

Kelompok 05 Lab A2

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Praktikum 3

1. Query untuk membuat trigger tr_UpdateAccountBalance_BeforeTransaction ke tabel transactions yang akan mencegah transaksi dilakukan jika saldo akun tidak cukup. Jika saldo < jumlah amount, maka transaksi harus dibatalkan. Gunakan syntax Rollback.

```
-- 1. trigger tr_UpdateAccountBalance_BeforeTransaction
CREATE TRIGGER tr_UpdateAccountBalance_BeforeTransaction
ON transactions
INSTEAD OF INSERT
AS
BEGIN
    SET NOCOUNT ON;
    IF EXISTS (
        SELECT 1
        FROM inserted i
        JOIN accounts a ON i.account_id = a.account_id
        WHERE i.amount > a.balance
    )
    BEGIN
        RAISERROR('Transaksi ditolak. Saldo tidak mencukupi.', 16, 1);
        ROLLBACK;
        RETURN;
    END
    INSERT INTO transactions (
        transaction_id, account_id, transaction_type_id, amount,
        transaction_date, description, reference_account
    )
    SELECT
        transaction_id, account_id, transaction_type_id, amount,
        transaction_date, description, reference_account
    FROM inserted;
END;

INSERT INTO transactions (
    transaction_id, account_id, transaction_type_id, amount,
    transaction_date, description
)
VALUES (
    NEWID(), '9cd97ecb-58c9-4610-b4b1-d9f72bcae7f7', 3, 999999999, GETDATE(), 'Penarikan tidak sah'
);
```

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Messages

Msg 50000, Level 16, State 1, Procedure tr_UpdateAccountBalance_BeforeTransaction, Line 16 [Batch Start Line 32]
Transaksi ditolak. Saldo tidak mencukupi.
Msg 3609, Level 16, State 1, Line 33
The transaction ended in the trigger. The batch has been aborted.

Completion time: 2025-05-21T09:42:04.4020482+07:00

2. Query untuk membuat trigger tr_Deposit_AfterTransaction ke tabel transactions yang aktif jika ada transaksi transfer yang menambahkan transaksi baru ke akun tujuan (reference_account) dengan tipe transaksi deposit dan nilai amount yang sama.

```
-- 2. trigger tr_Deposit_AfterTransaction
CREATE TRIGGER tr_Deposit_AfterTransaction
ON transactions
AFTER INSERT
AS
BEGIN
    SET NOCOUNT ON;
    INSERT INTO transactions (
        transaction_id, account_id, transaction_type_id, amount,
        transaction_date, description, reference_account
    )
    SELECT
        NEWID(), -- ID transaksi baru
        i.reference_account, -- Akun tujuan
        tt_deposit.transaction_type_id, -- ID untuk transaksi 'Deposit'
        i.amount, -- Nominal yang sama
        GETDATE(), -- Tanggal transaksi saat ini
        'Auto deposit from transfer', -- Deskripsi
        i.account_id -- Referensi balik ke akun asal
    FROM inserted i
    JOIN transaction_types tt_transfer ON i.transaction_type_id = tt_transfer.transaction_type_id
    JOIN transaction_types tt_deposit ON tt_deposit.name = 'Deposit'
    WHERE tt_transfer.name = 'Transfer'
    AND i.reference_account IS NOT NULL;
END;
```

```
INSERT INTO transactions (
    transaction_id, account_id, transaction_type_id, amount, description, reference_account
)
VALUES (
    NEWID(),
    '9cd97ecb-58c9-4610-b4b1-d9f72bcae7f7', -- akun asal
    2, -- 2 = Transfer
    500000,
    'Transfer ke akun B',
    'e0c672fd-8182-42b1-8a70-2138f223c47c' -- akun tujuan
);

SELECT * FROM transactions
WHERE description = 'Uji transfer ke akun B'
OR description = 'Auto deposit from transfer';
```

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Results Messages

	transaction_id	account_id	transaction_type_id	amount	transaction_date	description	reference_account
1	66A507E6-8E20-49D2-8EC5-1852BB37F8A4	e0c672fd-8182-42b1-8a70-2138f223c47c	1	500000.00	2025-05-20 20:17:35.403	Auto deposit from transfer	9cd97ecb-58c9-4610-b4b1-d9f7

3. Query untuk membuat trigger `tr_LimitAccountsPerCustomer` yang akan mencegah penambahan akun baru (accounts) jika seorang nasabah (customer_id) sudah memiliki 3 akun. Trigger ini dijalankan sebelum insert ke tabel accounts. Jika jumlah akun untuk customer_id ≥ 3 , maka transaksi dibatalkan. Gunakan syntax Rollback.

```
-- 3. trigger tr_LimitAccountsPerCustomer
CREATE TRIGGER tr_LimitAccountsPerCustomer
ON accounts
INSTEAD OF INSERT
AS
BEGIN
    SET NOCOUNT ON;
    IF EXISTS (
        SELECT i.customer_id
        FROM inserted i
        GROUP BY i.customer_id
        HAVING (
            SELECT COUNT(*)
            FROM accounts a
            WHERE a.customer_id = i.customer_id
        ) >= 3
    )
    BEGIN
        RAISERROR ('Nasabah sudah memiliki 3 akun. Tidak dapat menambahkan akun baru.', 16, 1);
        ROLLBACK TRANSACTION;
        RETURN;
    END
    INSERT INTO accounts (account_id, customer_id, account_number, account_type, balance, created_at)
    SELECT account_id, customer_id, account_number, account_type, balance, created_at
    FROM inserted;
END;

INSERT INTO accounts (customer_id, account_number, account_type, balance)
VALUES ('5b3fb023-f043-4cae-8783-ef1c98d11b38', '9999999999', 'savings', 5000.00);
```

