

BAZA DANYCH UPROSZCZONEGO SYSTEMU BANKOWEGO

PROJEKT ZALICZENIOWY KURSU BAZY DANYCH
KONRAD BARAN, PAWEŁ MAŁECKI

Spis treści

CEL I ZAŁOŻENIA PROJEKTU.....	2
Struktura banku.....	2
Ograniczenia przyjęte przy projektowaniu.....	2
Możliwości.....	2
DIAGRAM ER.....	3
SCHEMAT BAZY DANYCH.....	3
WYPEŁNIENIE BAZY PRZYKŁADOWYM ZESTAWEM REKORDÓW	4
DODATKOWE WIĘZY INTEGRALNOŚCI DANYCH (NIE ZAPISANE W SCHEMACIE)	10
UTWORZONE INDEKSY	10
OPIS STWORZONYCH WIDOKÓW.....	10
OPIS PROCEDUR SKŁADOWANYCH	11
OPIS FUNKCJI	11
OPIS WYZWALACZY	12
TYPOWE ZAPYTANIA.....	12
Zestawienie typowych zapytań użytkownika:.....	12
Zestawienie typowych zapytań administratora:	13
Aplikacja okienkowa dla systemu.....	13
Wybór roli użytkownika:	13
Perspektywa klienta	13
Perspektywa administratora	16
OPIS SCHEDULED JOBS	17
STRATEGIE PIELĘGNACJI BAZY DANYCH (KOPIE ZAPASOWE)	17
SKRYPT TWORZĄCY BAZĘ DANYCH	18
--Utworzenie tabel.....	18
--Dodanie widoków	20
--Dodanie procedur	23
--Dodanie funkcji	31
--Dodatknie wyzwalaczy.....	34
--Dodanie Job Scheduler.....	36

CEL I ZAŁOŻENIA PROJEKTU

Celem naszego projektu było utworzenie bazy danych systemu bankowego obsługiwanej przez aplikację kliencką dla klienta banku i pracownika nadzorującego bazę tj. administratora bazy. Stworzono i zaimplementowano szereg funkcjonalności służących do jej sprawnego zarządzania z obu perspektyw.

Schematyczność w obsługiwaniu różnych typów kont, klientów, bankomatów i oddziałów pozwala na proste dodawanie nowego podmiotu do bazy, spełniając założenia dla jego typu.

Struktura banku

System działa dla wymyślanego międzynarodowego banku, posiadającego oddziały w różnych krajach. Oddziałom podlegają bankomaty, w których można przeprowadzać wpłaty i wypłaty. Klienci mają ukończone co najmniej 16 lat. Mogą posiadać wiele kont, a każde z nich może posiadać kilka kart kredytowych (w zależności od typu konta). Dozwolone są przelewy na własne konta. Karty posiadają limity tj. maksymalną sumę, którą można jednorazowo wydać.

Ograniczenia przyjęte przy projektowaniu

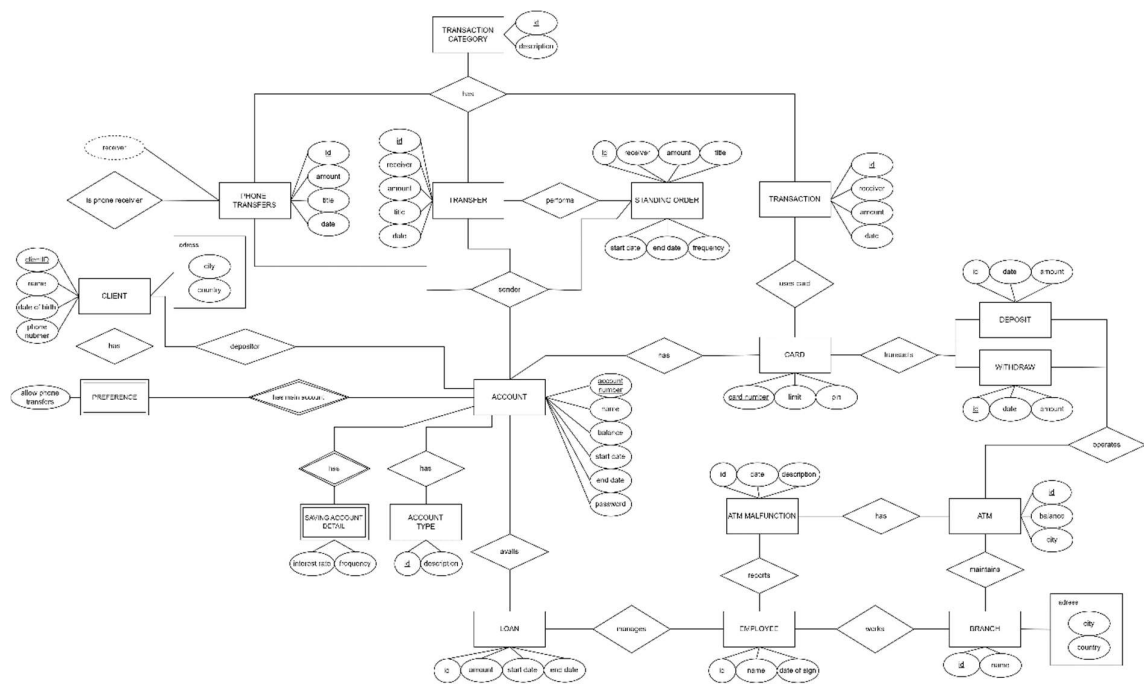
Zakładamy uproszczony system banku, w którym operacje mają naśladować ich główne zamierzenie z pominięciem szczegółów technicznych, wymagań wobec klientów (np. zdolność kredytowa) i ze znacznym uproszczeniem zabezpieczeń (dowolne hasło 20 znaków), które w prawdziwym systemie bankowym stanowią kluczowy element. Pominięciem zostało również weryfikację poprawności danych do przelewów z kontami zewnętrznymi spoza naszego systemu bankowego.

Możliwości

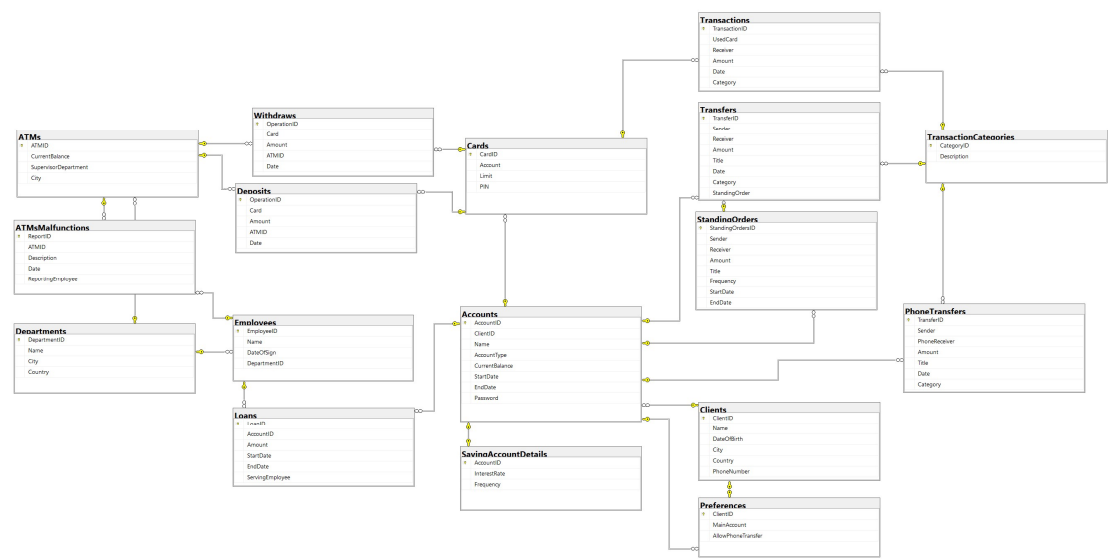
Aplikacja dla klienta pozwala na zarządzanie kontem bankowym, wykonywanie prostych przelewów oraz wpłaty i wypłaty w bankomatach lokalnych oddziałów. Możliwości przepływu pieniędzy zostały wzbogacone o przelewy na numer telefonu, przelewy na własne konto oraz zlecenie stałych przelewów. Klient z kontem typu różnym od konta dla młodzieży może również pobrać pożyczkę. Oprócz tego istnieje możliwość zmiany hasła konta lub PINu dla karty kredytowej. Wprowadziliśmy opcję sprawdzania historii konta, z uwzględnieniem uproszczonych filtrów wyszukiwania.

Ze strony administratora bazy istnieje szereg operacji służących zarządzaniem klientami oraz lokalnymi oddziałami banku. Przewidziano funkcjonalności takie jak dodawanie nowego pracownika, oddziału oraz bankomatu. Można utworzyć nowy typ konta i kategorię transakcji. Dodatkowo został zaimplementowany system pożyczek. Pracownik nadzorujący bazę może utworzyć bądź zamknąć konto dla nowego lub obecnego klienta banku, monitorować stan wszystkich kont oraz bankomatów z podziałem na różne statystyki. W razie wykrycia awarii jednego z bankomatów pracownik może zgłosić jego awarię.

DIAGRAM ER



SCHEMAT BAZY DANYCH



WYPEŁNIENIE BAZY PRZYKŁADOWYM ZESTAWEM REKORDÓW

Do celów testowania oraz zilustrowania przykładowego działania systemu utworzony został pokazny zbiór danych losowych, które spełniają założenia oraz wypełniają wszystkie tabele. Poniżej zostały przedstawione fragmenty zapytań wypełniających bazę.

```
SET IDENTITY_INSERT [Branches] ON
INSERT INTO [Branches] (BranchID, Name, City, Country) VALUES
(1, 'Branch no. 119 in Balingueo', 'Balingueo', 'Philippines'),
(2, 'Branch no. 97 in Boyle', 'Boyle', 'Ireland'),
(3, 'Branch no. 30 in Ribeiro', 'Ribeiro', 'Portugal'),
(4, 'Branch no. 96 in Manicaragua', 'Manicaragua', 'Cuba'),
(5, 'Branch no. 83 in Sulang Tengah', 'Sulang Tengah', 'Indonesia'),
(6, 'Branch no. 265 in Hidalgo', 'Hidalgo', 'Mexico'),
(7, 'Branch no. 297 in Jhumra', 'Jhumra', 'Pakistan'),
(8, 'Branch no. 259 in Kraków', 'Kraków', 'Poland'),
(9, 'Branch no. 193 in Tsiombe', 'Tsiombe', 'Madagascar'),
(10, 'Branch no. 292 in Baranowo', 'Baranowo', 'Poland'),
...
(25, 'Branch no. 47 in Hamakita', 'Hamakita', 'Japan')
SET IDENTITY_INSERT [Branches] OFF
SET IDENTITY_INSERT [Employees] ON
INSERT INTO [Employees] (EmployeeID, Name, DateOfSign, BranchID) VALUES
(1, 'Iolanthe Widdocks', CONVERT(DATE, '17.02.2007', 105), 22),
(2, 'Gus Benitti', CONVERT(DATE, '03.03.2006', 105), 15),
(3, 'Thedric Rawood', CONVERT(DATE, '19.09.2011', 105), 23),
(4, 'Xenia Balassa', CONVERT(DATE, '07.04.2019', 105), 11),
(5, 'Corinna Caldaro', CONVERT(DATE, '05.01.2003', 105), 23),
(6, 'Hilton Titmuss', CONVERT(DATE, '02.05.2005', 105), 4),
(7, 'Gibb Gert', CONVERT(DATE, '01.09.2013', 105), 22),
(8, 'Abigael Garside', CONVERT(DATE, '09.01.2005', 105), 5),
(9, 'Rosalinde Gannicliff', CONVERT(DATE, '07.12.2022', 105), 16),
(10, 'Maurita Ogger', CONVERT(DATE, '14.09.2017', 105), 11),
...
(112, 'Oren Beach', CONVERT(DATE, '16.03.2007', 105), 6)
SET IDENTITY_INSERT [Employees] OFF

SET IDENTITY_INSERT [ATMs] ON
INSERT INTO [ATMs] (ATMID, CurrentBalance, SupervisorDepartment, City) VALUES
(1, 5691, 5, 'Kalipare'),
(2, 4546, 2, 'Cobh'),
(3, 7575, 11, 'Curahpacul Satu'),
(4, 11833, 3, 'Castainço'),
(5, 1933, 5, 'Kuniran'),
(6, 4472, 21, 'Itapemirim'),
(7, 6400, 23, 'La Rochelle'),
(8, 9694, 11, 'Cimara'),
(9, 8927, 22, 'Baylo'),
(10, 2672, 5, 'Muesanaik'),
...
(87, 2014, 12, 'Czerniewice')
SET IDENTITY_INSERT [ATMs] OFF

SET IDENTITY_INSERT [ATMsMalfunctions] ON
INSERT INTO [ATMsMalfunctions] (ReportID, ATMID, [Description], [Date],
ReportingEmployee) VALUES
(1, 86, 'Faulty dispenser', CONVERT(DATE, '08-09-2013', 105), 97),
(2, 40, 'Faulty dispenser', CONVERT(DATE, '03-11-2013', 105), 59),
(3, 75, 'Worn out card reader', CONVERT(DATE, '04-09-2018', 105), 97),
(4, 43, 'Faulty dispenser', CONVERT(DATE, '08-12-2021', 105), 41),
(5, 23, 'Software glitch', CONVERT(DATE, '13-10-2022', 105), 105),
(6, 48, 'Broken keypad', CONVERT(DATE, '21-11-2012', 105), 38),
(7, 43, 'Faulty dispenser', CONVERT(DATE, '07-04-2012', 105), 33),
(8, 63, 'Receipt malfunctions', CONVERT(DATE, '01-01-2012', 105), 12),
(9, 81, 'Worn out card reader', CONVERT(DATE, '18-04-2007', 105), 14),
(10, 60, 'Broken keypad', CONVERT(DATE, '16-10-2015', 105), 13),
```

```

...
(97,60,'Software glitch',CONVERT(DATE,'11-09-2020',105),13)
SET IDENTITY_INSERT [ATMsMalfunctions] OFF

SET IDENTITY_INSERT [Clients] ON
INSERT INTO [Clients] (ClientID, Name, DateOfBirth, City, Country, PhoneNumber) VALUES
(1,'Phil Lofting',CONVERT(DATE,'30-03-1995',105),'Krajan Dua
Putukrejo','Indonesia','+62697945465'),
(2,'Filbert Bassingham',CONVERT(DATE,'21-01-1988',105),'Esperanza','Dominican
Republic','+1614187413'),
(3,'Osmond Culkin',CONVERT(DATE,'08-06-1977',105),'Tacoma','United
States','+1253714047'),
(4,'Trina Ivanyushin',CONVERT(DATE,'26-10-
2006',105),'Remas','Albania','+355363144224'),
(5,'Sukey Jack',CONVERT(DATE,'24-08-1967',105),'Raszowa','Poland','+48156764940'),
(6,'Diahann Broz',CONVERT(DATE,'09-05-2000',105),'Zhukovskiy','Russia','+7354293872'),
(7,'Gualterio Castagnaro',CONVERT(DATE,'06-09-1977',105),'Huoqiu
Chengguanzhen','China','+86775132185'),
(8,'Jorey Chumley',CONVERT(DATE,'02-12-2003',105),'Xiaohe','China','+86229326632'),
(9,'Chlo Donnett',CONVERT(DATE,'25-11-1973',105),'Hongshan','China','+86368625073'),
(10,'Laryssa Roebottom',CONVERT(DATE,'15-02-
1969',105),'Smedjebacken','Sweden','+46600402366'),
...
(250,'Bobbie Rosenthal',CONVERT(DATE,'21-01-
1988',105),'Kętrzyn','Poland','+48736787227')
SET IDENTITY_INSERT [Clients] OFF

SET IDENTITY_INSERT [AccountTypes] ON
INSERT INTO [AccountTypes] (AccountType, Description) VALUES
(1,'personal'),
(2,'for minors'),
(3,'saving'),
(4,'business')
SET IDENTITY_INSERT [AccountTypes] OFF

INSERT INTO [Accounts] VALUES
('AD9413090105NMC3VM1EDKD',1,'Cardguard',1,0,CONVERT(DATE,'22-11-
2021',105),CONVERT(DATE,'21-08-2022',105),'AHIMGGAOkpo73zRml6mI'),
('CY9215826814N5WF0EAUVLJRJNYEP',2,'Wrapsafe',4,0,CONVERT(DATE,'01-09-
2021',105),NULL,'HKSbuz0x818qw52YmZI3'),
('IS467634787117169699889043',3,'Hatity',4,0,CONVERT(DATE,'28-06-
2021',105),CONVERT(DATE,'17-11-2021',105),'uF4DGA7cB6fg30i7rrt'),
('CY12037553938HANCACNARCJXUQ2',4,'Span',3,0,CONVERT(DATE,'15-07-
2021',105),NULL,'t9Fc15AZCyWkX45gfQuH'),
('PT07106690676316508649610',4,'Wrapsafe',1,0,CONVERT(DATE,'21-10-
2021',105),NULL,'UgGj8604FBIHv0131y6m'),
('FR45266161274652TMVIVPQ5L01',5,'Bitwolf',1,0,CONVERT(DATE,'03-08-
2021',105),CONVERT(DATE,'30-03-2022',105),'E0V00r1oFG1dbh24FNSb'),
('LT696654847411372478',6,'Bitchip',1,0,CONVERT(DATE,'16-06-
2021',105),NULL,'tP5489h517q6U8ne2zI7'),
('SI97275105530910376',7,'Lotstring',3,0,CONVERT(DATE,'05-08-
2021',105),NULL,'u46Ts48r44gLa0m8Tx27'),
('ES3876567973341776820457',8,'Rank',1,0,CONVERT(DATE,'10-05-
2022',105),NULL,'s37kZAVbJ56CUWmF5aWr'),
('PT29499781625205195427425',9,'Zontrax',3,0,CONVERT(DATE,'12-07-
2021',105),NULL,'05bwYmpwi46LjrCabX1B'),
...
('SI90561448213410524',250,'Alphazap',3,0,CONVERT(DATE,'22-02-
2021',105),CONVERT(DATE,'24-08-2021',105),'w01urKZBYjFP3K7vg6Xb')

INSERT INTO [Preferences] VALUES
(1,NULL,0),
(2,'CY9215826814N5WF0EAUVLJRJNYEP',1),
(3,NULL,0),
(4,'PT07106690676316508649610',1),
(5,NULL,0),
(6,'LT696654847411372478',1),

