Problem 2. What is Transact-SQL (T-SQL)?

Perform a research (e.g. in Google or Wikipedia) and provide an information about Transact-SQL.

T-SQL (Transact-SQL) is a set of programming extensions from Sybase and Microsoft that add several features to the Structured Query Language (SQL) including transaction control, exception and error handling, row processing, and declared variables. Microsoft's SQL Server and Sybase's SQL server support T-SQL statements.

- ## Variables

    Transact-SQL provides the following statements to declare and set local variables: DECLARE, SET and SELECT.

    ```
    DECLARE @var1 NVARCHAR(30)
    SET @var1 = 'Some Name'
    SELECT @var1 = Name
    FROM Sales.Store
    WHERE CustomerID = 1000
    ```

- ## Flow control

    Keywords for flow control in Transact-SQL include BEGIN and END, BREAK, CONTINUE, GOTO, IF and ELSE, RETURN, WAITFOR, and WHILE.

    - IF and ELSE allow conditional execution.

        ```
        IF DATEPART(dw, GETDATE()) = 7 OR DATEPART(dw, GETDATE()) = 1
            PRINT 'It is the weekend.'
        ELSE
            PRINT 'It is a weekday.'
        ```

    - BEGIN and END mark a block of statements.

        ```
        IF DATEPART(dw, GETDATE()) = 7 OR DATEPART(dw, GETDATE()) = 1
        BEGIN
            PRINT 'It is the weekend.'
            PRINT 'Get some rest on the weekend!'
        END
        ELSE
        BEGIN
            PRINT 'It is a weekday.'
            PRINT 'Get to work on a weekday!'
        ```

```
        END
```

- WAITFOR will wait for a given amount of time, or until a particular time of day. The statement can be used for delays or to block execution until the set time.

- RETURN is used to immediately return from a stored procedure or function.

- BREAK ends the enclosing WHILE loop, while CONTINUE causes the next iteration of the loop to execute. An example of a WHILE loop is given below.

```
DECLARE @i INT
SET @i = 0

WHILE @i < 5
BEGIN
   PRINT 'Hello world.'
   SET @i = @i + 1
END
```

Changes to DELETE and UPDATE statements

In Transact-SQL, both the DELETE and UPDATE statements allow a FROM clause to be added, which allows joins to be included.

```
DELETE u
  FROM users AS u
  INNER JOIN user_flags AS f
    ON u.id = f.id
    WHERE f.name = 'idle'
```

BULK INSERT

BULK INSERT is a Transact-SQL statement that implements a bulk data-loading process, inserting multiple rows into a table, reading data from an external sequential file. Use of BULK INSERT results in better performance than processes that issue individual INSERT statements for each row to be added.

TRY CATCH

Beginning with SQL Server 2005, Microsoft introduced additional TRY CATCH logic to support exception type behaviour. This behaviour enables developers to simplify their code and leave out @@ERROR checking after each SQL execution statement.

```sql
-- begin transaction
BEGIN TRAN

BEGIN TRY
    -- execute each statement
    INSERT INTO MYTABLE(NAME) VALUES ('ABC')
    INSERT INTO MYTABLE(NAME) VALUES ('123')

    -- commit the transaction
    COMMIT TRAN
END TRY
BEGIN CATCH
    -- rollback the transaction because of error
    ROLLBACK TRAN
END CATCH
```