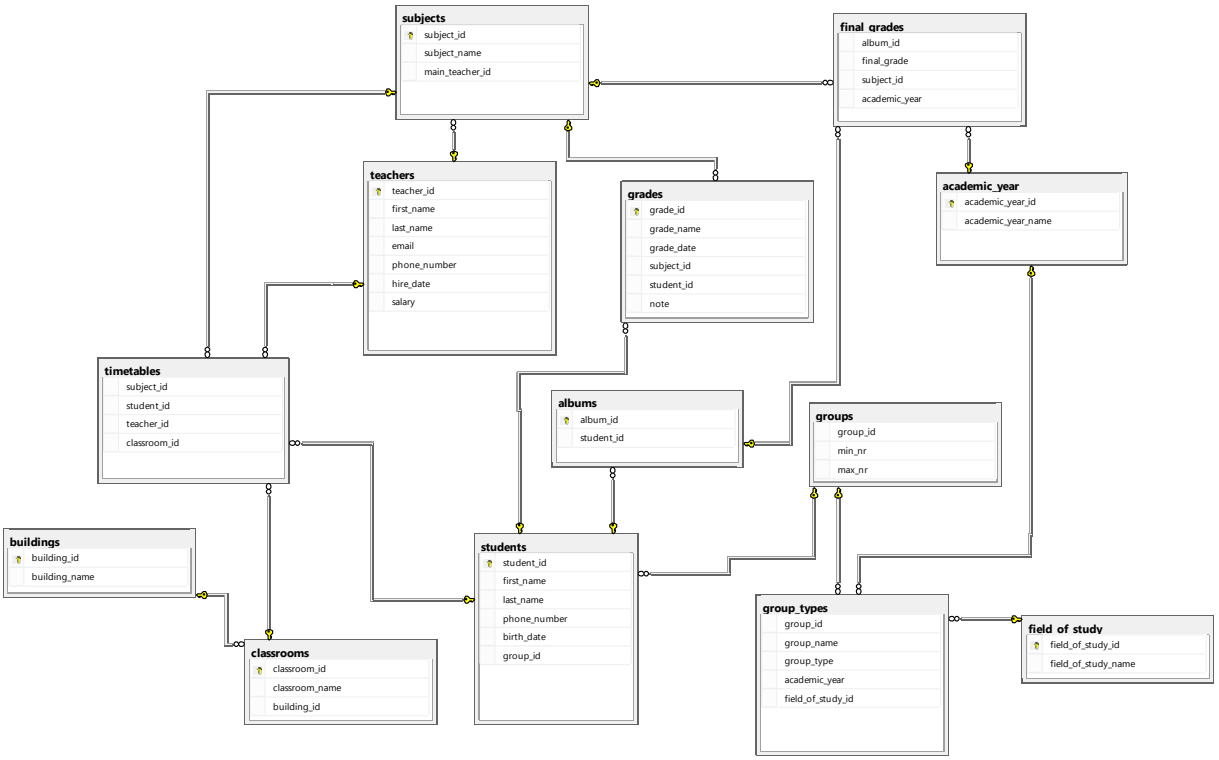
INSERT INTO UNIVERSITY..final_grades VALUES (2,4,1,1);
INSERT INTO UNIVERSITY..final_grades VALUES (2,5,2,1);

INSERT INTO UNIVERSITY..final_grades VALUES (2,4,3,1);

INSERT INTO UNIVERSITY..final_grades VALUES (3,1,1,1);

SELECT * FROM final_grades;
```

d) Schemat bazy danych



2. Zapytania

a) Zapytanie 1. Odnaleźć imię, nazwisko datę urodzenia, numer telefonu, kierunek studiów oraz nazwę grupy tych studentów, którzy studiują zaocznie fizykę.

```
SELECT DISTINCT students.first_name+' '+ students.last_name  AS 'Student',
students.birth_date AS 'Birth Date',
students.phone_number AS 'Phone Number', group_name AS 'Group',
group_type AS 'Type', field_of_study_name AS 'Field of study'
FROM students, groups, group_types,field_of_study
WHERE students.group_id = groups.group_id
AND group_types.group_id = groups.group_id
AND field_of_study.field_of_study_id = group_types.field_of_study_id
AND group_types.group_type = 'PART TIME'
AND field_of_study.field_of_study_name = 'Physics';
```

Wynik zapytania 1.:

	Student	Birth Date	Phone Num...	Group	Type	Field of study
1	Ed Sheeran	1997-05-20 00:00:00.000	524.177.7217	40	PART TIME	Physics
2	Selena Gomez	1992-07-22 00:00:00.000	523.137.7217	40	PART TIME	Physics

b) Zapytanie 2. Odnaleźć imię, nazwisko, przedmioty z prowadzącymi oraz budynki i klasy, w których się odbywają, dla studenta o nazwisku 'Raskolnikov'.

