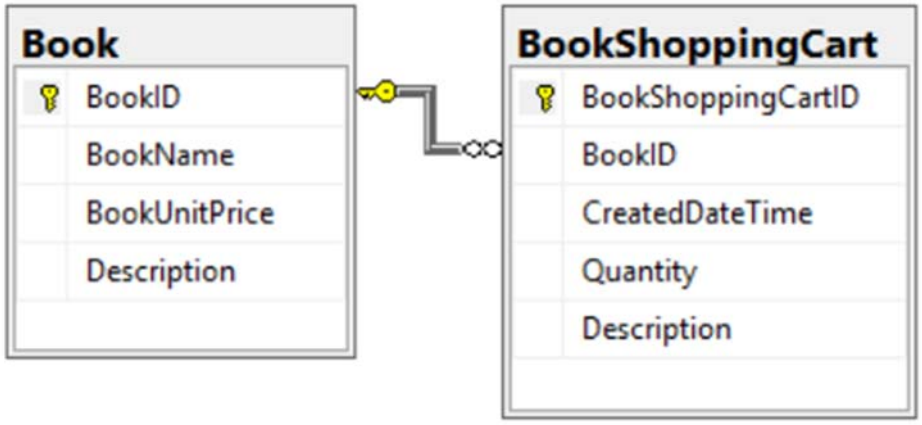
(T21)討論 Cursor
CourseGUID: e48417fc-9db5-4e99-822c-706c5ccef6cc
==========
(T21)討論 Cursor
==========
1. Create Sample Data
2. Cursor basic
3. Cursor Scroll,FIRST, NEXT
4. Cursor Scroll,LAST, PRIOR
5. Cursor Scroll,ABSOLUTE 9, RELATIVE 10
6. Cursor Scroll,ABSOLUTE 9, RELATIVE 10
---
7. Cursor options and scope
8. Cursor basic, store procedure
---
9. Update TableA.ColumnA1 with TableACursor
9.1. Update with Cursor
9.2. Replace Cursor by Normal Update.
---
10. Update TableB.ColumnB4 with TablAACursor
11. Clean up
==========

1. Create Sample Data



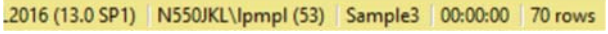

```
--============================================================
--T021_01_Create Sample Data
--============================================================
--============================================================
--T021_01_01
------------------------------------------------------------
--T021_01_01_01
--Create Table
IF ( EXISTS ( SELECT    *
              FROM      INFORMATION_SCHEMA.TABLES
              WHERE     TABLE_NAME = 'BookShoppingCart' ) )
    BEGIN
        DROP TABLE BookShoppingCart;
    END;
GO -- Run the previous command and begins new batch
IF ( EXISTS ( SELECT    *
```

```
            FROM      INFORMATION_SCHEMA.TABLES
            WHERE     TABLE_NAME = 'Book' ) )
    BEGIN
        DROP TABLE Book;
    END;
GO -- Run the previous command and begins new batch
CREATE TABLE [dbo].[Book]
(
  [BookID] [INT] PRIMARY KEY
                 IDENTITY(1, 1)
                 NOT NULL ,
  [BookName] [NVARCHAR](100) NULL ,
  [BookUnitPrice] [MONEY] NULL ,
  [Description] [NVARCHAR](1000) NULL
);
GO -- Run the previous command and begins new batch
CREATE TABLE [dbo].[BookShoppingCart]
(
  [BookShoppingCartID] [INT] PRIMARY KEY
                             IDENTITY(1, 1)
                             NOT NULL ,
  [BookID] [INT] FOREIGN KEY REFERENCES [dbo].[Book] ( [BookID] )
                 NOT NULL ,
  [CreatedDateTime] [DATETIME] NULL ,
  [Quantity] [INT] NULL ,
  [Description] [NVARCHAR](1000) NULL
);
GO -- Run the previous command and begins new batch
------------------------------------------------------------
--T021_01_01_02
--Insert sample data to [Book] table
--Whole T021_01_01 has to execute together.
--Book Counter
--**Changeable: Amount of data Rows
DECLARE @TotalBookRows INT = 70;
DECLARE @BookCount INT= 1;
-- random UnitPrice between 1 and 100
DECLARE @RandomUnitPrice MONEY;
DECLARE @BookUnitPrice_Max INT;
DECLARE @BookUnitPrice_Min INT;
SET @BookUnitPrice_Min = 1;
SET @BookUnitPrice_Max = 100;
WHILE ( @BookCount <= @TotalBookRows )
    BEGIN
        SELECT  @RandomUnitPrice = FLOOR(RAND() * ( @BookUnitPrice_Max
                                                    - @BookUnitPrice_Min )
                                  + @BookUnitPrice_Min);
        INSERT  INTO [dbo].[Book]
        VALUES  ( 'Book ' + CAST(@BookCount AS NVARCHAR(20)), @RandomUnitPrice,
                  'Book Description ' + CAST(@BookCount AS NVARCHAR(20)) );
        PRINT @BookCount;
        SET @BookCount += 1;
    END;
/*
1.
Random Number
```

```
1.1.
RAND([seed])
Reference:
https://docs.microsoft.com/en-us/sql/t-sql/functions/rand-transact-sql
https://www.w3schools.com/sql/func_mysql_rand.asp
Returns a pseudo-random float value from 0 through 1, exclusive.
0 <= ReturnNumber < 1
Same seed always returns the same RAND([seed]) value.
1.2.
FLOOR(RAND()*(b-a)+a);
Where a is the smallest number and b is the largest number that you want to generate a random number for.
Reference:
https://www.techonthenet.com/sql_server/functions/rand.php
PRINT FLOOR(RAND()*(25-10)+10);
10 <= IntNumber < 25
2.
Random DateTime
--Ch25_08
--Get Random DateTime
--Reference: http://crodrigues.com/sql-server-generate-random-datetime-within-a-range/
DECLARE @RandomDateTime DATETIME;
DECLARE @DateFrom DATETime = '2012-01-01'
DECLARE @DateTo DATeTime = '2017-06-30'
DECLARE @DaysRandom Int= 0
DECLARE @MillisRandom Int=0
--get random number of days
select @DaysRandom= DATEDIFF(day,@DateFrom,@DateTo)
SELECT @DaysRandom = ROUND(((@DaysRandom -1) * RAND()), 0)
--get random millis
SELECT @MillisRandom = ROUND(((99999999) * RAND()), 0)
SELECT @RandomDateTime = DATEADD(day, @DaysRandom, @DateFrom)
SELECT @RandomDateTime = DATEADD(MILLISECOND, @MillisRandom, @RandomDateTime)
SELECT @RandomDateTime
*/
------------------------------------------------------------
--T021_01_01_03
--Insert sample data to [BookShoppingCart] table
--Whole T021_01_01 has to execute together.
--BookShoppingCart Counter
DECLARE @TotalBookShoppingCartRows INT;
DECLARE @BookShoppingCartCount INT;
SET @BookShoppingCartCount = 1;
SET @TotalBookShoppingCartRows = 100;
-- @RandomBookID
DECLARE @RandomBookID INT;
DECLARE @RandomBookID_Max INT;
DECLARE @RandomBookID_Min INT;
SET @RandomBookID_Min = 1;
SET @RandomBookID_Max = @TotalBookRows - ( @TotalBookRows * 0.1 );
--Should be @RandomBookID_Max = @TotalBookRows,
--but I purposely set  @RandomBookID_Max =  @TotalBookRows - ( @TotalBookRows * 0.1 )
--I want some book data that was never sold.
--@RandomCreatedDateTime
--Reference: http://crodrigues.com/sql-server-generate-random-datetime-within-a-range/
DECLARE @RandomCreatedDateTime DATETIME;
DECLARE @DateFrom DATETIME = '2012-01-01';
DECLARE @DateTo DATETIME = '2017-06-30';
DECLARE @DaysRandom INT= 0;
DECLARE @MillisRandom INT= 0;
-- @RandomQuantity is between 1 to 10
DECLARE @RandomQuantity INT;
DECLARE @RandomQuantity_Max INT;
DECLARE @RandomQuantity_Min INT;
```

```
SET @RandomQuantity_Min = 1;
SET @RandomQuantity_Max = 10;
WHILE ( @BookShoppingCartCount <= @TotalBookShoppingCartRows )
    BEGIN
            --1. @RandomBookID
        SELECT  @RandomBookID = FLOOR(RAND() * ( @RandomBookID_Max
                                                 - @RandomBookID_Min )
                                      + @RandomBookID_Min);
            --2. @RandomQuantity
        SELECT  @RandomQuantity = FLOOR(RAND() * ( @RandomQuantity_Max
                                                   - @RandomQuantity_Min )
                                        + @RandomQuantity_Min);
            --3. @RandomCreatedDateTime
            --get random number of days
        SELECT  @DaysRandom = DATEDIFF(DAY, @DateFrom, @DateTo);
        SELECT  @DaysRandom = ROUND(( ( @DaysRandom - 1 ) * RAND() ), 0);
            --get random millis
        SELECT  @MillisRandom = ROUND(( ( 99999999 ) * RAND() ), 0);
        SELECT  @RandomCreatedDateTime = DATEADD(DAY, @DaysRandom, @DateFrom);
        SELECT  @RandomCreatedDateTime = DATEADD(MILLISECOND, @MillisRandom,
                                                 @RandomCreatedDateTime);
        INSERT  INTO [dbo].[BookShoppingCart]
        VALUES  ( @RandomBookID, @RandomCreatedDateTime, @RandomQuantity, ('Description
' + CONVERT(NVARCHAR,@BookShoppingCartCount)) );
        PRINT @BookShoppingCartCount;
        SET @BookShoppingCartCount += 1;
    END;
GO -- Run the previous command and begins new batch
--=========================================================
--T021_01_02
SELECT  *
FROM    [dbo].[Book];
SELECT  *
FROM    [dbo].[BookShoppingCart];
GO -- Run the previous command and begins new batch
```

	BookID	BookName	BookUnitPrice	Description
1	1	Book 1	77.00	Book Description 1
2	2	Book 2	36.00	Book Description 2
3	3	Book 3	13.00	Book Description 3
4	4	Book 4	42.00	Book Description 4
5	5	Book 5	19.00	Book Description 5
6	6	Book 6	59.00	Book Description 6
7	7	Book 7	20.00	Book Description 7
8	8	Book 8	92.00	Book Description 8
9	9	Book 9	97.00	Book Description 9
10	10	Book 10	32.00	Book Description 10
11	11	Book 11	48.00	Book Description 11
12	12	Book 12	86.00	Book Description 12



