Podstawy Baz Danych laboratoria - sprawozdanie z projektu

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Opis funkcjonalności bazy

Baza danych obsługuje firmę organizującą konferencje.

Klientami mogą być zarówno indywidualne osoby jak i firmy. Osoby mogą zapisać się na poszczególne dni konferencji, opłata jest jednak za całość.

W ramach konferencji organizowane są warsztaty. Osoba może zapisać się na warsztat trwający podczas konferencji na którą jest zapisany, ale nie może na dwa warsztaty które pokrywają się czasowo.

Wysokość opłaty jest zmienna w zależności od terminu płatności. Istnieje procedura służąca do usuwania rezerwacji nieopłaconych do tygodnia przed rozpoczęciem konferencji, jednak MSSQL w wersji Express oraz tej udostępnionej przez AGH nie umożliwia zaplanowanego uruchamiania jej w określonym czasie. Studenci mają możliwość otrzymania zniżki.

Firma ma dostęp do raportów pokazujących listę stałych klientów, oraz uczestników konferencji i warsztatów w poszczególny dzień.

Stworzony jest również generator danych symulujący 3-letnią działalność firmy.

Użytkownicy i role

- ### customerservice

  Osoba obsługująca klientów indywidualnych i korporacyjnych. Zajmuje się zapisywaniem uczestników na konferencje i warsztaty, oraz obsługuje płatności.

  ```
  CREATE ROLE [customerservice]
  GRANT SELECT ON GetAttendantsAtConferenceDay TO customerservice
  GRANT SELECT ON GetAttendantsAtWorkshopsOnConferenceDay TO customerservice
  GRANT SELECT ON GetConferenceStart TO customerservice
  GRANT SELECT ON GetIndividualClientOrThrow TO customerservice
  GRANT SELECT ON GetConferenceWithPriceAccordingToDate TO customerservice
  GRANT SELECT ON LoyalClientsView TO customerservice
  GRANT EXECUTE ON AddAddress TO customerservice
  GRANT EXECUTE ON AddClient TO customerservice
  GRANT EXECUTE ON AddCorporateClient TO customerservice
  GRANT EXECUTE ON AddStudent TO customerservice
  ```

```
GRANT EXECUTE ON AssignEmployerToEmployee TO customerservice
GRANT EXECUTE ON MakeReservation TO customerservice
GRANT EXECUTE ON MakeReservationCorporation TO customerservice
GRANT EXECUTE ON PayForReservationWithADate TO customerservice
GRANT EXECUTE ON DeleteUnpaidReservations TO customerservice
GRANT EXECUTE ON ReserveAPlaceForAWorkshop TO customerservice
```

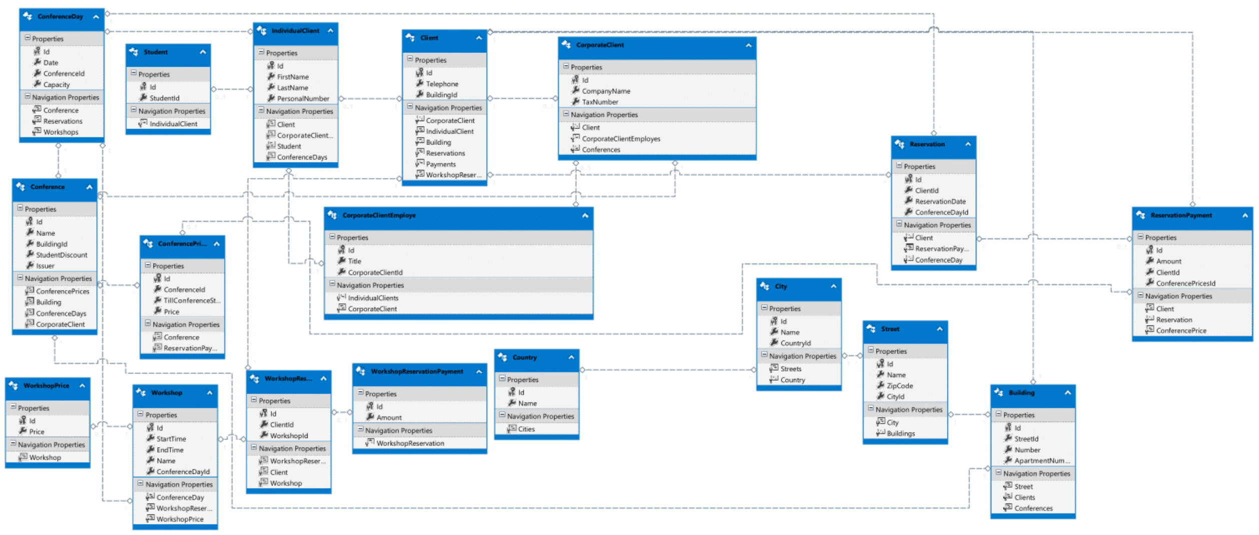
- **organizer**

  Tworzy konferencje oraz warsztaty, nadaje im ceny za uczestnictwo.

```
CREATE ROLE [organizer]
GRANT SELECT ON GetAttendantsAtConferenceDay TO customerservice
GRANT SELECT ON GetAttendantsAtWorkshopsOnConferenceDay TO customerservice
GRANT SELECT ON GetConferenceStart TO customerservice
GRANT SELECT ON LoyalClientsView TO customerservice
GRANT EXECUTE ON DeleteUnpaidReservations TO customerservice
GRANT EXECUTE ON AddPriceToConference TO customerservice
GRANT EXECUTE ON AddConference TO customerservice
GRANT EXECUTE ON AddConferenceDay TO customerservice
GRANT EXECUTE ON AddWorkshop TO customerservice
GRANT EXECUTE ON AddPriceToWorkshop TO customerservice
```

Schemat bazy danych

- ### Schemat UML



- ### Definicje tabel

```
-- Creating table 'Clients'
CREATE TABLE [dbo].[Clients] (
    [Id] int IDENTITY(1,1) NOT NULL,
    [Telephone] nvarchar(max)  NOT NULL,
```

```sql
    [BuildingId] int  NOT NULL
);
GO

-- Creating table 'CorporateClients'
CREATE TABLE [dbo].[CorporateClients] (
    [Id] int  NOT NULL,
    [CompanyName] nvarchar(120)  NOT NULL,
    [TaxNumber] nvarchar(30)  NOT NULL
);
GO

-- Creating table 'IndividualClients'
CREATE TABLE [dbo].[IndividualClients] (
    [Id] int  NOT NULL,
    [FirstName] nvarchar(max)  NOT NULL,
    [LastName] nvarchar(max)  NOT NULL,
    [PersonalNumber] nchar(11)  NOT NULL
);
GO

-- Creating table 'CorporateClientEmployes'
CREATE TABLE [dbo].[CorporateClientEmployes] (
    [Id] int  NOT NULL,
    [Title] nvarchar(max)  NOT NULL,
    [CorporateClientId] int  NULL
);
GO

-- Creating table 'Workshops'
CREATE TABLE [dbo].[Workshops] (
    [Id] int IDENTITY(1,1) NOT NULL,
    [StartTime] datetime  NOT NULL,
    [EndTime] datetime  NOT NULL,
    [Name] nvarchar(max)  NOT NULL,
    [ConferenceDayId] int  NOT NULL
);
GO

-- Creating table 'WorkshopPrices'
CREATE TABLE [dbo].[WorkshopPrices] (
    [Id] int  NOT NULL,
    [Price] decimal(18,0)  NOT NULL
);
GO

-- Creating table 'Conferences'
CREATE TABLE [dbo].[Conferences] (
    [Id] int IDENTITY(1,1) NOT NULL,
    [Name] nvarchar(max)  NOT NULL,
    [BuildingId] int  NOT NULL,
    [StudentDiscount] tinyint  NOT NULL,
    [Issuer] int  NOT NULL
```

```sql
);
GO

-- Creating table 'ConferencePrices'
CREATE TABLE [dbo].[ConferencePrices] (
    [Id] int IDENTITY(1,1) NOT NULL,
    [ConferenceId] int  NOT NULL,
    [TillConferenceStart] smallint  NOT NULL,
    [Price] decimal(18,0)  NOT NULL
);
GO

-- Creating table 'Students'
CREATE TABLE [dbo].[Students] (
    [Id] int  NOT NULL,
    [StudentId] nvarchar(120)  NOT NULL
);
GO

-- Creating table 'Cities'
CREATE TABLE [dbo].[Cities] (
    [Id] int IDENTITY(1,1) NOT NULL,
    [Name] nvarchar(80)  NOT NULL,
    [CountryId] int  NOT NULL
);
GO

-- Creating table 'Streets'
CREATE TABLE [dbo].[Streets] (
    [Id] int IDENTITY(1,1) NOT NULL,
    [Name] nvarchar(50)  NOT NULL,
    [ZipCode] nvarchar(20)  NOT NULL,
    [CityId] int  NOT NULL
);
GO

-- Creating table 'Buildings'
CREATE TABLE [dbo].[Buildings] (
    [Id] int IDENTITY(1,1) NOT NULL,
    [StreetId] int  NOT NULL,
    [Number] nvarchar(20)  NOT NULL,
    [ApartmentNumber] int  NULL
);
GO

-- Creating table 'Countries'
CREATE TABLE [dbo].[Countries] (
    [Id] int IDENTITY(1,1) NOT NULL,
    [Name] nvarchar(50)  NOT NULL
);
GO

-- Creating table 'Reservations'
```

```
CREATE TABLE [dbo].[Reservations] (
    [Id] int IDENTITY(1,1) NOT NULL,
    [ClientId] int  NOT NULL,
    [ReservationDate] datetime  NOT NULL,
    [ConferenceDayId] int  NOT NULL
);
GO

-- Creating table 'ConferenceDays'
CREATE TABLE [dbo].[ConferenceDays] (
    [Id] int IDENTITY(1,1) NOT NULL,
    [Date] datetime  NOT NULL,
    [ConferenceId] int  NOT NULL,
    [Capacity] int  NOT NULL
);
GO

-- Creating table 'WorkshopReservations'
CREATE TABLE [dbo].[WorkshopReservations] (
    [Id] int IDENTITY(1,1) NOT NULL,
    [ClientId] int  NOT NULL,
    [WorkshopId] int  NOT NULL
);
GO

-- Creating table 'ReservationPayments'
CREATE TABLE [dbo].[ReservationPayments] (
    [Id] int  NOT NULL,
    [Amount] decimal(18,0)  NOT NULL,
    [ClientId] int  NOT NULL,
    [ConferencePricesId] int  NULL
);
GO

-- Creating table 'WorkshopReservationPayments'
CREATE TABLE [dbo].[WorkshopReservationPayments] (
    [Id] int  NOT NULL,
    [Amount] decimal(18,0)  NOT NULL
);
GO

-- Creating table 'IndividualClientConferenceDay'
CREATE TABLE [dbo].[IndividualClientConferenceDay] (
    [IndividualClientConferenceDay_ConferenceDay_Id] int  NOT NULL,
    [ConferenceDays_Id] int  NOT NULL
);
GO
```