```
SELECT students. first_name+' '+ students.last_name  AS 'Student',
subject_name AS 'Subject',teachers.first_name +' '+ teachers.last_name AS 'Teacher' ,
classroom_name AS 'Classrooms', building_name AS 'Buildings'
FROM students, timetables, subjects,teachers, classrooms, buildings
WHERE students.student_id = timetables.student_id AND timetables.subject_id =
subjects.subject_id
AND teachers.teacher_id = timetables.teacher_id
AND timetables.classroom_id = classrooms.classroom_id
AND buildings.building_id = classrooms.building_id
AND students.last_name = 'Raskolnikov';
```

Wynik zapytania 2.:

	Student	Subject	Teacher	Classroo...	Buildings
1	Rodion Raskolnikov	POBI	Katniss Everdeen	F.04	B14
2	Rodion Raskolnikov	PROKOMP	Anastasia Grey	F.04	B14
3	Rodion Raskolnikov	TP	Luis Popp	AULA	B14
4	Rodion Raskolnikov	WDI	John Chen	F10	B9

c) Zapytanie 3. Odnaleźć imię, nazwisko prowadzących przedmioty, nazwę przedmiotu wraz z liczbą zapisanych na nie studentów. Wynik uporządkować rosnąco po liczbie studentów.

```
SELECT DISTINCT subject_name AS 'Taught Subject' , teachers.first_name +' '+
teachers.last_name AS 'Main Teacher',
count(students.student_id) AS 'Number Of Students'
FROM students, timetables, subjects, teachers
WHERE students.student_id = timetables.student_id AND timetables.subject_id =
subjects.subject_id
AND teachers.teacher_id = subjects.main_teacher_id
GROUP BY subject_name, teachers.first_name,teachers.last_name
ORDER BY 'Number Of Students' ASC;
```

Wynik zapytania 3.:

	Taught Subject	Main Teacher	Number Of Students
1	CAD	Katniss Everdeen	3
2	EMBEDDED	John Chen	3
3	ENGLISH	Anastasia Grey	3
4	PE	Anastasia Grey	3
5	POBI	Luis Popp	3
6	PROKOMP	Luis Popp	4
7	TP	John Chen	7
8	WDI	Nancy Greenberg	8
9	ZSBD	Daniel Faviet	8
10	SYSOPY	Nancy Greenberg	32

d) Zapytanie 4. Odnaleźć imię, nazwisko, przedmioty i notatki do ocen wraz z datą ich wstawienia dla tych studentów, którzy dostali ocenę cząstkową '5'.

```
SELECT students.student_id, students. first_name+' '+ students.last_name  AS 'Student',
grade_name AS 'Grade', subject_name AS 'Subject', note AS 'Note', grade_date AS 'Date'
FROM students, grades, subjects
WHERE students.student_id = grades.student_id
AND subjects.subject_id=grades.subject_id
AND grade_name='5';
```

Wynik zapytania 4.:

	student...	Student	Grade	Subject	Note	Date
1	640	Lilly Collins	5	CAD	For Homework	2017-12-17 00:00:00.000
2	640	Lilly Collins	5	WDI	For Homework	2017-12-03 00:00:00.000
3	650	Nastya Kasnikov	5	TP	Mid test	2018-02-01 00:00:00.000
4	670	Harry Potter	5	PROKOMP	For Homework	2018-06-01 00:00:00.000

e) Zapytanie 5. Wyznaczyć średnią ocen w przedmiocie dla studentów na podstawie ich ocen cząstkowych.

```
SELECT students. first_name+' '+ students.last_name  AS 'Student',
 ROUND(AVG(CAST(grades.grade_name AS FLOAT)), 2)  AS 'Average Grade', subject_name AS
'Subject'
FROM students, grades, subjects
WHERE students.student_id = grades.student_id
AND subjects.subject_id=grades.subject_id
GROUP BY subject_name, students. first_name, students.last_name, students.student_id
ORDER BY students.last_name , students.student_id , subject_name;
```

Wynik zapytania 5.:

	Student	Average Grade	Subject
1	Hermann Baer	2	PROKOMP
2	Lilly Collins	5	CAD
3	Lilly Collins	4	WDI
4	William Gietz	4	SYSOPY
5	Shelley Higgins	3	PE
6	Nastya Kasnikov	5	TP
7	Susan Mavris	2	SYSOPY
8	Harry Potter	5	PROKOMP
9	Harry Potter	3,5	TP
10	Rodion Raskolnikov	4	TP

f) Zapytanie 6. Odnaleźć imię i nazwisko studenta z najwyższą średnią ocen na roku na podstawie ocen końcowych.