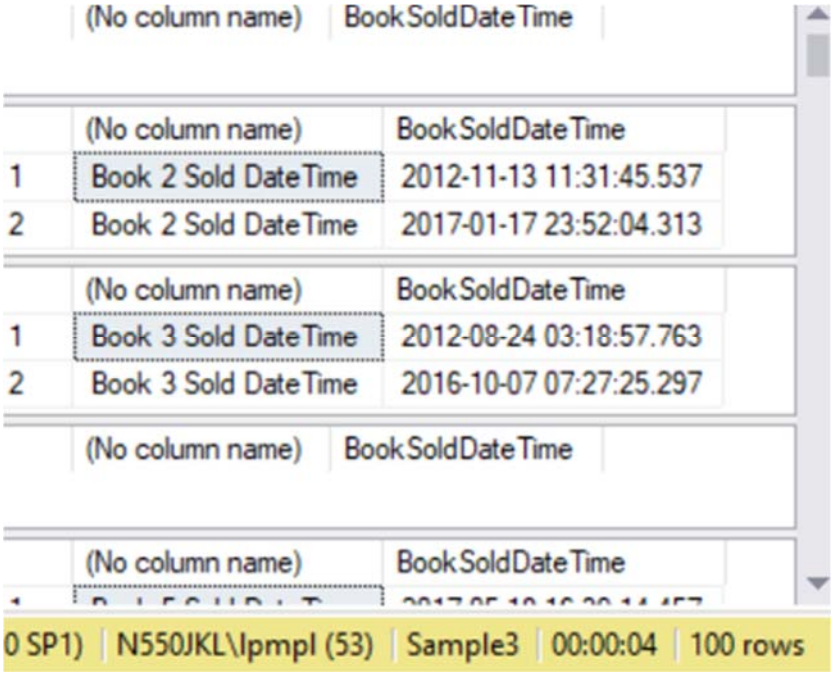
	BookShoppingCartID	BookID	CreatedDateTime	Quantity	Description
1	1	38	2015-11-02 08:19:27.807	4	Description 1
2	2	60	2013-12-09 02:39:19.660	3	Description 2
3	3	49	2016-11-12 14:45:57.803	4	Description 3
4	4	44	2016-07-15 22:28:23.970	7	Description 4
5	5	18	2015-12-20 01:02:38.323	6	Description 5
6	6	18	2017-04-03 01:58:06.157	7	Description 6
7	7	9	2015-05-16 06:53:51.283	6	Description 7
8	8	46	2015-08-10 11:55:04.620	7	Description 8
9	9	17	2013-03-09 00:11:52.177	2	Description 9
10	10	44	2014-10-20 15:04:06.843	3	Description 10
11	11	57	2015-11-21 02:51:33.043	8	Description 11
12	12	12	2015-11-28 12:17:40.907	1	Description 12

Q... | N550JKL\SQL2016 (13.0 SP1) | N550JKL\lpmpl (53) | Sample3 | 00:00:00 | 100 rows

==========

2. Cursor basic

```
--============================================================
--T021_02_Create Cursor basic
--============================================================
DECLARE @BookID INT;
DECLARE @BookName NVARCHAR(MAX);
DECLARE BookCursor CURSOR
FOR
    SELECT  b.BookID ,
            b.BookName
    FROM    dbo.Book b;
OPEN BookCursor;
-- *** FETCH (NEXT/First/LAST/ABSOLUTE 9/ABSOLUTE -1) FROM CursorName INTO @ColumnA1,
FETCH NEXT FROM BookCursor INTO @BookID, @BookName;
WHILE @@FETCH_STATUS = 0
    BEGIN
        SELECT  @BookName + ' Sold DateTime' ,
                bsc.CreatedDateTime AS BookSoldDateTime
        FROM    dbo.BookShoppingCart bsc
        WHERE   bsc.BookID = @BookID;
              --*** FETCH (NEXT/PRIOR/RELATIVE 10/RELATIVE -10) FROM CursorName INTO @ColumnA1, @ColumnA2;
        FETCH NEXT FROM BookCursor INTO @BookID, @BookName;
    END;
CLOSE BookCursor;
DEALLOCATE BookCursor;
GO -- Run the previous command and begins new batch
```



	(No column name)	BookSoldDateTime
1	Book 2 Sold DateTime	2012-11-13 11:31:45.537
2	Book 2 Sold DateTime	2017-01-17 23:52:04.313

	(No column name)	BookSoldDateTime
1	Book 3 Sold DateTime	2012-08-24 03:18:57.763
2	Book 3 Sold DateTime	2016-10-07 07:27:25.297


```
/*
1.
Cursor Syntax 1:
--DECLARE @ColumnA1 dataType;
--DECLARE @ColumnA2 dataType;
--DECLARE CursorName CURSOR (options...)
--FOR
--    SELECT  a.ColumnA1 ,
--            a.ColumnA2
--    FROM    TableA a;
--OPEN CursorName;
---- FETCH (NEXT/First/LAST/ABSOLUTE 9/ABSOLUTE -1) FROM CursorName INTO @ColumnA1, @ColumnA2
---- must map to SELECT  a.ColumnA1 ,a.ColumnA2
--FETCH NEXT FROM CursorName INTO @ColumnA1, @ColumnA2;
--WHILE @@FETCH_STATUS = 0
--    BEGIN
--           SELECT  @ColumnA2,
--                           b.ColumnB3 AS AliasName
--        FROM    TableB b
--        WHERE   b.ColumnA1 = @ColumnA1;
--           --FETCH (NEXT/PRIOR/RELATIVE 10/RELATIVE -10) FROM CursorName INTO @ColumnA1, @ColumnA2;
--        FETCH NEXT FROM CursorName INTO @ColumnA1, @ColumnA2;
--    END;
--CLOSE CursorName;
--DEALLOCATE CursorName;
1.1.
CURSOR is a way to step through a set of records one row at a time.
It is like a pointer in each record and moving through one step at a time.
--OPEN CursorName;
---FETCH (NEXT/First/LAST/ABSOLUTE 9/ABSOLUTE -1) FROM CursorName INTO @ColumnA1, @ColumnA2
Open the Cursor and point to the (NEXT/First/LAST/ABSOLUTE 9/ABSOLUTE -1) data set
must map to SELECT  a.ColumnA1 ,a.ColumnA2.
If you have selected extra Columns,
then you have to declare extra variable to map them.
In this case,
declare @ColumnA1 and @ColumnA2 and map to  --SELECT  a.ColumnA1 ,a.ColumnA2
Read the value for each record set and put into variables @ColumnA1 and @ColumnA2
--WHILE @@FETCH_STATUS = 0
means successfully read a next record into variables @ColumnA1 and @ColumnA2.
--SELECT  @ColumnA2,
--           b.ColumnB3 AS AliasName
--FROM    TableB b
--WHERE   b.ColumnA1 = @ColumnA1;
during while loop, you can use  @ColumnA1 and @ColumnA2 in other sql statement.
```

```
----FETCH (NEXT/PRIOR/RELATIVE 10/RELATIVE -10) FROM CursorName INTO @ColumnA1, @ColumnA2;
Use the Cursor and point to the (NEXT/PRIOR/RELATIVE 10/RELATIVE -10) data set,
--WHILE @@FETCH_STATUS = 0
check if successfully read a (NEXT/PRIOR/RELATIVE 10/RELATIVE -10) record into variables @ColumnA1 and
@ColumnA2.
This while loop will run until NOT(@@FETCH_STATUS = 0)
That means the pointer reach to the end of loop and get out the loop.
1.2.
--DECLARE CursorName CURSOR (options...)
--FOR
--    SELECT  ...
--OPEN CursorName;
--FETCH (NEXT/First/LAST/ABSOLUTE 9/ABSOLUTE -1) FROM CursorName INTO @ColumnA1, @ColumnA2
--...
--WHILE @@FETCH_STATUS = 0
--    BEGIN
--           ...
--    END;
--CLOSE CursorName;
--DEALLOCATE CursorName;
1.2.1.
This is the life of CURSOR
--DECLARE CursorName CURSOR (options...)
--FOR
Then
--OPEN CursorName;
--FETCH (NEXT/First/LAST/ABSOLUTE 9/ABSOLUTE -1) FROM CursorName INTO @ColumnA1, @ColumnA2
Then
--WHILE @@FETCH_STATUS = 0
Then
--CLOSE CursorName;
Then
--DEALLOCATE CursorName;
means get rid of the CursorName.
-------------------------------------------------
2.
--DECLARE @BookID INT;
--DECLARE @BookName NVARCHAR(MAX);
--DECLARE BookCursor CURSOR
--FOR
--    SELECT  b.BookID ,
--            b.BookName
--    FROM    dbo.Book b;
--OPEN BookCursor;
--FETCH NEXT FROM BookCursor INTO @BookID, @BookName;
--WHILE @@FETCH_STATUS = 0
--    BEGIN
--           SELECT  @BookName + ' Sold DateTime',
--                        bsc.CreatedDateTime AS BookSoldDateTime
--        FROM    dbo.BookShoppingCart bsc
--        WHERE   bsc.BookID = @BookID;
--        FETCH NEXT FROM BookCursor INTO @BookID, @BookName;
--    END;
--CLOSE BookCursor;
--DEALLOCATE BookCursor;
2.1.
--DECLARE BookCursor CURSOR
--FOR
--    SELECT  b.BookID ,
--            b.BookName
--    FROM    dbo.Book b;
--OPEN BookCursor;
--FETCH NEXT FROM BookCursor INTO @BookID, @BookName;
2.1.1.
CURSOR is a way to step through a set of records one row at a time.
It is like a pointer in each record and moving through one step at a time.
2.1.2.
```

```
--DECLARE BookCursor CURSOR
--FOR
--    SELECT  b.BookID ,
--            b.BookName
--    FROM    dbo.Book b;
declare @BookID and @BookName variables to read the values for each record set.
2.1.3.
--OPEN BookCursor;
--FETCH NEXT FROM BookCursor INTO @BookID, @BookName;
Open the Cursor and point to the first data set,
Read the value and put into variables @BookID and @BookName
2.2.
--WHILE @@FETCH_STATUS = 0
--    BEGIN
--          SELECT  @BookName + ' Sold DateTime',
--                        bsc.CreatedDateTime AS BookSoldDateTime
--        FROM    dbo.BookShoppingCart bsc
--        WHERE   bsc.BookID = @BookID;
--        FETCH NEXT FROM BookCursor INTO @BookID, @BookName;
--    END;
2.2.1.
--WHILE @@FETCH_STATUS = 0
means successfully read a next record into variables @BookID and @BookName.
--SELECT  @BookName + ' Sold DateTime',
--          bsc.CreatedDateTime AS BookSoldDateTime
--FROM    dbo.BookShoppingCart bsc
--WHERE   bsc.BookID = @BookID;
during while loop, you can use  @ColumnA1 and @ColumnA2 in other sql statement.
--FETCH NEXT FROM BookCursor INTO @BookID, @BookName;
Use the Cursor and point to the next data set,
Read the value and put into variables @BookID and @BookName
--WHILE @@FETCH_STATUS = 0
check if successfully read a next record into variables @BookID and @BookName.
This while loop will run until NOT(@@FETCH_STATUS = 0)
That means the pointer reach to the end of loop and get out the loop.
2.3.
-- DECLARE BookCursor CURSOR
--FOR
--    SELECT  ...
--OPEN BookCursor;
--FETCH NEXT FROM BookCursor INTO @BookID, @BookName;
--...
--WHILE @@FETCH_STATUS = 0
--    BEGIN
--          ...
--    END;
--CLOSE BookCursor;
--DEALLOCATE BookCursor;
2.3.1.
This is the life of CURSOR
-- DECLARE BookCursor CURSOR
--FOR
Then
--OPEN BookCursor;
Then
--FETCH NEXT FROM BookCursor INTO @BookID, @BookName;
Then
--WHILE @@FETCH_STATUS = 0
Then
--CLOSE BookCursor;
Then
--DEALLOCATE BookCursor;
means get rid of the CURSOR.
*/

================================================
```

