

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 aggregates:

<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 committed 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

4 filestream and free text search