8.2 Variables

The ability to using variables in SQL is a powerful feature. You need to use the keyword **DECLARE** when you want to define the variables. Local variables must have the the symbol "@" as a prefix. You also need to specify a data type for your variable (int, varchar(x), etc.).

Syntax for declaring variables:

```
declare @local_variable data_type
```

If you have more than one variable you want to declare:

```
declare
@myvariable1 data_type,
@myvariable2 data_type,
…
```

When you want to assign values to the variable, you must use either a **SET** or a **SELECT** statement.

Example:

```
declare @myvariable int

set @myvariable=4
```

If you want to see the value for a variable, you can e.g., use the **PRINT** command like this:

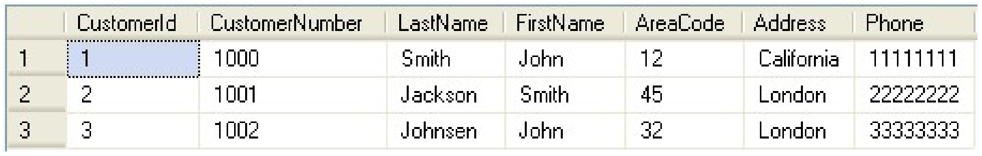
```
declare @myvariable int

set @myvariable=4

print @myvariable
```

The following will be shown in SQL Server:

```
4
```

Assigning variables with a value from a SELECT statement is very useful.

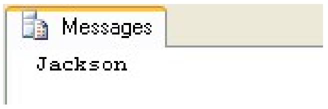
We use the CUSTOMER table as an example:



	CustomerId	CustomerNumber	LastName	FirstName	AreaCode	Address	Phone
1	1	1000	Smith	John	12	California	11111111
2	2	1001	Jackson	Smith	45	London	22222222
3	3	1002	Johnsen	John	32	London	33333333

You can assign a value to the variable from a select statement like this:

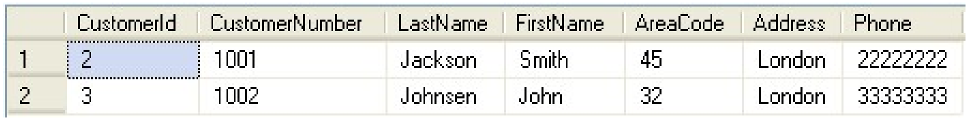
```
declare @mylastname varchar(50)

select @mylastname=LastName from CUSTOMER where CustomerId=2
print @mylastname
```



```
Jackson
```

You can also use a variable in the WHERE clause LIKE, e.g., this:

```
declare @find varchar(30)
set @find = 'J%'
select * from CUSTOMER
where LastName LIKE @find
```



	CustomerId	CustomerNumber	LastName	FirstName	AreaCode	Address	Phone
1	2	1001	Jackson	Smith	45	London	22222222
2	3	1002	Johnsen	John	32	London	33333333

8.3 Built-in Global Variables

SQL have lots of built-in variables that are very useful to use in queries and scripts.

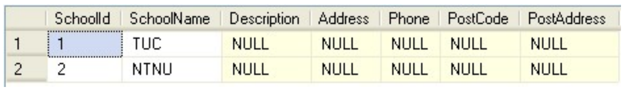
8.3.1 @@IDENTITY

After an INSERT, SELECT INTO, or bulk copy statement is completed, @@IDENTITY contains the last identity value that is generated by the statement. If the statement did not affect any tables with identity columns, @@IDENTITY returns NULL. If multiple rows are inserted, generating multiple identity values, @@IDENTITY returns the last identity value generated.

Example:

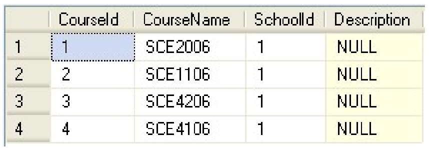
Given to tables; SCHOOL and COURSE:

SCHOOL table:



	SchoolId	SchoolName	Description	Address	Phone	PostCode	PostAddress
1	1	TUC	NULL	NULL	NULL	NULL	NULL
2	2	NTNU	NULL	NULL	NULL	NULL	NULL

COURSE table:



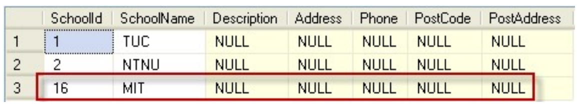
	CourseId	CourseName	SchoolId	Description
1	1	SCE2006	1	NULL
2	2	SCE1106	1	NULL
3	3	SCE4206	1	NULL
4	4	SCE4106	1	NULL