```
SELECT TOP 1 students.student_id AS 'Id', students. first_name+' '+ students.last_name  AS
'Student',
 ROUND(AVG(CAST(final_grades.final_grade AS FLOAT)), 2)  AS 'Student Average'
FROM students, albums,final_grades
WHERE students.student_id = albums.student_id AND  albums.album_id
=final_grades.album_id
GROUP BY students. first_name, students.last_name, students.student_id
ORDER BY avg(final_grades.final_grade) DESC;
```

Wynik zapytania 6:

	Id	Student	Student Average
1	680	Peter Parker	5

g) Zapytanie 7. Wyznaczyć średnią ocen dla przedmiotu na podstawie ocen końcowych. Wynik posortować malejąco.

```
SELECT subject_name AS 'Subject', ROUND(AVG(CAST(final_grades.final_grade AS FLOAT)), 2)
AS 'Subject Average Grade'
FROM students, albums,final_grades, subjects
WHERE students.student_id = albums.student_id  AND  albums.album_id
=final_grades.album_id
AND subjects.subject_id=final_grades.subject_id
GROUP BY subject_name
ORDER BY 'Subject Average Grade' DESC;
```

Wynik zapytania 7:

	Subject	Subject Average Grade
1	SYSOPY	4,67
2	ZSBD	4,5
3	TP	4

h) Zapytanie 8. Wyznaczyć średnią ocen dla każdej z grup w przedmiocie 'Sysopy' na podstawie ocen końcowych. Wynik posortować malejąco.

```
SELECT subject_name AS 'Subject',groups.group_id AS 'Group',
ROUND(AVG(CAST(final_grades.final_grade AS FLOAT)), 2) AS 'Subject Average Grade'
FROM students, albums,final_grades, subjects, groups
WHERE students.student_id = albums.student_id  AND  albums.album_id
=final_grades.album_id
AND subjects.subject_id=final_grades.subject_id AND students.group_id = groups.group_id
AND subject_name = 'Sysopy'
GROUP BY groups.group_id, subject_name
ORDER BY 'Subject Average Grade' DESC;
```

Wynik zapytania 8:

	Subject	Group	Subject Average Grade
1	SYSOPY	11	5
2	SYSOPY	10	4,5

i) Zapytanie 9. Wyznaczyć liczbę studentów w każdej z grup dziekańskich.

```
SELECT group_name AS 'Group', count(student_id) AS 'Number of students'
FROM students, groups , group_types
WHERE students.group_id = groups.group_id
AND group_types.group_id = groups.group_id
GROUP BY  group_types. group_name, groups.group_id
ORDER BY groups.group_id ;
```

Wynik zapytania 9:

	Group	Number of students
1	10	5
2	11	4
3	12	4
4	13	5
5	14	7
6	15	5
7	16	4
8	17	5
9	18	4
10	20	6
11	30	6
12	40	2

j) Zapytanie 10. Odnaleźć imię i nazwisko, nr telefonu, email, datę zatrudnienia i pensję wykładowców zatrudnionych po '1995/01/01'.

```
SELECT first_name +' '+ last_name AS 'Teacher' , phone_number AS 'Phone Number' ,
email AS 'Email', hire_date AS 'Hire Date' , salary AS 'Salary'
FROM teachers
WHERE hire_date > '1995/01/01'
ORDER BY first_name, last_name;
```

Wynik zapytania 10:

	Teacher	Phone Number	Email	Hire Date	Salary
1	Anastasia Grey	515.124.3213	AGREY	1999-01-17 00:00:00.000	2250,00
2	John Chen	515.124.4269	JCHEN	1997-09-28 00:00:00.000	2100,00
3	Luis Popp	515.124.4567	LPOPP	1999-12-07 00:00:00.000	2500,00

k) Zapytanie 11. Odnaleźć najwcześniej zatrudnionego wykładowcę.

```
SELECT first_name +' '+ last_name AS 'First Hired Teacher' , hire_date AS 'Hire Date'
FROM teachers
WHERE hire_date= (SELECT min (hire_date)FROM teachers );
```

Wynik zapytania 11:

	First Hired Teacher	Hire Date
1	Katniss Everdeen	1989-02-12 00:00:00.000

l) Zapytanie 12. Odnaleźć najpóźniej zatrudnionego wykładowcę.

```
SELECT first_name +' '+ last_name AS 'Last Hired Teacher' , hire_date AS 'Hire Date'

FROM teachers

WHERE hire_date= (SELECT max(hire_date)FROM teachers );
```

Wynik zapytania 12:

	Last Hired Teacher	Hire Date
1	Luis Popp	1999-12-07 00:00:00.000

m) Zapytanie 13. Odnaleźć studentów niezapisanych na żaden przedmiot.