3. Cursor Scroll,FIRST, NEXT

```
--=========================================================
--T021_03_Cursor Scroll,FIRST, NEXT
--=========================================================
DECLARE BookCursor CURSOR SCROLL
FOR
    SELECT  b.BookID ,
            b.BookName ,
            b.BookUnitPrice ,
            b.[Description]
    FROM    dbo.Book b;
OPEN BookCursor;
-- *** FETCH (NEXT/First/LAST/ABSOLUTE 9/ABSOLUTE -1) FROM CursorName INTO @ColumnA1,
FETCH FIRST FROM BookCursor;
--FETCH NEXT FROM BookCursor;
WHILE @@FETCH_STATUS = 0
    --*** FETCH (NEXT/PRIOR/RELATIVE 10/RELATIVE -10) FROM CursorName INTO @ColumnA1, @ColumnA2;
    FETCH NEXT FROM BookCursor;
CLOSE BookCursor;
DEALLOCATE BookCursor;
GO -- Run the previous command and begins new batch
```

	BookID	BookName	BookUnitPrice	Description
1	1	Book 1	77.00	Book Description 1

	BookID	BookName	BookUnitPrice	Description
1	2	Book 2	36.00	Book Description 2

	BookID	BookName	BookUnitPrice	Description
1	3	Book 3	13.00	Book Description 3

	BookID	BookName	BookUnitPrice	Description
1	4	Book 4	42.00	Book Description 4

	BookID	BookName	BookUnitPrice	Description
1	5	Book 5	19.00	Book Description 5

BookID	BookName	BookUnitPrice	Description

2016 (13.0 SP1) | N550JKL\Ipmpl (53) | Sample3 | 00:00:05 | 70 rows

```
/*
1.
--DECLARE BookCursor CURSOR SCROLL
When you declare CURSOR with SCROLL option
Then it will allow you to
---- *** FETCH (NEXT/First/LAST/ABSOLUTE 9/ABSOLUTE -1) FROM CursorName INTO @ColumnA1,
--FETCH FIRST FROM BookCursor;
----FETCH NEXT FROM BookCursor;
--WHILE @@FETCH_STATUS = 0
--      --*** FETCH (NEXT/PRIOR/RELATIVE 10/RELATIVE -10) FROM CursorName INTO @ColumnA1, @ColumnA2;
--      FETCH NEXT FROM BookCursor;
It will start to SELECT the first data row
and then SELECT forward One by One until LAST records.
--FETCH FIRST FROM BookCursor;
----FETCH NEXT FROM BookCursor;
means get the first one.
--      FETCH NEXT FROM BookCursor;
means read the next one until end of while loop.
```

```
*/

==================================================
```

4. Cursor Scroll,LAST, PRIOR

```
--=========================================================
--T021_04_Cursor Scroll,LAST, PRIOR
--=========================================================
DECLARE BookCursor CURSOR SCROLL
FOR
    SELECT  b.BookID ,
            b.BookName ,
            b.BookUnitPrice ,
            b.[Description]
    FROM    dbo.Book b;
OPEN BookCursor;
-- *** FETCH (NEXT/First/LAST/ABSOLUTE 9/ABSOLUTE -1) FROM CursorName INTO @ColumnA1,
FETCH LAST FROM BookCursor;
WHILE @@FETCH_STATUS = 0
    --*** FETCH (NEXT/PRIOR/RELATIVE 10/RELATIVE -10) FROM CursorName INTO @ColumnA1, @ColumnA2;
    FETCH PRIOR FROM BookCursor;
CLOSE BookCursor;
DEALLOCATE BookCursor;
GO -- Run the previous command and begins new batch
```

	BookID	BookName	BookUnitPrice	Description
1	70	Book 70	43.00	Book Description 70

	BookID	BookName	BookUnitPrice	Description
1	69	Book 69	94.00	Book Description 69

	BookID	BookName	BookUnitPrice	Description
1	68	Book 68	30.00	Book Description 68

	BookID	BookName	BookUnitPrice	Description
1	67	Book 67	42.00	Book Description 67

	BookID	BookName	BookUnitPrice	Description
1	66	Book 66	19.00	Book Description 66

BookID	BookName	BookUnitPrice	Description

2016 (13.0 SP1) | N550JKL\Ipmpl (53) | Sample3 | 00:00:02 | 70 rows

```
/*
1.
--DECLARE BookCursor CURSOR SCROLL
When you declare CURSOR with SCROLL option
Then it will allow you to
---- FETCH (NEXT/First/LAST/ABSOLUTE 9/ABSOLUTE -1) FROM CursorName INTO @ColumnA1,
--FETCH LAST FROM BookCursor;
--WHILE @@FETCH_STATUS = 0
--     --FETCH (NEXT/PRIOR/RELATIVE 10/RELATIVE -10) FROM CursorName INTO @ColumnA1, @ColumnA2;
--     FETCH PRIOR FROM BookCursor;
It will start to SELECT the last data row
and then SELECT backforward One by One until first records.
--FETCH LAST FROM BookCursor;
means get the last one.
--     FETCH PRIOR FROM BookCursor;
```

```
means read the previous one until end of while loop.
*/

==================================================
```

5. Cursor Scroll,ABSOLUTE 9, RELATIVE 10

```
--=========================================================
--T021_05_Cursor Scroll,ABSOLUTE 9, RELATIVE 10
--=========================================================
DECLARE BookCursor CURSOR SCROLL
FOR
    SELECT  b.BookID ,
            b.BookName ,
            b.BookUnitPrice ,
            b.[Description]
    FROM    dbo.Book b;
OPEN BookCursor;
-- *** FETCH (NEXT/First/LAST/ABSOLUTE 9/ABSOLUTE -1) FROM CursorName INTO @ColumnA1,
FETCH ABSOLUTE 9 FROM BookCursor;
WHILE @@FETCH_STATUS = 0
    --*** FETCH (NEXT/PRIOR/RELATIVE 10/RELATIVE -10) FROM CursorName INTO @ColumnA1, @ColumnA2;
    FETCH RELATIVE 10 FROM BookCursor;
CLOSE BookCursor;
DEALLOCATE BookCursor;
GO -- Run the previous command and begins new batch
```