- ## Warunki intregralnościowe - klucze

```
-- --------------------------------------------------
-- Creating all PRIMARY KEY constraints
-- --------------------------------------------------

-- Creating primary key on [Id] in table 'Clients'
ALTER TABLE [dbo].[Clients]
ADD CONSTRAINT [PK_Clients]
    PRIMARY KEY CLUSTERED ([Id] ASC);
GO

-- Creating primary key on [Id] in table 'CorporateClients'
ALTER TABLE [dbo].[CorporateClients]
ADD CONSTRAINT [PK_CorporateClients]
    PRIMARY KEY CLUSTERED ([Id] ASC);
GO

-- Creating primary key on [Id] in table 'IndividualClients'
ALTER TABLE [dbo].[IndividualClients]
ADD CONSTRAINT [PK_IndividualClients]
    PRIMARY KEY CLUSTERED ([Id] ASC);
GO

-- Creating primary key on [Id] in table 'CorporateClientEmployes'
ALTER TABLE [dbo].[CorporateClientEmployes]
ADD CONSTRAINT [PK_CorporateClientEmployes]
    PRIMARY KEY CLUSTERED ([Id] ASC);
GO

-- Creating primary key on [Id] in table 'Workshops'
ALTER TABLE [dbo].[Workshops]
ADD CONSTRAINT [PK_Workshops]
    PRIMARY KEY CLUSTERED ([Id] ASC);
GO

-- Creating primary key on [Id] in table 'WorkshopPrices'
ALTER TABLE [dbo].[WorkshopPrices]
ADD CONSTRAINT [PK_WorkshopPrices]
    PRIMARY KEY CLUSTERED ([Id] ASC);
GO

-- Creating primary key on [Id] in table 'Conferences'
ALTER TABLE [dbo].[Conferences]
ADD CONSTRAINT [PK_Conferences]
    PRIMARY KEY CLUSTERED ([Id] ASC);
GO

-- Creating primary key on [Id] in table 'ConferencePrices'
ALTER TABLE [dbo].[ConferencePrices]
ADD CONSTRAINT [PK_ConferencePrices]
    PRIMARY KEY CLUSTERED ([Id] ASC);
GO

-- Creating primary key on [Id] in table 'Students'
ALTER TABLE [dbo].[Students]
ADD CONSTRAINT [PK_Students]
```

```sql
    PRIMARY KEY CLUSTERED ([Id] ASC);
GO

-- Creating primary key on [Id] in table 'Cities'
ALTER TABLE [dbo].[Cities]
ADD CONSTRAINT [PK_Cities]
    PRIMARY KEY CLUSTERED ([Id] ASC);
GO

-- Creating primary key on [Id] in table 'Streets'
ALTER TABLE [dbo].[Streets]
ADD CONSTRAINT [PK_Streets]
    PRIMARY KEY CLUSTERED ([Id] ASC);
GO

-- Creating primary key on [Id] in table 'Buildings'
ALTER TABLE [dbo].[Buildings]
ADD CONSTRAINT [PK_Buildings]
    PRIMARY KEY CLUSTERED ([Id] ASC);
GO

-- Creating primary key on [Id] in table 'Countries'
ALTER TABLE [dbo].[Countries]
ADD CONSTRAINT [PK_Countries]
    PRIMARY KEY CLUSTERED ([Id] ASC);
GO

-- Creating primary key on [Id] in table 'Reservations'
ALTER TABLE [dbo].[Reservations]
ADD CONSTRAINT [PK_Reservations]
    PRIMARY KEY CLUSTERED ([Id] ASC);
GO

-- Creating primary key on [Id] in table 'ConferenceDays'
ALTER TABLE [dbo].[ConferenceDays]
ADD CONSTRAINT [PK_ConferenceDays]
    PRIMARY KEY CLUSTERED ([Id] ASC);
GO

-- Creating primary key on [Id] in table 'WorkshopReservations'
ALTER TABLE [dbo].[WorkshopReservations]
ADD CONSTRAINT [PK_WorkshopReservations]
    PRIMARY KEY CLUSTERED ([Id] ASC);
GO

-- Creating primary key on [Id] in table 'ReservationPayments'
ALTER TABLE [dbo].[ReservationPayments]
ADD CONSTRAINT [PK_ReservationPayments]
    PRIMARY KEY CLUSTERED ([Id] ASC);
GO

-- Creating primary key on [Id] in table 'WorkshopReservationPayments'
ALTER TABLE [dbo].[WorkshopReservationPayments]
```

```sql
ADD CONSTRAINT [PK_WorkshopReservationPayments]
    PRIMARY KEY CLUSTERED ([Id] ASC);
GO

-- Creating primary key on [IndividualClientConferenceDay_ConferenceDay_Id],
[ConferenceDays_Id] in table 'IndividualClientConferenceDay'
ALTER TABLE [dbo].[IndividualClientConferenceDay]
ADD CONSTRAINT [PK_IndividualClientConferenceDay]
    PRIMARY KEY CLUSTERED ([IndividualClientConferenceDay_ConferenceDay_Id],
[ConferenceDays_Id] ASC);
GO

-- --------------------------------------------------
-- Creating all FOREIGN KEY constraints
-- --------------------------------------------------

-- Creating foreign key on [Id] in table 'CorporateClients'
ALTER TABLE [dbo].[CorporateClients]
ADD CONSTRAINT [FK_Client_CorporateClient]
    FOREIGN KEY ([Id])
    REFERENCES [dbo].[Clients]
        ([Id])
    ON DELETE NO ACTION ON UPDATE NO ACTION;
GO

-- Creating foreign key on [Id] in table 'IndividualClients'
ALTER TABLE [dbo].[IndividualClients]
ADD CONSTRAINT [FK_Client_IndividualClient]
    FOREIGN KEY ([Id])
    REFERENCES [dbo].[Clients]
        ([Id])
    ON DELETE NO ACTION ON UPDATE NO ACTION;
GO

-- Creating foreign key on [Id] in table 'CorporateClientEmployes'
ALTER TABLE [dbo].[CorporateClientEmployes]
ADD CONSTRAINT [FK_CorporateClientEmployeIndividualClient]
    FOREIGN KEY ([Id])
    REFERENCES [dbo].[IndividualClients]
        ([Id])
    ON DELETE NO ACTION ON UPDATE NO ACTION;
GO

-- Creating foreign key on [CorporateClientId] in table 'CorporateClientEmployes'
ALTER TABLE [dbo].[CorporateClientEmployes]
ADD CONSTRAINT [FK_CorporateClientCorporateClientEmploye]
    FOREIGN KEY ([CorporateClientId])
    REFERENCES [dbo].[CorporateClients]
        ([Id])
    ON DELETE NO ACTION ON UPDATE NO ACTION;
GO

-- Creating foreign key on [ConferenceId] in table 'ConferencePrices'
```

```
ALTER TABLE [dbo].[ConferencePrices]
ADD CONSTRAINT [FK_ConferenceConferencePrices]
    FOREIGN KEY ([ConferenceId])
    REFERENCES [dbo].[Conferences]
        ([Id])
    ON DELETE NO ACTION ON UPDATE NO ACTION;
GO

-- Creating foreign key on [Id] in table 'Students'
ALTER TABLE [dbo].[Students]
ADD CONSTRAINT [FK_StudentIndividualClient]
    FOREIGN KEY ([Id])
    REFERENCES [dbo].[IndividualClients]
        ([Id])
    ON DELETE NO ACTION ON UPDATE NO ACTION;
GO

-- Creating foreign key on [CityId] in table 'Streets'
ALTER TABLE [dbo].[Streets]
ADD CONSTRAINT [FK_CityStreet]
    FOREIGN KEY ([CityId])
    REFERENCES [dbo].[Cities]
        ([Id])
    ON DELETE NO ACTION ON UPDATE NO ACTION;
GO

-- Creating foreign key on [StreetId] in table 'Buildings'
ALTER TABLE [dbo].[Buildings]
ADD CONSTRAINT [FK_StreetBuilding]
    FOREIGN KEY ([StreetId])
    REFERENCES [dbo].[Streets]
        ([Id])
    ON DELETE NO ACTION ON UPDATE NO ACTION;
GO

-- Creating foreign key on [BuildingId] in table 'Clients'
ALTER TABLE [dbo].[Clients]
ADD CONSTRAINT [FK_ClientBuilding]
    FOREIGN KEY ([BuildingId])
    REFERENCES [dbo].[Buildings]
        ([Id])
    ON DEL

-- Creating foreign key on [BuildingId] in table 'Conferences'
ALTER TABLE [dbo].[Conferences]
ADD CONSTRAINT [FK_ConferenceBuilding]
    FOREIGN KEY ([BuildingId])
    REFERENCES [dbo].[Buildings]
        ([Id])
    ON DELETE NO ACTION ON UPDATE NO ACTION;
GO

-- Creating foreign key on [ConferenceId] in table 'ConferenceDays'
```

```
ALTER TABLE [dbo].[ConferenceDays]
ADD CONSTRAINT [FK_ConferenceDayConference]
    FOREIGN KEY ([ConferenceId])
    REFERENCES [dbo].[Conferences]
        ([Id])
    ON DELETE NO ACTION ON UPDATE NO ACTION;
GO

-- Creating foreign key on [ClientId] in table 'Reservations'
ALTER TABLE [dbo].[Reservations]
ADD CONSTRAINT [FK_ReservationClient]
    FOREIGN KEY ([ClientId])
    REFERENCES [dbo].[Clients]
        ([Id])
    ON DELETE NO ACTION ON UPDATE NO ACTION;
GO

-- Creating foreign key on [IndividualClientConferenceDay_ConferenceDay_Id] in table
'IndividualClientConferenceDay'
ALTER TABLE [dbo].[IndividualClientConferenceDay]
ADD CONSTRAINT [FK_IndividualClientConferenceDay_IndividualClient]
    FOREIGN KEY ([IndividualClientConferenceDay_ConferenceDay_Id])
    REFERENCES [dbo].[IndividualClients]
        ([Id])
    ON DELETE NO ACTION ON UPDATE NO ACTION;
GO

-- Creating foreign key on [ConferenceDays_Id] in table
'IndividualClientConferenceDay'
ALTER TABLE [dbo].[IndividualClientConferenceDay]
ADD CONSTRAINT [FK_IndividualClientConferenceDay_ConferenceDay]
    FOREIGN KEY ([ConferenceDays_Id])
    REFERENCES [dbo].[ConferenceDays]
        ([Id])
    ON DELETE NO ACTION ON UPDATE NO ACTION;
GO

-- Creating foreign key on [Issuer] in table 'Conferences'
ALTER TABLE [dbo].[Conferences]
ADD CONSTRAINT [FK_CorporateClientConference]
    FOREIGN KEY ([Issuer])
    REFERENCES [dbo].[CorporateClients]
        ([Id])
    ON DELETE NO ACTION ON UPDATE NO ACTION;
GO

-- Creating foreign key on [ClientId] in table 'ReservationPayments'
ALTER TABLE [dbo].[ReservationPayments]
ADD CONSTRAINT [FK_PaymentClient]
    FOREIGN KEY ([ClientId])
    REFERENCES [dbo].[Clients]
        ([Id])
    ON DELETE NO ACTION ON UPDATE NO ACTION;
```

```
GO

-- Creating foreign key on [Id] in table 'ReservationPayments'
ALTER TABLE [dbo].[ReservationPayments]
ADD CONSTRAINT [FK_ReservationPaymentReservation]
    FOREIGN KEY ([Id])
    REFERENCES [dbo].[Reservations]
        ([Id])
    ON DELETE CASCADE ON UPDATE NO ACTION;
GO

-- Creating foreign key on [Id] in table 'WorkshopReservationPayments'
ALTER TABLE [dbo].[WorkshopReservationPayments]
ADD CONSTRAINT [FK_WorkshopReservationPaymentWorkshopReservation]
    FOREIGN KEY ([Id])
    REFERENCES [dbo].[WorkshopReservations]
        ([Id])
    ON DELETE NO ACTION ON UPDATE NO ACTION;
GO

-- Creating foreign key on [ConferencePricesId] in table 'ReservationPayments'
ALTER TABLE [dbo].[ReservationPayments]
ADD CONSTRAINT [FK_ConferencePricesReservationPayment]
    FOREIGN KEY ([ConferencePricesId])
    REFERENCES [dbo].[ConferencePrices]
        ([Id])
    ON DELETE NO ACTION ON UPDATE NO ACTION;
GO

-- Creating foreign key on [ConferenceDayId] in table 'Reservations'
ALTER TABLE [dbo].[Reservations]
ADD CONSTRAINT [FK_ConferenceDayReservation]
    FOREIGN KEY ([ConferenceDayId])
    REFERENCES [dbo].[ConferenceDays]
        ([Id])
    ON DELETE NO ACTION ON UPDATE NO ACTION;
GO

-- Creating foreign key on [CountryId] in table 'Cities'
ALTER TABLE [dbo].[Cities]
ADD CONSTRAINT [FK_CountryCity]
    FOREIGN KEY ([CountryId])
    REFERENCES [dbo].[Countries]
        ([Id])
    ON DELETE NO ACTION ON UPDATE NO ACTION;
GO

-- Creating foreign key on [ConferenceDayId] in table 'Workshops'
ALTER TABLE [dbo].[Workshops]
ADD CONSTRAINT [FK_ConferenceDayWorkshop]
    FOREIGN KEY ([ConferenceDayId])
    REFERENCES [dbo].[ConferenceDays]
        ([Id])
    ON DELETE NO ACTION ON UPDATE NO ACTION;
GO
-- Creating foreign key on [ClientId] in table 'WorkshopReservations'
ALTER TABLE [dbo].[WorkshopReservations]
ADD CONSTRAINT [FK_ClientWorkshopReservation]
    FOREIGN KEY ([ClientId])
    REFERENCES [dbo].[Clients]
        ([Id])
    ON DELETE NO ACTION ON UPDATE NO ACTION;
GO

-- Creating foreign key on [WorkshopId] in table 'WorkshopReservations'
ALTER TABLE [dbo].[WorkshopReservations]
ADD CONSTRAINT [FK_WorkshopWorkshopReservation]
    FOREIGN KEY ([WorkshopId])
    REFERENCES [dbo].[Workshops]
        ([Id])
    ON DELETE NO ACTION ON UPDATE NO ACTION;
GO

-- Creating foreign key on [Id] in table 'WorkshopPrices'
ALTER TABLE [dbo].[WorkshopPrices]
ADD CONSTRAINT [FK_WorkshopWorkshopPrice]
    FOREIGN KEY ([Id])
    REFERENCES [dbo].[Workshops]
        ([Id])
    ON DELETE NO ACTION ON UPDATE NO ACTION;
GO
```