```

```
(7, 'SI97275105530910376', 1),
(8, 'ES3876567973341776820457', 1),
(9, 'PT29499781625205195427425', 1),
(10, 'AE953455736311284747558', 1),
...
(250, NULL, 0)
```

```
INSERT INTO [Cards] VALUES
```

```
('3553394739569566', 'AD9413090105NMC3VM1EDKD', 100000, '4801'),
('5108759701882616', 'AD9413090105NMC3VM1EDKD', 100000, '3395'),
('5610448283291799', 'AD9413090105NMC3VM1EDKD', 100000, '7989'),
('6767194131657216', 'CY9215826814N5WF0EAUULRJNYEP', 100000, '7879'),
('490512906359513746', 'IS467634787117169699889043', 100000, '5203'),
('67629884540120505', 'CY12037553938HANCACNARCJXUQ2', 100000, '8448'),
('5602214913961221', 'PT07106690676316508649610', 100000, '6919'),
('3585389241553134', 'FR45266161274652TMVIVPQ5L01', 100000, '0603'),
('3553021434179678', 'FR45266161274652TMVIVPQ5L01', 100000, '4605'),
('3539594910319199', 'LT696654847411372478', 100000, '1577'),
...
('3531018699110411', 'SI90561448213410524', 100000, '0442')
```

```
SET IDENTITY_INSERT [TransactionCategories] ON
```

```
INSERT INTO [TransactionCategories] (CategoryID, Description) VALUES
```

```
(1, 'Income'),
(2, 'Housing'),
(3, 'Home Services'),
(4, 'Utilities'),
(5, 'Household Items'),
(6, 'Food'),
(7, 'Transportation'),
(8, 'Health'),
(9, 'Kids'),
(10, 'Pets'),
...
```

```
(19, 'Debt Payments')
```

```
SET IDENTITY_INSERT [TransactionCategories] OFF
```

```
SET IDENTITY_INSERT [Deposits] ON
```

```
INSERT INTO [Deposits] (OperationID, Card, Amount, ATMID, [Date]) VALUES
```

```
(1, '0604041071005273611', 2350, 28, CONVERT(DATE, '27-04-2022', 105)),
(2, '0604041071005273611', 730, 77, CONVERT(DATE, '05-04-2022', 105)),
(3, '0604208558230577674', 1910, 18, CONVERT(DATE, '01-07-2021', 105)),
(4, '0604621349629116', 1170, 10, CONVERT(DATE, '05-12-2022', 105)),
(5, '0604621349629116', 1140, 51, CONVERT(DATE, '13-05-2022', 105)),
(6, '0604621349629116', 870, 33, CONVERT(DATE, '11-08-2022', 105)),
(7, '0604621349629116', 2120, 8, CONVERT(DATE, '08-09-2021', 105)),
(8, '0604745800328270', 370, 80, CONVERT(DATE, '09-07-2021', 105)),
(9, '0604745800328270', 1330, 72, CONVERT(DATE, '29-11-2021', 105)),
(10, '0604745800328270', 860, 23, CONVERT(DATE, '12-03-2022', 105)),
...
```

```
(1365, '6771510211345444174', 1750, 24, CONVERT(DATE, '31-10-2021', 105))
```

```
SET IDENTITY_INSERT [Deposits] OFF
```

```
SET IDENTITY_INSERT [Withdraws] ON
```

```
INSERT INTO [Withdraws] (OperationID, Card, Amount, ATMID, [Date]) VALUES
```

```
(1, '6767733260832950879', 90, 13, CONVERT(DATE, '22-05-2022', 105)),
(2, '6767733260832950879', 1100, 23, CONVERT(DATE, '05-06-2022', 105)),
(3, '6767733260832950879', 460, 17, CONVERT(DATE, '20-07-2022', 105)),
(4, '6767733260832950879', 170, 56, CONVERT(DATE, '21-08-2022', 105)),
(5, '3576049661406996', 570, 22, CONVERT(DATE, '27-09-2022', 105)),
(6, '3576049661406996', 930, 84, CONVERT(DATE, '15-11-2022', 105)),
(7, '3568688788664829', 340, 63, CONVERT(DATE, '15-10-2021', 105)),
(8, '3568688788664829', 1000, 43, CONVERT(DATE, '08-07-2022', 105)),
(9, '3553394739569566', 700, 27, CONVERT(DATE, '24-01-2022', 105)),
(10, '5610448283291799', 190, 1, CONVERT(DATE, '02-02-2022', 105)),
...
```

```

(993, '3560656041219275', 130, 13, CONVERT(DATE, '20-06-2022', 105))
SET IDENTITY_INSERT [Withdraws] OFF

SET IDENTITY_INSERT [Loans] ON
INSERT INTO [Loans] (LoanID, AccountID, Amount, StartDate, EndDate, ServingEmployee)
VALUES
(1, 'AD0357942949XKSMVLBOOIBA', 30000, CONVERT(DATE, '14-01-2023', 105), CONVERT(DATE, '14-01-2023', 105), 79),
(2, 'AD3436784333NJ8STCMDIPRF', 3300, CONVERT(DATE, '25-03-2022', 105), CONVERT(DATE, '28-09-2022', 105), 2),
(3, 'AD3436784333NJ8STCMDIPRF', 39000, CONVERT(DATE, '20-07-2022', 105), CONVERT(DATE, '29-08-2022', 105), 55),
(4, 'AD6546708196DCNFM1FYRYWR', 190000, CONVERT(DATE, '11-08-2021', 105), CONVERT(DATE, '09-12-2022', 105), 15),
(5, 'AD9413090105NCMC3VM1EDKD', 10200, CONVERT(DATE, '23-03-2022', 105), CONVERT(DATE, '22-05-2022', 105), 12),
(6, 'AE208442104089089423018', 6400, CONVERT(DATE, '08-12-2022', 105), CONVERT(DATE, '12-12-2022', 105), 16),
(7, 'AL0870006466BDDYHJJGOUNQB7A6', 38000, CONVERT(DATE, '02-05-2022', 105), CONVERT(DATE, '05-05-2022', 105), 76),
(8, 'AL33908744009C521XY5QXTPUATG', 15000, CONVERT(DATE, '21-07-2022', 105), CONVERT(DATE, '14-09-2022', 105), 60),
(9, 'AL5959600739QLBVKSV5UR8L5MCU', 9700, CONVERT(DATE, '21-09-2022', 105), CONVERT(DATE, '24-10-2022', 105), 39),
(10, 'AL7735553150TGPITLB0SYRDI9PS', 43000, CONVERT(DATE, '10-03-2022', 105), CONVERT(DATE, '20-10-2022', 105), 98),
...
(202, 'TR7857618UXWCWBI4V4IUMMBD5', 3700, CONVERT(DATE, '17-03-2022', 105), CONVERT(DATE, '06-10-2022', 105), 97)
SET IDENTITY_INSERT [Loans] OFF

SET IDENTITY_INSERT [PhoneTransfers] ON
INSERT INTO [PhoneTransfers] (TransferID, Sender, PhoneReceiver, Amount, Title, [Date], Category) VALUES
(1, 'AD9413090105NCMC3VM1EDKD', '+86311454257', 24, 'globe', CONVERT(DATE, '23-03-2022', 105), 14),
(2, 'AD9413090105NCMC3VM1EDKD', '+351741434882', 255, 'painting', CONVERT(DATE, '09-08-2022', 105), 7),
(3, 'CY9215826814N5WF0EAUVLJRJNYEP', '+86247969462', 275, 'christmas ornament', CONVERT(DATE, '20-12-2021', 105), 13),
(4, 'CY9215826814N5WF0EAUVLJRJNYEP', '+63470868442', 477, 'bowl', CONVERT(DATE, '04-07-2022', 105), 6),
(5, 'CY9215826814N5WF0EAUVLJRJNYEP', '+261972212399', 74, 'duffel bag', CONVERT(DATE, '30-06-2022', 105), 14),
(6, 'IS467634787117169699889043', '+48999197762', 228, 'pedestal', CONVERT(DATE, '26-09-2021', 105), 16),
(7, 'IS467634787117169699889043', '+86170742330', 395, 'mace', CONVERT(DATE, '17-11-2021', 105), 3),
(8, 'IS467634787117169699889043', '+81388309971', 335, 'spool of ribbon', CONVERT(DATE, '08-11-2021', 105), 14),
(9, 'CY12037553938HANCACNARCJXUQ2', '+261972212399', 12, 'tiger', CONVERT(DATE, '30-10-2022', 105), 14),
(10, 'CY12037553938HANCACNARCJXUQ2', '+81509432607', 450, 'knitting needles', CONVERT(DATE, '25-07-2021', 105), 7),
...
(1000, 'MU31UEWC1168158191908027236MKS', '+62342261629', 78, 'purse', CONVERT(DATE, '31-01-2022', 105), 14)

INSERT INTO [PhoneTransfers] (TransferID, Sender, PhoneReceiver, Amount, Title, [Date], Category) VALUES
(1001, 'MU31UEWC1168158191908027236MKS', '+86965300625', 225, 'spatula', CONVERT(DATE, '15-01-2022', 105), 17),
(1002, 'MU31UEWC1168158191908027236MKS', '+7712613785', 326, 'box of chocolates', CONVERT(DATE, '03-02-2022', 105), 1),
(1003, 'MU31UEWC1168158191908027236MKS', '+967507351165', 41, 'feather', CONVERT(DATE, '09-03-2022', 105), 17),