	BookID	BookName	BookUnitPrice	Description
1	9	Book 9	97.00	Book Description 9

	BookID	BookName	BookUnitPrice	Description
1	19	Book 19	41.00	Book Description 19

	BookID	BookName	BookUnitPrice	Description
1	29	Book 29	46.00	Book Description 29

	BookID	BookName	BookUnitPrice	Description
1	39	Book 39	57.00	Book Description 39

	BookID	BookName	BookUnitPrice	Description
1	49	Book 49	48.00	Book Description 49

	BookID	BookName	BookUnitPrice	Description
1	59	Book 59	18.00	Book Description 59

	BookID	BookName	BookUnitPrice	Description
1	69	Book 69	94.00	Book Description 69

BookID	BookName	BookUnitPrice	Description

L2016 (13.0 SP1) | N550JKL\lpmpl (53) | Sample3 | 00:00:00 | 7 rows

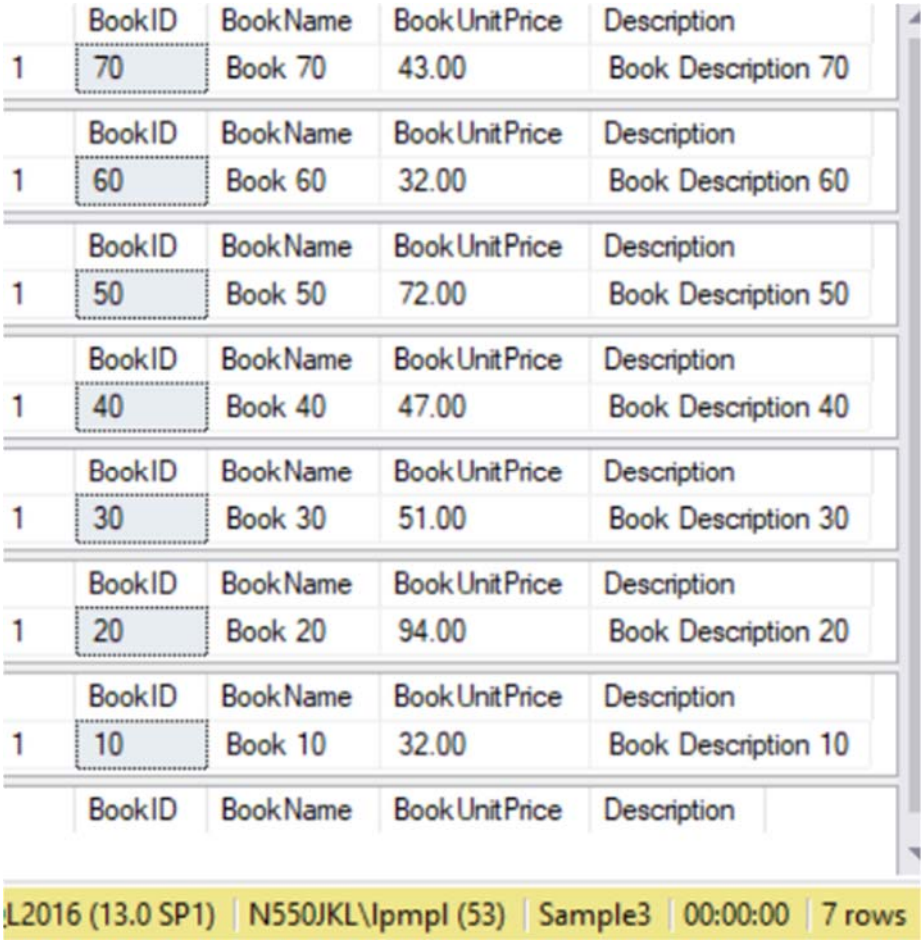
```
/*
1.
--DECLARE BookCursor CURSOR SCROLL
When you declare CURSOR with SCROLL option
```

```
Then it will allow you to
---- *** FETCH (NEXT/First/LAST/ABSOLUTE 9/ABSOLUTE -1) FROM CursorName INTO @ColumnA1,
--FETCH ABSOLUTE 9 FROM BookCursor;
--WHILE @@FETCH_STATUS = 0
--    --*** FETCH (NEXT/PRIOR/RELATIVE 10/RELATIVE -10) FROM CursorName INTO @ColumnA1, @ColumnA2;
--     FETCH RELATIVE 10 FROM BookCursor;
In the beginning, your CURSOR point to id 1
--FETCH ABSOLUTE 9 FROM BookCursor
will make your CURSOR point to id 9
--     FETCH RELATIVE 10 FROM BookCursor
will make your CURSOR point to next item with id 9+10=19
and while loop to keep going to move next item with 9+10+10=29
unitl end of while loop.
*/

==================================================
```

6. Cursor Scroll,ABSOLUTE 9, RELATIVE 10

```
DECLARE BookCursor CURSOR SCROLL
FOR
    SELECT  b.BookID ,
            b.BookName ,
            b.BookUnitPrice ,
            b.[Description]
    FROM    dbo.Book b;
OPEN BookCursor;
-- *** FETCH (NEXT/First/LAST/ABSOLUTE 9/ABSOLUTE -1) FROM CursorName INTO @ColumnA1,
FETCH ABSOLUTE -1 FROM BookCursor;
WHILE @@FETCH_STATUS = 0
    --*** FETCH (NEXT/PRIOR/RELATIVE 10/RELATIVE -10) FROM CursorName INTO @ColumnA1, @ColumnA2;
    FETCH RELATIVE -10 FROM BookCursor;
CLOSE BookCursor;
DEALLOCATE BookCursor;
GO -- Run the previous command and begins new batch
```



	BookID	BookName	BookUnitPrice	Description
1	70	Book 70	43.00	Book Description 70

	BookID	BookName	BookUnitPrice	Description
1	60	Book 60	32.00	Book Description 60

	BookID	BookName	BookUnitPrice	Description
1	50	Book 50	72.00	Book Description 50

	BookID	BookName	BookUnitPrice	Description
1	40	Book 40	47.00	Book Description 40

	BookID	BookName	BookUnitPrice	Description
1	30	Book 30	51.00	Book Description 30

	BookID	BookName	BookUnitPrice	Description
1	20	Book 20	94.00	Book Description 20

	BookID	BookName	BookUnitPrice	Description
1	10	Book 10	32.00	Book Description 10

BookID	BookName	BookUnitPrice	Description

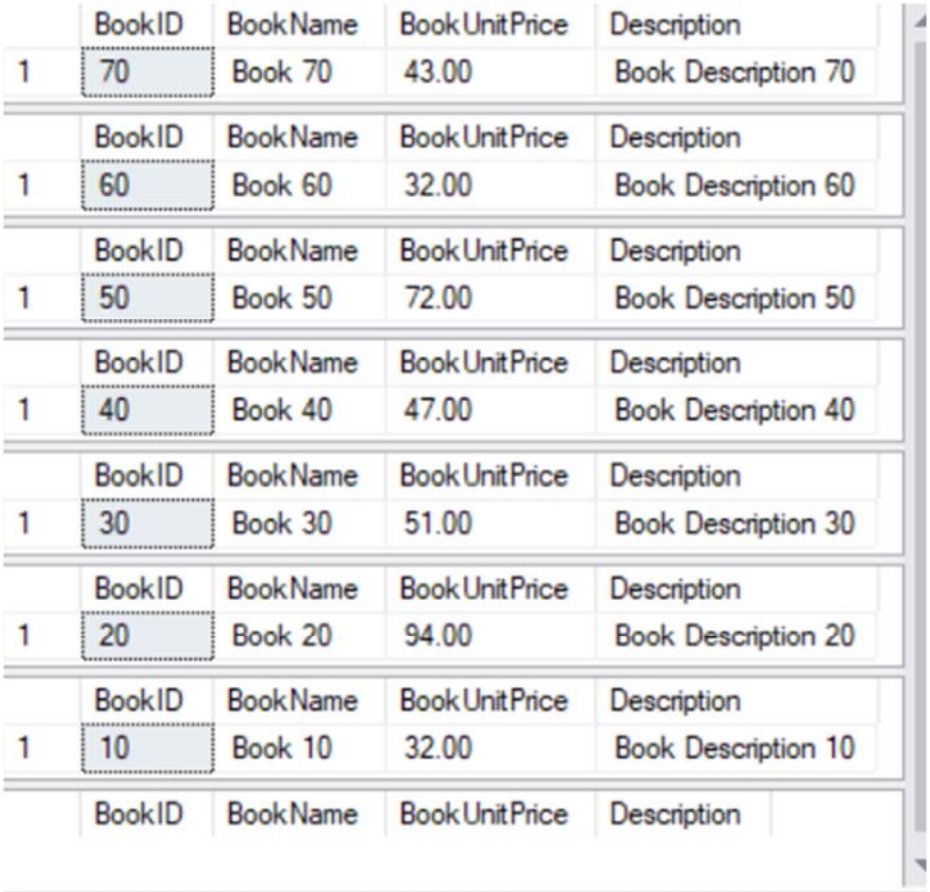

```
/*
1.
--DECLARE BookCursor CURSOR SCROLL
When you declare CURSOR with SCROLL option
Then it will allow you to
---- *** FETCH (NEXT/First/LAST/ABSOLUTE 9/ABSOLUTE -1) FROM CursorName INTO @ColumnA1,
--FETCH ABSOLUTE -1 FROM BookCursor;
--WHILE @@FETCH_STATUS = 0
In the beginning, your CURSOR point to the position -1
that means the last data set with the id 300
--    --*** FETCH (NEXT/PRIOR/RELATIVE 10/RELATIVE -10) FROM CursorName INTO @ColumnA1, @ColumnA2;
--     FETCH RELATIVE -10 FROM BookCursor;
will make your CURSOR point to next item with id 300-10=290
until the end of loop.
*/
```

==========

7. Cursor options and scope

```
--=========================================================
--T021_07_Cursor options and scope
--=========================================================
--DECLARE BookCursor CURSOR (options...)
--DECLARE BookCursor CURSOR (LOCAL/GLOBAL/SCROLL/GLOBAL SCROLL/...
--.../FORWARD_ONLY/FAST_FORWARD/STATIC/KEYSET/DYNAMIC/...
--.../Read_Only/SCROLL_LOCKS/OPTIMISTIC/...
--.../GLOBAL FORWARD_ONLY STATIC READ_ONLY/SCROLL FORWARD_ONLY/...
--.../SCROLL FAST_FORWARD {invalid because scroll is not read only}  ...)
DECLARE BookCursor CURSOR SCROLL
FOR
```

```
    SELECT  b.BookID ,
            b.BookName ,
            b.BookUnitPrice ,
            b.[Description]
    FROM    dbo.Book b;
OPEN BookCursor;
-- *** FETCH (NEXT/First/LAST/ABSOLUTE 9/ABSOLUTE -1) FROM CursorName INTO @ColumnA1,
FETCH ABSOLUTE -1 FROM BookCursor;
WHILE @@FETCH_STATUS = 0
    --*** FETCH (NEXT/PRIOR/RELATIVE 10/RELATIVE -10) FROM CursorName INTO @ColumnA1, @ColumnA2;
    FETCH RELATIVE -10 FROM BookCursor;
CLOSE BookCursor;
DEALLOCATE BookCursor;
GO -- Run the previous command and begins new batch
```



	BookID	BookName	BookUnitPrice	Description
1	70	Book 70	43.00	Book Description 70

	BookID	BookName	BookUnitPrice	Description
1	60	Book 60	32.00	Book Description 60

	BookID	BookName	BookUnitPrice	Description
1	50	Book 50	72.00	Book Description 50

	BookID	BookName	BookUnitPrice	Description
1	40	Book 40	47.00	Book Description 40

	BookID	BookName	BookUnitPrice	Description
1	30	Book 30	51.00	Book Description 30

	BookID	BookName	BookUnitPrice	Description
1	20	Book 20	94.00	Book Description 20

	BookID	BookName	BookUnitPrice	Description
1	10	Book 10	32.00	Book Description 10

BookID	BookName	BookUnitPrice	Description


```
/*
1.
Scope of CURSOR
LOCAL, GLOBAL
1.1.
-- DECLARE BookCursor CURSOR LOCAL
LOCAL means the CURSOR is valid in current batch
That means it is valid before GO
1.2.
-- DECLARE BookCursor CURSOR GLOBAL
GLOBAL means the CURSOR is valid in any batch
That means it is still valid after GO
By default, CURSOR is GLOBAL
However, you may change the default.
Database Name --> Right Click --> Properties -->
options --> Default CURSOR --> GLOBAL / LOCAL
2.
Scroll seting for CURSOR
SCROLL, FORWARD_ONLY
```