- ## Warunki integralnościowe - pozostałe

```
/*
    When IndividualClient is saved PESEL is parsed
*/

CREATE FUNCTION IsValidPesel
(
  @number nchar(11)
)
RETURNS bit
AS
BEGIN
  IF ISNUMERIC(@number) = 0
    RETURN 0
  DECLARE
    @vals AS TABLE
    (
      Pos tinyint IDENTITY(1,1) NOT NULL,
      W tinyint NOT NULL
    )
```

```sql
    /*
https://pl.wikipedia.org/wiki/PESEL#Cyfra_kontrolna_i_sprawdzanie_poprawno.C5.9Bci_num
eru */
  INSERT INTO @vals VALUES (1), (3), (7), (9), (1), (3), (7), (9), (1), (3), (1)

  IF (SELECT SUM(CONVERT(INT, SUBSTRING(@number, Pos, 1)) * W) % 10 FROM @vals ) = 0
  BEGIN
    DECLARE @day int = CONVERT(INT, SUBSTRING(@number, 5, 2))
    IF(@day < 32)
    RETURN 1
  END
  RETURN 0
END

GO

CREATE FUNCTION IsDateBefore(
@before DATETIME,
@after DATETIME)
RETURNS bit
AS
BEGIN
    IF  (@before < @after)
        BEGIN
            RETURN 1;
        END
    RETURN 0;
END

GO

/* Warunki integralnościowe dla unikalnego numeru pesel w tabeli, walidacja pesel
według sumy kontrolnej i poprawności daty. Dla studenta  */
ALTER TABLE dbo.IndividualClients ADD CONSTRAINT PersonalNumberCheck CHECK
(dbo.IsValidPesel(PersonalNumber) = 1 )
ALTER TABLE dbo.IndividualClients ADD CONSTRAINT UC_PersonalNumber UNIQUE
(PersonalNumber)
ALTER TABLE dbo.Students ADD CONSTRAINT UC_StudentId Unique (StudentId)

GO

ALTER TABLE dbo.CorporateClients ADD CONSTRAINT UC_TaxNumber UNIQUE (TaxNumber)
ALTER TABLE dbo.CorporateClients ADD CONSTRAINT UC_CompanyNumber UNIQUE (TaxNumber)

GO
/* Warunki integralnościowe dla niepowtarzających się krotek adresu. */

ALTER TABLE dbo.Countries ADD CONSTRAINT UC_Country UNIQUE (Name);
ALTER TABLE dbo.Cities ADD CONSTRAINT UC_City UNIQUE (Name, CountryId);
ALTER TABLE dbo.Streets ADD CONSTRAINT UC_Street UNIQUE (Name, ZipCode, CityId);
ALTER TABLE dbo.Buildings ADD CONSTRAINT UC_Buildings UNIQUE (StreetId, Number,
ApartmentNumber);
GO
```

```
/* Ceny dla konferencji powinny być unikalne dla krotki Konferencja, Dzień od którego
obowiązuje próg cenowy  */

ALTER TABLE dbo.ConferencePrices ADD CONSTRAINT UC_Price_Stage UNIQUE (ConferenceId,
TillConferenceStart)
GO

--/*  Jeden klient może mieć tylko jedną rezerwację na daną konferencji - */

--ALTER TABLE dbo.Reservations ADD CONSTRAINT UC_Client_ConferenceId UNIQUE (ClientId,
)
--GO

/* Dla warsztatu upewnijmy się, że nigdy data zakończenia nie będzie poprzedzała daty
rozpoczęcia */
ALTER TABLE dbo.Workshops ADD CONSTRAINT C_IsEndDateAfter CHECK
(dbo.IsDateBefore(StartTime, EndTime) = 1)
GO

/* Nie można zarejestrować się na konferencję */
CREATE FUNCTION CanReservationBePlaced
(
    @conferenceDayId int
)
RETURNS bit
AS
BEGIN

DECLARE @capacity int;
SELECT @capacity = Capacity from ConferenceDays WHERE Id = @conferenceDayId;

DECLARE @already int;
SELECT @already = COUNT(*) FROM Reservations Where ConferenceDayId = @conferenceDayId

IF (@capacity >= @already)
    RETURN 1;
RETURN 0;

END
GO

ALTER TABLE dbo.Reservations ADD CONSTRAINT C_IsEnoughtCapacity CHECK
(dbo.CanReservationBePlaced(ConferenceDayId) = 1);
ALTER TABLE dbo.Reservations ADD CONSTRAINT DF_ReservationDate DEFAULT GETDATE() FOR
ReservationDate;
GO
```