```



```

(1004, 'CH6569821IBPATSHZIOIH', '+264343441963', 254, 'key chain', CONVERT(DATE, '02-10-2022', 105), 15),
(1005, 'CH6569821IBPATSHZIOIH', '+86533742427', 440, 'rusty nail', CONVERT(DATE, '11-04-2022', 105), 15),
(1006, 'CH6569821IBPATSHZIOIH', '+62478307271', 480, 'case', CONVERT(DATE, '09-05-2022', 105), 18),
(1007, 'CH6569821IBPATSHZIOIH', '+7586777818', 471, 'tree', CONVERT(DATE, '02-09-2022', 105), 15),
(1008, 'FR273037025062NQTUZZGL8HIC68', '+7121813198', 400, 'sheep', CONVERT(DATE, '30-05-2022', 105), 18),
(1009, 'FR273037025062NQTUZZGL8HIC68', '+63820742955', 466, 'chocolate', CONVERT(DATE, '11-06-2022', 105), 5),
(1010, 'FR273037025062NQTUZZGL8HIC68', '+351943860770', 165, 'hand mirror', CONVERT(DATE, '18-03-2022', 105), 18),
...
(1071, 'MR2233184551320834197541398', '+420145477570', 336, 'puddle', CONVERT(DATE, '12-09-2022', 105), 1)
SET IDENTITY_INSERT [PhoneTransfers] OFF

INSERT INTO [SavingAccountDetails] (AccountID, InterestRate, Frequency) VALUES
('AE236837503028130721519', 'yearly', 3.8),
('AE953455736311284747558', 'half year', 4.9),
('AT226036253155779986', 'yearly', 1.3),
('AT312563855247280428', 'monthly', 2.0),
('AT678813955725840852', 'monthly', 2.9),
('AZ32WDFXIMHARYKZEWVKS5QG5GQ7', 'monthly', 4.5),
('AZ64HEGTJCSUZBLP4MODQD5TXA2Y', 'quarter', 1.2),
('AZ73BFASX07TAC1SDXQLYB2RTNGJ', 'monthly', 3.5),
('BG13JEIC509423NAXUKOLW', 'half year', 5.4),
('BG80BGKW2232103ST3GTY6', 'half year', 3.5),
...
('VG35WZDA4882933705963825', 'quarter', 4.3)

SET IDENTITY_INSERT [Transactions] ON
INSERT INTO [Transactions] (TransactionID, UsedCard, Receiver, Amount, [Date], Category) VALUES
(1, '0604041071005273611', 'MD5860226340534482710520', 21, CONVERT(DATE, '17-04-2022', 105), 6),
(2, '3545214934208144', 'NL41MIGS2389939465', 18, CONVERT(DATE, '06-04-2021', 105), 8),
(3, '3545214934208144', 'SI98397065207785717', 573, CONVERT(DATE, '12-04-2021', 105), 4),
(4, '201694443691883', 'DE59418084112530380214', 10, CONVERT(DATE, '14-05-2021', 105), 4),
(5, '3545214934208144', 'IQ86BGCQ605758161158884', 742, CONVERT(DATE, '17-05-2021', 105), 16),
(6, '3545214934208144', 'JO33CXAK4019486286072200895281', 289, CONVERT(DATE, '23-05-2021', 105), 17),
(7, '201694443691883', 'BY91686859148228813080886167', 346, CONVERT(DATE, '27-06-2021', 105), 3),
(8, '3574144298800935', 'LV27TPYW5658482129676', 659, CONVERT(DATE, '18-08-2021', 105), 13),
(9, '0604621349629116', 'MD3516041554886658371484', 473, CONVERT(DATE, '29-08-2021', 105), 17),
(10, '6333260678108171', 'MK73620077620369144', 475, CONVERT(DATE, '03-12-2021', 105), 6),
...
(1265, '6771162572428662052', 'RS07756783329260007681', 1018, CONVERT(DATE, '25-06-2022', 105), 10)
SET IDENTITY_INSERT [Transactions] OFF

SET IDENTITY_INSERT [StandingOrders] ON
INSERT INTO [StandingOrders] (StandingOrdersID, Sender, Receiver, Amount, Title, Frequency, StartDate, EndDate) VALUES
(1, 'AD9413090105NMC3VM1EDKD', 'HU90888651622857489620287790', 53, 'Security services', 2, CONVERT(DATE, '09-04-2022', 105), CONVERT(DATE, '17-06-2022', 105)),
(2, 'CY9215826814N5WF0EAUULRJNYEP', 'TN9828137049969786960962', 241, 'Marketing services', 5, CONVERT(DATE, '22-05-2022', 105), CONVERT(DATE, '23-11-2022', 105)),
(3, 'FR45266161274652TMVIVPQ5L01', 'GR522354528C95EVZDAXCLHW06W', 354, 'Construction services', 2, CONVERT(DATE, '02-01-2022', 105), CONVERT(DATE, '18-03-2022', 105)),
(4, 'FR45266161274652TMVIVPQ5L01', 'SE2575710596688421800564', 256, 'Travel services', 5, CONVERT(DATE, '20-08-2021', 105), CONVERT(DATE, '04-02-2022', 105)),

```

```

(5, 'SI97275105530910376', 'LI93719230XAYHIGPTSWF', 447, 'Event planning
services', 14, CONVERT(DATE, '26-08-2021', 105), CONVERT(DATE, '06-11-2022', 105)),
(6, 'ES3876567973341776820457', 'BR6719619074764247260759846PC', 242, 'Security
services', 4, CONVERT(DATE, '30-06-2022', 105), CONVERT(DATE, '01-11-2022', 105)),
(7, 'SM79Q3694121719TOU8ASQA0WSB', 'FR666537258783X80MC04VFTC42', 37, 'Construction
services', 3, CONVERT(DATE, '05-01-2022', 105), CONVERT(DATE, '22-04-2022', 105)),
(8, 'AE953455736311284747558', 'FR219161520100MAECISS28QI76', 402, 'Finance
services', 2, CONVERT(DATE, '08-03-2022', 105), CONVERT(DATE, '28-05-2022', 105)),
(9, 'FI2219198455116224', 'DK1296358774419108', 166, 'Legal services', 11, CONVERT(DATE, '11-
04-2021', 105), CONVERT(DATE, '01-04-2022', 105)),
(10, 'FR980228933378SS3VLX9UACU28', 'AT406845176291948939', 319, 'Insurance
services', 2, CONVERT(DATE, '22-03-2022', 105), CONVERT(DATE, '11-06-2022', 105)),
...
(338, 'SI90561448213410524', 'PT13236191257141033561499', 233, 'Finance
services', 3, CONVERT(DATE, '05-05-2021', 105), CONVERT(DATE, '16-08-2021', 105))
SET IDENTITY_INSERT [StandingOrders] OFF

SET IDENTITY_INSERT [Transfers] ON
INSERT INTO [Transfers] (TransferID, Sender, Receiver, Amount, Title, [Date],
Category, StandingOrder) VALUES
(1, 'AD9413090105NCMC3VM1EDKD', 'FR7945763658240BDHH9XQU3Z48', 3302, 'Restaurant', CONVERT(
DATE, '06-04-2022', 105), 14, NULL),
(2, 'AD9413090105NCMC3VM1EDKD', 'AE953455736311284747558', 1157, 'Yacht', CONVERT(DATE, '16-
04-2022', 105), 11, NULL),
(3, 'AD9413090105NCMC3VM1EDKD', 'LB3423188JABVMUC6GSTMJQWP8DR', 801, 'China', CONVERT(DATE,
'07-04-2022', 105), 15, NULL),
(4, 'CY9215826814N5WF0EAUVLJRJNYEP', 'FR569310056713SC8KZOLNQYJ12', 562, 'Television', CONVE
RT(DATE, '20-09-2022', 105), 19, NULL),
(5, 'CY9215826814N5WF0EAUVLJRJNYEP', 'AT312563855247280428', 278, 'Monkey', CONVERT(DATE, '25
-05-2022', 105), 15, NULL),
(6, 'CY9215826814N5WF0EAUVLJRJNYEP', 'FR938173448585BAIZQZ14X8G91', 925, 'Morning', CONVERT(
DATE, '07-10-2022', 105), 18, NULL),
(7, 'IS467634787117169699889043', 'SM21J8226711495E7QWVSFSIA8R', 1738, 'Napkin', CONVERT(DA
TE, '16-11-2021', 105), 19, NULL),
(8, 'IS467634787117169699889043', 'CY9215826814N5WF0EAUVLJRJNYEP', 832, 'Nigeria', CONVERT(D
ATE, '05-11-2021', 105), 11, NULL),
(9, 'IS467634787117169699889043', 'FR7945763658240BDHH9XQU3Z48', 1516, 'Eye', CONVERT(DATE,
'17-11-2021', 105), 9, NULL),
(10, 'CY12037553938HANCACNARCJXUQ2', 'MU31UEWC1168158191908027236MKS', 460, 'Nail', CONVERT
(DATE, '14-11-2021', 105), 3, NULL),
...
(4374, 'SI90561448213410524', 'PT13236191257141033561499', 233, 'Finance
services', CONVERT(DATE, '06-08-2021', 105), 1, 338)
SET IDENTITY_INSERT [Transfers] OFF

```

DODATKOWE WIĘZY INTEGRALNOŚCI DANYCH (NIE ZAPISANE W SCHEMACIE)

Oprócz oczywistych więzów widocznych w kwerendach tworzących, baza posiada również niezapisane więzy integralności. W skład tych więzów wchodzi:

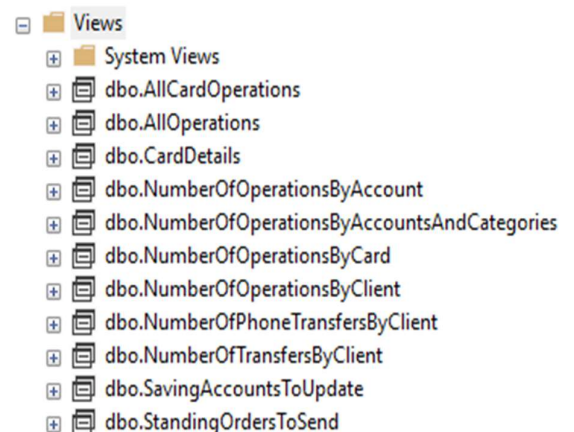
- odrzucenie wszelkich operacji, które:
 - są o niedodatniej kwocie,
 - wykonują transakcje na to samo konto,
 - wykonują transakcje o kwocie przekraczającej aktualny stan konta,
 - przy zleceniach stałych planowanie operacji o dacie mającej miejsce w przeszłości,
 - przy przelewach na telefon odbiorca musi akceptować ten typ przelewu,
 - przy transakcjach kartą wartość nie może przekroczyć limitu karty,
 - bankomat musi mieć wystarczająco dużo gotówki aby ją wypłacić,
 - konto wykonujące operację nie może być zamknięte,
- przy dodawaniu klientów, kont, kart:
 - minimalna długość hasła dla konta,
 - minimalna długość PINu dla karty,
 - minimalny wiek nowego klienta,
 - kredyt nie może kończyć się w przeszłości,
 - osoba wystawiająca kredyt musi być pracownikiem banku,
 - opisy oddziałów, imiona pracowników, nazwy miast, nazwy typów kont i typów kategorii muszą być dłuższe niż 2 znaki,
- przy zamykaniu konta trzeba podać prawidłowe hasło oraz konto musi być otwarte,
- przy zmianie PINu i hasła konta należy podać poprawne stare hasło/PIN,
- przy dodawaniu raportu o usterce bankomat i pracownik dodający muszą istnieć.

UTWORZONE INDEKSY

Więzy integralności oraz duża zależność między tablicami pozwoliła ograniczyć liczbę ręcznie utworzonych indeksów. Indeksy zostały utworzone głównie na kolumnach będących kluczami obcymi odpowiadającym numerom konta, identyfikatorach klienta oraz identyfikatorach karty. Decyzja związana jest z koniecznością częstego sprawdzania tych danych oraz z pewnością, że te dane nie ulegną zmianie. Z podobnych powodów został utworzony indeks w tabeli Clients na kolumnie PhoneNumbers, ta kolumna jako jedyna w tym zestawieniu nie jest kluczem obcym.






























OPIS STWORZONYCH WIDOKÓW

Baza obecnie posiada 11 widoków, część z nich jest wykorzystywana bezpośrednio w celu odpowiedzenia na zapytanie klienta. Pozostałe są pomocniczymi widokami wykorzystywanymi w procedurach, funkcjach itd. Wszystkie widoki skupiają się na zebraniu informacji z wielu tabel na temat konkretnego zagadnienia. Nazwy są intuicyjne, łatwo domyślić się przeznaczenia danego widoku. Przykładowo widok o nazwie „SavingAccountsToUpdate” służy zebraniu kont oszczędnościowych, których termin przyznania należności z oprocentowania wypada na aktualną datę. Z kolei „CardDetails” gromadzi informacje o operacjach dokonanych kartą (tj. wpłaty, wypłaty oraz transakcje) i wyświetla je w formacie: numer karty, kwota, data, rodzaj operacji.






















OPIS PROCEDUR SKŁADOWANYCH

Utworzonych zostało 20 procedur składowanych odpowiadających za dodawanie nowych klientów, kont, kart itd., utworzenie nowych przelewów różnego rodzaju, transakcji, zmianę limitów kart, dezaktywację kont oraz tworzenie raportów. Część z nich bazuje na utworzonych widokach. Procedury weryfikują czy dane spełniają narzucone wymagania. Przykładowe z nich to: nowy klient musi mieć ukończone 16 lat, hasło przy tworzeniu nowego konta musi mieć przynajmniej 20 znaków, PIN 4 cyfry, wartości przelewów nie mogą być ujemne, a konta z których przelewy są wysyłane nie mogą być zamknięte i posiadać odpowiednią ilość pieniędzy itd. Dodatkowo procedury „createBackup”, „checkLoans”, „checkSavingAccounts” i „checkStandingOrders” odpowiadają za wykonywanie cyklicznych operacji i tworzenie kopii zapasowych po przez automatyzację (Scheduled Jobs).