2.1.
--DECLARE BookCursor CURSOR SCROLL
When you declare SCROLL option for CURSOR
you may
--FETCH First FROM BookCursor;   or
--FETCH LAST FROM BookCursor;   or
--FETCH ABSOLUTE -1 FROM BookCursor
....
-- FETCH PRIOR FROM BookCursor;
-- FETCH RELATIVE -10 FROM BookCursor;
That means you may choose forward of backward.
2.2.
--DECLARE BookCursor CURSOR FORWARD_ONLY
You may only fetch forward.
--FETCH NEXT FROM BookCursor;
You can not use
--FETCH First FROM BookCursor;
3.
Record Set Types for CURSOR,
STATIC, DYNAMIC, KEYSET, FAST_FORWARD
Reference:
https://docs.microsoft.com/en-us/sql/t-sql/language-elements/declare-cursor-transact-sql
3.1.
-- DECLARE BookCursor CURSOR FAST_FORWARD
FAST_FORWARD is read-only and forward only,
but it enable performance optimizations
if you don't need to make any changes
3.2.
-- DECLARE BookCursor CURSOR STATIC
STATIC option means create a copy of your select statement results
into a temp db which you can not make any changes.
If any changes from other user, you will not see.
Because you are seeing a copy of temp db.
3.3.
-- DECLARE BookCursor CURSOR KEYSET
KEYSET option means create a copy of key value
from your select statements results into a temp db.
Because the temp db only store key, so you may see other user changes.
However, you can not see any changes if other user delete or insert new records.
3.4.
-- DECLARE BookCursor CURSOR DYNAMIC
That means you can update, delete, insert.
You may also see other users update, delete, insert.
4.
Record Locking Options for CURSORs
Read_Only, SCROLL_LOCKS, OPTIMISTIC
4.1.
-- DECLARE BookCursor CURSOR Read_Only
Read_Only means you may not make any changes.
If you use FAST_FORWARD which will automaticly apply Read_Only
4.2.
-- DECLARE BookCursor CURSOR SCROLL_LOCKS
SCROLL_LOCKS option means
when your cursor moves to a record and that record is locked.
It prevents other users from making changes to the record you locked.
Thus, it guarantee you are always able to successfully update the record.
4.3.
-- DECLARE BookCursor CURSOR OPTIMISTIC
OPTIMISTIC option only locks a record at the instant you try to make change.
If another user had made a change to the record in between your cursor scrolling
to it, then attempting to make the change would fail.
5.
Combining Cursor Options
-- DECLARE BookCursor CURSOR GLOBAL FORWARD_ONLY STATIC READ_ONLY
It is fine when you combining cursor option.
-- DECLARE BookCursor CURSOR SCROLL FORWARD_ONLY
or

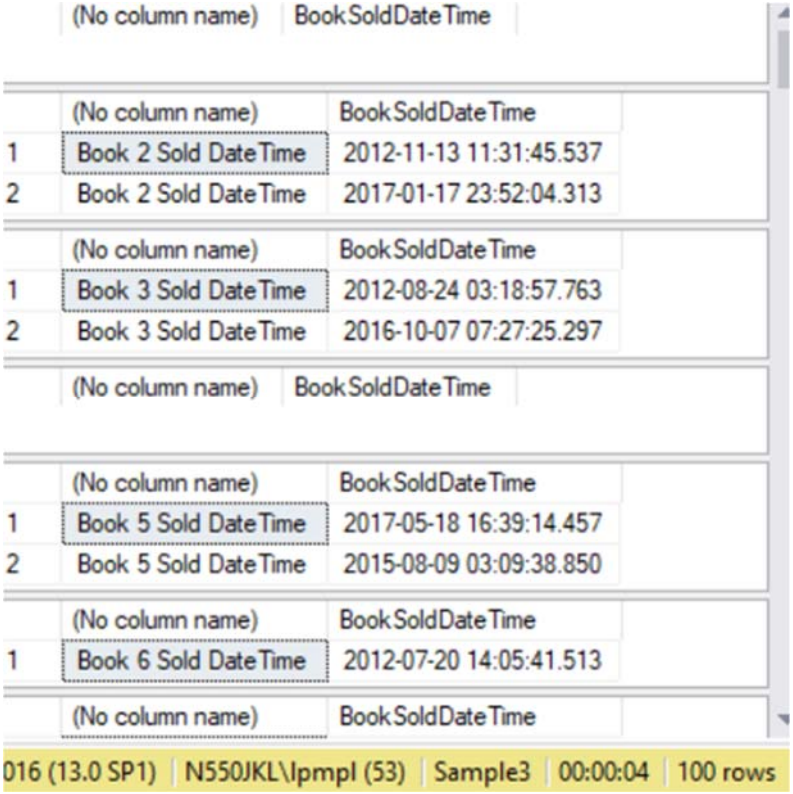
```
-- DECLARE BookCursor CURSOR SCROLL FAST_FORWARD
it is not valid, because scroll is not read only
*/
```

==========

8. Cursor basic, store procedure

```
--=========================================================
--T021_08_Cursor basic, store procedure.
--=========================================================
--If store procedure is EXISTS, then drop it.
IF EXISTS(SELECT *
          FROM   INFORMATION_SCHEMA.ROUTINES
          WHERE  ROUTINE_NAME = 'spListBookSoldDateTime'
                 AND SPECIFIC_SCHEMA = 'dbo')
  BEGIN
      DROP PROCEDURE spListBookSoldDateTime
  END
GO -- Run the previous command and begins new batch
--Create Store Procedure
CREATE PROC spListBookSoldDateTime
    (
      @BookID INT ,
      @BookName NVARCHAR(100)
    )
AS
    BEGIN
        SELECT  @BookName + ' Sold DateTime' ,
                bsc.CreatedDateTime AS BookSoldDateTime
        FROM    dbo.BookShoppingCart bsc
        WHERE   bsc.BookID = @BookID;
    END;
GO -- Run the previous command and begins new batch
--Cursor basic with store procedure.
--See the comment in
DECLARE @BookID INT;
DECLARE @BookName NVARCHAR(MAX);
DECLARE BookCursor CURSOR
FOR
    SELECT  b.BookID ,
            b.BookName
    FROM    dbo.Book b;
OPEN BookCursor;
-- *** FETCH (NEXT/First/LAST/ABSOLUTE 9/ABSOLUTE -1) FROM CursorName INTO @ColumnA1,
FETCH NEXT FROM BookCursor INTO @BookID, @BookName;
WHILE @@FETCH_STATUS = 0
    BEGIN
          --SELECT  @BookName + ' Sold DateTime',
          --           bsc.CreatedDateTime AS BookSoldDateTime
        --FROM    dbo.BookShoppingCart bsc
        --WHERE   bsc.BookID = @BookID;
        EXEC spListBookSoldDateTime @BookID, @BookName;
              --*** FETCH (NEXT/PRIOR/RELATIVE 10/RELATIVE -10) FROM CursorName INTO @ColumnA1, @ColumnA2;
        FETCH NEXT FROM BookCursor INTO @BookID, @BookName;
    END;
CLOSE BookCursor;
```

```
DEALLOCATE BookCursor;
GO -- Run the previous command and begins new batch
```



	(No column name)	BookSoldDateTime
1	Book 2 Sold DateTime	2012-11-13 11:31:45.537
2	Book 2 Sold DateTime	2017-01-17 23:52:04.313

	(No column name)	BookSoldDateTime
1	Book 3 Sold DateTime	2012-08-24 03:18:57.763
2	Book 3 Sold DateTime	2016-10-07 07:27:25.297

	(No column name)	BookSoldDateTime
1	Book 5 Sold DateTime	2017-05-18 16:39:14.457
2	Book 5 Sold DateTime	2015-08-09 03:09:38.850

	(No column name)	BookSoldDateTime
1	Book 6 Sold DateTime	2012-07-20 14:05:41.513

016 (13.0 SP1) | N550JKL\lpmpl (53) | Sample3 | 00:00:04 | 100 rows

==========

9. Update TableA.ColumnA1 with TableACursor

```
--============================================================
--T021_09_Update TableA.ColumnA1 with  TableACursor
--Replace TableACursor by normal Update TableA.
--============================================================
/*
Goal:
1.
Update TableA.ColumnA1 with  TableACursor
2.
dbo.Book b has b.BookID, b.BookName, b.BookUnitPrice.
Depending on b.BookUnitPrice, we need to update b.[Description]
3.
Curson is very bad in Performance.
Thus, Replace TableACursor by normal Update TableA.
*/
```

9.1. Update with Cursor

```
--============================================================
--T021_09_01
--Update with Cursor
DECLARE @BookID INT;
DECLARE @BookName NVARCHAR(100);
DECLARE @BookUnitPrtice MONEY;
DECLARE @DescriptionExtraInfo NVARCHAR(100);
DECLARE BookCursor CURSOR
FOR
    SELECT  b.BookID ,
            b.BookName ,
            b.BookUnitPrice
    FROM    dbo.Book b
```

```
       -- *** declare a CURSOR "BookCursor" and help to update the field [Book].[Description]
       FOR UPDATE OF b.[Description];
OPEN BookCursor;
-- *** FETCH (NEXT/First/LAST/ABSOLUTE 9/ABSOLUTE -1) FROM CursorName INTO @ColumnA1,
--INTO @BookID, @BookName, @BookUnitPrtice;    must map to
--SELECT  b.BookID , b.BookName, b.BookUnitPrice
FETCH NEXT FROM BookCursor INTO @BookID, @BookName, @BookUnitPrtice;
WHILE @@FETCH_STATUS = 0
    BEGIN
             --set @DescriptionExtraInfo
        SELECT  @DescriptionExtraInfo =
                    CASE
                           WHEN ( @BookUnitPrtice > 25 AND @BookUnitPrtice <= 50)
               THEN '2nd level book.'
               WHEN ( @BookUnitPrtice > 50 AND @BookUnitPrtice <= 75)
               THEN '3rd level book.'
               WHEN ( @BookUnitPrtice > 75 )
               THEN '4th level book.'
               ELSE ''
           END;
             -- Update [Description]
        UPDATE  dbo.Book
        SET     dbo.Book.[Description] += (' -- ' + @DescriptionExtraInfo)
             --*** WHERE   Book.BookID = @BookID;
        WHERE CURRENT OF BookCursor;
             --*** FETCH (NEXT/PRIOR/RELATIVE 10/RELATIVE -10) FROM CursorName INTO @ColumnA1, @ColumnA2,
@ColumnA3;
             FETCH NEXT FROM BookCursor INTO @BookID, @BookName, @BookUnitPrtice;
    END;
CLOSE BookCursor;
DEALLOCATE BookCursor;
GO -- Run the previous command and begins new batch
SELECT  b.BookID,
             b.BookName,
             b.BookUnitPrice,
             b.[Description] AS BookDescription
FROM    dbo.Book b
WHERE   (
                    ( b.BookUnitPrice > 25 AND b.BookUnitPrice <= 50) OR
                    ( b.BookUnitPrice > 50 AND b.BookUnitPrice <= 75) OR
                    ( b.BookUnitPrice > 75)
        );
GO -- Run the previous command and begins new batch
```