- **Indeksy**

```
-- Creating non-clustered index for FOREIGN KEY 'FK_CorporateClientCorporateClientEmploye'
CREATE INDEX [IX_FK_CorporateClientCorporateClientEmploye]
```

```sql
ON [dbo].[CorporateClientEmployes]
    ([CorporateClientId]);
GO

-- Creating non-clustered index for FOREIGN KEY 'FK_ConferenceConferencePrices'
CREATE INDEX [IX_FK_ConferenceConferencePrices]
ON [dbo].[ConferencePrices]
    ([ConferenceId]);
GO
-- Creating non-clustered index for FOREIGN KEY 'FK_CityStreet'
CREATE INDEX [IX_FK_CityStreet]
ON [dbo].[Streets]
    ([CityId]);
GO

-- Creating non-clustered index for FOREIGN KEY 'FK_StreetBuilding'
CREATE INDEX [IX_FK_StreetBuilding]
ON [dbo].[Buildings]
    ([StreetId]);
GO

-- Creating non-clustered index for FOREIGN KEY 'FK_ClientBuilding'
CREATE INDEX [IX_FK_ClientBuilding]
ON [dbo].[Clients]
    ([BuildingId]);
GO

-- Creating non-clustered index for FOREIGN KEY 'FK_ConferenceBuilding'
CREATE INDEX [IX_FK_ConferenceBuilding]
ON [dbo].[Conferences]
    ([BuildingId]);
GO

-- Creating non-clustered index for FOREIGN KEY 'FK_ConferenceDayConference'
CREATE INDEX [IX_FK_ConferenceDayConference]
ON [dbo].[ConferenceDays]
    ([ConferenceId]);
GO

-- Creating non-clustered index for FOREIGN KEY 'FK_ReservationClient'
CREATE INDEX [IX_FK_ReservationClient]
ON [dbo].[Reservations]
    ([ClientId]);
GO

-- Creating non-clustered index for FOREIGN KEY
'FK_IndividualClientConferenceDay_ConferenceDay'
CREATE INDEX [IX_FK_IndividualClientConferenceDay_ConferenceDay]
ON [dbo].[IndividualClientConferenceDay]
    ([ConferenceDays_Id]);
GO

-- Creating non-clustered index for FOREIGN KEY 'FK_CorporateClientConference'
```

```sql
CREATE INDEX [IX_FK_CorporateClientConference]
ON [dbo].[Conferences]
    ([Issuer]);
GO

-- Creating non-clustered index for FOREIGN KEY 'FK_PaymentClient'
CREATE INDEX [IX_FK_PaymentClient]
ON [dbo].[ReservationPayments]
    ([ClientId]);
GO

-- Creating non-clustered index for FOREIGN KEY 'FK_ConferencePricesReservationPayment'
CREATE INDEX [IX_FK_ConferencePricesReservationPayment]
ON [dbo].[ReservationPayments]
    ([ConferencePricesId]);
GO

-- Creating non-clustered index for FOREIGN KEY 'FK_ConferenceDayReservation'
CREATE INDEX [IX_FK_ConferenceDayReservation]
ON [dbo].[Reservations]
    ([ConferenceDayId]);
GO

-- Creating non-clustered index for FOREIGN KEY 'FK_CountryCity'
CREATE INDEX [IX_FK_CountryCity]
ON [dbo].[Cities]
    ([CountryId]);
GO

-- Creating non-clustered index for FOREIGN KEY 'FK_ConferenceDayWorkshop'
CREATE INDEX [IX_FK_ConferenceDayWorkshop]
ON [dbo].[Workshops]
    ([ConferenceDayId]);
GO

-- Creating non-clustered index for FOREIGN KEY 'FK_ClientWorkshopReservation'
CREATE INDEX [IX_FK_ClientWorkshopReservation]
ON [dbo].[WorkshopReservations]
    ([ClientId]);
GO

-- Creating non-clustered index for FOREIGN KEY 'FK_WorkshopWorkshopReservation'
CREATE INDEX [IX_FK_WorkshopWorkshopReservation]
ON [dbo].[WorkshopReservations]
    ([WorkshopId]);
GO
```

Widoki

- **LoyalClientsView**

Wyświetla listę 1000 najlepszych klientów uszeregowanych malejąco pod względem sumy opłat za udział w konferencjach.

```
CREATE OR ALTER VIEW LoyalClientsView
  AS
    SELECT TOP 1000 IC.FirstName, IC.LastName, CC.CompanyName, sum(RP.Amount) as
TotalPaid
        FROM IndividualClients IC
    RIGHT JOIN Clients C
        ON IC.Id = C.Id
    LEFT JOIN CorporateClients CC
        ON CC.Id = C.Id
    INNER JOIN Reservations R
        ON C.Id = R.ClientId
    INNER JOIN ReservationPayments RP
        ON R.Id = RP.Id
    GROUP BY IC.FirstName, IC.LastName, CC.CompanyName
    ORDER BY TotalPaid DESC;
```

Funkcje

- ### GetIndividualClientOrThrow

Zwraca ID klienta po PESEL-u.

```

CREATE FUNCTION GetIndividualClientOrThrow(@PersonalNumber nvarchar(50))
RETURNS INT
AS
BEGIN

    DECLARE @client_id int;
    SELECT @client_id = Min(Id) FROM IndividualClients WHERE PersonalNumber =
@PersonalNumber;

    IF @client_id IS NULL
    BEGIN
         RETURN CAST('Client canont be found.' AS INT);
    END

    RETURN @client_id;
END
GO

```

- ### GetAttendantsAtConferenceDay

Podaje listę osób zarejestrowanych na dany dzień konferencji.

```
CREATE FUNCTION GetAttendantsAtConferenceDay (
    @ConferenceId int,
    @ConferenceDay int
    )
RETURNS TABLE
AS
RETURN
(
    SELECT CDC.Id as ConferenceDayId, A.FirstName, A.LastName, A.PersonalNumber,
S.StudentId, CC.CompanyName
    from (
        SELECT * FROM ConferenceDays CD
        where CD.ConferenceId = @conferenceId
        ORDER BY CD.Date ASC
        OFFSET @ConferenceDay ROWS
        FETCH NEXT 1 ROW ONLY
    ) AS CDC

    LEFT JOIN IndividualClientConferenceDay ICCD
    ON CDC.Id = ICCD.ConferenceDays_Id

    LEFT JOIN IndividualClients A
    ON A.Id = ICCD.IndividualClientConferenceDay_ConferenceDay_Id

    LEFT JOIN Students S
    ON S.Id = A.Id

    LEFT JOIN CorporateClientEmployes CCE
    ON A.Id = CCE.Id

    LEFT JOIN CorporateClients CC
    ON CC.Id = CCE.CorporateClientId
);
```

