

(T38)討論 SequenceObject 和 IdentityProperty

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0. Summary

1.

Sequence Object

Reference:

<https://docs.microsoft.com/en-us/sql/t-sql/statements/create-sequence-transact-sql>

```
CREATE SEQUENCE [schema_name . ] sequence_name
[ AS [ built_in_integer_type | user-defined_integer_type ] ]
[ START WITH <constant> ]
[ INCREMENT BY <constant> ]
[ { MINVALUE [ <constant> ] } | { NO MINVALUE } ]
[ { MAXVALUE [ <constant> ] } | { NO MAXVALUE } ]
[ CYCLE | { NO CYCLE } ]
[ { CACHE [ <constant> ] } | { NO CACHE } ]
[ ; ]
```

E.g.

```
--CREATE SEQUENCE SequenceObj4
```

```
--AS INT
```

```
--START WITH 14
```

```
--INCREMENT BY 1
```

```
--MINVALUE 10
```

```
--MAXVALUE 15
```

```
--CYCLE
```

```
--CACHE 10
```

1.1.

```
--AS DataType
```

E.g.

```
--AS INT
```

Default is bigint.

DataType can be Built-in integer type
(tinyint , smallint, int, bigint, decimal etc...) or
user-defined integer type.

1.2.

--START WITH N

E.g.

--START WITH 14

The sequence object starting value is N.

1.3.

--INCREMENT BY N

E.g.

--INCREMENT BY 1

The value to increment if N is positive.
or the value to decrement if N is negative.

1.4.

--MINVALUE N

E.g.

--NO MINVALUE

--MINVALUE 10

Minimum value of the sequence object

1.5.

--MAXVALUE N

E.g.

--NO MAXVALUE

--MAXVALUE 15

Maximum value of the sequence object

1.6.

E.g.

--NO CYCLE

--CYCLE

CYCLE means the sequence object will restart to min value,
when the max value (for incrementing sequence object) or
min value (for decrementing sequence object) is reached.

Default is NO CYCLE, which throws an error
when minimum or maximum value is met.

1.7.

CACHE Property

--CACHE

E.g.

--NO CACHE

--CACHE 10

Cache means the value is temporarily saved in the memory instead of disk.

Thus, CACHE improves performance.

By default, it is CACHE.

Microsoft change the default CACHE size without notice.

But we can still specify the CACHE size.

--CACHE 10

means to create the sequence object with 10 values cached.

When the 11th value is requested,
the next 10 values will be cached again.

2.

Sequence object V.S. Identity property

2.1.

Different 1.

2.1.1.

Identity property

is a table column property and

it can only be used in the Table column.

2.1.2.

Sequence object

is a user-defined database object.

It can be shared by multiple tables.

2.2.

Different 2.

2.2.1.

Identity property

will generate the next identity value

Only when using INSERT clause to insert a row.

2.2.2.

--SELECT NEXT VALUE FOR SequenceObjName

Sequence object

can use NEXT VALUE FOR SequenceObjName to

generate the next sequence value.

It is not necessary to use INSERT clause to insert a row.

2.3.

Different 3.

2.3.1.

Identity property

can not set Max and Min value.

The Max and Min value depend on the column data type.

2.3.2.

Sequence object

can set Max and Min value.

By default, the Max and Min value depend on

the Sequence object data type.

2.4.

Different 4.

2.4.1.

Identity property

has no CYCLE option

to automatically restart the identity values.

2.4.2.

Sequence object

can use CYCLE option

to automatically restart

when the max value (for incrementing sequence object) or

min value (for decrementing sequence object) is reached.