```
SELECT DISTINCT students.student_id AS 'Student id', students.first_name+' '+ students.last_name  AS
'Student'
FROM students
EXCEPT
        (
                SELECT DISTINCT students.student_id,students.first_name+' '+ students.last_name  AS
'Student'
                FROM students, timetables
                WHERE students.student_id = timetables.student_id
        )
```

Wynik zapytania 13:

	Student id	Student
1	700	Bronagh Murphy
2	810	Tyrion Lannister
3	820	Cersei Lannister
4	830	Sansa Stark
5	840	Khal Drogo
6	850	Joffrey Baratheon
7	1030	Sherlock Holmes
8	1150	Ed Sheeran
9	1160	Selena Gomez

n) Zapytanie 14. Odnaleźć oceny końcowe studenta o nazwisku 'Baer'.

```
SELECT  students. first_name+' '+ students.last_name  AS 'Student',subject_name AS
'Subject',
final_grades.final_grade AS 'Final Grade'
FROM students, albums,final_grades, subjects
WHERE students.student_id = albums.student_id  AND  albums.album_id
=final_grades.album_id
AND subjects.subject_id=final_grades.subject_id
AND students.last_name = 'Baer'
GROUP BY subject_name,students. first_name,students.last_name , final_grades.final_grade
ORDER BY 'Final Grade' DESC;
```

Wynik zapytania 14:

	Student	Subject	Final Grade
1	Hermann Baer	ZSBD	5
2	Hermann Baer	SYSOPY	4
3	Hermann Baer	TP	4

o) Zapytanie 15. Odnaleźć imię, nazwisko prowadzących przedmioty wraz z liczbą prowadzonych przez nich przedmiotów.

```
SELECT  teachers.first_name +' '+ teachers.last_name AS 'Teacher',
count(DISTINCT timetables.subject_id) AS 'Number Of Subjects'
FROM timetables, subjects, teachers
WHERE teachers.teacher_id = timetables.teacher_id AND timetables.subject_id =
subjects.subject_id
GROUP BY  teachers.first_name,teachers.last_name
ORDER BY 'Number Of Subjects' ASC;
```

Wynik zapytania 15:

	Teacher	Number Of Subjects
1	Katniss Everdeen	4
2	Daniel Faviet	4
3	Nancy Greenberg	4
4	Anastasia Grey	4
5	John Chen	5
6	Luis Popp	6

p) Zapytanie 16. Odnaleźć wykładowców, którzy nie uczą żadnych przedmiotów.

```
SELECT DISTINCT teachers.teacher_id AS 'Teachers id', teachers.first_name+' '+ teachers.last_name   AS
'Teachers'
FROM teachers
EXCEPT
        (
                SELECT DISTINCT teachers.teacher_id,teachers.first_name+' '+ teachers.last_name
                FROM teachers, timetables
                WHERE teachers.teacher_id = timetables.teacher_id
        )
```

Wynik zapytania 16:

	Teachers id	Teachers
1	160	Nikogo Nieucze

r) Zapytanie 17. Wypisać z użyciem kursora nazwiska wszystkich studentów z grupy '20' oraz podać liczbę urodzonych przed rokiem

```
DECLARE @imię varchar(40), @nazwisko varchar(40), @student_id int, @group_id int, @num int, @licz int , @birth_date
datetime;
set @num=20
set @licz=0
DECLARE kursor_studenci_w_grupie CURSOR FOR
SELECT first_name, last_name, student_id, group_id, birth_date FROM students;
OPEN kursor_studenci_w_grupie
    FETCH NEXT FROM kursor_studenci_w_grupie
    INTO @imię, @nazwisko ,@student_id,@group_id,@birth_date

    WHILE @@FETCH_STATUS = 0
    BEGIN
        IF (@group_id = @num)
                        BEGIN
        PRINT 'Id: ' + CAST(@student_id AS VARCHAR) + ' Imię: ' + CAST(@imię AS VARCHAR) + '  Nazwisko: ' + @nazwisko
                                + '  Urodziny: ' + CAST(@birth_date AS VARCHAR)
                            IF (@birth_date < '1997/01/01')
                            BEGIN
                            set @licz = @licz + 1
                            END
                        END
        FETCH NEXT FROM kursor_studenci_w_grupie
        INTO @imię, @nazwisko ,@student_id,@group_id,@birth_date
                        END
                        PRINT 'Liczba osob w grupie urodzonych przed 1997: ' + CAST(@licz AS VARCHAR)

CLOSE kursor_studenci_w_grupie;
DEALLOCATE kursor_studenci_w_grupie;
```

Wynik zapytania 17:

```
Id: 1030  Imię: Sherlock   Nazwisko: Holmes   Urodziny: Apr 30 1998 12:00AM
Id: 1040  Imię: Oliver   Nazwisko: Queen   Urodziny: Apr 30 1997 12:00AM
Id: 1050  Imię: Felicity   Nazwisko: Smoak   Urodziny: Apr 30 1999 12:00AM
Id: 1060  Imię: Roy   Nazwisko: Harper   Urodziny: Apr 30 1996 12:00AM
Id: 1070  Imię: Thea   Nazwisko: Queen   Urodziny: Apr 30 1996 12:00AM
Id: 1080  Imię: John   Nazwisko: Diggle   Urodziny: Apr 30 1998 12:00AM
Liczba osob urodzonych przed 1997: 2
```

3. Funkcje

a) Funkcja podająca dla każdej grupy, ile procent wszystkich studentów znajduje się w tej grupie.

```
USE UNIVERSITY;
IF OBJECT_ID ('group_perc') IS NOT NULL
drop function group_perc;
go
create function group_perc (@group_id varchar(15)) returns float
as
begin
       declare @percentage float
       declare @in_group float
       declare @all float
       select @all = count(*) from students
       select @in_group = count (*) from students as s
                                          where group_id in (select g.group_id from
groups as g
                                                                                    where
g.group_id = @group_id)

set @percentage = 100 * @in_group / @all
return @percentage
end
go
```

Przykładowe wywołanie nr 1:

```
select distinct gt.group_name AS 'Group',cast(round(dbo.group_perc(g.group_id), 1) as
varchar)

+ '%' as 'Percentage' from groups g, group_types gt where g.group_id = gt.group_id AND
g.group_id =10 group by gt.group_name, g.group_id;
```

Wynik wywołania:

	Group	Percentage
1	10	8.6%

Przykładowe wywołanie nr 2:

```
select distinct gt.group_name AS 'Group',cast(round(dbo.group_perc(g.group_id), 1)
as varchar)

+ '%' as 'Percentage' from groups g, group_types gt where g.group_id = gt.group_id
```

Wynik wywołania:

	Group	Percentage
1	10	8.6%
2	11	6.9%
3	12	6.9%
4	13	10.3%
5	14	12.1%
6	15	8.6%
7	16	6.9%
8	17	8.6%
9	18	6.9%
10	20	10.3%
11	30	10.3%
12	40	3.4%

4. Procedury

a) Procedura ADD_STUDENT przypisuje losowo wybrany numer przy dodawaniu nowego studenta.

```
if exists(select 1 from sys.objects where TYPE='P' and name = 'ADD_STUDENT')
drop procedure ADD_STUDENT;
go
create procedure ADD_STUDENT
	@first_name varchar(25),
		@last_name varchar(25),
		@phone_number varchar(15),
		@birth_date DATETIME,
		@group_id int
as
begin
	declare @student_id varchar(4) = 1;
		declare @numer int, @flaga int = 1;
		while(@flaga = 1)
		begin
			SELECT @numer = (600+ CONVERT(INT, (700 - 600 +1) * RAND()))
			set @flaga = 0

			DECLARE kursor CURSOR FOR
			SELECT @student_id FROM students
			OPEN kursor
			FETCH NEXT FROM kursor INTO @student_id
			WHILE @@FETCH_STATUS = 0
			  BEGIN
				if(cast(@numer as varchar) = @student_id)
				begin
					set @flaga = 1;
					break;
				end
				FETCH NEXT FROM kursor INTO @student_id
			  END
			CLOSE kursor
			DEALLOCATE kursor

			if(@flaga = 0)
				set @student_id = cast(@numer as varchar);
		end

	insert into students values(@student_id, @first_name, @last_name, @phone_number,
@birth_date, @group_id);
end
```

Przykładowe wywołanie:

```
begin
        exec UNIVERSITY..ADD_STUDENT 'John', 'Green', '0-22-111-7532', '03-FEB-1998', '13'
end
```

Losowo dobrane student_id dla wprowadzonego studenta:

	student_id	first_name	last_name	phone_number	birth_date	group_id
1	696	John	Green	0-22-111-7532	1998-02-03 00:00:00.000	13

b) Procedura MODIFY_SALARY wprowadza podwyżkę pensji o dany procent wykładowcy o podanym id.

