1 user defined functions(UDF)

types:

- Scalar - returns a single value

- Table valued - returns a table

- System - built ins

```
01 |    CREATE FUNCTION <fname> (<params>)
02 |    RETURNS <ftype>
03 |    AS BEGIN
04 |        DECLARE <result> <ftype>
05 |        SELECT  <result> = <statement>
06 |        RETURN  <result>
07 |    END
08 |
```

udf agrregates:
https://docs.microsoft.com/en-us/sql/relational-databases/user-defined-functions/create-user-defined-aggregates?view=sql-server-ver15

```
01 |    ALTER FUNCTION <f>
02 |    ...
03 |
04 |    IF OBJECT_ID (<fname>, N'IF') IS NOT NULL
05 |        DROP FUNCTION <fname>
06 |
```

  u cant rename udfs
udf disadvantages:

- CANNOT BE USED TO PERFORM ACTIONS THAT MODIFY THE DATABASE STATE

- CAN NOT RETURN MULTIPLE RESULT SETS

- UDFs dont support error handling

- CANNOT CALL stored procedure

- cannot make use of dynamic sql or temp tables

- FOR XML is not allowed

- cannot call another > 32 deep

2 transactions and error handling

Transaction is a single unit of work
if its successful the result is commited and its permanent
otherwise it can be canceled or rolled back
ACID:

- Atomicity

- Isolation

- Consistency

- Durability

```
01 |   BEGIN <TRAN | TRANSACTION > <tname >
02 |   WITH MARK [ '<description >' ]
03 |   ...
04 |   -- tname and description are optional
05 |   -- tname can be variable
06 |
07 |   COMMIT <TRAN | TRANSACTION > <tname >
08 |   -- tname is optional
09 |
10 |   ROLLBACK <TRAN | TRANSACTION > <tname | savepoint >
11 |
12 |   SAVE <TRAN | TRANSACTION > <savepoint >
13 |
14 |   SET TRANSACTION ISOLATION LEVEL <level >
15 |
```

Isolation levels:

- READ UNCOMMITTED

- READ COMMITTED - default

- REPEATABLE READ

- SNAPSHOT

- SERIALIZABLE

```
01 |    @@error = 0 -- success
02 |    @@error = 1 -- fail
03 |
04 |    RAISERROR(<msg>, <severity>, <state>)
05 |
06 |    BEGIN TRY
07 |        <statement>
08 |    END TRY
09 |    BEGIN CATCH
10 |        <statement>
11 |    END CATCH
12 |
```

Data available in catch:

- ERROR_NUMBER – returns the internal number of the error

- ERROR_STATE – returns the information about the source

- ERROR_SEVERITY – returns the information about anything from informational errors to errors user of DBA can fix, etc.

- ERROR_LINE – returns the line number at which an error happened on

- ERROR_PROCEDURE – returns the name of the stored procedure or function

- ERROR_MESSAGE – returns the most essential information and that is the message text of the error

3   dynamic queries

PIVOT - rotates a table-valued expression. It turns the unique values in one column into multiple columns in the output and performs aggregations on any remaining column values.
$EXEC(< sql\ statement\ in\ string >)$

4   filestream and free text search

FILESTREAM - attribute that allows to store data in filesystem, allowing $> 2gb$
FREETEXT is kinda like LIKE but more like search engine(e.g. google), searches in FULLTEXT

```
01 |    CREATE FULLTEXT CATALOG ftCatalog AS DEFAULT;
02 |
03 |    CREATE FULLTEXT INDEX ON [Production].[ProductDescription](Description)
04 |    KEY INDEX [PK_ProductDescription_ProductDescriptionID]
05 |
```