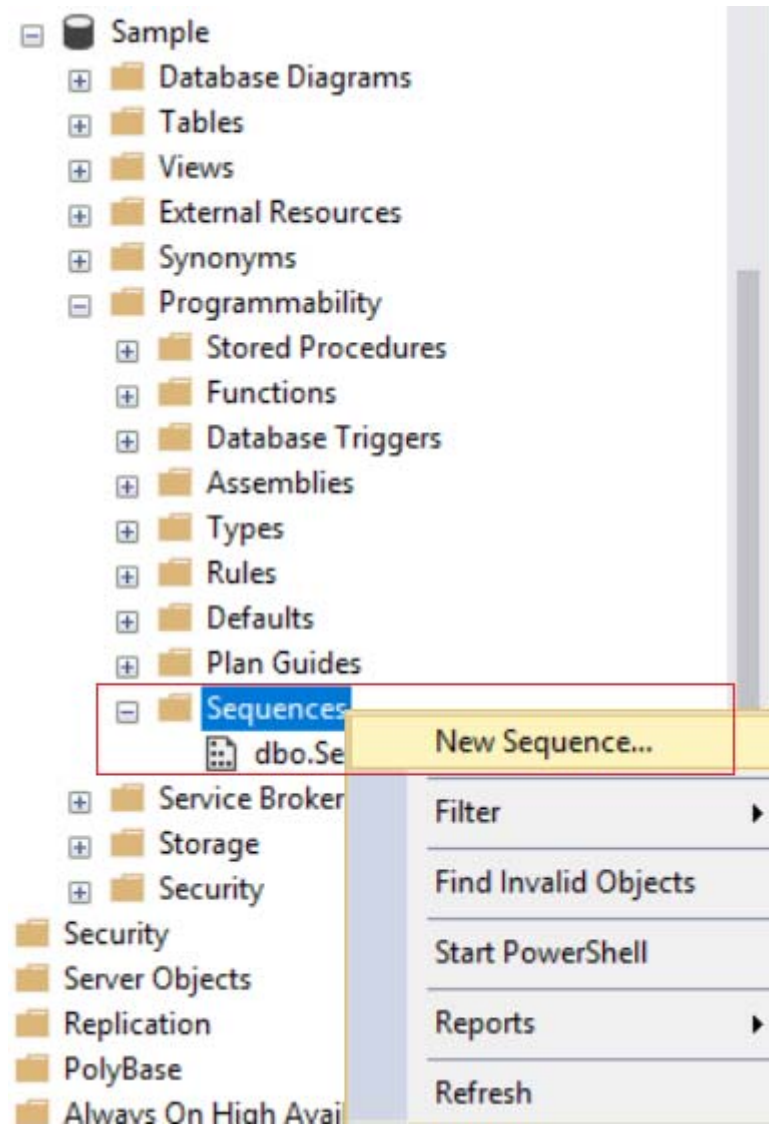
=====

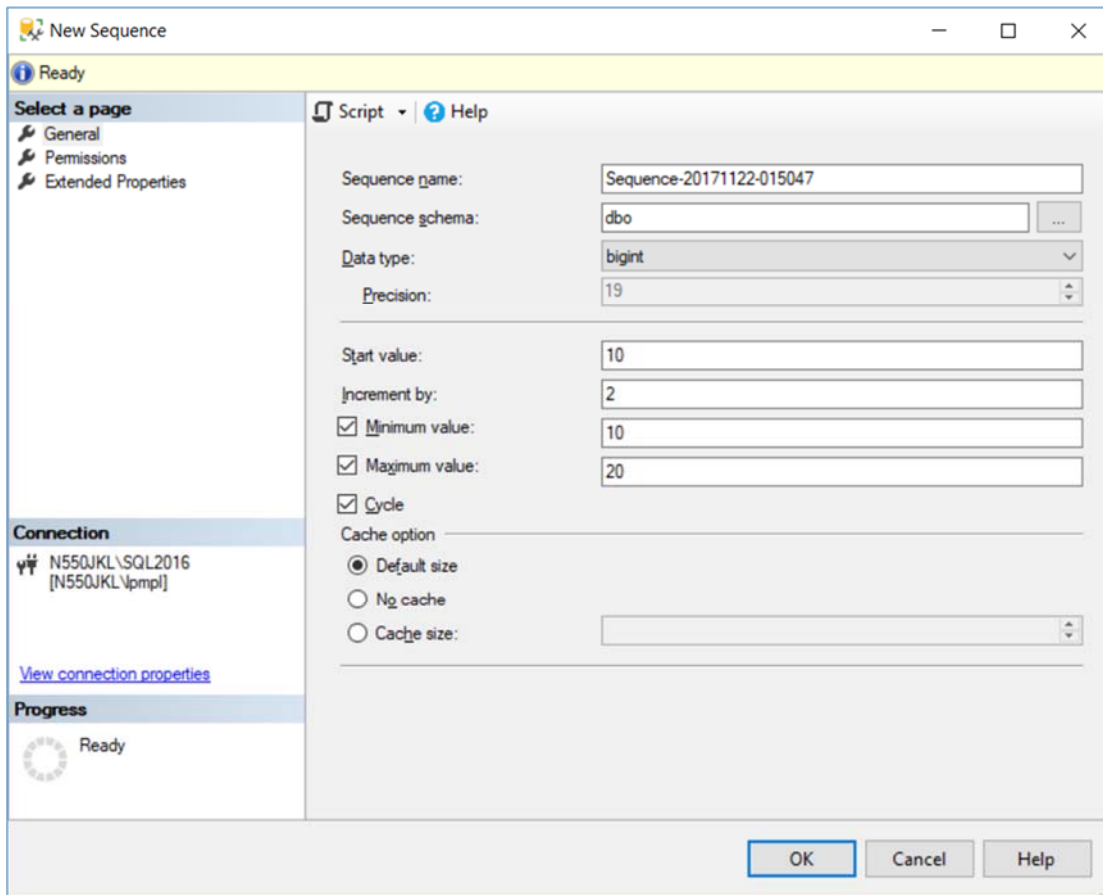
1. SequenceObject

--T038_01_SequenceObject

1.0. Create Sequence Object by SSMS

Database --> Sequences --> New Sequence...