```
if exists(select 1 from sys.objects where TYPE='P' and name = 'MODIFY_SALARY')
drop procedure MODIFY_SALARY
go
create procedure MODIFY_SALARY
      @teacher_id  int = 100,
                  @percentage int = 10
as
begin
          if(@teacher_id IN (select teacher_id  from teachers))
          begin
                    update teachers
           set salary += salary *(@percentage)/100
                                    where teacher_id = @teacher_id
                                    print ( 'Wprowadzono podwyzke o ' + cast(@percentage as
                                    varchar) + ' procent' + ' dla wykładowcy' + cast(@teacher_id as
                                    varchar))
          end
          else
          print('Nieprawidlowe id nauczyciela')

end
go
```

Przykładowe wywołania:

```
begin
        exec UNIVERSITY..MODIFY_SALARY
        exec UNIVERSITY..MODIFY_SALARY 150, 50
end
```

Wynik wywołania:

```
(1 row(s) affected)
Wprowadzono podwyzke o 10 procent dla wykładowcy 100

(1 row(s) affected)
Wprowadzono podwyzke o 50 procent dla wykładowcy 150
```

c) Procedura DELETE_TEACHER usuwa wykładowców, którzy nie uczą żadnych przedmiotów. Niemożliwe jest usunięcie wykładowcy, który uczy jakiegoś przedmiotu.

```
if exists(select 1 from sys.objects where TYPE='P' and name = 'DELETE_TEACHER')
drop procedure DELETE_TEACHER;
go
create procedure DELETE_TEACHER
@teacher_id int = 530
as
begin
                if(@teacher_id IN (select teacher_id from teachers)
                AND @teacher_id NOT IN
                                (
                                        SELECT DISTINCT teachers.teacher_id
                                         FROM timetables, teachers
                                        WHERE teachers.teacher_id = timetables.teacher_id )
                                )
                begin
                delete from teachers where teacher_id = @teacher_id
                print('Teacher '+ cast(@teacher_id as varchar) +' was deleted')
                end
                else print('Teacher '+ cast(@teacher_id as varchar) +' cannot be deleted')
end
```

Przykładowe wywołania:

```
begin
        exec UNIVERSITY..DELETE_TEACHER 160
        exec UNIVERSITY..DELETE_TEACHER 150
end
```

Wynik wywołania:

```
(1 row(s) affected)
Teacher 160 was deleted
Teacher 150 cannot be deleted
```

d) Procedura ADD_ TEACHER przypisuje losowo wybrany numer przy dodawaniu nowego wykładowcy.

```
if exists(select 1 from sys.objects where TYPE='P' and name = 'ADD_TEACHER')
drop procedure ADD_TEACHER
go
create procedure ADD_TEACHER
      @first_name varchar(25), @last_name varchar(25),@email  varchar(25),@phone_number varchar(15),
     @hire_date DATETIME, @salary money
as
begin
          declare @teacher_id int = 1;
                    declare @numer int, @flaga int = 1;
                    while(@flaga = 1)
                    begin
                              SELECT @numer = (100+ CONVERT(INT, (200 - 100 +1) * RAND()))
                              set @flaga = 0
                              DECLARE kursor CURSOR FOR
                              SELECT teacher_id FROM teachers
                              OPEN kursor
                              FETCH NEXT FROM kursor INTO @teacher_id
                              WHILE @@FETCH_STATUS = 0
                                BEGIN
                                        if(cast(@numer as varchar) = @teacher_id)
                                        begin
                                                  set @flaga = 1;
                                                  break;
                                        end
                                        FETCH NEXT FROM kursor INTO @teacher_id
                                END
                              CLOSE kursor
                              DEALLOCATE kursor
                              if(@flaga = 0)
                                        set @teacher_id = cast(@numer as varchar)
                    end

insert into teachers values(@teacher_id, @first_name, @last_name, @email, @phone_number, @hire_date, @salary);
end
```

Przykładowe wywołania:

```
begin
        exec UNIVERSITY..ADD_TEACHER 'Tomasz', 'Makowski', 'TMAK', '0-98-457 7532', '22-FEB-2018', '2000'
end
```

Losowo dobrane teacher_id dla wprowadzonego wykładowcy:

	teacher_id	first_name	last_name	email	phone_number	hire_date	salary
1	183	Tomasz	Makowski	TMAK	0-98-457 7532	2018-02-22 00:00:00.000	2000,00

5. Wyzwalacze

a) Wyzwalacz GRADE_ADD_CHECK uniemożliwia wprowadzenie oceny cząstkowej z przedmiotu, na który dany student nie chodzi.