	BookID	BookName	BookUnitPrice	BookDescription
1	1	Book 1	77.00	Book Description 1 -- 4th level book.
2	2	Book 2	36.00	Book Description 2 -- 2nd level book.
3	4	Book 4	42.00	Book Description 4 -- 2nd level book.
4	6	Book 6	59.00	Book Description 6 -- 3rd level book.
5	8	Book 8	92.00	Book Description 8 -- 4th level book.
6	9	Book 9	97.00	Book Description 9 -- 4th level book.
7	10	Book 10	32.00	Book Description 10 -- 2nd level book.
8	11	Book 11	48.00	Book Description 11 -- 2nd level book.
9	12	Book 12	86.00	Book Description 12 -- 4th level book.
10	13	Book 13	83.00	Book Description 13 -- 4th level book.
11	14	Book 14	52.00	Book Description 14 -- 3rd level book.
12	15	Book 15	37.00	Book Description 15 -- 2nd level book.
13	16	Book 16	87.00	Book Description 16 -- 4th level book.
14	17	Book 17	85.00	Book Description 17 -- 4th level book.
15	18	Book 18	92.00	Book Description 18 -- 4th level book.
16	19	Book 19	41.00	Book Description 19 -- 2nd level book.
17	20	Book 20	94.00	Book Description 20 -- 4th level book.

9.2. Replace Cursor by Normal Update.

```
--=========================================================
--T021_09_02
--Replace Cursor by Normal Update.
UPDATE  dbo.Book
SET     dbo.Book.[Description] +=
            CASE
                    WHEN ( Book.BookUnitPrice > 25 AND Book.BookUnitPrice <= 50)
                    THEN ' -- 2nd level book.'
                    WHEN ( Book.BookUnitPrice > 50 AND Book.BookUnitPrice <= 75)
                    THEN ' -- 3rd level book.'
                    WHEN ( Book.BookUnitPrice > 75)
                    THEN ' -- 4th level book.'
                    ELSE ''
        END
GO -- Run the previous command and begins new batch
SELECT  b.BookID,
            b.BookName,
            b.BookUnitPrice,
            b.[Description] AS BookDescription
FROM    dbo.Book b
WHERE   (
                    ( b.BookUnitPrice > 25 AND b.BookUnitPrice <= 50) OR
                    ( b.BookUnitPrice > 50 AND b.BookUnitPrice <= 75) OR
                    ( b.BookUnitPrice > 75)
        );
GO -- Run the previous command and begins new batch
```

	BookID	BookName	BookUnitPrice	BookDescription
1	1	Book 1	77.00	Book Description 1 -- 4th level book. -- 4th level book.
2	2	Book 2	36.00	Book Description 2 -- 2nd level book. -- 2nd level book.
3	4	Book 4	42.00	Book Description 4 -- 2nd level book. -- 2nd level book.
4	6	Book 6	59.00	Book Description 6 -- 3rd level book. -- 3rd level book.
5	8	Book 8	92.00	Book Description 8 -- 4th level book. -- 4th level book.
6	9	Book 9	97.00	Book Description 9 -- 4th level book. -- 4th level book.
7	10	Book 10	32.00	Book Description 10 -- 2nd level book. -- 2nd level book.
8	11	Book 11	48.00	Book Description 11 -- 2nd level book. -- 2nd level book.
9	12	Book 12	86.00	Book Description 12 -- 4th level book. -- 4th level book.
10	13	Book 13	83.00	Book Description 13 -- 4th level book. -- 4th level book.
11	14	Book 14	52.00	Book Description 14 -- 3rd level book. -- 3rd level book.
12	15	Book 15	37.00	Book Description 15 -- 2nd level book. -- 2nd level book.
13	16	Book 16	87.00	Book Description 16 -- 4th level book. -- 4th level book.
14	17	Book 17	85.00	Book Description 17 -- 4th level book. -- 4th level book.
15	18	Book 18	92.00	Book Description 18 -- 4th level book. -- 4th level book.
16	19	Book 19	41.00	Book Description 19 -- 2nd level book. -- 2nd level book.
17	20	Book 20	94.00	Book Description 20 -- 4th level book. -- 4th level book.

Query executed s... | N550JKL\SQL2016 (13.0 SP1) | N550JKL\lpmpl (53) | Sample3 | 00:00:00 | 61 rows

```
/*
1.
Cursor Syntax 2:
--DECLARE @ColumnA1 dataType;
--DECLARE @ColumnA2 dataType;
--DECLARE @ColumnA3 dataType;
--DECLARE @ColumnA4ExtraInfo dataType;
--DECLARE CursorName CURSOR (options...)
--FOR
--    SELECT  b.ColumnA1 ,
--            b.ColumnA2 ,
--            b.ColumnA3 ,
--    FROM    dbo.TableName b
--       -- *** declare a CursorName and help to update the field b.ColumnA4
--       FOR UPDATE OF b.ColumnA4;
--OPEN CursorName;
---- FETCH (NEXT/First/LAST/ABSOLUTE 9/ABSOLUTE -1) FROM CursorName INTO @ColumnA1, @ColumnA2, @ColumnA3
---- must map to SELECT  a.ColumnA1 ,a.ColumnA2, @ColumnA3
--FETCH NEXT FROM CursorName INTO @ColumnA1, @ColumnA2, @ColumnA3;
--WHILE @@FETCH_STATUS = 0
--    BEGIN
--            --Set @ColumnA4ExtraInfo = ...
--            ...
--            -- Update [ColumnA4]
--        UPDATE  TableName
--        SET     TableName.[ColumnA4] += (' -- ' + @ColumnA4ExtraInfo)
--             --*** WHERE   TableName.[ColumnA1] = @ColumnA1;
--        WHERE CURRENT OF CursorName;
--           --*** FETCH (NEXT/PRIOR/RELATIVE 10/RELATIVE -10) FROM CursorName INTO @ColumnA1, @ColumnA2,
@ColumnA3;
--            FETCH NEXT FROM CursorName INTO @ColumnA1, @ColumnA2, @ColumnA3;
--    END;
--CLOSE CursorName;
--DEALLOCATE CursorName;
1.1.
CURSOR is a way to step through a set of records one row at a time.
It is like a pointer in each record and moving through one step at a time.
--OPEN CursorName;
-- FETCH (NEXT/First/LAST/ABSOLUTE 9/ABSOLUTE -1) FROM CursorName INTO @ColumnA1, @ColumnA2, @ColumnA3
Open the Cursor and point to the (NEXT/First/LAST/ABSOLUTE 9/ABSOLUTE -1) data set
must map to SELECT  a.ColumnA1 ,a.ColumnA2, @ColumnA3
If you have selected extra Columns,
then you have to declare extra variable to map them.
In this case,
```

```
declare @ColumnA1, @ColumnA2, ColumnA3   must map to  --SELECT  b.ColumnA1 ,b.ColumnA2, b.ColumnA3
Read the value for each record set and put into variables @ColumnA1, @ColumnA2, @ColumnA3
--WHILE @@FETCH_STATUS = 0
means successfully read a next record into variables @ColumnA1, @ColumnA2, @ColumnA3
during while loop, you can use  @ColumnA1, @ColumnA2, @ColumnA3
to update  TableName.ColumnA4 or any other sql statement.
----FETCH (NEXT/PRIOR/RELATIVE 10/RELATIVE -10) FROM CursorName INTO @ColumnA1, @ColumnA2, @ColumnA3
Use the Cursor and point to the (NEXT/PRIOR/RELATIVE 10/RELATIVE -10) data set,
--WHILE @@FETCH_STATUS = 0
check if successfully read a (NEXT/PRIOR/RELATIVE 10/RELATIVE -10) record
into variables @ColumnA1, @ColumnA2, @ColumnA3
This while loop will run until NOT(@@FETCH_STATUS = 0)
That means the pointer reach to the end of loop and get out the loop.
1.2.
--DECLARE CursorName CURSOR (options...)
--FOR
--    SELECT  ...
--OPEN CursorName;
--FETCH (NEXT/First/LAST/ABSOLUTE 9/ABSOLUTE -1) FROM CursorName INTO @ColumnA1, @ColumnA2, @ColumnA3
--...
--WHILE @@FETCH_STATUS = 0
--    BEGIN
--           ...
--    END;
--CLOSE CursorName;
--DEALLOCATE CursorName;
1.2.1.
This is the life of CURSOR
--DECLARE CursorName CURSOR (options...)
--FOR
Then
--OPEN CursorName;
--FETCH (NEXT/First/LAST/ABSOLUTE 9/ABSOLUTE -1) FROM CursorName INTO @ColumnA1, @ColumnA2, @ColumnA3
Then
--WHILE @@FETCH_STATUS = 0
Then
--CLOSE CursorName;
Then
--DEALLOCATE CursorName;
means get rid of the CursorName.
-----------------------------------------------
2.
--DECLARE @BookID INT;
--DECLARE @BookName NVARCHAR(100);
--DECLARE @BookUnitPrtice MONEY;
--DECLARE @DescriptionExtraInfo NVARCHAR(100);
--DECLARE BookCursor CURSOR
--FOR
--    SELECT  b.BookID ,
--            b.BookName ,
--            b.BookUnitPrice
--    FROM    dbo.Book b
--       -- *** declare a CURSOR "BookCursor" and help to update the field [Book].[Description]
--       FOR UPDATE OF b.[Description];
--OPEN BookCursor;
---- *** FETCH (NEXT/First/LAST/ABSOLUTE 9/ABSOLUTE -1) FROM CursorName INTO @ColumnA1,
----INTO @BookID, @BookName, @BookUnitPrtice;    must map to
----SELECT  b.BookID , b.BookName, b.BookUnitPrice
--FETCH NEXT FROM BookCursor INTO @BookID, @BookName, @BookUnitPrtice;
--WHILE @@FETCH_STATUS = 0
--    BEGIN
--             --set @DescriptionExtraInfo
--        SELECT  @DescriptionExtraInfo =
--                  CASE
--                         WHEN ( @BookUnitPrtice > 25 AND @BookUnitPrtice <= 50)
--               THEN '2nd level book.'
--               WHEN ( @BookUnitPrtice > 50 AND @BookUnitPrtice <= 75)
```

```
--                THEN '3rd level book.'
--                WHEN ( @BookUnitPrtice > 75 )
--                THEN '4th level book.'
--                ELSE ''
--            END;
--             -- Update [Description]
--        UPDATE  dbo.Book
--        SET     dbo.Book.[Description] += (' -- ' + @DescriptionExtraInfo)
--             --*** WHERE   Book.BookID = @BookID;
--        WHERE CURRENT OF BookCursor;
--             --*** FETCH (NEXT/PRIOR/RELATIVE 10/RELATIVE -10) FROM CursorName INTO @ColumnA1,
@ColumnA2, @ColumnA3;
--             FETCH NEXT FROM BookCursor INTO @BookID, @BookName, @BookUnitPrtice;
--    END;
--CLOSE BookCursor;
--DEALLOCATE BookCursor;
2.1.
--DECLARE BookCursor CURSOR
--FOR
--    SELECT  b.BookID ,
--            b.BookName ,
--            b.BookUnitPrice
--    FROM    dbo.Book b
--     FOR UPDATE OF b.[Description];
--OPEN BookCursor;
---- *** FETCH (NEXT/First/LAST/ABSOLUTE 9/ABSOLUTE -1) FROM CursorName INTO @ColumnA1,
----INTO @BookID, @BookName, @BookUnitPrtice;    must map to
----SELECT  b.BookID , b.BookName, b.BookUnitPrice
--FETCH NEXT FROM BookCursor INTO @BookID, @BookName, @BookUnitPrtice;
2.1.1.
CURSOR is a way to step through a set of records one row at a time.
It is like a pointer in each record and moving through one step at a time.
2.1.2.
--DECLARE BookCursor CURSOR
--FOR
--    SELECT  b.BookID ,
--            b.BookName ,
--            b.BookUnitPrice
--    FROM    dbo.Book b
--     FOR UPDATE OF b.[Description];
declare a CURSOR "BookCursor" to read the values for each record set.
This select statement will help to
update the field [Book].[Description]
2.1.3.
--OPEN BookCursor;
--FETCH NEXT FROM BookCursor INTO @BookID, @BookName, @BookUnitPrtice;
Open the Cursor and point to the first data set,
Read the value and put into variables @BookID and @BookName, @BookUnitPrtice
which need to map to   SELECT  b.BookID , b.BookName, b.BookUnitPrice
2.2.
--WHILE @@FETCH_STATUS = 0
--    BEGIN
--             --set @DescriptionExtraInfo = ...
--        ...
--             -- Update [Description]
--        UPDATE  dbo.Book
--        SET     dbo.Book.[Description] += (' -- ' + @DescriptionExtraInfo)
--        WHERE CURRENT OF BookCursor;
--             --*** FETCH (NEXT/PRIOR/RELATIVE 10/RELATIVE -10) FROM CursorName INTO @ColumnA1,
@ColumnA2, @ColumnA3;
--             FETCH NEXT FROM BookCursor INTO @BookID, @BookName, @BookUnitPrtice;
--    END;
2.2.1.
--WHILE @@FETCH_STATUS = 0
means successfully read a next record into variables @BookID, @BookName, @BookUnitPrtice.
during while loop, you can use  @BookID, @BookName, @BookUnitPrtice
to update Book.[Description] or any other sql statement.
```

```
FETCH NEXT FROM BookCursor INTO @BookID, @BookName, @BookUnitPrtice;
Use the Cursor and point to the next data set,
Read the value and put into variables @BookID, @BookName, @BookUnitPrtice.
--WHILE @@FETCH_STATUS = 0
check if successfully read a next record into variables @BookID, @BookName, @BookUnitPrtice.
This while loop will run until NOT(@@FETCH_STATUS = 0)
That means the pointer reach to the end of loop and get out the loop.
2.3.
-- DECLARE BookCursor CURSOR
--FOR
--    SELECT  ...
--       FOR UPDATE OF b.[Description];
--OPEN BookCursor;
--FETCH NEXT FROM BookCursor INTO @BookID, @BookName, @BookUnitPrtice;
--...
--WHILE @@FETCH_STATUS = 0
--    BEGIN
--           ...
--    END;
--CLOSE BookCursor;
--DEALLOCATE BookCursor;
2.3.1.
This is the life of CURSOR
-- DECLARE BookCursor CURSOR
--FOR
--    SELECT  ...
--       FOR UPDATE OF b.[Description];
Then
--OPEN BookCursor;
Then
--FETCH NEXT FROM BookCursor INTO @BookID, @BookName, @BookUnitPrtice;
Then
--WHILE @@FETCH_STATUS = 0
Then
--CLOSE BookCursor;
Then
--DEALLOCATE BookCursor;
means get rid of the CURSOR.
*/
```