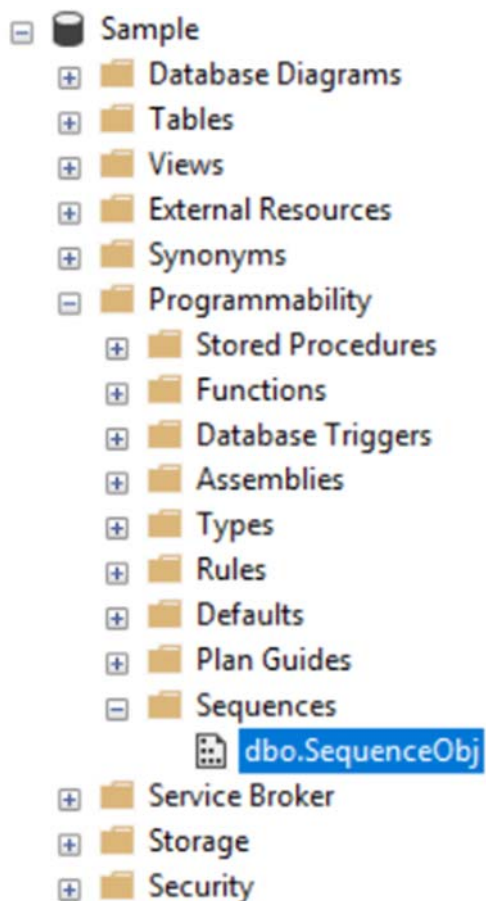


1.1. Sequence Object Basic concept.

```

-----
--T038_01_01
--Sequence Object Basic concept.
-----
--T038_01_01_01
--Delete SEQUENCE object if exist, otherwise create it.
IF ( EXISTS ( SELECT      *
                FROM        sys.sequences
                WHERE       name = 'SequenceObj' ) )
    BEGIN
        DROP SEQUENCE SequenceObj;
    END;
GO -- Run the previous command and begins new batch
CREATE SEQUENCE SequenceObj
AS INT
START WITH 1
INCREMENT BY 1;
GO -- Run the previous command and begins new batch
/*
Creating an Incrementing Sequence object
that starts with 1 and increments by 1.
*/

```



```
--T038_01_01_02
--Generating the Next Sequence Value.
--It will display 1,2,3
```

```
SELECT NEXT VALUE FOR
    SequenceObj;
SELECT NEXT VALUE FOR
    SequenceObj;
SELECT NEXT VALUE FOR
    SequenceObj;
```

```
GO -- Run the previous command and begins new batch
```

(No column name)	
1	1
(No column name)	
1	2
(No column name)	
1	3

```
--T038_01_01_03
--Retrieving the current sequence value
--the current_value will be 3
```

```
SELECT *
FROM sys.sequences
WHERE name = 'SequenceObj';
```

```
GO -- Run the previous command and begins new batch
```

```
SELECT current_value
FROM sys.sequences
```

```
WHERE name = 'SequenceObj';
```

```
GO -- Run the previous command and begins new batch
```

	name	object_id	principal_id	schema_id	parent_object_id	type	type_desc	create_date	modify_date	is_ms_shipped	is_published	is_schema_published
1	SequenceObj	1141579105	NULL	1	0	SO	SEQUENCE_OBJECT	2017-11-22 01:38:13.403	2017-11-22 01:38:13.403	0	0	0

	current_value
1	3

```
--T038_01_01_04
```

```
--Manually reset the current_value of the Sequence object to 1.
```

```
ALTER SEQUENCE SequenceObj RESTART WITH 1;
```

```
SELECT current_value
```

```
FROM sys.sequences
```

```
WHERE name = 'SequenceObj';
```

```
GO -- Run the previous command and begins new batch
```

	current_value
1	1

1.2. decrementing Sequence object

```
--T038_01_02
```

```
--decrementing Sequence object
```

```
--T038_01_02_01
```

```
--Delete decrementing SEQUENCE object if exist, otherwise create it.
```

```
--it starts with 10 and decrements by 1
```

```
IF ( EXISTS ( SELECT *  
              FROM sys.sequences  
              WHERE name = 'SequenceObj2' ) )
```

```
BEGIN
```

```
DROP SEQUENCE SequenceObj2;
```

```
END;
```

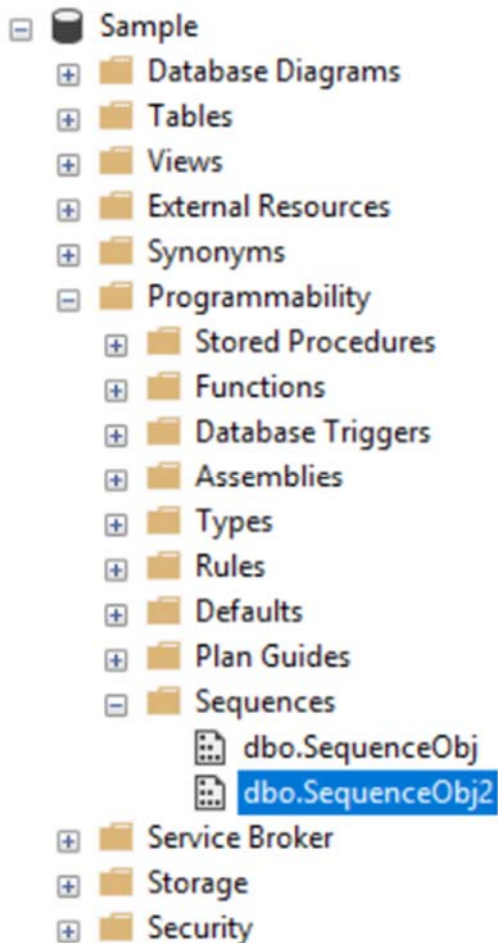
```
GO -- Run the previous command and begins new batch
```

```
CREATE SEQUENCE SequenceObj2
```

```
AS INT
```

```
START WITH 10
```

```
INCREMENT BY -1;
```