We want to insert a new School into the SCHOOL table and we want to insert 2 new Courses in the COURSE table that belong to the School we insert. To find the “SchoolId” we can use the @@IDENTITY variable:

```
declare @SchoolId int

-- Insert Data into SCHOOL table
insert into SCHOOL(SchoolName) values ('MIT')

select @SchoolId = @@IDENTITY


-- Insert Courses for the specific School above in the COURSE table
insert into COURSE(SchoolId,CourseName) values (@SchoolId, 'MIT-
101')
insert into COURSE(SchoolId,CourseName) values (@SchoolId, 'MIT-
201')
```

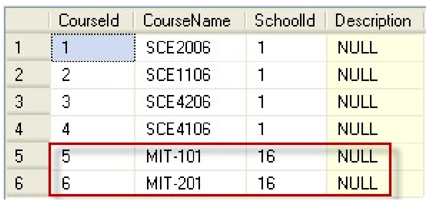
The result becomes:

SCHOOL table:



	SchoolId	SchoolName	Description	Address	Phone	PostCode	PostAddress
1	1	TUC	NULL	NULL	NULL	NULL	NULL
2	2	NTNU	NULL	NULL	NULL	NULL	NULL
3	16	MIT	NULL	NULL	NULL	NULL	NULL

COURSE table:



	CourseId	CourseName	SchoolId	Description
1	1	SCE2006	1	NULL
2	2	SCE1106	1	NULL
3	3	SCE4206	1	NULL
4	4	SCE4106	1	NULL
5	5	MIT-101	16	NULL
6	6	MIT-201	16	NULL

8.4 Flow Control

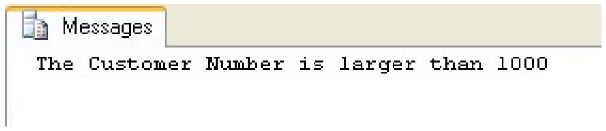
As with other programming languages you can use different kind of flow control, such as IF-ELSE, WHILE, etc, which is very useful.

8.4.1 IF – ELSE

The IF-ELSE is very useful. Below we see an example:

```
declare @customerNumber int
```

```
select @customerNumber=CustomerNumber from CUSTOMER
where CustomerId=2

if @customerNumber > 1000
      print 'The Customer Number is larger than 1000'
else
      print 'The Customer Number is not larger than 1000'
```



```
The Customer Number is larger than 1000
```

BEGIN…END:

If more than one line of code is to be executed within an IF sentence you need to use **BEGIN**…**END**.

Example:

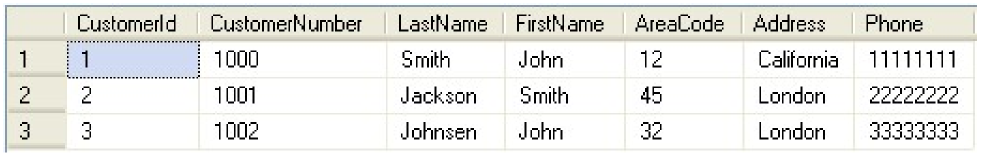
```
select @customerNumber=CustomerNumber from CUSTOMER where
CustomerId=2

if @customerNumber > 1000
      begin
            print 'The Customer Number is larger than 1000'
            update CUSTOMER set AreaCode=46 where CustomerId=2
      end
else
      print 'The Customer Number is not larger than 1000'
```

8.4.2 WHILE

We can also use WHILE, which is known from other programming languages.

Example:

We are using the CUSTOMER table:

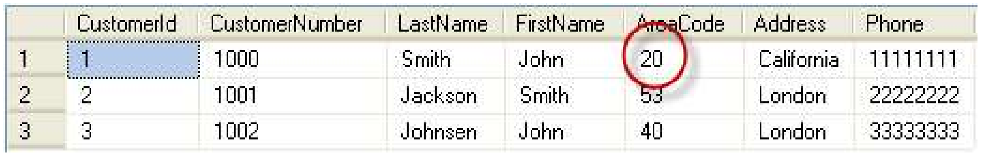


	CustomerId	CustomerNumber	LastName	FirstName	AreaCode	Address	Phone
1	1	1000	Smith	John	12	California	11111111
2	2	1001	Jackson	Smith	45	London	22222222
3	3	1002	Johnsen	John	32	London	33333333

and the following query:

```
while (select AreaCode from CUSTOMER where CustomerId=1) < 20
begin
   update CUSTOMER set AreaCode = AreaCode + 1
```

```
end

select * from CUSTOMER
```



	CustomerId	CustomerNumber	LastName	FirstName	AreaCode	Address	Phone
1	1	1000	Smith	John	20	California	11111111
2	2	1001	Jackson	Smith	53	London	22222222
3	3	1002	Johnsen	John	40	London	33333333

As you can see the code inside the WHILE loop is executed as long as “AreaCode” for CustomerId=1 is less than 20. For each iteration is the “AreaCode” for that customer incremented with 1.