- ## GetConferenceStart

Zwraca datę początku konferencji.

```
/*
    Zwraca Datę początku konferencji (Za początek konferencji przyjmujemy pierwszy
dzień konferencji przypisany doń)
*/
CREATE OR ALTER FUNCTION GetConferenceStart(@ConferenceIds int)
RETURNS DATETIME
AS
BEGIN
    DECLARE @date datetime;
    SELECT @date = [Date]
    FROM ConferenceDays
    WHERE ConferenceId = @ConferenceIds
    ORDER BY [Date];
    RETURN @date;
END
GO
```

- ## GetConferenceWithPriceAccordingToDate

Zwraca cenę konferencji biorąc pod uwagę datę zaksięgowania przelewu.

```
/*
    Zwraca cenę konferencji biorąc pod uwagę datę zaksięgowania przelewu
*/
CREATE OR ALTER FUNCTION GetConferenceWithPriceAccordingToDate(@ConferenceId int,
@PaymentDate datetime)
RETURNS decimal
AS
BEGIN
    DECLARE @result decimal;

SELECT TOP(1) @result = Price
    FROM ConferencePrices
    WHERE @ConferenceId = ConferenceId AND DATEADD(DD, -TillConferenceStart,
dbo.GetConferenceStart(ConferenceId)) < DATEADD(DD, 0, @PaymentDate)
    ORDER BY TillConferenceStart

    RETURN @result;
END
GO
```

- ## GetConferencePriceId

Zwraca id conferenceprice biorąc pod uwagę datę zaksięgowania przelewu.

```
/*
    Zwraca id conference price biorąc pod uwagę datę zaksięgowania przelewu
*/
CREATE OR ALTER FUNCTION GetConferencePriceId(@ConferenceId int, @PaymentDate
datetime)
RETURNS int
AS
BEGIN
    DECLARE @result int;

    SELECT TOP(1) @result = Id
    FROM ConferencePrices
    WHERE @ConferenceId = ConferenceId AND DATEADD(DD, -TillConferenceStart,
dbo.GetConferenceStart(ConferenceId)) < DATEADD(DD, 0, @PaymentDate)
```

```
    ORDER BY TillConferenceStart
    RETURN @result;
END
GO
```

- ## GetConferencePrice

Zwraca cenę konferencji i bierze pod uwagę, czy jest się studentem.

```
/*
    Zwraca cenę konferencji i bierze pod uwagę, czy jest studentem.
*/
CREATE OR ALTER FUNCTION GetConferencePrice(
    @ConferenceId int,
    @PersonalNumber nvarchar(50),
    @PaymentDate DateTime)
    RETURNS decimal
    AS
BEGIN
    DECLARE @conference_price decimal;
    SELECT @conference_price =
dbo.GetConferenceWithPriceAccordingToDate(@ConferenceId, @PaymentDate)

    DECLARE @client_id int
    SELECT @client_id = dbo.GetIndividualClientOrThrow(@PersonalNumber);

    DECLARE @student_id int
    SELECT TOP(1)
        @student_id = [Id]
    FROM Students
    WHERE Id = @client_id;

    DECLARE @student_discount int;
    SELECT TOP(1) @student_discount = StudentDiscount FROM Conferences where Id =
@ConferenceId;

    IF @student_discount is NULL OR @student_discount = 0
    BEGIN
        RETURN @conference_price;
    END

    IF @student_discount <= 100
    BEGIN
        RETURN @conference_price * (@student_discount / 100);
    END

    RETURN Cast('Never should be there' as int)
END
GO
```

Procedury

- ### AddAddress

  Zapisuje adres klienta rejestrującego się na konferencję. Rozbija go na tabele: Country, City, Street, Building. Zwraca ID Building.

```
/*
    Założenia
    Ta procedura będzie używana przez naszego pracownika, ufamy danym, które
wprowadzi, będą one zawsze poprawne.
    Przyjmuje krotkę z danymi adresowymi
*/
CREATE PROCEDURE AddAddress
    @Street nvarchar(50),
    @ApartmentNumber int NULL,
    @BuildingNumber int,
    @ZipCode nvarchar(6),
    @City nvarchar(50),
    @Country nvarchar(50)
AS

BEGIN TRANSACTION

BEGIN
   IF NOT EXISTS (SELECT * FROM [dbo].[Countries] WHERE Name = @Country)
   BEGIN
       INSERT INTO [dbo].[Countries](Name)
       VALUES (@Country)
   END
END

DECLARE @country_id int;
SET @country_id = (SELECT MIN(Id) FROM [dbo].[Countries] WHERE Name = @Country);

BEGIN
   IF NOT EXISTS (SELECT * FROM [dbo].Cities WHERE Name = @City and @country_id =
CountryId)
   BEGIN
       INSERT INTO [dbo].Cities(Name, CountryId)
       VALUES (@City, @country_id)
   END
END

DECLARE @city_id int;
SET @city_id = (SELECT MIN(Id) FROM [dbo].[Cities] WHERE Name = @City and CountryId =
@country_id);

BEGIN
```

```
    IF NOT EXISTS (SELECT * FROM [dbo].Streets WHERE Name = @Street and ZipCode =
@ZipCode and CityId = @city_id)
    BEGIN
        INSERT INTO [dbo].Streets(Name, ZipCode, CityId)
        VALUES (@Street, @ZipCode, @city_id)
    END
END

DECLARE @street_id int;
SET @street_id =  (SELECT MIN(Id) FROM [dbo].[Streets] WHERE Name = @Street and
ZipCode = @ZipCode and CityId = @city_id);

BEGIN
    IF NOT EXISTS (SELECT * FROM [dbo].Buildings WHERE Number = @BuildingNumber and
(ApartmentNumber = @ApartmentNumber or (ApartmentNumber is NULL and @ApartmentNumber
is NULL)) and StreetId = @street_id)
    BEGIN
        INSERT INTO [dbo].Buildings(Number, ApartmentNumber, StreetId)
        VALUES (@BuildingNumber, @ApartmentNumber, @street_id)
    END
END

COMMIT;

RETURN (SELECT MIN(Id) FROM [dbo].Buildings WHERE Number = @BuildingNumber and
(ApartmentNumber = @ApartmentNumber or (ApartmentNumber is NULL and @ApartmentNumber
is NULL)) and StreetId = @street_id)
```

- ## AddClient

Dodaje indywidualnego klienta przy rezerwacji na konferencję. Zwraca jego ID.

```
/*
    Add a client that is a individual client
    Założenia:
    Numer telefonu jest unikatowy dla każdego użytkownika, nie może być pusty (musimy
się jakoś kontaktować z uczestnikami)
*/
CREATE PROCEDURE AddClient
    @FirstName nvarchar(50),
    @LastName nvarchar(50),
    @PersonalNumber nvarchar(50),
    @Telephone nvarchar(50),
    @Street nvarchar(50),
    @ApartmentNumber int,
    @BuildingNumber int,
    @ZipCode nvarchar(6),
    @City nvarchar(50),
    @Country nvarchar(50)
    AS
    DECLARE @individual_client_id int;

    BEGIN TRANSACTION
    DECLARE @building_id int;
    EXEC @building_id = AddAddress
    @Street,
    @ApartmentNumber,
    @BuildingNumber,
    @ZipCode,
    @City,
    @Country

    BEGIN
    SET @individual_client_id = (SELECT Min(Id) FROM [dbo].IndividualClients WHERE
FirstName = @FirstName and LastName = @LastName and PersonalNumber = @PersonalNumber);
       IF @individual_client_id IS NULL
       BEGIN
            INSERT INTO [dbo].Clients(Telephone, BuildingId) VALUES (@Telephone,
@building_id);
            SET @individual_client_id = SCOPE_IDENTITY()
            INSERT INTO [dbo].IndividualClients(Id, FirstName, LastName,
PersonalNumber) VALUES (@individual_client_id, @FirstName, @LastName, @PersonalNumber)

       END
    END

    COMMIT;
    RETURN @individual_client_id;
    GO
```

- ## AddCorporateClient

Dodaje klienta korporacyjnego przy rezerwacji na konferencję.

```
/*
    Add a client that is a company
*/
CREATE PROCEDURE AddCorporateClient
    @CompanyName nvarchar(50),
    @TaxNumber nvarchar(50),
    @Telephone nvarchar(50),
    @Street nvarchar(50),
    @ApartmentNumber int,
    @BuildingNumber int,
    @ZipCode nvarchar(6),
    @City nvarchar(50),
    @Country nvarchar(50)
    AS

    BEGIN TRANSACTION
    DECLARE @building_id int;
    EXEC @building_id = AddAddress
    @Street,
    @ApartmentNumber,
    @BuildingNumber,
    @ZipCode,
    @City,
    @Country

    BEGIN
       IF NOT EXISTS (SELECT * FROM [dbo].CorporateClients WHERE TaxNumber =
@TaxNumber)
       BEGIN
            INSERT INTO [dbo].Clients(Telephone, BuildingId) VALUES (@Telephone,
@building_id);
            INSERT INTO [dbo].CorporateClients(Id, CompanyName, TaxNumber) VALUES
(@@IDENTITY, @CompanyName, @TaxNumber)
       END
    END

    COMMIT;
    RETURN 0;
    GO
```