 --T038_01_02_02
 --Generating the Next Sequence Value.
 --It will display 10,9,8

```
SELECT NEXT VALUE FOR
    SequenceObj2;
SELECT NEXT VALUE FOR
    SequenceObj2;
SELECT NEXT VALUE FOR
    SequenceObj2;
```

GO -- Run the previous command and begins new batch

	(No column name)
1	10
	(No column name)
1	9
	(No column name)
1	8

1.3. MINVALUE and MAXVALUE of Sequence object

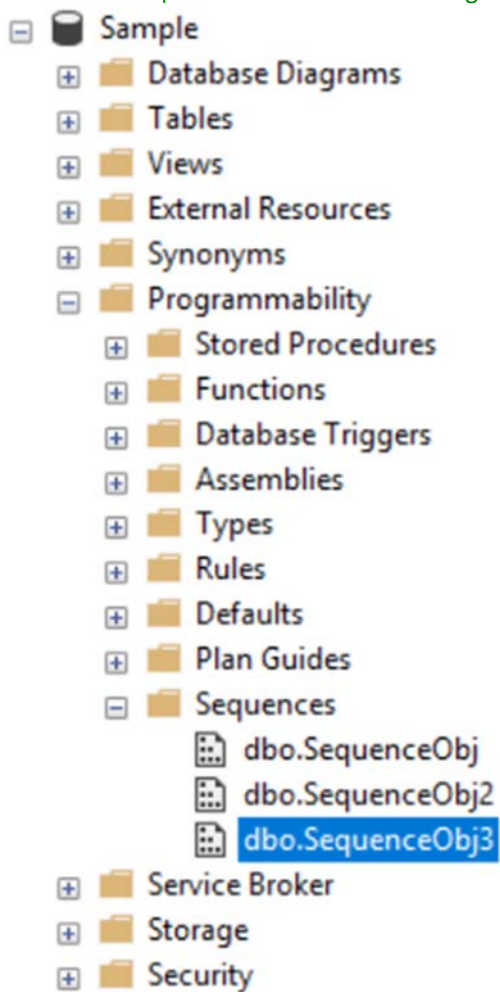
 --T038_01_03
 --MINVALUE and MAXVALUE of Sequence object

 --T038_01_03_01
 --Delete decrementing SEQUENCE object if exist, otherwise create it.
 --it starts with 14 and increments by 1
 --MINVALUE is 10, MAXVALUE is 15, No CYCLE by default.


```

IF ( EXISTS ( SELECT      *
               FROM        sys.sequences
               WHERE       name = 'SequenceObj3' ) )
BEGIN
    DROP SEQUENCE SequenceObj3;
END;
GO -- Run the previous command and begins new batch
CREATE SEQUENCE SequenceObj3
AS INT
START WITH 14
INCREMENT BY 1
MINVALUE 10
MAXVALUE 15;
GO -- Run the previous command and begins new batch

```



```

--T038_01_03_02
--Generating the Next Sequence Value.
SELECT NEXT VALUE FOR
    SequenceObj3;
SELECT NEXT VALUE FOR
    SequenceObj3;
SELECT NEXT VALUE FOR
    SequenceObj3;
GO -- Run the previous command and begins new batch
/*
Generating the Next Sequence Value
It will display 14, 15, NULL.
The last statement will show the error message
because it reach its max value limit.

```

```
--Msg 11728, Level 16, State 1, Line 167
--The sequence object 'SequenceObj3' has reached
--its minimum or maximum value.
--Restart the sequence object to
--allow new values to be generated.
*/
```

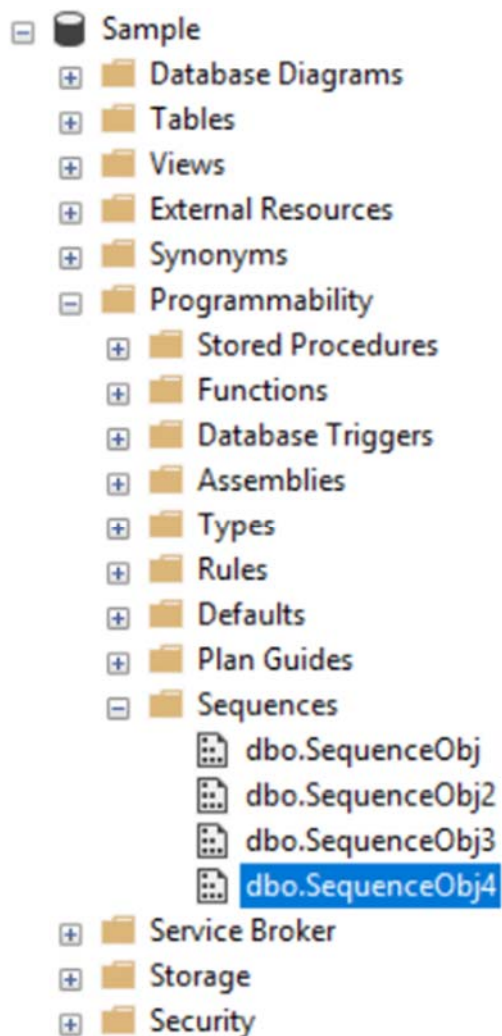
(No column name)	
1	14
(No column name)	
1	15