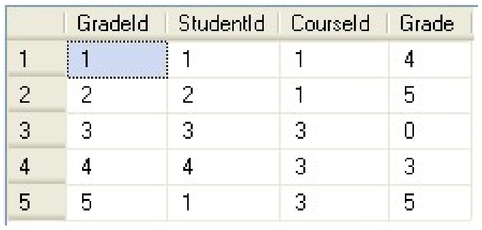
8.4.3 CASE

The CASE statement evaluates a list of conditions and returns one of multiple possible result expressions.

Example:

We have a “GRADE” table that contains the grades for each student in different courses:

```
select GradeId, StudentId, CourseId, Grade from GRADE
```

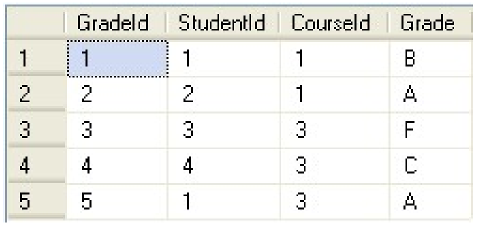


	GradeId	StudentId	CourseId	Grade
1	1	1	1	4
2	2	2	1	5
3	3	3	3	0
4	4	4	3	3
5	5	1	3	5

In the “GRADE” table is the grades stored as numbers, but since the students get grades with the letters A..F (A=5, B=4, C=3, D=2, E=1, F=0), we want to convert the values in the table into letters using a CASE statement:

```
select
GradeId,
StudentId,
CourseId,
case Grade
      when 5 then 'A'
      when 4 then 'B'
      when 3 then 'C'
      when 2 then 'D'
      when 1 then 'E'
      when 0 then 'F'
      else '-'
end   as Grade
from
```

```
GRADE
```



	GradeId	StudentId	CourseId	Grade
1	1	1	1	B
2	2	2	1	A
3	3	3	3	F
4	4	4	3	C
5	5	1	3	A

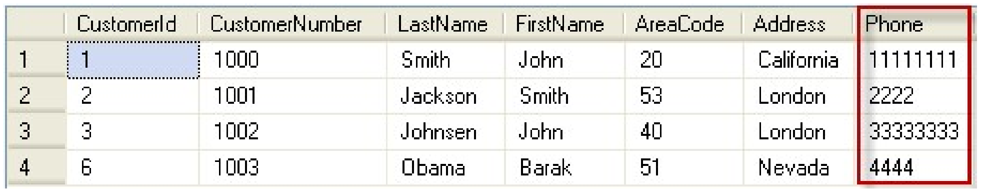
8.4.4 CURSOR

In advances scripts, CURSORs may be very useful. A CURSOR works like an advanced WHILE loop which we use to iterate through the records in one or more tables.

CURSORS are used mainly in stored procedures, triggers, and SQL scripts.

Example:

We use the CUSTOMER table as an example:



	CustomerId	CustomerNumber	LastName	FirstName	AreaCode	Address	Phone
1	1	1000	Smith	John	20	California	11111111
2	2	1001	Jackson	Smith	53	London	2222
3	3	1002	Johnsen	John	40	London	33333333
4	6	1003	Obama	Barak	51	Nevada	4444

We will create a CURSOR that iterate through all the records in the CUSTOMER table and check if the Phone number consists of 8 digits, if not the script will replace the invalid Phone number with the text "Phone number is not valid".

Here is the SQL Script using a CURSOR:

```
DECLARE
@CustomerId int,
@phone varchar(50)


DECLARE db_cursor CURSOR
FOR SELECT CustomerId from CUSTOMER

OPEN db_cursor
FETCH NEXT FROM db_cursor INTO @CustomerId

WHILE @@FETCH_STATUS = 0
BEGIN

      select @phone=Phone from CUSTOMER where CustomerId=@CustomerId

      if LEN(@phone) < 8
```