- ## AddStudent

Dodaje studenta, umożliwiając skorzystanie ze zniżki studenckiej. Zwraca jego ID w tabeli Students.

```
/*
    Dodaj studenta
*/
CREATE PROCEDURE AddStudent
    @FirstName nvarchar(50),
    @LastName nvarchar(50),
    @PersonalNumber nvarchar(50),
    @StudentId nvarchar(50),
    @Telephone nvarchar(50),
    @Street nvarchar(50),
    @ApartmentNumber int,
    @BuildingNumber int,
    @ZipCode nvarchar(6),
    @City nvarchar(50),
    @Country nvarchar(50)
    AS

    DECLARE @individual_client_id int;

    BEGIN TRANSACTION

    DECLARE @student_id int;

    BEGIN
    SET @student_id = (SELECT Min(Id) FROM [dbo].Students WHERE StudentId =
@StudentId);
       IF @student_id IS NULL
       BEGIN
        EXEC @student_id = AddClient @FirstName, @LastName, @PersonalNumber,
@Telephone, @Street, @ApartmentNumber, @BuildingNumber, @ZipCode, @City, @Country
        INSERT INTO [dbo].Students(Id, StudentId) VALUES (@student_id, @StudentId);
       END
    END

    COMMIT;
    RETURN @student_id;
```

- ## AssignEmployerToEmployee

```
/*
    Przypisuje pracownika do firmy o <see @tax_number> numerze  podatkowym </see>
    Jeżeli nie ma pracownika w naszej bazie, tworzymy go.
    Jeżeli pracownik już był wcześniej zarejestrowany
    Jeżeli nie ma firmy, trzeba ją najpierw stworzyć.
*/
CREATE   PROCEDURE AssignEmployerToEmployee
        @tax_number nvarchar(50),
        @EmployeeTitle nvarchar(50),
        @FirstName nvarchar(50),
        @LastName nvarchar(50),
        @PersonalNumber nvarchar(50),
        @Telephone nvarchar(50),
        @Street nvarchar(50),
        @ApartmentNumber int,
        @BuildingNumber int,
        @ZipCode nvarchar(6),
        @City nvarchar(50),
        @Country nvarchar(50)
    AS
    DECLARE @employee_employer  int;

    BEGIN TRANSACTION
        DECLARE @employee_id int;
        EXEC @employee_id = AddClient @FirstName, @LastName, @PersonalNumber,
@Telephone, @Street, @ApartmentNumber, @BuildingNumber, @ZipCode, @City, @Country;

        SET @employee_employer = (SELECT Min(Id) FROM [dbo].CorporateClientEmployes
WHERE Id = @employee_id);
        IF @employee_employer is NULL
        BEGIN
            DECLARE @employer_id int;
            SET @employer_id = (SELECT Min(Id) FROM [dbo].CorporateClients WHERE
TaxNumber = @tax_number);
```

```
            INSERT INTO [dbo].CorporateClientEmployes(Id, Title, CorporateClientId)
VALUES (@employee_id, @EmployeeTitle, @employer_id);
            SET @employee_employer = @employee_id;
        END;
    COMMIT;
    RETURN @employee_employer;
```

- ## AddPriceToConference

  Dodaje cenę do konferencji, która zaczyna się @DaysToConferenceStart od dni startu. Pozwala to na ustalanie niższych cen dla kupujących z wyprzedzeniem.

```
/*
Dodaje cenę do konferencji, która zaczyna się @DaysToConferenceStart od dni startu
*/
CREATE PROCEDURE AddPriceToConference
    @Price decimal,
    @DaysToConferenceStart int,
    @ConferenceId int
    AS

    DECLARE @price_id int;
    SET @price_id = (SELECT Min(Id) FROM ConferencePrices WHERE Price = @Price and
@DaysToConferenceStart = TillConferenceStart and ConferenceId = @ConferenceId)

    IF @price_id IS NULL
    BEGIN
        INSERT INTO ConferencePrices(Price, TillConferenceStart, ConferenceId) VALUES
(@Price, @DaysToConferenceStart, @ConferenceId)
        SET @price_id = @@IDENTITY;
    END
    RETURN @price_id;
GO
```

- ## AddConference

  Tworzymy konferencje dla danego pracodawcy ze znaną zniżką studencką, z domyślną ceną za konferencję .

```
/*
   Tworzymy konferencje dla danego pracodawcy
   ze znaną zniżką studencką,
   z domyślną ceną za konferencję
*/
CREATE PROCEDURE AddConference
        @IssuerCompanyTaxNumber nvarchar(50),
        @ConferenceName nvarchar(50),
        @StudentDiscount decimal,
        @Price int,
        @Street nvarchar(50),
        @ApartmentNumber int NULL,
        @BuildingNumber int,
        @ZipCode nvarchar(6),
        @City nvarchar(50),
        @Country nvarchar(50)
    AS
    DECLARE @conference_id int;

    BEGIN TRANSACTION
        DECLARE @address int;
        EXEC @address = AddAddress @Street, @ApartmentNumber, @BuildingNumber,
@ZipCode, @City, @Country;

        DECLARE @company_id int = (SELECT Min(Id) FROM CorporateClients WHERE
TaxNumber = @IssuerCompanyTaxNumber);

        INSERT INTO Conferences(BuildingId, Name, StudentDiscount, Issuer) values
(@address, @ConferenceName, @StudentDiscount, @company_id);
        SET @conference_id = @@IDENTITY;

        DECLARE @int16 INT;
        SELECT @int16 = dbo.ConstantInt16();

        EXEC AddPriceToConference @Price, @int16, @conference_id;
    COMMIT;

    RETURN @conference_id;
GO
```

- ## MakeReservation

Tworzymy rezerwację dla osoby o numerze PESEL @PersonalNumber. Gdy rezerwacja jest stworzona zwracamy już istniejącą. Ta procedura jest przeznaczona dla studentów i klientów indywidualnych.

```
CREATE OR ALTER PROCEDURE MakeReservation
    @PersonalNumber varchar(50),
    @ConferenceDayId int
AS

DECLARE @client_id INT;
SELECT @client_id =  Min(Id)
FROM IndividualClients
WHERE PersonalNumber = @PersonalNumber;

DECLARE @reservation_id int;
SELECT @reservation_id = Min(Id)
FROM Reservations
WHERE ClientId = @client_id and ConferenceDayId = @ConferenceDayId;
```

```
IF @reservation_id IS NULL
    BEGIN
    INSERT INTO Reservations
        (ClientId, ConferenceDayId, ReservationDate)
    VALUES
        (@client_id, @ConferenceDayId, GETDATE() );
    SET @reservation_id = @@IDENTITY;
END

RETURN @reservation_id;
GO
```

- ## MakeReservationCorporation

Powyższe, ale dla klienta korporacyjnego.

```
/*
   Tworzymy rezerwację dla firmy o @TaxNumber
   Gdy rezerwacja jest stworzona tworzymy kolejne
*/
CREATE OR ALTER PROCEDURE MakeReservationCorporation
    @TaxNumber varchar(50),
    @ConferenceDayId int,
    @Ammount int
AS
BEGIN
DECLARE @client_id INT;
SELECT @client_id =  Min(Id)
FROM CorporateClients
WHERE TaxNumber = @TaxNumber;

BEGIN TRANSACTION

DECLARE @i int = 0
WHILE @i < @Ammount
BEGIN
    SET @i = @i + 1

    INSERT INTO Reservations (ClientId, ConferenceDayId) VALUES (@client_id,
@ConferenceDayId)
    /* your code*/
END

COMMIT;
END

GO
```

- ## AddConferenceDay

Dodaje dzień konferencji.

```
/*
    Rejestrujemy dzień konferencji do konferencji
*/
CREATE OR ALTER PROCEDURE AddConferenceDay
@ConferenceId int,
@Date datetime,
@Capacity int
AS
DECLARE @id int;

select TOP(1) @id = id from ConferenceDays where CONVERT(datE, Date) = CONVERT(DATE,
@Date);

IF @id IS NULL
BEGIN
    INSERT INTO ConferenceDays(Capacity, ConferenceId, Date) VALUES (@Capacity,
@ConferenceId, CONVERT(DATE, @Date));
    SET @id = @@IDENTITY;
END

return @id;
GO
```

- ## PayForReservationWithADate

Przyjmuje opłatę za udział w konferencji.

```
/*
    Założenie: Klient w treści przelewu wpisuje numer konferencji, gdy przelew był zły
dzwonimy do klienta i
    Założenie: Gdy rezerwacja nie istnieje rzucamy wyjątek 'RESERVATION DOES NOT
EXISTS' o kluczu 1- oznacza, że płatność ma zostać zwrócona klientowi
    Założenie: Płacimy zawsze za całość konferencji
    Założenie: Gdy płatność już istnieje rzucamy wyjątek 'RESERVATION HAS BEEN ALREADY
PAID FOR' o kluczu 2
    Założenie:Gdy klient zapłaci za dużo/za mało 'RESERVATION HAS BEEN ALREADY PAID
FOR' o kluczu 2

    Klient wpłacił płatność w dniu podanym
    W przypadku odrzucenia rzucany jest wyjątek

    ZAŁOŻENIE -
*/
CREATE OR ALTER PROCEDURE PayForReservationWithADate
    @PersonalNumber varchar(50),
    @ConferenceDayId int,
    @PaymentDate datetime,
    @Ammount decimal
AS
```

```
DECLARE @clientId INT;
SELECT @clientId = dbo.GetIndividualClientOrThrow(@PersonalNumber);

DECLARE @conferenceId int;
SELECT @conferenceId = ConferenceId from ConferenceDays where Id = @ConferenceDayId ;

DECLARE @price decimal;
select @price = dbo.GetConferencePrice(@ConferenceId, @PersonalNumber, @PaymentDate);

DECLARE @priceId int;
select @priceId = dbo.GetConferencePriceId(@ConferenceId, @PaymentDate);

DECLARE @reservationId int;
SELECT @reservationId = Id FROM Reservations WHERE ConferenceDayId = @ConferenceDayId
and ClientId = @clientId;

if @reservationId is null
BEGIN
    ;THROW 51001, 'RESERVATION DOES NOT EXISTS', 1;
END

DECLARE @reservationPaymentId int;
SELECT @reservationPaymentId = Id FROM ReservationPayments
WHERE Id = @reservationId;

IF @reservationPaymentId IS NOT null
BEGIN
    ;THROW 51002, 'RESERVATION HAS BEEN ALREADY PAID FOR', 2;
END

IF @price != @Ammount
BEGIN
    DECLARE @msg NVARCHAR(2048) = ('RESERVATION CANNOT BE PLACED - AMMOUNT DIFFERS
WITH PRICE: ' + @price);
    THROW 51003, @msg, 3;
END

INSERT INTO ReservationPayments(Id, ClientId, Amount, ConferencePricesId)
VALUES(@reservationId ,@clientId, @price, @priceId)
RETURN @reservationId;

GO
```