Results Messages

Msg 11728, Level 16, State 1, Line 270
The sequence object 'SequenceObj3' has reached its minimum or maximum value. Restart the sequence object to allow new values to be generated.

1.4. MINVALUE, MAXVALUE and CYCLE of Sequence object

```
=====
--T038_01_04
--MINVALUE, MAXVALUE and CYCLE of Sequence object
-----
--T038_01_04_01
--Delete decrementing SEQUENCE object if exist, otherwise create it.
--it starts with 14 and increments by 1
--MINVALUE is 10, MAXVALUE is 15, Set CYCLE property.
IF ( EXISTS ( SELECT      *
                FROM        sys.sequences
                WHERE       name = 'SequenceObj4' ) )
BEGIN
    DROP SEQUENCE SequenceObj4;
END;
GO -- Run the previous command and begins new batch
CREATE SEQUENCE SequenceObj4
AS INT
START WITH 14
INCREMENT BY 1
MINVALUE 10
MAXVALUE 15
CYCLE;
GO -- Run the previous command and begins new batch
```



```
--T038_01_04_02
--Generating the Next Sequence Value.
SELECT NEXT VALUE FOR
    SequenceObj4;
SELECT NEXT VALUE FOR
    SequenceObj4;
SELECT NEXT VALUE FOR
    SequenceObj4;
SELECT NEXT VALUE FOR
    SequenceObj4;
GO -- Run the previous command and begins new batch
/*
Generating the Next Sequence Value
It will display 14, 15, 10, 11.
The 3rd statement will reach its max value limit.
Thus, CYCLE property will
reset it to min value which is 10.
*/
```

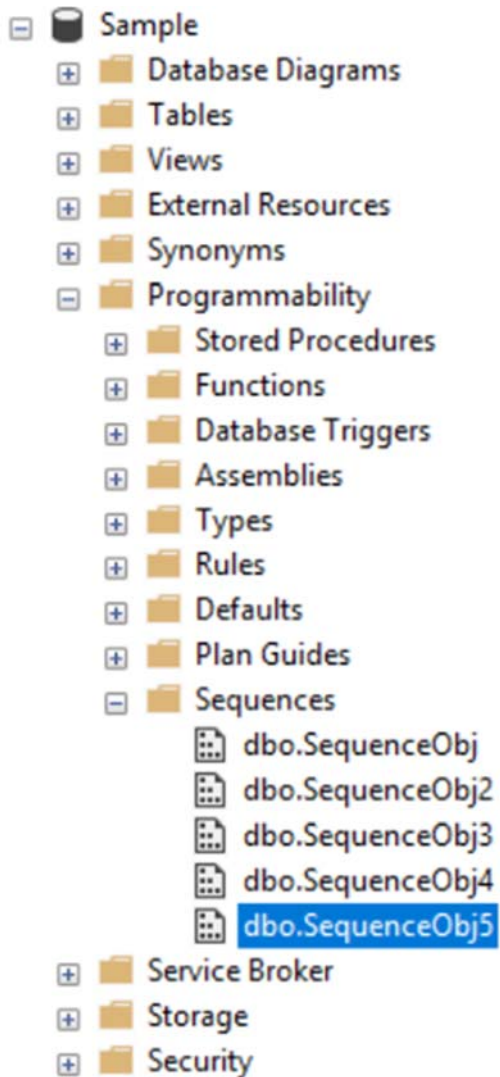
	(No column name)
1	14
	(No column name)
1	15
	(No column name)
1	10
	(No column name)
1	11

1.5. MINVALUE, MAXVALUE and CYCLE of Sequence object

```

=====
--T038_01_05
--MINVALUE, MAXVALUE and CYCLE of Sequence object
-----
--T038_01_05_01
--Delete decrementing SEQUENCE object if exist, otherwise create it.
--it starts with 14 and increments by 1
--MINVALUE is 10, MAXVALUE is 15, Set CYCLE, CACHE 10 property.
IF ( EXISTS ( SELECT *
                FROM sys.sequences
                WHERE name = 'SequenceObj5' ) )
BEGIN
    DROP SEQUENCE SequenceObj5;
END;
GO -- Run the previous command and begins new batch
CREATE SEQUENCE SequenceObj5
AS INT
START WITH 14
INCREMENT BY 1
MINVALUE 10
MAXVALUE 15
CYCLE
CACHE 10;
/*
--CACHE 10
Cache means the value is temporarily saved in the memory instead of disk.
This improves performance.
CACHE 10 means to create the sequence object with 10 values cached.
When the 11th value is requested,
the next 10 values will be cached again.
*/