- [-]  Stored Procedures
 - [+]  System Stored Procedures
 - [+]  dbo.addAccount
 - [+]  dbo.addNewAccount
 - [+]  dbo.addNewAccountType
 - [+]  dbo.addNewATM
 - [+]  dbo.addNewBranches
 - [+]  dbo.addNewCard
 - [+]  dbo.addNewClient
 - [+]  dbo.addNewDepartments
 - [+]  dbo.addNewDeposit
 - [+]  dbo.addNewEmployee
 - [+]  dbo.addNewLoan
 - [+]  dbo.addNewPhoneTransfer
 - [+]  dbo.addNewTransaction
 - [+]  dbo.addNewTransactionCategory
 - [+]  dbo.addNewTransfer
 - [+]  dbo.addNewWithdraw
 - [+]  dbo.addStandingOrders
 - [+]  dbo.changeAccountPassword
 - [+]  dbo.changeCardLimit
 - [+]  dbo.changeCardPIN
 - [+]  dbo.checkLoans
 - [+]  dbo.checkSavingAccounts
 - [+]  dbo.checkStandingOrders
 - [+]  dbo.createBackup
 - [+]  dbo.deleteAccount
 - [+]  dbo.disactiveAccount
 - [+]  dbo.reportATMsMalfunction

OPIS FUNKCJI

Baza obecnie posiada 16 funkcji, w tym 13 funkcji zwracających tablice i 3 zwracające wartości skalarne. Podobnie jak w przypadku widoków nie wszystkie są wykorzystywane bezpośrednio w odpowiedzi na zapytanie użytkownika. Większość funkcji tablicowych służy zwracania zestawu danych konkretnie pod danego klienta, placówkę, kartę itp. Sprawia to, że późniejsze wykorzystanie takiej funkcji jest dużo szybsze i prostsze od wykonania podzapytania z dodatkowym warunkiem. Przykładowo funkcja „AccountOperationsByMonth” przyjmuje numer konta i zwraca tablicę prezentującą liczbę operacji danego konta na przestrzeni miesięcy w formacie: miesiąc, rok, liczba operacji. Z kolei funkcje skalarne wykorzystywane są przykładowo podczas procesu logowania w aplikacji klienckiej. Funkcja „IfAccountExists” zwraca wartość typu bit, w zależności czy podany numer konta faktycznie istnieje w naszej bazie, a funkcja „GetPassword” zwraca hasło w postaci NVARCHAR dla podanego numeru konta.

- [-]  Functions
 - [-]  Table-valued Functions
 - [+]  dbo.AccountHistory
 - [+]  dbo.AccountOperationsByMonth
 - [+]  dbo.ATM_MalfunctionsHistory
 - [+]  dbo.ATMOperationsByMonth
 - [+]  dbo.ClientOperationsByCard
 - [+]  dbo.ClientOperationsByCategories
 - [+]  dbo.ClientOperationsByMonth
 - [+]  dbo.ClientOperationsByOperationType
 - [+]  dbo.ClientPhoneTransfersNumber
 - [+]  dbo.ClientTransfersNumber
 - [+]  dbo.DepartmentATMsBalance
 - [+]  dbo.NumberOfOperationsByCategories
 - [+]  dbo.OnOwnAccountsTransfers
 - [-]  Scalar-valued Functions
 - [+]  dbo.GetPassword
 - [+]  dbo.GetPIN
 - [+]  dbo.IfAccountExists

OPIS WYZWALACZY

Po nastąpieniu operacji takich jak wpłaty, wypłaty, płatności kartą przelewu z konto na konto, przelewu na numer telefonu konieczne jest natychmiastowe zapewnienie spójności bazy po przez zaktualizowanie stanu kont nadawców, odbiorców bądź bankomatów. Jeżeli przelew zachodzi pomiędzy klientem naszego banku oraz banku zewnętrznego, aktualizację konta zewnętrznego pomijamy. Jeżeli klient zaciągnie kredyt na jego konto przesyłana jest kwota, którą pożyczył.

Przykładowe wyzwalacze dla operacji przelewu z konto na konto i utworzenia kredytu:

```
CREATE TRIGGER newTransfer
ON dbo.Transfers
AFTER INSERT
AS
BEGIN
    UPDATE Accounts
    SET CurrentBalance = A.CurrentBalance - i.Amount
    FROM Accounts A
    JOIN inserted i ON i.Sender = A.AccountID

    IF (SELECT TOP 1 Receiver FROM inserted ORDER BY TransferID)
        IN (SELECT AccountID FROM Accounts)
    BEGIN
        UPDATE Accounts
        SET CurrentBalance = A.CurrentBalance + i.Amount
        FROM Accounts A
        JOIN inserted i ON i.Receiver = A.AccountID
    END
END
GO

CREATE TRIGGER newLoan
ON dbo.Loans
AFTER INSERT
AS
BEGIN
    UPDATE Accounts
    SET CurrentBalance = A.CurrentBalance + i.Amount
    FROM Accounts A
    JOIN inserted i ON i.AccountID = A.AccountID
    WHERE i.EndDate > GETDATE()
END
GO
```

TYPOWE ZAPYTANIA

Zestawienie typowych zapytań użytkownika:

Opis	Kwerenda (przykład)
Przelew na konto	<code>EXEC addNewTransfer @sender='CH0777012CHPF0RNYLH5D' , @receiver='CH1618474PWEBI8QAGREI' , @amount=1 , @title = 'test' , @category=1</code>
Przelew na telefon	<code>EXEC addNewPhoneTransfer @sender='CH0777012CHPF0RNYLH5D' , @phoneReceiver='123123123' , @amount=1 , @title = '11' , @category=1</code>
Wypłata	<code>EXEC addNewWithdraw @cardID='0604041071005273611' , @amount=1 , @ATM=1</code>
Wpłata	<code>EXEC addNewDeposit @cardID='0604041071005273611' , @amount=1 , @ATM=1</code>
Dodanie stałego zlecenia	<code>EXEC addStandingOrders @sender='CH0777012CHPF0RNYLH5D' , @receiver='CH1618474PWEBI8QAGREI' , @amount=1 , @title='test' , @frequency=5 , @startDate='2023-01-19' , @endDate='2023-06-18'</code>
Zmiana hasła konta	<code>EXEC changeAccountPassword @accountID='AD0357942949XKSMVLB00IBA' , @prev_password='93q0Kz2gZGE809Q37bq4' , @new_password='01234567890123456789'</code>
Zmiana limitu na karcie	<code>EXEC changeCardLimit @cardID='0604041071005273611' , @limit=123 , @pin='3504'</code>
Zmiana PINu na karcie	<code>EXEC changeCardPIN @cardID='0604041071005273611' , @prevPIN='3504' , @newPIN='1234'</code>
Zestawienie ilości operacji z podziałem na miesiące	<code>SELECT * FROM ClientOperationsByMonth(1)</code>
Zestawienie ilości transakcji wg karty	<code>SELECT * FROM ClientOperationsByCard(1)</code>
Całkowita liczba transferów	<code>SELECT * FROM ClientTransfersNumber(1)</code>
Całkowita liczba przelewów na telefon	<code>SELECT * FROM ClientPhoneTransfersNumber(1)</code>
Zestawienie ilości operacji z podziałem wg typu operacji	<code>SELECT * FROM ClientOperationsByOperationType(1)</code>
Zestawienie przelewów na własne konto	<code>SELECT * FROM OnOwnAccountsTransfers(4)</code>
Zestawienie wszystkich operacji różnych typów	<code>SELECT * FROM AccountHistory('AD0357942949XKSMVLB00IBA')</code>

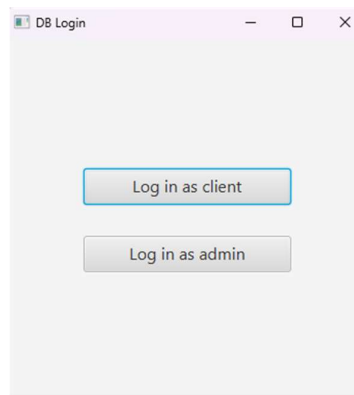
Zestawienie typowych zapytań administratora:

Opis	Kwerenda (przykład)
Dodawanie nowego klienta	<code>EXEC addNewClient @name='A B', @dateOfBirth='2000-01-01', @city='Krakow', @country='PL', @phoneNumber='123123123', @allowPhoneTransfers=1</code>
Dodawanie nowego konta bankowego	<code>EXEC addNewAccount @accountID='PL1234000012340000', @clientID=1, @name='konto', @accountType=1, @password='01234567890123456789'</code>
Dodawanie nowej karty debetowej	<code>EXEC addNewCard @cardID='123456789123456789', @accountID='AD0357942949XKSMVLB00IBA', @limit=1234, @pin='1234'</code>
Dodawanie nowego kredytu	<code>EXEC addNewLoan @accountID='AD0357942949XKSMVLB00IBA', @amount=10000000, @endDate='2050-01-01', @servingEmployee=1</code>
Dodawanie nowego oddziału bankowego	<code>EXEC addNewBranches @name='Branch no. 119 in Krakow', @city='Krakow', @country='PL'</code>
Dodanie nowego bankomatu	<code>EXEC addNewATM @currentBalance=123456, @supervisorDepartment=1, @city='ABC'</code>
Dezaktywacja konta klienckiego	<code>EXEC disactiveAccount @accountID='AD0357942949XKSMVLB00IBA', @password='01234567890123456789'</code>
Utworzenie nowego zgłoszenia usterki technicznej	<code>EXEC reportATMsMalfunction @ATMID='1', @description='Software glitch', @reportingEmployee=1</code>

Aplikacja okienkowa dla systemu

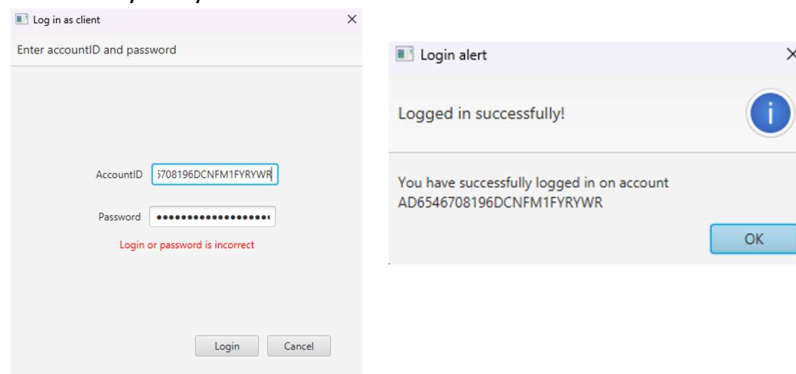
Zaimplementowano aplikację okienkową pełniącą funkcję zarówno dla klienta banku, jak i administratora. Poniżej przedstawiono podstawową obsługę systemu z poziomu aplikacji.

Wybór roli użytkownika:



Perspektywa klienta

1. Uzupełniamy dane logowania na wybrane konto. W przypadku wpisania błędnych danych aplikacja powiadomi o tym użytkownika.



2. Po poprawnym zalogowaniu, ukazuje się panel kontrolny klienta.

Client control panel

Louis Zmitruk

AD6546708196DCNFM1FYRYWR

959\$

Display account history

Display operations by month

Cards and details

Display operations by type

Display operations by categories

Choose operation...

Perform operation

Choose operation...

Change

3. Po wybraniu typu operacji z rozwijanej listy i kliknięciu przycisku „Perform operation” pojawia się okno dla stosownej operacji. W przykładzie widać operację przelewu. Wpisujemy konto odbiorcy, kwotę i tytuł przelewu, wybieramy kategorię przelewu z rozwijanej listy i zatwierdzamy przyciskiem „Done”.

The image shows two side-by-side windows from a software application. The left window, titled 'Client control panel', displays account information for 'Louis Zmitruk' with account number 'AD6546708196DCNFM1FYRYWR' and a balance of '959\$'. It contains several buttons: 'Display account history', 'Display operations by month', 'Cards and details', 'Display operations by type', 'Display operations by categories', 'Choose operation...' (highlighted with a red rectangle), and 'Perform operation'. The right window, titled 'Operation setup', has a header 'To perform Transfer insert the data below and press Done'. It contains input fields for 'Receiver', 'Amount', and 'Title', and a 'Category' dropdown menu. At the bottom right are 'Done' and 'Cancel' buttons.

4. Poniżej przykład zestawienia ilości operacji z podziałem wg typu operacji.

[illegible]

5. Poniżej przykład zestawienia ilości operacji z podziałem wg kategorii.

The screenshot shows two windows. The 'Client control panel' window displays user information for Louis Zmitruk (AD6546708196DCNFM1FYRYWR, 959\$) and a list of buttons: 'Display account history', 'Display operations by month', 'Cards and details', 'Display operations by type', and 'Display operations by categories' (highlighted with a red box). Below these are two 'Choose operation...' dropdowns and 'Perform operation' and 'Change' buttons. The 'Display query' window shows a table with the following data:

Description	Operations
Income	2
Housing	6
Home Services	4
Household Items	2
Food	1
Transportation	1
Health	1
Kids	6
Pets	1
Subscriptions	2
Clothing	3
Personal Care	1
Entertainment	8
Charitable Giving	3
Investing	1

6. Przykład zmiany limitu karty

The screenshot shows two windows. The 'Client control panel' window is identical to the one in the previous screenshot, with 'Display operations by categories' highlighted. The 'Change Limit' window displays the title 'Change Limit' and the instruction 'Choose card and enter new limit'. It features a dropdown menu showing the card number '6767733260832950879', a text input field for 'Current PIN', and another text input field for 'New limit'. At the bottom are 'OK' and 'Cancel' buttons.

Perspektywa administratora

1. Po wyborze strony jako administrator ukazuje się panel administracji podzielony na dwie kategorie: statystyki oraz procedury.