```
IF OBJECT_ID ('GRADE_ADD_CHECK' , 'TR') IS NOT NULL
  DROP trigger GRADE_ADD_CHECK ;
go
create trigger GRADE_ADD_CHECK
 on grades instead of insert
as
begin
        declare @student_id int = (select student_id from inserted);
        declare @subject_id int = (select subject_id from inserted);
        declare @sub_id int = (SELECT  t.subject_id FROM students s, timetables t
                                                WHERE s.student_id = t.student_id AND @student_id =
t.student_id AND @subject_id = t.subject_id)
        declare @note VARCHAR(30) = (select note from inserted),
                        @grade int = (select grade_name from inserted),
                @date datetime = (select grade_date from inserted),
                        @name VARCHAR(45) = (select first_name + ' ' + last_name from students where
student_id = @student_id),
                        @subject_name VARCHAR(30) = (select subject_name from subjects where subject_id
= @subject_id)

        if(@subject_id = @sub_id)
                begin
                INSERT INTO UNIVERSITY..grades VALUES (@grade,@date,@subject_id,@student_id,@note)
                print 'Zapisano ' + 'Student ' + @name + ' na przedmiot: ' + @subject_name + '.';
                end
                else
                print 'Student ' + @name + ' nie jest zapisany na przedmiot: ' + @subject_name + '.'
end
```

Próba wprowadzenia ocen dla 2 studentów niezapisanych na dany przedmiot i 1 zapisanego:

```
INSERT INTO UNIVERSITY..grades VALUES (2,'2018/02/01',1,640,'Test'); -- nie jest zapisany
 INSERT INTO UNIVERSITY..grades VALUES (5,'2018/02/01',1,660,'Test'); -- nie jest zapisany
 INSERT INTO UNIVERSITY..grades VALUES (5,'2018/02/01',3,640,'Project');  -- jest zapisany
```

Komunikat:

```
Student Lilly Collins nie jest zapisany na przedmiot: SYSOPY.

(1 row(s) affected)
Student Rodion Raskolnikov nie jest zapisany na przedmiot: SYSOPY.

(1 row(s) affected)

(1 row(s) affected)
Zapisano Student Lilly Collins na przedmiot: TP.

(1 row(s) affected)
```

b) Wyzwalacz TEACHER_HIRE_DATE, który po wstawieniu wykładowcy bez daty zatrudnienia, wstawia aktualną.

```
-- IF OBJECT_ID (TEACHER_HIRE_DATE , 'TR') IS NOT NULL
-- DROP trigger TEACHER_HIRE_DATE ;
go
create trigger TEACHER_HIRE_DATE
on teachers
after insert
as
declare @teacher_id int
set @teacher_id = (select teacher_id from inserted)
if (select teachers.hire_date from teachers where teachers.teacher_id =
@teacher_id) is null
begin
update teachers
set hire_date = GETDATE()
where teachers.teacher_id = @teacher_id
end
```

Wstawienie wykładowcy bez pola "hire_date":

```
INSERT INTO UNIVERSITY..teachers VALUES ( 200, 'Niemam', 'Daty', '','515.124.4567', NULL, 2670);
```

Zaktualizowana informacja w polu hire_date:

	teacher_id	first_name	last_na...	email	phone_number	hire_date	salary
1	200	Niemam	Daty		515.124.4567	2018-06-01 20:26:21.820	2670,00

c) Wyzwalacz ENTER_FINAL_GRADES, który po dodaniu do tabeli academic_year nowego roku akademickiego wprowadza 'final grade' jako zaokrągloną średnią ocen cząstkowych.

```
IF OBJECT_ID ('ENTER_FINAL_GRADES' , 'TR') IS NOT NULL
 DROP trigger ENTER_FINAL_GRADES ;
go
CREATE TRIGGER ENTER_FINAL_GRADES
ON academic_year
INSTEAD OF INSERT
AS
BEGIN --start kursor_studenci
	DECLARE  @student_id int
	DECLARE kursor_studenci CURSOR FOR
	SELECT student_id FROM students;
	OPEN kursor_studenci
		FETCH NEXT FROM kursor_studenci
		INTO @student_id
		WHILE @@FETCH_STATUS = 0
		BEGIN --start kursor_przedmioty
			DECLARE @subject_id int
			DECLARE kursor_przedmioty CURSOR FOR
			SELECT subject_id FROM subjects;
			OPEN kursor_przedmioty
				FETCH NEXT FROM kursor_przedmioty
				INTO @subject_id
				WHILE @@FETCH_STATUS = 0
				BEGIN
					IF EXISTS (SELECT student_id FROM grades WHERE @student_id = student_id AND
							@subject_id = subject_id)
					BEGIN
						DECLARE @final_grade int,
						@album_id int = (SELECT album_id FROM albums WHERE student_id =
						@student_id),
						@academic_year int = (SELECT TOP 1 academic_year_id FROM academic_year
						ORDER BY academic_year_id DESC);

						SELECT @final_grade = ROUND(AVG(grade_name),0) FROM grades
							WHERE @student_id = student_id AND @subject_id = subject_id

						INSERT INTO final_grades VALUES (@album_id, @final_grade,
						@subject_id,@academic_year);
					END

					FETCH NEXT FROM kursor_przedmioty
					INTO @subject_id
				END
			CLOSE kursor_przedmioty;
```