```



1.6. Clean up

```
=====
--Ch133_06
--Clean up
--Delete SEQUENCE object if exist
IF ( EXISTS ( SELECT      *
                FROM        sys.sequences
                WHERE        name = 'SequenceObj' ) )
BEGIN
    DROP SEQUENCE SequenceObj;
END;
GO -- Run the previous command and begins new batch
--Delete SEQUENCE object if exist
IF ( EXISTS ( SELECT      *
                FROM        sys.sequences
                WHERE        name = 'SequenceObj2' ) )
BEGIN
    DROP SEQUENCE SequenceObj2;
END;
GO -- Run the previous command and begins new batch
--Delete SEQUENCE object if exist
IF ( EXISTS ( SELECT      *
                FROM        sys.sequences
                WHERE        name = 'SequenceObj3' ) )
```

```

BEGIN
    DROP SEQUENCE SequenceObj3;
END;
GO -- Run the previous command and begins new batch
--Delete SEQUENCE object if exist
IF ( EXISTS ( SELECT      *
                FROM        sys.sequences
                WHERE       name = 'SequenceObj4' ) )
BEGIN
    DROP SEQUENCE SequenceObj4;
END;
GO -- Run the previous command and begins new batch
IF ( EXISTS ( SELECT      *
                FROM        sys.sequences
                WHERE       name = 'SequenceObj5' ) )
BEGIN
    DROP SEQUENCE SequenceObj5;
END;
GO -- Run the previous command and begins new batch

```

2. SequenceAndIdentity

```

-----
--T038_02_SequenceAndIdentity
-----
/*
2.
Sequence object V.S. Identity property
2.1.
Different 1.
2.1.1.
Identity property
is a table column property and
it can only be used in the Table column.
2.1.2.
Sequence object
is a user-defined database object.
It can be shared by multiple tables.
-----
2.2.
Different 2.
2.2.1.
Identity property
will generate the next identity value
Only when using INSERT cluase to insert a row.
2.2.2.
--SELECT NEXT VALUE FOR SequenceObjName
Sequence object
can use NEXT VALUE FOR SequenceObjName to
generate the next sequence value.
It is not necessary to use INSERT cluase to insert a row.
-----
2.3.
Different 3.
2.3.1.
Identity property

```

```

can not set Max and Min value.
The Max and Min value depend on the column data type.
2.3.2.
Sequence object
can set Max and Min value.
By default, the Max and Min value depend on
the Sequence object data type.
-----
2.4.
Different 4.
2.4.1.
Identity property
has no CYCLE option
to automatically restart the identity values.
2.4.2.
Sequence object
can use CYCLE option
to automatically restart
when the max value (for incrementing sequence object) or
min value (for decrementing sequence object) is reached.
*/

```

2.1. Sequence object V.S. Identity property

```

-----
--T038_02_01
/*
2.
Sequence object V.S. Identity property
2.1.
Different 1.
2.1.1.
Identity property
is a table column property and
it can only be used in the Table column.
2.1.2.
Sequence object
is a user-defined database object.
It can be shared by multiple tables.
2.
Sequence object V.S. Identity property
2.2.
Different 2.
2.2.1.
Identity property
will generate the next identity value
Only when using INSERT cluase to insert a row.
2.2.2.
--SELECT NEXT VALUE FOR SequenceObjName
Sequence object
can use NEXT VALUE FOR SequenceObjName to
generate the next sequence value.
It is not necessary to use INSERT cluase to insert a row.
*/
-----
--T038_02_01_01
/*
1.
Different 1.
Identity property
is a table column property and
it can only be used in the Table column.
2.
Different 2.
Identity property
will generate the next identity value

```

```

Only when using INSERT clause to insert a row.
*/
--If Table exists then DROP it
IF ( EXISTS ( SELECT *
                FROM INFORMATION_SCHEMA.TABLES
                WHERE TABLE_NAME = 'Person1' ) )
    BEGIN
        TRUNCATE TABLE dbo.Person1;
        DROP TABLE Person1;
    END;
GO -- Run the previous command and begins new batch
CREATE TABLE Person1
(
    Id INT PRIMARY KEY
        IDENTITY(1, 1) ,
    [Name] NVARCHAR(50) ,
);
GO -- Run the previous command and begins new batch
INSERT INTO Person1
VALUES ( 'Name01' );
INSERT INTO Person1
VALUES ( 'Name02' );
INSERT INTO Person1
VALUES ( 'Name03' );
GO -- Run the previous command and begins new batch
SELECT *
FROM Person1;
GO -- Run the previous command and begins new batch