Admin control panel

Admin panel

STATISTICS

Display all operations

Display operations per account

Display operations per client

Display all operations per account with category

Display chosen account

Display number of transfer by client

Display number of phone transfer by client

Display ATM by month

Display ATM history

PROCEDURES

Report ATM malfunction

Add new client

Add new account

Add new employee


Deactivate account

Create database backup

Copyright KP2023 ®

2. Po wybraniu przycisku oznaczonego nazwą operacji pokazuje się nowe okno dialogowe, odpowiednie do wybranej operacji. Poniżej zestawienie 3 przykładowych operacji, kolejno: wyświetlenie historii wybranego bankomatu, zgłoszenie usterki bankomat oraz dodanie nowego klienta:

[illegible]

 Operation


Enter data below to report a malfunction

14. Paris 15

Malfunction description

24. Erich Batram

OKCancel

 Operation

Enter data below to add new account to client

AccountID

11. Ginger Brownjohn

Name

3. saving

Password

OKCancel

OPIS SCHEDULED JOBS

Scheduled Jobs to czynności wykonujące się automatycznie względem ustalonego wcześniej planu (schedule). W naszym projekcie istnieją 4 takie automatyczne procedury. Wiąże się to z koniecznością posiadania faktycznego serwera aktywnego całodobowo, aby Job Agent (menager automatycznych procedur) działał poprawnie. Procedury wykonywane są zgodnie z dwoma planami:

- dziennym – procedury wykonywane każdego dnia o północy,
- miesięcznym – procedury wykonywane każdego pierwszego dnia miesiąca o północy.

Obecnie obsługiwane Scheduled Jobs to:

- wykonywanie stałych zleceń,
- naliczanie odsetek kont oszczędnościowych w postaci przelewu na to konto,
- uproszczone obsługiwane kredytów (tj. usunięcie kwoty kredytu z konta w dniu jego zakończenia),
- wykonywanie regularnych kopii zapasowych bazy.

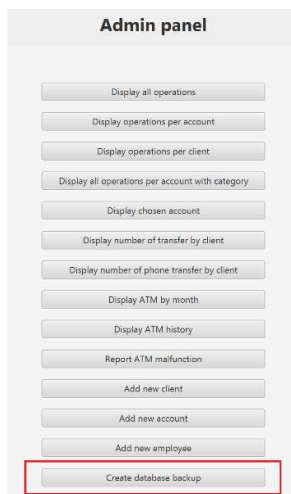
Poniżej przykład utworzenia schematów oraz procedury automatycznych backupów.

```
-- CREATING SCHEDULES
EXEC sp_add_schedule
    @schedule_name = N'Daily',
    @freq_type = 4, --daily
    @freq_interval = 1,
    @active_start_time = 000000 ; --every midnight
GO

EXEC sp_add_schedule
    @schedule_name = N'Monthly',
    @freq_type = 16, --monthly
    @freq_interval = 1, --on the 1st day of the month
    @freq_recurrence_factor = 1,
    @active_start_time = 000000 ; --every midnight
GO

-- DATABASE BACKUP
EXEC sp_add_job
    @job_name = N'monthlyBackup'
GO
EXEC sp_add_jobstep
    @job_name = N'monthlyBackup',
    @step_name = N'CreateMonthlyBackupOfDB',
    @subsystem = N'TSQL',
    @command = N'EXEC createBackup',
    @retry_attempts = 5,
    @retry_interval = 5;
GO
GO
EXEC sp_attach_schedule
    @job_name = N'monthlyBackup',
    @schedule_name = N'Monthly'
GO
```

STRATEGIE PIELĘGNACJI BAZY DANYCH (KOPIE ZAPASOWE)



Nasza baza posiada zaimplementowany system automatycznych comiesięcznych backupów. Backupy są wykonywane każdego pierwszego dnia miesiąca (dokładny opis działania w podpunkcie Scheduled Jobs). Kopie tworzone są w podanej lokalizacji, a w ich nazwie występuje data utworzenia. Backup można też wykonywać ręcznie w dowolnej chwili z poziomu panelu administratora.

```
BEGIN
DECLARE @path NVARCHAR(100) = 'C:\Users\Konrad\Desktop\BAZA BACKUP\'
DECLARE @filename NVARCHAR(100) = 'backup' + CONVERT(NVARCHAR, GETDATE(), 5) + '.bak'
DECLARE @final NVARCHAR(100) = @path + @filename

BACKUP DATABASE DBproject
TO DISK = @final
END
```

SKRYPT TWORZĄCY BAZĘ DANYCH

--Utworzenie tabel

```
CREATE TABLE [Clients] (
    [ClientID] INT IDENTITY PRIMARY KEY,
    [Name] NVARCHAR(100),
    [DateOfBirth] DATE,
    [City] NVARCHAR(100),
    [Country] NVARCHAR(100),
    [PhoneNumber] NVARCHAR(100) UNIQUE,

    INDEX IdxPhoneNumber(PhoneNumber)
)

CREATE TABLE [AccountTypes] (
    [AccountType] INT IDENTITY PRIMARY KEY,
    [Description] NVARCHAR(100)
)

CREATE TABLE [Accounts] (
    [AccountID] NVARCHAR(100) PRIMARY KEY,
    [ClientID] INT FOREIGN KEY REFERENCES [Clients] ([ClientID]),
    [Name] NVARCHAR(100),
    [AccountType] INT FOREIGN KEY REFERENCES [AccountTypes] ([AccountType]),
    [CurrentBalance] INT,
    [StartDate] DATE,
    [EndDate] DATE,
    [Password] NVARCHAR(100),

    INDEX IdxClientID(ClientID)
)

CREATE TABLE [Cards] (
    [CardID] NVARCHAR(100) PRIMARY KEY,
    [Account] NVARCHAR(100) FOREIGN KEY REFERENCES [Accounts] ([AccountID]),
    [Limit] INT,
    [PIN] NVARCHAR(100)
)

CREATE TABLE [Preferences] (
    [ClientID] INT FOREIGN KEY REFERENCES [Clients] ([ClientID]),
    [MainAccount] NVARCHAR(100) FOREIGN KEY REFERENCES [Accounts] ([AccountID]),
    [AllowPhoneTransfer] BIT,

    INDEX IdxClientID(ClientID),
    INDEX IdxAccountID(MainAccount)
)

CREATE TABLE [SavingAccountDetails] (
    [AccountID] NVARCHAR(100) FOREIGN KEY REFERENCES [Accounts] ([AccountID]),
    [InterestRate] NVARCHAR(100),
    [Frequency] FLOAT,

    INDEX IdxAccountID(AccountID)
)

CREATE TABLE [Branches] (
    [BranchID] INT IDENTITY PRIMARY KEY,
    [Name] NVARCHAR(100),
    [City] NVARCHAR(100),
    [Country] NVARCHAR(100)
)
```

```

CREATE TABLE [Employees] (
    [EmployeeID] INT IDENTITY PRIMARY KEY,
    [Name] NVARCHAR(100),
    [DateOfSign] DATE,
    [BranchID] INT FOREIGN KEY REFERENCES [Branches] ([BranchID])
)

CREATE TABLE [Loans] (
    [LoanID] INT IDENTITY PRIMARY KEY,
    [AccountID] NVARCHAR(100) FOREIGN KEY REFERENCES [Accounts] ([AccountID]),
    [Amount] MONEY,
    [StartDate] DATE,
    [EndDate] DATE,
    [ServingEmployee] INT FOREIGN KEY REFERENCES [Employees] ([EmployeeID]),

    INDEX IdxAccountID(AccountID)
)

CREATE TABLE [ATMs] (
    [ATMID] INT IDENTITY PRIMARY KEY,
    [CurrentBalance] INT,
    [SupervisorDepartment] INT REFERENCES [Branches] ([BranchID]),
    [City] NVARCHAR(100)
)

CREATE TABLE [ATMsMalfunctions] (
    [ReportID] INT IDENTITY PRIMARY KEY,
    [ATMID] INT FOREIGN KEY REFERENCES [ATMs] ([ATMID]),
    [Description] NVARCHAR(100),
    [Date] DATE,
    [ReportingEmployee] INT FOREIGN KEY REFERENCES [Employees] ([EmployeeID])
)

CREATE TABLE [Withdraws] (
    [OperationID] INT IDENTITY PRIMARY KEY,
    [Card] NVARCHAR(100) FOREIGN KEY REFERENCES [Cards] ([CardID]),
    [Amount] MONEY,
    [ATMID] INT FOREIGN KEY REFERENCES [ATMs] ([ATMID]),
    [Date] DATE,

    INDEX IdxCardID(Card)
)

CREATE TABLE [Deposits] (
    [OperationID] INT IDENTITY PRIMARY KEY,
    [Card] NVARCHAR(100) FOREIGN KEY REFERENCES [Cards] ([CardID]),
    [Amount] MONEY,
    [ATMID] INT FOREIGN KEY REFERENCES [ATMs] ([ATMID]),
    [Date] DATE,

    INDEX IdxCardID(Card)
)

CREATE TABLE [TransactionCategories] (
    [CategoryID] INT IDENTITY PRIMARY KEY,
    [Description] NVARCHAR(100)
)

CREATE TABLE [StandingOrders] (
    [StandingOrdersID] INT IDENTITY PRIMARY KEY,
    [Sender] NVARCHAR(100) FOREIGN KEY REFERENCES [Accounts] ([AccountID]),
    [Receiver] NVARCHAR(100),
    [Amount] MONEY,
    [Title] NVARCHAR(100),
    [Frequency] INT,
    [StartDate] DATE,
    [EndDate] DATE,

```

```

    INDEX IdxAccountID(Sender)
)

CREATE TABLE [Transfers] (
    [TransferID] INT IDENTITY PRIMARY KEY,
    [Sender] NVARCHAR(100) FOREIGN KEY REFERENCES [Accounts] ([AccountID]),
    [Receiver] NVARCHAR(100),
    [Amount] MONEY,
    [Title] NVARCHAR(100),
    [Date] DATE,
    [Category] INT FOREIGN KEY REFERENCES [TransactionCategories] ([CategoryID]),
    [StandingOrder] INT FOREIGN KEY REFERENCES [StandingOrders] ([StandingOrdersID]),

    INDEX IdxAccountID(Sender)
)

CREATE TABLE [Transactions] (
    [TransactionID] INT IDENTITY PRIMARY KEY,
    [UsedCard] NVARCHAR(100) FOREIGN KEY REFERENCES [Cards] ([CardID]),
    [Receiver] NVARCHAR(100),
    [Amount] MONEY,
    [Date] DATE,
    [Category] INT FOREIGN KEY REFERENCES [TransactionCategories] ([CategoryID]),

    INDEX IdxCARDID(UsedCard)
)

CREATE TABLE [PhoneTransfers] (
    [TransferID] INT IDENTITY PRIMARY KEY,
    [Sender] NVARCHAR(100) FOREIGN KEY REFERENCES [Accounts] ([AccountID]),
    [PhoneReceiver] NVARCHAR(100),
    [Amount] MONEY,
    [Title] NVARCHAR(100),
    [Date] DATE,
    [Category] INT FOREIGN KEY REFERENCES [TransactionCategories] ([CategoryID])
)

--Dodanie widoków
IF OBJECT_ID('SavingAccountsToUpdate', 'V') IS NOT NULL
DROP VIEW SavingAccountsToUpdate
GO
CREATE VIEW SavingAccountsToUpdate AS(
    SELECT *
    FROM(
        SELECT SAD.*, A.CurrentBalance,
        CASE
            WHEN InterestRate = 'half year' THEN IIF(MONTH(A.StartDate) % 6 IN
(MONTH(GETDATE()), 0), 0, 1)
            WHEN InterestRate = 'quarter' THEN IIF(MONTH(A.StartDate) % 3 IN
(MONTH(GETDATE()), 0), 0, 1)
            WHEN InterestRate = 'yearly' THEN IIF(MONTH(A.StartDate) =
MONTH(GETDATE()), 0, 1)
            ELSE 0
        END 'mod'
        FROM SavingAccountDetails SAD
        JOIN Accounts A ON A.AccountID = SAD.AccountID
        WHERE A.EndDate IS NULL
    ) SUB
    WHERE mod = 0
)
GO

IF OBJECT_ID('StandingOrdersToSend', 'V') IS NOT NULL
DROP VIEW StandingOrdersToSend

```

```

GO
CREATE VIEW StandingOrdersToSend AS(
    SELECT *
    FROM StandingOrders
    WHERE StartDate <= CAST(GETDATE() AS Date) AND CAST(GETDATE() AS Date) <= EndDate
        AND DAY(StartDate) = DAY(GETDATE())
)
GO

IF OBJECT_ID('CardDetails', 'V') IS NOT NULL
DROP VIEW CardDetails
GO
CREATE VIEW CardDetails AS(
SELECT DISTINCT Card,
    COUNT(Amount) OVER(PARTITION BY Card) 'Operations',
    SUM(Amount) OVER(PARTITION BY Card) 'Value'
FROM(
    SELECT Card, Amount, [Date]
    FROM Withdraws
    UNION ALL
    SELECT Card, Amount, [Date]
    FROM Deposits
    UNION ALL
    SELECT UsedCard, Amount, [Date]
    FROM Transactions
) CardOperations
)
GO

IF OBJECT_ID('AllOperations', 'V') IS NOT NULL
DROP VIEW AllOperations
GO
CREATE VIEW AllOperations AS(
    SELECT AccountID, Date, -Amount 'Amount', 'Withdraw' 'Operation'
    FROM Withdraws W
    JOIN Cards C ON C.CardID = W.Card
    JOIN Accounts A ON A.AccountID = C.Account
    UNION ALL
    SELECT AccountID, Date, Amount, 'Deposit' 'Operation'
    FROM Deposits D
    JOIN Cards C ON C.CardID = D.Card
    JOIN Accounts A ON A.AccountID = C.Account
    UNION ALL
    SELECT AccountID, Date, -Amount 'Amount', 'Made transaction' 'Operation'
    FROM Transactions T
    JOIN Cards C ON C.CardID = T.UsedCard
    JOIN Accounts A ON A.AccountID = C.Account
    UNION ALL
    SELECT AccountID, Date, Amount, 'Recived transaction' 'Operation'
    FROM Transactions T
    JOIN Accounts A ON A.AccountID = T.Receiver
    UNION ALL
    SELECT AccountID, Date, -Amount 'Amount', 'Made transfer' 'Operation'
    FROM Transfers T
    JOIN Accounts A ON A.AccountID = T.Sender
    UNION ALL
    SELECT AccountID, Date, Amount, 'Recived transfer' 'Operation'
    FROM Transfers T
    JOIN Accounts A ON A.AccountID = T.Receiver
    UNION ALL
    SELECT AccountID, Date, -Amount 'Amount', 'Made phone transfer' 'Operation'
    FROM PhoneTransfers PT
    JOIN Accounts A ON A.AccountID = PT.Sender
    UNION ALL
    SELECT MainAccount, Date, Amount, 'Recived phone transfer' 'Operation'
    FROM PhoneTransfers PT
    JOIN Clients C ON C.PhoneNumber = PT.PhoneReceiver