```
                    DEALLOCATE kursor_przedmioty; --koniec kursor_przedmioty

                    FETCH NEXT FROM kursor_studenci
                    INTO @student_id
                END
        CLOSE kursor_studenci;
        DEALLOCATE kursor_studenci; --koniec kursor_studenci

        DECLARE @academic_year_id INT = (SELECT academic_year_id FROM inserted),
                    @academic_year_name DATETIME = (SELECT academic_year_name FROM inserted);
        INSERT INTO academic_year VALUES(@academic_year_id, @academic_year_name);
END
go
        INSERT INTO academic_year VALUES(2, '2018/10/15');
        SELECT* from final_grades
```

Tabela z ocenami końcowym 'final_grade' przed dodaniem do tabeli academic_year nowego roku akademickiego.

	album_id	final_grade	subject_id	academic_year
1	1	5	1	1
2	1	4	3	1
3	1	4	2	1
4	2	4	1	1
5	2	5	2	1
6	2	4	3	1
7	3	1	1	1

Tabela z ocenami końcowym 'final_grade' przed dodaniem do tabeli academic_year nowego roku akademickiego.

	album_id	final_grade	subject_id	academic_year
1	1	5	1	1
2	1	4	3	1
3	1	4	2	1
4	2	4	1	1
5	2	5	2	1
6	2	4	3	1
7	3	1	1	1
8	1	2	1	1
9	2	2	5	1
10	3	3	8	1
11	4	4	1	1
12	5	4	4	1
13	5	5	10	1
14	6	5	3	1
15	7	4	3	1
16	8	3	3	1
17	8	5	5	1

d) Wyzwalacz DELETE_STUDENT, który przy próbie usunięcia studenta w pierwszej kolejności wypisuje go ze wszystkich przedmiotów, na które jest zapisany, a następnie trwale usuwa go z listy studentów.

```
SELECT* from students WHERE student_id = 600
IF OBJECT_ID ('DELETE_STUDENT' , 'TR') IS NOT NULL
 DROP trigger DELETE_STUDENT ;
go
CREATE TRIGGER DELETE_STUDENT
ON students
INSTEAD OF DELETE
AS
BEGIN

	DECLARE @student_id int = (SELECT student_id FROM deleted),
			@ilosc int,
			@first_name VARCHAR(20) = (SELECT first_name FROM deleted),
			@last_name VARCHAR(25) = (SELECT last_name FROM deleted)

	SET @ilosc = (SELECT count(subject_id)
	FROM timetables		WHERE student_id = @student_id)

	DELETE FROM timetables
	WHERE student_id = @student_id

	DELETE FROM final_grades
	WHERE album_id = (SELECT album_id FROM albums WHERE student_id = @student_id)

	DELETE FROM grades
	WHERE student_id = @student_id

	DELETE FROM albums
	WHERE student_id = @student_id

	DELETE FROM students
	WHERE student_id = @student_id

	print 'Studenta ' + @first_name + ' ' + @last_name + ' wypisano z ' + cast(@ilosc as VARCHAR) + ' przedmiotów, a
nastepnie usunięto z listy studentów.'

END
go
	DELETE FROM students
	WHERE student_id = 600;

	SELECT* from students WHERE student_id = 600
```

Wynik zapytania o dane studenta przed jego usunięciem.

	student_id	first_name	last_name	phone_number	birth_date	group_id
1	600	Susan	Mavris	516.124.4567	1996-12-13 00:00:00.000	10

Wynik zapytania o dane studenta po jego usunięciu.

	student...	first_na...	last_na...	phone_num...	birth_d...	group...

e) Wyzwalacz UPDATE_GRADE, który po każdej modyfikacji w tabeli "grades" wprowadza aktualną datą modyfikacji do pola "grade_date".

```
SELECT* from grades WHERE grade_id = 5

IF OBJECT_ID ('UPDATE_GRADE' , 'TR') IS NOT NULL
 DROP trigger UPDATE_GRADE ;
go
CREATE TRIGGER UPDATE_GRADE
ON grades
AFTER UPDATE
AS
BEGIN
	DECLARE @grade_id int = (SELECT grade_id FROM inserted)

	UPDATE grades
	SET grade_date = GETDATE()
	WHERE @grade_id = grade_id;
END
go
	UPDATE grades
	SET grade_name = 1
	WHERE grade_id = 5;

	SELECT* from grades WHERE grade_id = 5
```

Tabela 'grades' przed modyfikacją.

	grade_id	grade_name	grade_date	subject_id	student_id	note
1	5	4	2017-11-10 00:00:00.000	1	630	For Homework

Tabela 'grades' po modyfikacji, z zaktualizowaną datą modyfikacji.

	grade_id	grade_name	grade_date	subject_id	student...	note
1	5	1	2018-06-05 20:39:43.450	1	630	For Homework