- ## DeleteUnpaidReservations

Procedura wykonywana codziennie. Na zapłatę klienci mają tydzień od rezerwacji na konferencję. Jeśli do tego czasu nie pojawi się opłata, rezerwacja jest anulowana.

```
/*
    Procedura wykonywana codziennie.
    Na zapłatę klienci mają tydzień od rezerwacji na konferencję. Jeśli do tego czasu
    nie pojawi się opłata, rezerwacja jest anulowana.
*/
CREATE OR ALTER PROCEDURE DeleteUnpaidReservations
AS

    DELETE R FROM Reservations R
    RIGHT JOIN ReservationPayments RP
        ON R.Id = RP.Id
    WHERE RP.Id IS NULL
        AND DATEADD(week, 1, R.ReservationDate) > GETDATE();

GO
```

- ## AddWorkshop

  Dodaje warsztat i przypisuje go do dnia konferencji.

```
  /*
   Tworzymy warsztat
*/
CREATE PROCEDURE AddWorkshop
    @ConferenceDayId int,
    @StartDate datetime,
    @EndDate datetime,
    @Name nvarchar(50)
    AS
    DECLARE @workshop_id int;

    BEGIN TRANSACTION
        INSERT INTO Workshops(StartTime, EndTime, ConferenceDayId, Name) VALUES
        (@StartDate, @EndDate, @ConferenceDayId, @Name);

        SET @workshop_id = @@IDENTITY;
    COMMIT;

    RETURN @workshop_id;
GO
```

- ## AddPriceToWorkshop

  Ustanawia cenę udziału w warsztacie.

```
CREATE PROCEDURE AddPriceToWorkshop
    @Price decimal,
    @WorkshopId int
    as

    IF @Price < 0
    BEGIN
```

```
        RETURN -1;
    END

    INSERT INTO WorkshopPrices(Id, Price) VALUES (@WorkshopId, @Price);

    RETURN @@IDENTITY;
GO
```

- ### ReserveAPlaceForAWorkshop

  Rezerwuje udział w warsztacie dla klienta.

```
CREATE PROCEDURE ReserveAPlaceForAWorkshop
    @WorkshopId int,
    @ClientId int
    as

    INSERT INTO WorkshopReservations(ClientId, WorkshopId) VALUES (@ClientId,
@WorkshopId)

    RETURN @@IDENTITY;
GO
```

Triggery

- ### DISALLOW_WORKSHOP_RESERVATION_FOR_SAME_CLIENT

  Zapewnia, że klient nie zarejestruje się na równocześnie trwające warsztaty.

```
CREATE TRIGGER DISALLOW_WORKSHOP_RESERVATION_FOR_SAME_CLIENT
ON [WorkshopReservations]
AFTER INSERT
AS

IF EXISTS (
SELECT * FROM inserted i INNER JOIN Workshops WI ON i.Id = WI.Id where
    (SELECT COUNT(*) FROM WorkshopReservations INNER JOIN Workshops WRW ON
WorkshopReservations.Id = WRW.Id
        WHERE  WI.StartTime <= WRW.StartTime AND WI.EndTime <= WRW.EndTime AND
WI.EndTime >= WRW.StartTime
    )
    > 0
)
BEGIN
RAISERROR ('Same client can not have overlapping time.', 16, 1);
ROLLBACK TRANSACTION;
RETURN
END;
```

```
GO
```

Generator danych

Generator danych został stworzony z użyciem biblioteki Bogus.

Generujemy `return conferenceFaker.GenerateLazy(2 * 3 * 12 + 5).ToList();` konferencji, co odpowiada 2 konferencjom przez trzy lata.

Każda konferencja ma regułę, że posiada do 100 miejsc `conferenceDayFaker.RuleFor(x => x.Capacity, x => x.Random.Number(100));` ponadto `var r = f.Random.Number(1, 5);` odpowiada za liczbę dni na konferencję, biblioteka gwarantuje nam rozkład normalny generowanych wartości, więc średnio będzie to 2,3 dni.

Za warsztaty odpowiada `var r2 = f.Random.Number(0, 8);` - średnio będzie 4 warsztaty na dzień, na każdy będzie od 0 do 8 warsztatów.

Za przypisanie uczestników do konferencji odpowiada fragment

```
        foreach (var conference in context.Conferences)
            {
                foreach (var day in conference.ConferenceDays)
                {
                    foreach (var reservation in day.Reservations)
                    {
                        if(faker.Random.Bool() && conference.ConferencePrices.Any())
                        {
                            var price = faker.PickRandom(conference.ConferencePrices);
                            reservation.ReservationPayment = new ReservationPayment()
                            {
                                Client = reservation.Client,
                                Amount = price.Price,
                                ConferencePrice = price,
                            };
                        }
                    }
                }
            }
```

Dla każdej stworzonej konferencji, która ma cenę (mogą być darmowe) tworzymy prezentacje i losową spłacamy. Fragment

```
    var workshops = context.Workshops.ToArray();
            foreach (var workshop in workshops)
            {
                var prices = faker.Random.Number(500);

                if (faker.Random.Bool())
                {
```

```
                var toAdd = new WorkshopPrice
                {
                    Price = faker.Random.Number(1, 400),
                };
                workshop.WorkshopPrice = toAdd;

                foreach (var res in workshop.WorkshopReservations)
                {
                    res.WorkshopReservationPayment = new WorkshopReservationPayment
                    {
                        Amount = workshop.WorkshopPrice.Price,
                    };
                }
            }
        }
```

wykonuje analogiczną operację dla warsztatu.

Stworzone zostały też metody `PopulateBuildings`, `PopulateIndividualClient`, `PopulateCorporateClient`, `PopulateStudents`, które losują poszczególne adresy, klientów, klientów korporacyjnych i studentów.