```

```

        JOIN Preferences P ON P.ClientID = C.ClientID
    )
GO

IF OBJECT_ID('NumberOfOperationsByAccount', 'V') IS NOT NULL
DROP VIEW NumberOfOperationsByAccount
GO
CREATE VIEW NumberOfOperationsByAccount AS
    SELECT Account, COUNT(*) 'Operations'
    FROM(
        SELECT Amount, [Date], Sender AS [Account]
        FROM Transfers
        UNION ALL
        SELECT Amount, [Date], Receiver AS [Account]
        FROM Transfers
        UNION ALL
        SELECT Amount, [Date], (SELECT Account FROM Cards WHERE CardID = T.UsedCard)
    AS [Account]
    FROM Transactions T
        UNION ALL
        SELECT Amount, [Date], Receiver AS [Account]
        FROM Transactions T
        UNION ALL
        SELECT Amount, [Date], Sender AS [Account]
        FROM PhoneTransfers PT
        UNION ALL
        SELECT Amount, [Date], (SELECT MainAccount FROM Preferences P
                                JOIN Clients C ON C.ClientID =
P.ClientID
                                WHERE C.PhoneNumber =
PT.PhoneReceiver) AS [Account]
        FROM PhoneTransfers PT
    ) AccountOperations
    WHERE Account IS NOT NULL
    GROUP BY Account
GO

IF OBJECT_ID('NumberOfOperationsByClient', 'V') IS NOT NULL
DROP VIEW NumberOfOperationsByClient
GO
CREATE VIEW NumberOfOperationsByClient AS
    SELECT A.ClientID, SUM(N.Operations) AS 'Operations'
    FROM NumberOfOperationsByAccount N
    JOIN Accounts A ON A.AccountID = N.Account
    GROUP BY A.ClientID
GO

IF OBJECT_ID('NumberOfOperationsByAccountsAndCategories', 'V') IS NOT NULL
DROP VIEW NumberOfOperationsByAccountsAndCategories
GO
CREATE VIEW NumberOfOperationsByAccountsAndCategories AS
    SELECT Account, Category, COUNT(*) 'Operations'
    FROM(
        SELECT Category, Amount, [Date], Sender AS [Account]
        FROM Transfers
        UNION ALL
        SELECT Category, Amount, [Date], Receiver AS [Account]
        FROM Transfers
        UNION ALL
        SELECT Category, Amount, [Date], (SELECT Account FROM Cards WHERE CardID =
T.UsedCard) AS [Account]
        FROM Transactions T
        UNION ALL
        SELECT Category, Amount, [Date], Receiver AS [Account]
        FROM Transactions T
        UNION ALL
        SELECT Category, Amount, [Date], Sender AS [Account]

```

```

        FROM PhoneTransfers PT
        UNION ALL
        SELECT Category, Amount, [Date], (SELECT MainAccount FROM Preferences P
                                           JOIN Clients C ON
C.ClientID = P.ClientID
                                           WHERE
C.PhoneNumber = PT.PhoneReceiver) AS [Account]
        FROM PhoneTransfers PT
    ) AccountOperations
    WHERE Account IS NOT NULL
    GROUP BY Category, Account
GO

IF OBJECT_ID('NumberOfTransfersByClient', 'V') IS NOT NULL
DROP VIEW NumberOfTransfersByClient
GO
CREATE VIEW NumberOfTransfersByClient AS
    SELECT A.ClientID, COUNT(T.[Account]) AS 'Operations'
    FROM (SELECT Sender AS [Account]
          FROM Transfers
          UNION ALL
          SELECT Receiver AS [Account]
          FROM Transfers) T
    JOIN Accounts A ON A.AccountID = T.Account
    GROUP BY A.ClientID
GO

IF OBJECT_ID('NumberOfPhoneTransfersByClient', 'V') IS NOT NULL
DROP VIEW NumberOfPhoneTransfersByClient
GO
CREATE VIEW NumberOfPhoneTransfersByClient AS
    SELECT ClientID, COUNT(PT.ClientID) AS 'Operations'
    FROM (SELECT ClientID
          FROM PhoneTransfers tmpPT
          JOIN Accounts A ON A.AccountID = tmpPT.Sender
          UNION ALL
          SELECT ClientID
          FROM PhoneTransfers tmpPT
          JOIN Clients C ON C.PhoneNumber = tmpPT.PhoneReceiver
          ) PT
    GROUP BY ClientID
GO

IF OBJECT_ID('NumberOfOperationsByCard', 'V') IS NOT NULL
DROP VIEW NumberOfOperationsByCard
GO
CREATE VIEW NumberOfOperationsByCard AS(
    SELECT Card,
           COUNT(*) 'Operations'
    FROM(
        SELECT Card, Amount, [Date]
        FROM Withdraws
        UNION ALL
        SELECT Card, Amount, [Date]
        FROM Withdraws
        UNION ALL
        SELECT UsedCard, Amount, [Date]
        FROM Transactions
    ) CardOperations
    GROUP BY Card
)
GO

--Dodanie procedur
DROP PROCEDURE addNewClient
GO
CREATE PROCEDURE addNewClient

```



```

@name NVARCHAR(100),
@dateOfBirth DATE,
@city NVARCHAR(100),
@country NVARCHAR(100),
@phoneNumber NVARCHAR(100),
@allowPhoneTransfers BIT
AS
BEGIN
    IF @dateOfBirth > GETDATE()
        RAISERROR('Date of Birth can not be in the future', 17, 1)
    ELSE IF @dateOfBirth > CAST DATEADD(YEAR, -16, GETDATE()) AS DATE
        RAISERROR('Client must be older than the age of 16 ', 17, 1)
    ELSE
        BEGIN
            INSERT INTO Clients VALUES
                (@name, @dateOfBirth, @city, @country, @phoneNumber);

            INSERT INTO Preferences VALUES
                (@@IDENTITY, NULL, @allowPhoneTransfers)
        END
END
GO

DROP PROCEDURE IF EXISTS addNewAccount
GO
CREATE PROCEDURE addNewAccount
@accountID NVARCHAR(100),
@clientID INT,
@name NVARCHAR(100),
@accountType INT,
@password NVARCHAR(100),
@interestRate FLOAT = 1.0,
@frequency NVARCHAR(100) = 'monthly'
AS
BEGIN
    IF LEN(@password) < 20
        RAISERROR('Password not strong enough', 17, 1);
    ELSE
        BEGIN
            INSERT INTO Accounts VALUES
                (@accountID, @clientID, @name, @accountType, 0, CAST(GETDATE() AS Date),
NULL, @password)

            IF (SELECT MainAccount FROM Preferences WHERE ClientID = @clientID) IS
NULL
                BEGIN
                    UPDATE Preferences
                    SET MainAccount = @accountID
                    WHERE ClientID = @clientID
                END

            IF @accountType = 3
                BEGIN
                    INSERT INTO SavingAccountDetails VALUES
                        (@accountID, @interestRate, @frequency)
                END
        END
END
GO

DROP PROCEDURE IF EXISTS addNewCard
GO
CREATE PROCEDURE addNewCard
@cardID NVARCHAR(100),
@accountID NVARCHAR(100),
@limit INT,
@pin NVARCHAR(100)

```

```

AS
BEGIN
    IF NOT EXISTS (SELECT AccountID FROM Accounts WHERE AccountID = @accountID)
        RAISERROR('Account does not exist',17,1);
    ELSE IF (SELECT EndDate FROM Accounts WHERE AccountID = @accountID) IS NOT NULL
        RAISERROR('Account has been closed', 17 ,1)
    ELSE IF LEN(@pin) <> 4
        RAISERROR('Incorrect pin',17,1);
    ELSE IF @limit < 0
        RAISERROR('Incorrect limit',17,1);
    ELSE
        INSERT INTO Cards VALUES
            (@cardID, @accountID, @limit, @pin);
END
GO

DROP PROCEDURE IF EXISTS addNewTransfer
GO
CREATE PROCEDURE addNewTransfer
@sender NVARCHAR(100),
@receiver NVARCHAR(100),
@amount MONEY,
@title NVARCHAR(100),
@category INT
AS
BEGIN
    IF NOT EXISTS (SELECT AccountID FROM Accounts WHERE AccountID = @sender)
        RAISERROR('Account does not exist',17,1);
    ELSE IF (SELECT EndDate FROM Accounts WHERE AccountID = @sender) IS NOT NULL
        RAISERROR('Account has been closed', 17 ,1)
    ELSE IF @amount <= 0
        RAISERROR('Incorrect amount',17,1)
    ELSE IF ( SELECT CurrentBalance
                FROM Accounts
                WHERE AccountID = @sender ) < @amount
        RAISERROR('Not enough funds',17,1)
    ELSE IF @sender = @receiver
        RAISERROR('Incorrect operation',17,1)
    ELSE
        INSERT INTO Transfers VALUES
            (@sender, @receiver, @amount, @title, CAST(GETDATE() AS Date), @category,
NULL)
END
GO

DROP PROCEDURE IF EXISTS addNewPhoneTransfer
GO
CREATE PROCEDURE addNewPhoneTransfer
@sender NVARCHAR(100),
@phoneReceiver NVARCHAR(100),
@amount MONEY,
@title NVARCHAR(100),
@category INT
AS
BEGIN
    IF NOT EXISTS (SELECT AccountID FROM Accounts WHERE AccountID = @sender)
        RAISERROR('Account does not exist',17,1);
    ELSE IF (SELECT EndDate FROM Accounts WHERE AccountID = @sender) IS NOT NULL
        RAISERROR('Account has been closed', 17 ,1)
    ELSE IF @amount <= 0
        RAISERROR('Incorrect amount',17,1)
    ELSE IF ( SELECT CurrentBalance
                FROM Accounts
                WHERE AccountID = @sender ) < @amount
        RAISERROR('Not enough funds',17,1)
    ELSE IF ( SELECT AllowPhoneTransfer
                FROM Preferences P

```

```

        JOIN Clients C ON C.ClientID = P.ClientID
        WHERE C.PhoneNumber = @phoneReceiver ) = 0
        RAISERROR('Receiver does not accept phoneTransfers',17,1)
ELSE IF ( SELECT MainAccount
        FROM Preferences P
        JOIN Clients C ON C.ClientID = P.ClientID
        WHERE C.PhoneNumber = @phoneReceiver ) = @sender
        RAISERROR('Incorrect operation',17,1)
ELSE
    INSERT INTO PhoneTransfers VALUES
        (@sender, @phoneReceiver, @amount, @title, CAST(GETDATE() AS Date),
@category)
END
GO

DROP PROCEDURE IF EXISTS addNewTransaction
GO
CREATE PROCEDURE addNewTransaction
@cardID NVARCHAR(100),
@receiver NVARCHAR(100),
@amount MONEY,
@title NVARCHAR(100),
@category INT
AS
BEGIN
    IF @amount <= 0
        RAISERROR('Incorrect amount', 17 ,1)
    ELSE IF (SELECT EndDate FROM Accounts JOIN Cards ON Account = AccountID WHERE
CardID = @cardID) IS NOT NULL
        RAISERROR('Account has been closed', 17 ,1)
    ELSE IF @amount > (
        SELECT CurrentBalance
        FROM Accounts A
        JOIN Cards C ON C.Account = A.AccountID
        WHERE C.CardID = @cardID)
        RAISERROR('Not enough funds', 17, 1)
    ELSE IF @amount > (SELECT Limit FROM Cards WHERE CardID = @cardID)
        RAISERROR('Amount greater then card limit',17,1)
    ELSE IF @receiver = (SELECT Account FROM Cards WHERE CardID = @cardID)
        RAISERROR('Incorrect operation', 17, 1)
    ELSE
        INSERT INTO Transactions VALUES
            (@cardID, @receiver, @amount, GETDATE(), @category)
END
GO

DROP PROCEDURE IF EXISTS addNewWithdraw
GO
CREATE PROCEDURE addNewWithdraw
@cardID NVARCHAR(100),
@amount MONEY,
@ATM INT
AS
BEGIN
    IF @amount <= 0
        RAISERROR('Incorrect amount',17,1)
    ELSE IF (SELECT EndDate FROM Accounts JOIN Cards ON Account = AccountID WHERE
CardID = @cardID) IS NOT NULL
        RAISERROR('Account has been closed', 17 ,1)
    ELSE IF NOT EXISTS(SELECT * FROM ATMs WHERE ATMID = @ATM)
        RAISERROR('ATM does not exist',17,1)
    ELSE IF @amount > (SELECT CurrentBalance FROM ATMs WHERE ATMID = @ATM)
        RAISERROR('ATM does not have enough funds',17,1)
    ELSE IF @amount > (
        SELECT CurrentBalance
        FROM Accounts A
        JOIN Cards C ON C.Account = A.AccountID