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Messages

Msg 50000, Level 16, State 1, Procedure tr_LimitAccountsPerCustomer, Line 18 [Batch Start Line 109]
Nasabah sudah memiliki 3 akun. Tidak dapat menambahkan akun baru.
Msg 3609, Level 16, State 1, Line 110
The transaction ended in the trigger. The batch has been aborted.

Completion time: 2025-05-28T05:47:41.0600419+07:00

4. Query untuk membuat trigger `tr_BlockInvalidReferenceAccount` pada tabel transactions yang aktif jika terdapat insert transaksi transfer, sistem harus mengecek apakah akun tujuan (reference_account) benar-benar ada di tabel accounts. Jika tidak ditemukan, batalkan transaksi. Gunakan syntax Rollback.

```
-- 4. trigger tr_BlockInvalidReferenceAccount
CREATE TRIGGER tr_BlockInvalidReferenceAccount
ON transactions
INSTEAD OF INSERT
AS
BEGIN
    SET NOCOUNT ON;
    IF EXISTS (
        SELECT 1
        FROM inserted i
        WHERE i.transaction_type_id = 2
        AND (
            i.reference_account IS NULL OR
            NOT EXISTS (
                SELECT 1
                FROM accounts a
                WHERE a.account_id = i.reference_account
            )
        )
    )
    BEGIN
        RAISERROR ('Transaksi transfer gagal: reference_account tidak valid.', 16, 1);
        ROLLBACK TRANSACTION;
        RETURN;
    END
    INSERT INTO transactions (transaction_id, account_id, transaction_type_id, amount, transaction_date, description, reference_account)
    SELECT transaction_id, account_id, transaction_type_id, amount, transaction_date, description, reference_account
    FROM inserted;
END;
```

```

INSERT INTO transactions (account_id, transaction_type_id, amount, description, reference_account)
VALUES (
    '9cd97ecb-58c9-4610-b4b1-d9f72bcae7f7',
    2, -- transfer
    1000.00,
    'Transfer to invalid account',
    '00000000-0000-0000-0000-000000000000'
);

```

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Messages

Msg 50000, Level 16, State 1, Procedure tr_BlockInvalidReferenceAccount, Line 21 [Batch Start Line 140]
 Transaksi transfer gagal: reference_account tidak valid.
 Msg 3609, Level 16, State 1, Line 141
 The transaction ended in the trigger. The batch has been aborted.

Completion time: 2025-05-23T05:53:41.6474820+07:00

- Query untuk membuat trigger tr_EnsureMinimumBalance di tabel transactions yang aktif saat transaksi withdrawal atau transfer dilakukan. Trigger harus memeriksa apakah saldo akun setelah transaksi memiliki minimal Rp100.000. Jika tidak, transaksi dibatalkan. Gunakan syntax Rollback.

```

-- 5. trigger tr_EnsureMinimumBalance
CREATE TRIGGER tr_EnsureMinimumBalance
ON transactions
INSTEAD OF INSERT
AS
BEGIN
    SET NOCOUNT ON;
    IF EXISTS (
        SELECT 1
        FROM inserted i
        JOIN transaction_types tt ON i.transaction_type_id = tt.transaction_type_id
        WHERE tt.name IN ('Withdrawal', 'Transfer')
    )
    BEGIN
        IF EXISTS (
            SELECT 1
            FROM inserted i
            JOIN transaction_types tt ON i.transaction_type_id = tt.transaction_type_id
            JOIN accounts a ON i.account_id = a.account_id
            WHERE tt.name IN ('Withdrawal', 'Transfer')
            AND (a.balance - i.amount) < 100000
        )
        BEGIN
            RAISERROR('Transaksi ditolak. Saldo akhir tidak boleh kurang dari Rp100.000.', 16, 1);
            ROLLBACK;
            RETURN;
        END
    END

    INSERT INTO transactions (
        transaction_id, account_id, transaction_type_id, amount,
        transaction_date, description, reference_account
    )
    SELECT
        transaction_id, account_id, transaction_type_id, amount,
        transaction_date, description, reference_account
    FROM inserted;
END;

```

```

INSERT INTO transactions (
    transaction_id, account_id, transaction_type_id, amount, description
)
VALUES (
    NEWID(), '9cd97ecb-58c9-4610-b4b1-d9f72bcae7f7', 3, 9000000, 'Penarikan berlebihan');

```

108 %

Messages

Msg 50000, Level 16, State 1, Procedure tr_EnsureMinimumBalance, Line 26 [Batch Start Line 77]
 Transaksi ditolak. Saldo akhir tidak boleh kurang dari Rp100.000.
 Msg 3609, Level 16, State 1, Line 78
 The transaction ended in the trigger. The batch has been aborted.

Completion time: 2025-05-20T19:57:04.7878073+07:00