Dla klientów indywidualnych został zaimplementowany generator pesel.

```
using System;
using System.Text;

namespace AghDataBase
{
    public class PeselGenerator
    {
        private readonly Random _random;

        public PeselGenerator()
        {
            this._random = new Random();
        }

        public string Generate()
        {
            var peselStringBuilder = new StringBuilder();
            var birthDate = this.GenerateDate(1900, 2099);

            this.AppendPeselDate(birthDate, peselStringBuilder);

            peselStringBuilder.Append(this.GenerateRandomNumbers(4));


 peselStringBuilder.Append(PeselCheckSumCalculator.Calculate(peselStringBuilder.ToString())
);

            return peselStringBuilder.ToString();
        }
        public static string GetPeselMonthShiftedByYear(DateTime date)
        {
            if (date.Year < 1900 || date.Year > 2299)
            {
                throw new NotSupportedException(System.String.Format("PESEL for year: {0}
is not supported", date.Year));
            }

            var monthShift = (int)((date.Year - 1900) / 100) * 20;

            return (date.Month + monthShift).ToString("00");
        }

        private DateTime GenerateDate(int yearFrom, int yearTo)
        {
            var year = this._random.Next(yearFrom, yearTo + 1);
            var month = this._random.Next(12) + 1;
            var day = this._random.Next(DateTime.DaysInMonth(year, month)) + 1;

            return new DateTime(year, month, day);
        }

        private void AppendPeselDate(DateTime date, StringBuilder builder)
        {
            builder.Append((date.Year % 100).ToString("00"));
            builder.Append(GetPeselMonthShiftedByYear(date));
            builder.Append(date.Day.ToString("00"));
        }

        private string GenerateRandomNumbers(int numbersCount)
        {
            var maxValue = (int)Math.Pow(10, numbersCount);
            var format = "D" + numbersCount;

            return this._random.Next(maxValue).ToString(format);
        }
    }
}
```

```
using Bogus;
using System.Collections.Generic;
using System.Linq;

namespace AghDataBase
{
    internal class Program
    {
        private static PeselGenerator peselGenerator = new PeselGenerator();


        private static void Main(string[] args)
        {
            var context = new Model1Container();
            var availableBuildings = PopulateBuildings();
            var randomizeIndividualClient = PopulateIndividualClient(availableBuildings);
            var randomizeCorporateClient = PopulateCorporateClient(availableBuildings);
            var students = PopulateStudents(availableBuildings);
            var randomizeConferences = PopulateConferences(availableBuildings,
randomizeCorporateClient, students, randomizeIndividualClient);

            var employeRelation = new Faker<CorporateClientEmploye>().RuleFor(x => x.Title,
f => f.Company.CatchPhrase())
                .RuleFor(x => x.CorporateClient, f =>
f.PickRandom(randomizeCorporateClient))
                .RuleFor(x => x.IndividualClients, f =>
f.PickRandom(randomizeIndividualClient));

            context.IndividualClients.AddRange(randomizeIndividualClient);
            context.CorporateClients.AddRange(randomizeCorporateClient);
            context.Conferences.AddRange(randomizeConferences);
            context.Students.AddRange(students);
            context.CorporateClientEmployes.AddRange(employeRelation.GenerateLazy(700));
            context.SaveChanges();

            var faker = new Faker();
            var conferences = context.Conferences.ToArray();
            foreach (var conference in conferences)
            {
                var prices = faker.Random.Number(5);
                var tillDays = 0;
                var price = 0;

                for (var p = 0; p < prices; p++)
                {
                    tillDays += faker.Random.Number(1, 14);
                    var priceAddition = faker.Random.Number(1, 200);
                    price += priceAddition;
                    var toAdd = new ConferencePrices
                    {
                        TillConferenceStart = (short)tillDays,
                        Price = price
                    };
                    conference.ConferencePrices.Add(toAdd);
                }
            }
            context.SaveChanges();

            foreach (var conference in context.Conferences)
            {
                foreach (var day in conference.ConferenceDays)
                {
                    foreach (var reservation in day.Reservations)
                    {
                        if(faker.Random.Bool() && conference.ConferencePrices.Any())
                        {
```

```
                        var price = faker.PickRandom(conference.ConferencePrices);
                        reservation.ReservationPayment = new ReservationPayment()
                        {
                            Client = reservation.Client,
                            Amount = price.Price,
                            ConferencePrice = price,
                        };
                    }
                }
            }
        }

        var workshops = context.Workshops.ToArray();
        foreach (var workshop in workshops)
        {
            var prices = faker.Random.Number(500);

            if (faker.Random.Bool())
            {
                var toAdd = new WorkshopPrice
                {
                    Price = faker.Random.Number(1, 400),
                };
                workshop.WorkshopPrice = toAdd;

                foreach (var res in workshop.WorkshopReservations)
                {
                    res.WorkshopReservationPayment = new WorkshopReservationPayment
                    {
                        Amount = workshop.WorkshopPrice.Price,
                    };
                }
            }
        }
        context.SaveChanges();


    }

    private static List<Conference> PopulateConferences(List<Building> buildings,
List<CorporateClient> corporateClients, IEnumerable<Student> clients,
IEnumerable<IndividualClient> individualClients)
    {
        var conferenceDayFaker = new Faker<ConferenceDay>();
        conferenceDayFaker.RuleFor(x => x.Capacity, x => x.Random.Number(100));

        var workshopFaker = new Faker<Workshop>()
            .RuleFor(x => x.Name, f => new string(f.Hacker.Verb().Take(48).ToArray()))
            .RuleFor(x => x.WorkshopPrice, f => f.Random.Bool() ? new WorkshopPrice() {
Price = (int)f.Random.Decimal(800) } : null);

        var cls = individualClients.Concat(clients.Select(x =>
x.IndividualClient)).Select(x => x.Client).ToList();
```

```
            var conferenceFaker = new Faker<Conference>();
            conferenceFaker
                .RuleFor(x => x.Building, f => buildings[f.Random.Number(buildings.Count -
1)])
                .RuleFor(x => x.Name, f => f.Lorem.Word())
                .RuleFor(x => x.StudentDiscount, f => (byte)f.Random.Number(99))
                .RuleFor(x => x.ConferenceDays, f =>
                {

                    var list = new List<ConferenceDay>();
                    var r = f.Random.Number(1, 5);
                    var r2 = f.Random.Number(0, 8);
                    for (var i = 0; i < r; i++)
                    {
                        var date = f.Date.PastOffset(3);
                        var day = conferenceDayFaker.Generate();
                        for (var res = 0; res < f.Random.Number(day.Capacity); res++)
                        {
                            var reservation = new Reservation();
                            reservation.Client = f.PickRandom(cls);
                            day.Reservations.Add(reservation);
                        }

                        var randomDate = f.Date.RecentOffset(r, date);
                        day.Date = randomDate.Date;
                        if (list.All(x => x.Date != day.Date))
                        {
                            for (var w = 0; w < r2; w++)
                            {
                                var workshop = workshopFaker.Generate();
                                workshop.StartTime = f.Date.Between(day.Date,
day.Date.AddDays(1));

                                workshop.EndTime = f.Date.Between(workshop.StartTime,
day.Date.AddDays(1));

                                day.Workshops.Add(workshop);

                                var r3 = f.Random.Int(0, 7);
                                for (var rr3 = 0; rr3 < r3; rr3++)
                                {
                                    workshop.WorkshopReservations.Add(new
WorkshopReservation

                                    {
                                        Client = f.PickRandom(cls)
                                    });
                                }
                            }

                            list.Add(day);
                        }
                    }
                    return list;
                })
                .RuleFor(x => x.CorporateClient, f =>
corporateClients[f.Random.Number(corporateClients.Count - 1)]);

            return conferenceFaker.GenerateLazy(2 * 3 * 12 + 5).ToList();
        }

        private static List<CorporateClient> PopulateCorporateClient(List<Building>
buildings)
        {
            var clientFaker = new Faker<Client>()
                .RuleFor(x => x.Telephone, f => f.Person.Phone)
                .RuleFor(x => x.Building, f => buildings[f.Random.Number(buildings.Count -
1)]);

            var conferenceDay = new Faker<ConferenceDay>()
                .RuleFor(x => x.Date, f => f.Date.Future());

            var peselGenerator = new PeselGenerator();

            var icFaker = new Faker<CorporateClient>()
                .RuleFor(x => x.CompanyName, f => f.Company.CompanyName())
                .RuleFor(x => x.TaxNumber, f => f.Finance.Account(29))
                .RuleFor(x => x.Client, f => clientFaker.Generate());

            return icFaker.GenerateLazy(40).ToList();
        }

        private static List<IndividualClient> PopulateIndividualClient(List<Building>
buildings)
        {
            var clientFaker = new Faker<Client>()
                .RuleFor(x => x.Telephone, f => f.Person.Phone)
                .RuleFor(x => x.Building, f => buildings[f.Random.Number(buildings.Count -
1)]);


            var icFaker = new Faker<IndividualClient>();
            icFaker.RuleFor(x => x.FirstName, f => f.Name.FirstName())
            .RuleFor(x => x.LastName, f => f.Name.LastName())
            .RuleFor(x => x.PersonalNumber, f => peselGenerator.Generate())
            .RuleFor(x => x.Client, f => clientFaker.Generate());

            return icFaker.GenerateLazy(100).ToList();
        }

        private static List<Student> PopulateStudents(List<Building> buildings)
        {
            var studentFaker = new Faker<Student>();
            studentFaker
                .RuleFor(x => x.StudentId, f => new string(f.Random.Chars('0', '9', 9)))
                .RuleFor(x => x.IndividualClient, f =>
PopulateIndividualClient(buildings).First());
            return studentFaker.GenerateLazy(500).ToList();
        }

        private static List<Building> PopulateBuildings()
        {
            var availableBuildings = new List<Building>();

            var countryFaker = new Faker<Country>()
                .RuleFor(o => o.Name, f => f.Address.Country());

            var cityFaker = new Faker<City>()
                .RuleFor(o => o.Name, f => f.Address.City());

            var streetFaker = new Faker<Street>()
                .RuleFor(o => o.ZipCode, f => f.Address.ZipCode())
                .RuleFor(o => o.Name, f => f.Address.StreetName());

            var buildingFaker = new Faker<Building>()
                .RuleFor(o => o.ApartmentNumber, f => f.Random.Number(100))
                .RuleFor(o => o.Number, f => f.Address.BuildingNumber());

            var countries = countryFaker.Generate(4);

            foreach (var country in countries)
            {
                foreach (var cf in cityFaker.Generate(8))
                {
                    cf.Country = country;
                    foreach (var sf in streetFaker.Generate(5))
                    {
                        sf.City = cf;
                        foreach (var bf in buildingFaker.Generate(2))
                        {
                            bf.Street = sf;
                            availableBuildings.Add(bf);
                        }
                    }
                }
            }
            return availableBuildings;
        }


    }
}
```

Podsumowanie i wnioski

Napotkaliśmy stosunkowo dużą ilość nieoczywistych do rozwiązania problemów przy projektowaniu bazy.

Jednym z problemów było stworzenie klienta, który pokrywałby się zarówno z firmą jak i osobą w zależoności od zapotrzebowania. Zastosowaliśmy tzw. table per type, gdzie dziedziczenie implementujemy przez tabele powiązane kluczem głównym, który jednocześnie jest kluczem obcym do klucza głównego encji bazowej.

Problematyczny był również sposób przechowywania zmiennych progów cenowych w czasie.

Podsumowując projekt poszerzył naszą świadomość o złożoności i potencjalnych problemach przy projektowaniu nietrywialnych systemów bazodanowych.