```

```

        WHERE C.CardID = @cardID)
        RAISERROR('Not enough funds',17,1)
    ELSE
        INSERT INTO Withdraws VALUES
        (@cardID, @amount, @ATM, GETDATE())
END
GO

DROP PROCEDURE IF EXISTS addNewDeposit
GO
CREATE PROCEDURE addNewDeposit
@cardID NVARCHAR(100),
@amount MONEY,
@ATM INT
AS
BEGIN
    IF @amount <= 0
        RAISERROR('Incorrect amount',17,1)
    ELSE IF (SELECT EndDate FROM Accounts JOIN Cards ON Account = AccountID WHERE
CardID = @cardID) IS NOT NULL
        RAISERROR('Account has been closed', 17 ,1)
    ELSE IF NOT EXISTS(SELECT * FROM ATMs WHERE ATMID = @ATM)
        RAISERROR('ATM does not exist',17,1)
    ELSE
        INSERT INTO Deposits VALUES
        (@cardID, @amount, @ATM, GETDATE())
END
GO

DROP PROCEDURE IF EXISTS addStandingOrders
GO
CREATE PROCEDURE addStandingOrders
@sender NVARCHAR(100),
@receiver NVARCHAR(100),
@amount MONEY,
@title NVARCHAR(100),
@frequency INT,
@startDate DATE,
@endDate DATE
AS
BEGIN
    IF NOT EXISTS (SELECT AccountID FROM Accounts WHERE AccountID = @sender)
        RAISERROR('Account does not exist',17,1);
    ELSE IF (SELECT EndDate FROM Accounts WHERE AccountID = @sender) IS NOT NULL
        RAISERROR('Account has been closed', 17 ,1)
    ELSE IF @sender = @receiver OR @endDate = @startDate
        RAISERROR('Incorrect operation',17,1)
    ELSE IF @amount <= 0
        RAISERROR('Incorrect amount',17,1)
    ELSE IF @frequency <= 0 OR @frequency > (DATEDIFF(day, @startDate, @endDate))
        RAISERROR('Incorrect frequency',17,1)
    ELSE IF @startDate < GETDATE()
        RAISERROR('Start date can not be in the past', 17, 1)
    ELSE IF @endDate < GETDATE()
        RAISERROR('End date can not be in the past', 17, 1)
    ELSE
        INSERT INTO StandingOrders VALUES
        (@sender, @receiver, @amount, @title, @frequency, @startDate, @endDate)
END
GO

DROP PROCEDURE IF EXISTS addNewLoan
GO
CREATE PROCEDURE addNewLoan
@accountID NVARCHAR(100),
@amount MONEY,
@endDate DATE,

```

```

@servingEmployee INT
AS
BEGIN
    IF NOT EXISTS (SELECT AccountID FROM Accounts WHERE AccountID = @accountID)
        RAISERROR('Account does not exist',17,1);
    ELSE IF (SELECT EndDate FROM Accounts WHERE AccountID = @accountID) IS NOT NULL
        RAISERROR('Account has been closed', 17 ,1)
    ELSE IF (SELECT AccountType FROM Accounts WHERE AccountID = @accountID) = 2
        RAISERROR('Incorrect account type', 17 ,1)
    ELSE IF @amount <= 0
        RAISERROR('Incorrect amount', 17 ,1)
    ELSE IF NOT EXISTS(SELECT * FROM Employees WHERE EmployeeID = @servingEmployee)
        RAISERROR('Employee does not exist',17,1)
    ELSE IF @endDate < GETDATE()
        RAISERROR('Date can not be in the past', 17, 1)
    ELSE
        INSERT INTO Loans VALUES
            (@accountID, @amount, GETDATE(), @endDate, @servingEmployee)
END
GO

DROP PROCEDURE IF EXISTS addNewBranches
GO
CREATE PROCEDURE addNewBranches
@name NVARCHAR(100),
@city NVARCHAR(100),
@country NVARCHAR(100)
AS
BEGIN
    IF LEN(@name) < 2 OR LEN(@city) < 2 OR LEN(@country) < 2
        RAISERROR('To short parameters', 17, 1)
    ELSE
        INSERT INTO Branches VALUES
            (@name, @city, @country)
END
GO

DROP PROCEDURE IF EXISTS addNewEmployee
GO
CREATE PROCEDURE addNewEmployee
@name NVARCHAR(100),
@dateOfSign DATE,
@BranchID INT
AS
BEGIN
    IF LEN(@name) < 2
        RAISERROR('To short name', 17, 1)
    ELSE IF @dateOfSign > GETDATE()
        RAISERROR('Date can not be in the future', 17, 1)
    ELSE
        INSERT INTO Employees VALUES
            (@name, @dateOfSign, @BranchID)
END
GO

DROP PROCEDURE IF EXISTS addNewATM
GO
CREATE PROCEDURE addNewATM
@currentBalance INT,
@supervisorDepartment INT,
@city NVARCHAR(100)
AS
BEGIN
    IF LEN(@city) < 2
        RAISERROR('To short city name', 17, 1)
    ELSE IF @currentBalance < 0
        RAISERROR('Incorrect current balance', 17, 1)

```

```

        ELSE
            INSERT INTO ATMs VALUES
                (@currentBalance, @supervisorDepartment, @city)
    END
GO

DROP PROCEDURE IF EXISTS addNewAccountType
GO
CREATE PROCEDURE addNewAccountType
    @description NVARCHAR(100)
AS
BEGIN
    IF LEN(@description) >= 2
        INSERT INTO AccountTypes VALUES
            (@description)
    ELSE
        RAISERROR('To short description', 17, 1)
END
GO

DROP PROCEDURE IF EXISTS addNewTransactionCategory
GO
CREATE PROCEDURE addNewTransactionCategory
    @description NVARCHAR(100)
AS
BEGIN
    IF LEN(@description) >= 2
        INSERT INTO TransactionCategories VALUES
            (@description)
    ELSE
        RAISERROR('To short description', 17, 1)
END
GO

DROP PROCEDURE IF EXISTS disactiveAccount
GO
CREATE PROCEDURE disactiveAccount
    @accountID NVARCHAR(100),
    @password NVARCHAR(100)
AS
BEGIN
    IF NOT EXISTS (SELECT AccountID FROM Accounts WHERE AccountID = @accountID)
        RAISERROR('Account does not exist', 17, 1);
    ELSE IF (SELECT EndDate FROM Accounts WHERE AccountID = @accountID) IS NOT NULL
        RAISERROR('Account is disactivated', 17, 1);
    ELSE IF @password <> (SELECT Password FROM Accounts WHERE AccountID =
@accountID)
        RAISERROR('Password is not correct', 17, 1);
    ELSE
        BEGIN
            DECLARE @clientID INT
            SET @clientID = (SELECT A.ClientID FROM Accounts A WHERE A.AccountID =
@accountID)
            IF ( SELECT MainAccount FROM Preferences WHERE ClientID = @clientID) =
@accountID
                BEGIN
                    IF (SELECT COUNT(*) FROM Accounts WHERE ClientID = @clientID and
AccountID <> @accountID and EndDate IS NULL) > 0
                        UPDATE Preferences
                            SET MainAccount = ( SELECT TOP 1 AccountID FROM Accounts
                                WHERE ClientID =
@clientID and AccountID <> @accountID and EndDate IS NULL)
                                WHERE ClientID = @clientID
                    ELSE
                        UPDATE Preferences
                            SET MainAccount = NULL, AllowPhoneTransfer = 0

```

```

        WHERE ClientID = @clientID
    END

    UPDATE Accounts
    SET EndDate = CAST(GETDATE() AS Date)
    WHERE AccountID = @accountID
END
GO

DROP PROCEDURE IF EXISTS changeAccountPassword
GO
CREATE PROCEDURE changeAccountPassword
@accountID NVARCHAR(100),
@prev_password NVARCHAR(100),
@new_password NVARCHAR(100)
AS
BEGIN
    IF NOT EXISTS (SELECT AccountID FROM Accounts WHERE AccountID = @accountID)
        RAISERROR('Account does not exist',17,1)
    ELSE IF (SELECT EndDate FROM Accounts WHERE AccountID = @accountID) IS NOT NULL
        RAISERROR('Account is disactivated',17,1)
    ELSE IF @prev_password <> (SELECT Password FROM Accounts WHERE AccountID =
@accountID)
        RAISERROR('Previous password is not correct',17,1)
    ELSE
        BEGIN
            UPDATE Accounts
            SET Password = @new_password
            WHERE AccountID = @accountID
        END
END
GO

DROP PROCEDURE IF EXISTS changeCardLimit
GO
CREATE PROCEDURE changeCardLimit
@cardID NVARCHAR(100),
@limit INT,
@pin NVARCHAR(100)
AS
BEGIN
    IF @pin <> (SELECT PIN FROM Cards WHERE CardID = @cardID)
        RAISERROR('PIN is not correct',17,1)
    ELSE IF @limit <= 0
        RAISERROR('Incorrect limit',17,1)
    ELSE
        UPDATE Cards
        SET Limit = @limit
        WHERE CardID = @cardID
END
GO

DROP PROCEDURE IF EXISTS changeCardPIN
GO
CREATE PROCEDURE changeCardPIN
@cardID NVARCHAR(100),
@prevPIN NVARCHAR(100),
@newPIN NVARCHAR(100)
AS
BEGIN
    IF @prevPIN <> (SELECT PIN FROM Cards WHERE CardID = @cardID)
        RAISERROR('Previous PIN is not correct',17,1)
    ELSE
        UPDATE Cards
        SET PIN = @newPIN
        WHERE CardID = @cardID

```

```

END
GO
DROP PROCEDURE IF EXISTS reportATMsMalfunction
GO
CREATE PROCEDURE reportATMsMalfunction
@ATMID INT,
@description NVARCHAR(100),
@reportingEmployee INT
AS
BEGIN
    IF NOT EXISTS(SELECT * FROM ATMs WHERE ATMID = @ATMID)
        RAISERROR('ATM does not exist',17,1)
    ELSE IF NOT EXISTS(SELECT * FROM Employees WHERE EmployeeID =
@reportingEmployee)
        RAISERROR('Employee does not exist',17,1)
    ELSE
        INSERT INTO ATMsMalfunctions VALUES
            (@ATMID, @description, GETDATE(), @reportingEmployee)
END
GO

--Dodanie funkcji
IF OBJECT_ID('ClientOperationsByMonth', 'IF') IS NOT NULL
DROP FUNCTION ClientOperationsByMonth
GO
CREATE FUNCTION ClientOperationsByMonth(@clientID INT)
RETURNS TABLE
AS
RETURN(
    SELECT MONTH([Date]) 'Month', YEAR([Date]) 'Year',
    COUNT(*) 'Operations'
    FROM Accounts A
    JOIN AllOperations AO ON AO.AccountID = A.AccountID
    WHERE ClientID = @clientID
    GROUP BY MONTH([Date]), YEAR([Date])
)
GO

IF OBJECT_ID('ClientOperationsByCard', 'IF') IS NOT NULL
DROP FUNCTION ClientOperationsByCard
GO
CREATE FUNCTION ClientOperationsByCard(@clientID INT)
RETURNS TABLE
AS
RETURN(
    SELECT A.ClientID, C.CardID, N.Operations
    FROM Accounts A
    JOIN Cards C ON C.Account = A.AccountID
    JOIN NumberOfOperationsByCard N ON N.Card = C.CardID
    WHERE A.ClientID = @clientID
)
GO

IF OBJECT_ID('ClientTransfersNumber', 'IF') IS NOT NULL
DROP FUNCTION ClientTransfersNumber
GO
CREATE FUNCTION ClientTransfersNumber(@clientID INT)
RETURNS TABLE
AS
RETURN(
    SELECT ClientID, N.Operations
    FROM NumberOfTransfersByClient N
    WHERE ClientID = @clientID
)
GO

IF OBJECT_ID('ClientPhoneTransfersNumber', 'IF') IS NOT NULL

```



```

DROP FUNCTION ClientPhoneTransfersNumber
GO
CREATE FUNCTION ClientPhoneTransfersNumber(@clientID INT)
RETURNS TABLE
AS
RETURN(
    SELECT ClientID, N.Operations
    FROM NumberOfPhoneTransfersByClient N
    WHERE ClientID = @clientID
)
GO

IF OBJECT_ID('ClientOperationsByOperationType', 'IF') IS NOT NULL
DROP FUNCTION ClientOperationsByOperationType
GO
CREATE FUNCTION ClientOperationsByOperationType(@clientID INT)
RETURNS TABLE
AS
RETURN(
    SELECT 'Transfers: ' AS 'Type', Operations
    FROM ClientTransfersNumber(@clientID)
    UNION ALL
    SELECT 'Card Operations: ' AS 'Type', SUM(Operations)
    FROM ClientOperationsByCard(@clientID)
    UNION ALL
    SELECT 'Transactions: ' AS 'Type', Operations
    FROM ClientPhoneTransfersNumber(@clientID)
)
GO

IF OBJECT_ID('OnOwnAccountsTransfers', 'IF') IS NOT NULL
DROP FUNCTION OnOwnAccountsTransfers
GO
CREATE FUNCTION OnOwnAccountsTransfers(@clientID INT)
RETURNS TABLE
AS
RETURN(
    SELECT *
    FROM Transfers
    WHERE Sender IN (SELECT AccountID FROM Accounts WHERE ClientID = @clientID)
    AND Receiver IN (SELECT AccountID FROM Accounts WHERE ClientID = @clientID)
)
GO

IF OBJECT_ID('NumberOfOperationsByCategories', 'IF') IS NOT NULL
DROP FUNCTION NumberOfOperationsByCategories
GO
CREATE FUNCTION NumberOfOperationsByCategories()
RETURNS TABLE
AS
RETURN(
    SELECT A.ClientID, N.Category, SUM(N.Operations) AS 'Operations'
    FROM NumberOfOperationsByAccountsAndCategories N
    JOIN Accounts A ON A.AccountID = N.Account
    GROUP BY A.ClientID, N.Category
)
GO

IF OBJECT_ID('ClientOperationsByCategories', 'IF') IS NOT NULL
DROP FUNCTION ClientOperationsByCategories
GO
CREATE FUNCTION ClientOperationsByCategories(@clientID INT)
RETURNS TABLE
AS
RETURN(
    SELECT N.Category, N.Operations
    FROM NumberOfOperationsByCategories() N