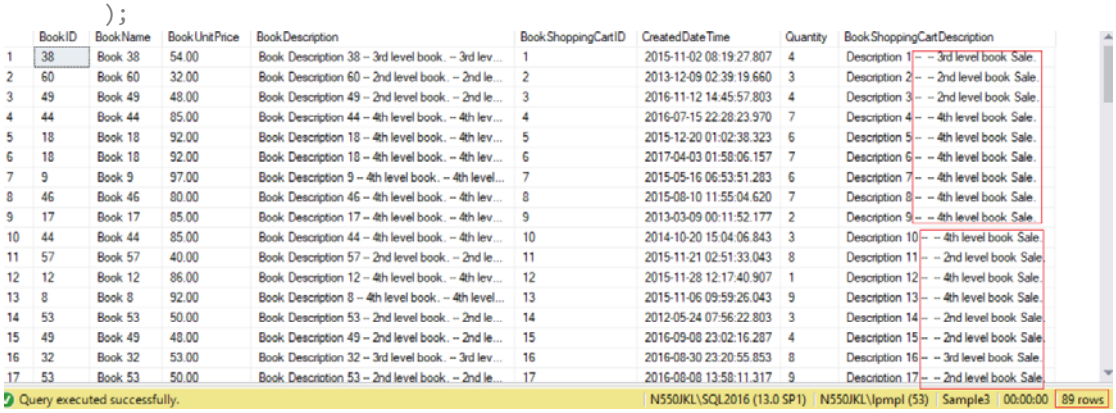
==========

10. Update TableB.ColumnB4 with TablAACursor

```
--=========================================================
--T021_10_Update TableB.ColumnB4 with  TablAACursor
--Replace TablAACursor by using  Update TableB...From TableB Join Join TableA .... WHERE...
--=========================================================
/*
Goal:
1.
Update TableB.ColumnB4 with  TablAACursor
2.
dbo.Book b has b.BookID, b.BookName, b.BookUnitPrice.
Depending on b.BookUnitPrice, we need to update dbo.BookShoppingCart.[Description]
3.
Curson is very bad in Performance.
Thus, Replace TablAACursor by using  Update TableB...From TableB Join Join TableA .... WHERE...
4.
See the comment in Ch63toCh64_08
*/
--Update TableB.ColumnB4 with  TablAACursor
DECLARE @BookID INT;
DECLARE @BookName NVARCHAR(100);
DECLARE @BookUnitPrtice MONEY;
DECLARE @DescriptionExtraInfo NVARCHAR(100);
```

```
DECLARE BookCursor CURSOR
FOR
    SELECT  b.BookID ,
            b.BookName ,
            b.BookUnitPrice
    FROM    dbo.Book b
        --FOR UPDATE OF BookShoppingCart.[Description];
        ----Error: The multi-part identifier "BookShoppingCart.Description" could not be bound.
        --When Update TableB.ColumnB4 with  TablAACursor,
        --we can not use   TablAACursor "FOR UPDATE OF "
OPEN BookCursor;
-- *** FETCH (NEXT/First/LAST/ABSOLUTE 9/ABSOLUTE -1) FROM CursorName INTO @ColumnA1,
--INTO @BookID, @BookName, @BookUnitPrtice;    must map to
--SELECT  b.BookID , b.BookName, b.BookUnitPrice
FETCH NEXT FROM BookCursor INTO @BookID, @BookName, @BookUnitPrtice;
WHILE @@FETCH_STATUS = 0
    BEGIN
            --set @DescriptionExtraInfo
        SELECT  @DescriptionExtraInfo =
                CASE
                        WHEN ( @BookUnitPrtice > 25 AND @BookUnitPrtice <= 50)
                        THEN ' -- 2nd level book Sale.'
                        WHEN ( @BookUnitPrtice > 50 AND @BookUnitPrtice <= 75)
                        THEN ' -- 3rd level book Sale.'
                        WHEN ( @BookUnitPrtice > 75)
                        THEN ' -- 4th level book Sale.'
                        ELSE ''
            END;
             PRINT @DescriptionExtraInfo
             -- Update [Description]
        UPDATE  dbo.BookShoppingCart
        SET     dbo.BookShoppingCart.[Description] += (' -- ' + @DescriptionExtraInfo)
             --WHERE CURRENT OF BookCursor;
             ----Error: The cursor does not include the table being modified or the table is not
updatable through the cursor.
             --When Update TableB.ColumnB4 with  TablAACursor,
             --we can not update use "WHERE CURRENT OF TablAACursor;"
             WHERE   BookShoppingCart.BookID = @BookID;
             --*** FETCH (NEXT/PRIOR/RELATIVE 10/RELATIVE -10) FROM CursorName INTO @ColumnA1, @ColumnA2,
@ColumnA3;
             FETCH NEXT FROM BookCursor INTO @BookID, @BookName, @BookUnitPrtice;
    END;
CLOSE BookCursor;
DEALLOCATE BookCursor;
GO -- Run the previous command and begins new batch
SELECT  b.BookID,
             b.BookName,
             b.BookUnitPrice,
             b.[Description] AS BookDescription,
             bsc.BookShoppingCartID,
             bsc.CreatedDateTime,
             bsc.Quantity,
             bsc.[Description] AS BookShoppingCartDescription
FROM    dbo.Book b
        JOIN dbo.BookShoppingCart bsc ON b.BookID = bsc.BookID
WHERE   (
                    ( b.BookUnitPrice > 25 AND b.BookUnitPrice <= 50) OR
                    ( b.BookUnitPrice > 50 AND b.BookUnitPrice <= 75) OR
```