```

	Id	Name
1	1	Name01
2	2	Name02
3	3	Name03

```

--T038_02_01_02
/*
1.
Different 1.
Sequence object
is a user-defined database object.
It can be shared by multiple tables.
2.
Different 2.
Sequence object
can use NEXT VALUE FOR SequenceObjName to
generate the next sequence value.
It is not necessary to use INSERT clause to insert a row.
*/
--Delete SEQUENCE object if exist
IF ( EXISTS ( SELECT *
                FROM sys.sequences
                WHERE name = 'SequenceObjA' ) )
    BEGIN
        DROP SEQUENCE SequenceObjA;
    END;
GO -- Run the previous command and begins new batch

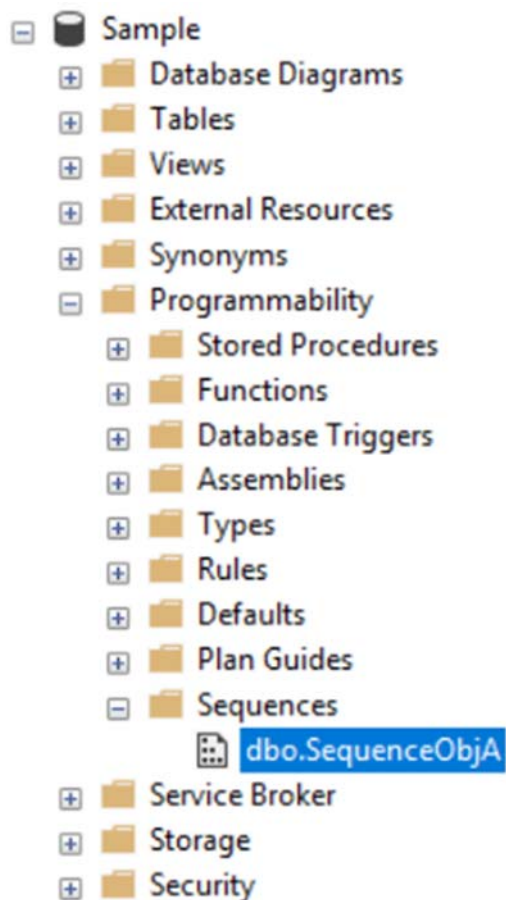
```



```

CREATE SEQUENCE SequenceObjA
AS INT
START WITH 1
INCREMENT BY 1;
GO -- Run the previous command and begins new batch

```



```

-----
--If Table exists then DROP it
IF ( EXISTS ( SELECT      *
                FROM        INFORMATION_SCHEMA.TABLES
                WHERE       TABLE_NAME = 'Person2' ) )
BEGIN
    TRUNCATE TABLE dbo.Person2;
    DROP TABLE Person2;
END;
GO -- Run the previous command and begins new batch
CREATE TABLE Person2
(
    Id INT PRIMARY KEY ,
    [Name] NVARCHAR(50) ,
);
GO -- Run the previous command and begins new batch
-----
--If Table exists then DROP it
IF ( EXISTS ( SELECT      *
                FROM        INFORMATION_SCHEMA.TABLES
                WHERE       TABLE_NAME = 'Person3' ) )
BEGIN
    TRUNCATE TABLE dbo.Person3;
    DROP TABLE Person3;
END;

```

```

GO -- Run the previous command and begins new batch
CREATE TABLE Person3
(
    Id INT PRIMARY KEY ,
    [Name] NVARCHAR(50) ,
);
GO -- Run the previous command and begins new batch
-----
INSERT INTO Person3
VALUES ( NEXT VALUE FOR SequenceObjA, 'P3Name01' );
INSERT INTO Person3
VALUES ( NEXT VALUE FOR SequenceObjA, 'P3Name02' );
GO -- Run the previous command and begins new batch
--NEXT VALUE FOR SequenceObjA will be 1,2
INSERT INTO Person2
VALUES ( NEXT VALUE FOR SequenceObjA, 'P2Name01' );
INSERT INTO Person2
VALUES ( NEXT VALUE FOR SequenceObjA, 'P2Name02' );
INSERT INTO Person2
VALUES ( NEXT VALUE FOR SequenceObjA, 'P2Name03' );
GO -- Run the previous command and begins new batch
--NEXT VALUE FOR SequenceObjA will be 3,4,5
-----
SELECT *
FROM Person2;
GO -- Run the previous command and begins new batch
SELECT *
FROM Person3;
GO -- Run the previous command and begins new batch

```

	Id	Name
1	3	P2Name01
2	4	P2Name02
3	5	P2Name03

	Id	Name
1	1	P3Name01
2	2	P3Name02

```

-----
SELECT NEXT VALUE FOR
    SequenceObjA;
SELECT NEXT VALUE FOR
    SequenceObjA;
SELECT NEXT VALUE FOR
    SequenceObjA;
GO -- Run the previous command and begins new batch
--NEXT VALUE FOR SequenceObjA will be 6,7,8