```

```

        WHERE ClientID = @clientID
    )
GO

IF OBJECT_ID('AccountHistory', 'IF') IS NOT NULL
DROP FUNCTION AccountHistory
GO
CREATE FUNCTION AccountHistory(@account NVARCHAR(100))
RETURNS TABLE
AS
RETURN(
    SELECT ROW_NUMBER() OVER(ORDER BY Date) 'Id',*
    FROM AllOperations
    WHERE AccountID = @account
)
GO

IF OBJECT_ID('AccountOperationsByMonth', 'IF') IS NOT NULL
DROP FUNCTION AccountOperationsByMonth
GO
CREATE FUNCTION AccountOperationsByMonth(@account NVARCHAR(100))
RETURNS TABLE
AS
RETURN(
    SELECT MONTH([Date]) 'Month',
    YEAR([Date]) 'Year',
    COUNT(*) 'Operations'
    FROM AccountHistory(@account)
    GROUP BY MONTH([Date]), YEAR([Date])
)
GO

IF OBJECT_ID('GetPassword', 'FN') IS NOT NULL
DROP FUNCTION GetPassword
GO
CREATE FUNCTION GetPassword(@account NVARCHAR(100))
RETURNS NVARCHAR(100)
AS
BEGIN
RETURN(
    SELECT [Password]
    FROM Accounts
    WHERE AccountID = @account
)
END
GO

IF OBJECT_ID('GetPIN', 'FN') IS NOT NULL
DROP FUNCTION GetPIN
GO
CREATE FUNCTION GetPIN(@cardID NVARCHAR(100))
RETURNS NVARCHAR(100)
AS
BEGIN
RETURN(
    SELECT PIN
    FROM Cards
    WHERE CardID = @cardID
)
END
GO

IF OBJECT_ID('IfAccountExists', 'FN') IS NOT NULL
DROP FUNCTION IfAccountExists
GO
CREATE FUNCTION IfAccountExists(@account NVARCHAR(100))

```

```

RETURNS BIT
AS
BEGIN
RETURN(
    SELECT IIF(@account IN (
        SELECT AccountID
        FROM Accounts), 1, 0)
    )
END
GO

IF OBJECT_ID('DepartmentATMsBalance', 'IF') IS NOT NULL
DROP FUNCTION DepartmentATMsBalance
GO
CREATE FUNCTION DepartmentATMsBalance(@departmentID INT)
RETURNS TABLE
AS
RETURN(
    SELECT SUM(CurrentBalance) as balancesSUM
    FROM ATMs
    WHERE SupervisorDepartment = @departmentID
    GROUP BY SupervisorDepartment
    )
GO

IF OBJECT_ID('ATMOperationsByMonth', 'IF') IS NOT NULL
DROP FUNCTION ATMOperationsByMonth
GO
CREATE FUNCTION ATMOperationsByMonth(@atm INT)
RETURNS TABLE
AS
RETURN(
    SELECT MONTH([Date]) 'Month', YEAR([Date]) 'Year',
    COUNT(*) 'Operations'
    FROM(
        SELECT *
        FROM Withdraws
        UNION ALL
        SELECT *
        FROM Deposits
    ) Operations
    WHERE ATMID = @atm
    GROUP BY MONTH([Date]), YEAR([Date])
    )
GO

IF OBJECT_ID('ATM_MalfunctionsHistory', 'IF') IS NOT NULL
DROP FUNCTION ATM_MalfunctionsHistory
GO
CREATE FUNCTION ATM_MalfunctionsHistory(@atmID INT)
RETURNS TABLE
AS
RETURN (
    SELECT *
    FROM ATMsMalfunctions
    WHERE ATMID = @atmID
    )
GO

--Dodatnie wyzwalaczy
CREATE TRIGGER newWithdraw
ON dbo.Withdraws
AFTER INSERT
AS
BEGIN
    UPDATE Accounts
    SET CurrentBalance = A.CurrentBalance - i.Amount

```

```

FROM Accounts A
JOIN Cards C ON C.Account = A.AccountID
JOIN inserted i ON i.Card = C.CardID

    UPDATE ATMs
    SET CurrentBalance = A.CurrentBalance - i.Amount
FROM ATMs A
JOIN inserted i ON i.ATMID = A.ATMID
END
GO

CREATE TRIGGER newDeposit
ON dbo.Deposits
AFTER INSERT
AS
BEGIN
    UPDATE Accounts
    SET CurrentBalance = A.CurrentBalance + i.Amount
FROM Accounts A
JOIN Cards C ON C.Account = A.AccountID
JOIN inserted i ON i.Card = C.CardID

    UPDATE ATMs
    SET CurrentBalance = A.CurrentBalance + i.Amount
FROM ATMs A
JOIN inserted i ON i.ATMID = A.ATMID
END
GO

CREATE TRIGGER newTransaction
ON dbo.Transactions
AFTER INSERT
AS
BEGIN
    UPDATE Accounts
    SET CurrentBalance = A.CurrentBalance - i.Amount
FROM Accounts A
JOIN Cards C ON C.Account = A.AccountID
JOIN inserted i ON i.UsedCard = C.CardID

    IF (SELECT TOP 1 Receiver FROM inserted ORDER BY TransactionID) IN (SELECT
AccountID FROM Accounts)
    BEGIN
        UPDATE Accounts
        SET CurrentBalance = A.CurrentBalance + i.Amount
FROM Accounts A
JOIN inserted i ON i.Receiver = A.AccountID
    END
END
GO

CREATE TRIGGER newTransfer
ON dbo.Transfers
AFTER INSERT
AS
BEGIN
    UPDATE Accounts
    SET CurrentBalance = A.CurrentBalance - i.Amount
FROM Accounts A
JOIN inserted i ON i.Sender = A.AccountID

    IF (SELECT TOP 1 Receiver FROM inserted ORDER BY TransferID) IN (SELECT
AccountID FROM Accounts)
    BEGIN
        UPDATE Accounts
        SET CurrentBalance = A.CurrentBalance + i.Amount
FROM Accounts A

```

```

        JOIN inserted i ON i.Receiver = A.AccountID
    END
END
GO

CREATE TRIGGER newPhoneTransfer
ON dbo.PhoneTransfers
AFTER INSERT
AS
BEGIN
    UPDATE Accounts
    SET CurrentBalance = A.CurrentBalance - i.Amount
    FROM Accounts A
    JOIN inserted i ON i.Sender = A.AccountID

    IF (SELECT TOP 1 PhoneReceiver FROM inserted ORDER BY TransferID) IN (SELECT
    PhoneNumber FROM Clients)
    BEGIN
        UPDATE Accounts
        SET CurrentBalance = A.CurrentBalance + i.Amount
        FROM Accounts A
        JOIN Preferences P ON P.MainAccount = A.AccountID
        JOIN Clients C ON C.ClientID = P.ClientID
        JOIN inserted i ON i.PhoneReceiver = C.PhoneNumber
    END
END
GO

CREATE TRIGGER newLoan
ON dbo.Loans
AFTER INSERT
AS
BEGIN
    UPDATE Accounts
    SET CurrentBalance = A.CurrentBalance + i.Amount
    FROM Accounts A
    JOIN inserted i ON i.AccountID = A.AccountID
    WHERE i.EndDate > GETDATE()
END
GO

--Dodanie Job Scheduler
USE DBproject
DROP PROCEDURE IF EXISTS createBackup
GO
CREATE PROCEDURE createBackup
AS
BEGIN
    DECLARE @path NVARCHAR(100) = 'C:\Users\Konrad\Desktop\BAZA BACKUP\'
    DECLARE @filename NVARCHAR(100) = 'backup' + CONVERT(NVARCHAR, GETDATE(), 5) +
    '.bak'
    DECLARE @final NVARCHAR(100) = @path + @filename

    BACKUP DATABASE DBproject
    TO DISK = @final
END
GO

DROP PROCEDURE IF EXISTS checkLoans
GO
CREATE PROCEDURE checkLoans
AS
BEGIN
    UPDATE Accounts
    SET CurrentBalance = A.CurrentBalance - L.Amount
    FROM Accounts A
    JOIN Loans L ON L.AccountID = A.AccountID

```

```

        WHERE L.EndDate = GETDATE()
END
GO

DROP PROCEDURE IF EXISTS checkSavingAccounts
GO
CREATE PROCEDURE checkSavingAccounts
AS
BEGIN
    --DECLARE @month INT = MONTH(GETDATE())
    DECLARE @rowCount INT = (SELECT COUNT(*) FROM SavingAccountsToUpdate)
    DECLARE @temp TABLE(ID INT IDENTITY, Account NVARCHAR(100), Frequency FLOAT,
CurrentBalance MONEY)
    DECLARE @id INT = 1

    INSERT INTO @temp (Account, Frequency, CurrentBalance)
    SELECT AccountID, Frequency, CurrentBalance FROM SavingAccountsToUpdate

    DECLARE @account NVARCHAR(100)
    DECLARE @frequency FLOAT
    DECLARE @balance MONEY

    WHILE @rowCount > 0
    BEGIN
        SELECT @id = ID,
            @account = Account,
            @frequency = Frequency,
            @balance = CurrentBalance
        FROM @temp
        ORDER BY ID DESC OFFSET @rowCount - 1 ROWS FETCH NEXT 1 ROWS ONLY

        DECLARE @amount MONEY = CAST(@balance * @frequency AS MONEY)

        INSERT INTO Transfers VALUES
        ('BANK',@account,@amount,'Saving Account Income',GETDATE(),1,NULL)
        SET @rowCount = @rowCount - 1
    END
END
GO

DROP PROCEDURE IF EXISTS checkStandingOrders
GO
CREATE PROCEDURE checkStandingOrders
AS
BEGIN
    DECLARE @rowCount INT = (SELECT COUNT(*) FROM StandingOrdersToSend)
    DECLARE @temp TABLE(ID INT IDENTITY, Sender NVARCHAR(100), Receiver NVARCHAR(100),
Amount MONEY, Title NVARCHAR(100))
    DECLARE @id INT = 1

    INSERT INTO @temp (Sender, Receiver, Amount, Title)
    SELECT SOS.Sender, SOS.Receiver, SOS.Amount, SOS.Title FROM StandingOrdersToSend
SOS

    DECLARE @tmp_sender NVARCHAR(100)
    DECLARE @tmp_receiver NVARCHAR(100)
    DECLARE @tmp_amount MONEY
    DECLARE @tmp_title NVARCHAR(100)

    WHILE @rowCount > 0
    BEGIN
        SELECT @id = ID,
            @tmp_sender = Sender,
            @tmp_receiver = Receiver,
            @tmp_amount = Amount,
            @tmp_title = Title
        FROM @temp

```

```

        ORDER BY ID DESC OFFSET @rowCount - 1 ROWS FETCH NEXT 1 ROWS ONLY

        EXEC [dbo].[addNewTransfer] @sender = @tmp_sender, @receiver = @tmp_receiver,
@amount = @tmp_amount, @title = @tmp_title, @category=11

        SET @rowCount = @rowCount - 1
    END
END
GO

USE msdb
GO

-- DELETING
IF EXISTS(SELECT * FROM dbo.sysjobs WHERE name = 'checkSavingAcoounts')
    EXEC sp_delete_job @job_name = 'checkSavingAcoounts'
GO
IF EXISTS(SELECT * FROM dbo.sysjobs WHERE name = 'checkLoans')
    EXEC sp_delete_job @job_name = 'checkLoans'
GO
IF EXISTS(SELECT * FROM dbo.sysjobs WHERE name = 'checkStandingOrders')
    EXEC sp_delete_job @job_name = 'checkStandingOrders'
GO
IF EXISTS(SELECT * FROM dbo.sysjobs WHERE name = 'monthlyBackup')
    EXEC sp_delete_job @job_name = 'monthlyBackup'
GO

IF EXISTS(SELECT * FROM dbo.sysschedules WHERE name = 'Daily')
    EXEC sp_delete_schedule @schedule_name = 'Daily'
GO
IF EXISTS(SELECT * FROM dbo.sysschedules WHERE name = 'Monthly')
    EXEC sp_delete_schedule @schedule_name = 'Monthly'
GO

-- CREATING SCHEDULES
EXEC sp_add_schedule
    @schedule_name = N'Daily',
    @freq_type = 4, --daily
    @freq_interval = 1,
    @active_start_time = 000000 ; --every midnight
GO

EXEC sp_add_schedule
    @schedule_name = N'Monthly',
    @freq_type = 16, --monthly
    @freq_interval = 1, --on the 1st day of the month
    @freq_recurrence_factor = 1,
    @active_start_time = 000000 ; --every midnight
GO

-- LOANS CHECK
EXEC sp_add_job
    @job_name = 'checkLoans'
GO
EXEC sp_add_jobstep
    @job_name = N'checkLoans',
    @step_name = N'CheckLoans',
    @subsystem = N'TSQL',
    @command = N'EXEC checkLoans',
    @retry_attempts = 5,
    @retry_interval = 5;
GO
EXEC sp_attach_schedule
    @job_name = N'checkLoans',
    @schedule_name = N'Daily'
GO

```

```

-- SAVING ACCOUNTS CHECK
EXEC sp_add_job
    @job_name = N'checkSavingAcoounts'
GO
EXEC sp_add_jobstep
    @job_name = N'checkSavingAcoounts',
    @step_name = N'CheckSavingAcoounts',
    @subsystem = N'TSQL',
    @command = N'EXEC checkSavingAccounts',
    @retry_attempts = 5,
    @retry_interval = 5;
GO
EXEC sp_attach_schedule
    @job_name = N'checkSavingAcoounts',
    @schedule_name = N'Monthly'
GO

-- STANDING ORDERS CHECK
EXEC sp_add_job
    @job_name = N'checkStandingOrders'
GO
EXEC sp_add_jobstep
    @job_name = N'checkStandingOrders',
    @step_name = N'CheckStandingOrders',
    @subsystem = N'TSQL',
    @command = N'EXEC checkStandingOrders',
    @retry_attempts = 5,
    @retry_interval = 5;
GO
GO
EXEC sp_attach_schedule
    @job_name = N'checkStandingOrders',
    @schedule_name = N'Daily'
GO

-- DATABASE BACKUP
EXEC sp_add_job
    @job_name = N'monthlyBackup'
GO
EXEC sp_add_jobstep
    @job_name = N'monthlyBackup',
    @step_name = N'CreateMonthlyBackupOfDB',
    @subsystem = N'TSQL',
    @command = N'EXEC createBackup',
    @retry_attempts = 5,
    @retry_interval = 5;
GO
GO
EXEC sp_attach_schedule
    @job_name = N'monthlyBackup',
    @schedule_name = N'Monthly'
GO

```