```

	(No column name)
1	6
	(No column name)
1	7
	(No column name)
1	8

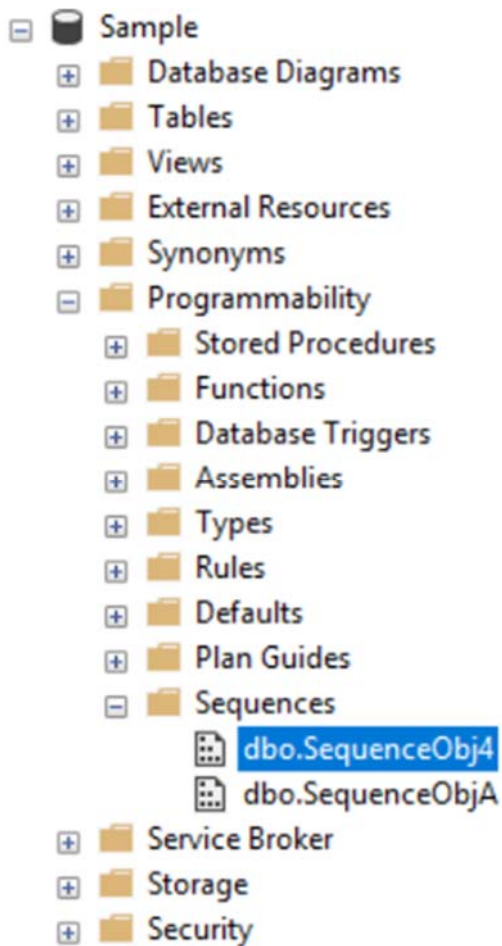
2.2. Sequence object V.S. Identity property

```

=====
--T038_02_02
/*
Sequence object V.S. Identity property
1.
Different 3.
1.1.
Identity property
can not set Max and Min value.
The Max and Min value depend on the column data type.
1.2.
Sequence object
can set Max and Min value.
By default, the Max and Min value depend on
the Sequence object data type.
-----
2.
Different 4.
2.1.
Identity property
has no CYCLE option
to automatically restart the identity values.
2.2.
Sequence object
can use CYCLE option
to automatically restart
when the max value (for incrementing sequence object) or
min value (for decrementing sequence object) is reached.
*/
-----

--T038_02_02_01
--MINVALUE, MAXVALUE and CYCLE of Sequence object
--Delete decrementing SEQUENCE object if exist, otherwise create it.
--it starts with 14 and increments by 1
--MINVALUE is 10, MAXVALUE is 15, Set CYCLE property.
IF ( EXISTS ( SELECT      *
                FROM        sys.sequences
                WHERE       name = 'SequenceObj4' ) )
BEGIN
    DROP SEQUENCE SequenceObj4;
END;
GO -- Run the previous command and begins new batch
CREATE SEQUENCE SequenceObj4
AS INT
START WITH 14
INCREMENT BY 1
MINVALUE 10
MAXVALUE 15
CYCLE;
GO -- Run the previous command and begins new batch

```



```
--T038_02_02_02
--Generating the Next Sequence Value.
SELECT NEXT VALUE FOR
    SequenceObj4;
SELECT NEXT VALUE FOR
    SequenceObj4;
SELECT NEXT VALUE FOR
    SequenceObj4;
SELECT NEXT VALUE FOR
    SequenceObj4;
GO -- Run the previous command and begins new batch
/*
Generating the Next Sequence Value
It will display 14, 15, 10, 11.
The 3rd statement will reach its max value limit.
Thus, CYCLE property will
reset it to min value which is 10.
*/
```

	(No column name)
1	14
	(No column name)
1	15
	(No column name)
1	10
	(No column name)
1	11

2.3. Clean up

```
=====
--T038_02_03
--Clean up
--If Table exists then DROP it
IF ( EXISTS ( SELECT      *
                FROM        INFORMATION_SCHEMA.TABLES
                WHERE       TABLE_NAME = 'Person1' ) )
    BEGIN
        TRUNCATE TABLE dbo.Person1;
        DROP TABLE Person1;
    END;
GO -- Run the previous command and begins new batch
--Delete SEQUENCE object if exist
IF ( EXISTS ( SELECT      *
                FROM        sys.sequences
                WHERE       name = 'SequenceObjA' ) )
    BEGIN
        DROP SEQUENCE SequenceObjA;
    END;
GO -- Run the previous command and begins new batch
--If Table exists then DROP it
IF ( EXISTS ( SELECT      *
                FROM        INFORMATION_SCHEMA.TABLES
                WHERE       TABLE_NAME = 'Person2' ) )
    BEGIN
        TRUNCATE TABLE dbo.Person2;
        DROP TABLE Person2;
    END;
GO -- Run the previous command and begins new batch
--If Table exists then DROP it
IF ( EXISTS ( SELECT      *
                FROM        INFORMATION_SCHEMA.TABLES
                WHERE       TABLE_NAME = 'Person3' ) )
    BEGIN
        TRUNCATE TABLE dbo.Person3;
        DROP TABLE Person3;
    END;
GO -- Run the previous command and begins new batch
IF ( EXISTS ( SELECT      *
                FROM        sys.sequences
                WHERE       name = 'SequenceObj4' ) )
    BEGIN
        DROP SEQUENCE SequenceObj4;
    END;
GO -- Run the previous command and begins new batch
```