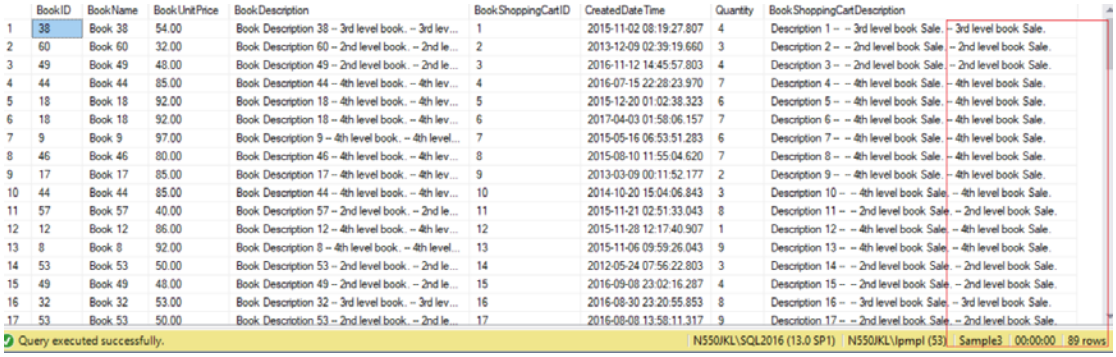
```
                    ( b.BookUnitPrice > 75)
        );
```



	BookID	BookName	BookUnitPrice	BookDescription	BookShoppingCartID	CreatedDateTime	Quantity	BookShoppingCartDescription
1	38	Book 38	54.00	Book Description 38 – 3rd level book. – 3rd lev...	1	2015-11-02 08:19:27.807	4	Description 1 – – 3rd level book Sale.
2	60	Book 60	32.00	Book Description 60 – 2nd level book. – 2nd le...	2	2013-12-09 02:39:19.660	3	Description 2 – – 2nd level book Sale.
3	49	Book 49	48.00	Book Description 49 – 2nd level book. – 2nd le...	3	2016-11-12 14:45:57.803	4	Description 3 – – 2nd level book Sale.
4	44	Book 44	85.00	Book Description 44 – 4th level book. – 4th lev...	4	2016-07-15 22:28:23.970	7	Description 4 – – 4th level book Sale.
5	18	Book 18	92.00	Book Description 18 – 4th level book. – 4th lev...	5	2015-12-20 01:02:38.323	6	Description 5 – – 4th level book Sale.
6	18	Book 18	92.00	Book Description 18 – 4th level book. – 4th lev...	6	2017-04-03 01:58:06.157	7	Description 6 – – 4th level book Sale.
7	9	Book 9	97.00	Book Description 9 – 4th level book. – 4th level...	7	2015-05-16 06:53:51.283	6	Description 7 – – 4th level book Sale.
8	46	Book 46	80.00	Book Description 46 – 4th level book. – 4th lev...	8	2015-08-10 11:55:04.620	7	Description 8 – – 4th level book Sale.
9	17	Book 17	85.00	Book Description 17 – 4th level book. – 4th lev...	9	2013-03-09 00:11:52.177	2	Description 9 – – 4th level book Sale.
10	44	Book 44	85.00	Book Description 44 – 4th level book. – 4th lev...	10	2014-10-20 15:04:06.843	3	Description 10 – – 4th level book Sale.
11	57	Book 57	40.00	Book Description 57 – 2nd level book. – 2nd le...	11	2015-11-21 02:51:33.043	8	Description 11 – – 2nd level book Sale.
12	12	Book 12	86.00	Book Description 12 – 4th level book. – 4th lev...	12	2015-11-28 12:17:40.907	1	Description 12 – – 4th level book Sale.
13	8	Book 8	92.00	Book Description 8 – 4th level book. – 4th level...	13	2015-11-06 09:59:26.043	9	Description 13 – – 4th level book Sale.
14	53	Book 53	50.00	Book Description 53 – 2nd level book. – 2nd le...	14	2012-05-24 07:56:22.803	3	Description 14 – – 2nd level book Sale.
15	49	Book 49	48.00	Book Description 49 – 2nd level book. – 2nd le...	15	2016-09-08 23:02:16.287	4	Description 15 – – 2nd level book Sale.
16	32	Book 32	53.00	Book Description 32 – 3rd level book. – 3rd lev...	16	2016-08-30 23:20:55.853	8	Description 16 – – 3rd level book Sale.
17	53	Book 53	50.00	Book Description 53 – 2nd level book. – 2nd le...	17	2016-08-08 13:58:11.317	9	Description 17 – – 2nd level book Sale.

Query executed successfully. N550JKL\SQL2016 (13.0 SP1) N550JKL\lpmpl (53) Sample3 00:00:00 89 rows

```
-------------------------------------------------
--Replace TablAACursor by using  Update TableB...From TableB Join Join TableA .... WHERE...
UPDATE  dbo.BookShoppingCart
SET     dbo.BookShoppingCart.[Description] +=
            CASE
                    WHEN ( b.BookUnitPrice > 25 AND b.BookUnitPrice <= 50)
                    THEN ' -- 2nd level book Sale.'
                    WHEN ( b.BookUnitPrice > 50 AND b.BookUnitPrice <= 75)
                    THEN ' -- 3rd level book Sale.'
                    WHEN ( b.BookUnitPrice > 75)
                    THEN ' -- 4th level book Sale.'
                    ELSE ''
        END
FROM    dbo.BookShoppingCart bsc
        JOIN dbo.Book b ON bsc.BookID = b.BookID
WHERE   (
                    ( b.BookUnitPrice > 25 AND b.BookUnitPrice <= 50) OR
                    ( b.BookUnitPrice > 50 AND b.BookUnitPrice <= 75) OR
                    ( b.BookUnitPrice > 75)
        );
GO -- Run the previous command and begins new batch
SELECT  b.BookID,
            b.BookName,
            b.BookUnitPrice,
            b.[Description] AS BookDescription,
            bsc.BookShoppingCartID,
            bsc.CreatedDateTime,
            bsc.Quantity,
            bsc.[Description] AS BookShoppingCartDescription
FROM    dbo.Book b
        JOIN dbo.BookShoppingCart bsc ON b.BookID = bsc.BookID
WHERE   (
                    ( b.BookUnitPrice > 25 AND b.BookUnitPrice <= 50) OR
                    ( b.BookUnitPrice > 50 AND b.BookUnitPrice <= 75) OR
                    ( b.BookUnitPrice > 75)
        );
GO -- Run the previous command and begins new batch
```



	BookID	BookName	BookUnitPrice	BookDescription	BookShoppingCartID	CreatedDateTime	Quantity	BookShoppingCartDescription
1	38	Book 38	54.00	Book Description 38 – 3rd level book. – 3rd lev...	1	2015-11-02 08:19:27.807	4	Description 1 – – 3rd level book Sale. – 3rd level book Sale.
2	60	Book 60	32.00	Book Description 60 – 2nd level book. – 2nd le...	2	2013-12-09 02:39:19.660	3	Description 2 – – 2nd level book Sale. – 2nd level book Sale.
3	49	Book 49	48.00	Book Description 49 – 2nd level book. – 2nd le...	3	2016-11-12 14:45:57.803	4	Description 3 – – 2nd level book Sale. – 2nd level book Sale.
4	44	Book 44	85.00	Book Description 44 – 4th level book. – 4th lev...	4	2016-07-15 22:28:23.970	7	Description 4 – – 4th level book Sale. – 4th level book Sale.
5	18	Book 18	92.00	Book Description 18 – 4th level book. – 4th lev...	5	2015-12-20 01:02:38.323	6	Description 5 – – 4th level book Sale. – 4th level book Sale.
6	18	Book 18	92.00	Book Description 18 – 4th level book. – 4th lev...	6	2017-04-03 01:58:06.157	7	Description 6 – – 4th level book Sale. – 4th level book Sale.
7	9	Book 9	97.00	Book Description 9 – 4th level book. – 4th level...	7	2015-05-16 06:53:51.283	6	Description 7 – – 4th level book Sale. – 4th level book Sale.
8	46	Book 46	80.00	Book Description 46 – 4th level book. – 4th lev...	8	2015-08-10 11:55:04.620	7	Description 8 – – 4th level book Sale. – 4th level book Sale.
9	17	Book 17	85.00	Book Description 17 – 4th level book. – 4th lev...	9	2013-03-09 00:11:52.177	2	Description 9 – – 4th level book Sale. – 4th level book Sale.
10	44	Book 44	85.00	Book Description 44 – 4th level book. – 4th lev...	10	2014-10-20 15:04:06.843	3	Description 10 – – 4th level book Sale. – 4th level book Sale.
11	57	Book 57	40.00	Book Description 57 – 2nd level book. – 2nd le...	11	2015-11-21 02:51:33.043	8	Description 11 – – 2nd level book Sale. – 2nd level book Sale.
12	12	Book 12	86.00	Book Description 12 – 4th level book. – 4th lev...	12	2015-11-28 12:17:40.907	1	Description 12 – – 4th level book Sale. – 4th level book Sale.
13	8	Book 8	92.00	Book Description 8 – 4th level book. – 4th level...	13	2015-11-06 09:59:26.043	9	Description 13 – – 4th level book Sale. – 4th level book Sale.
14	53	Book 53	50.00	Book Description 53 – 2nd level book. – 2nd le...	14	2012-05-24 07:56:22.803	3	Description 14 – – 2nd level book Sale. – 2nd level book Sale.
15	49	Book 49	48.00	Book Description 49 – 2nd level book. – 2nd le...	15	2016-09-08 23:02:16.287	4	Description 15 – – 2nd level book Sale. – 2nd level book Sale.
16	32	Book 32	53.00	Book Description 32 – 3rd level book. – 3rd lev...	16	2016-08-30 23:20:55.853	8	Description 16 – – 3rd level book Sale. – 3rd level book Sale.
17	53	Book 53	50.00	Book Description 53 – 2nd level book. – 2nd le...	17	2016-08-08 13:58:11.317	9	Description 17 – – 2nd level book Sale. – 2nd level book Sale.

Query executed successfully. N550\KL\SQL2016 (13.0 SP1) N550\KL\lpmpl (53) Sample3 00:00:00 89 rows

==========

11. Clean up

```
--=========================================================
--T021_11_Clean up
--=========================================================
IF ( EXISTS ( SELECT    *
              FROM      INFORMATION_SCHEMA.TABLES
              WHERE     TABLE_NAME = 'BookShoppingCart' ) )
    BEGIN
        DROP TABLE BookShoppingCart;
    END;
IF ( EXISTS ( SELECT    *
              FROM      INFORMATION_SCHEMA.TABLES
              WHERE     TABLE_NAME = 'Book' ) )
    BEGIN
        DROP TABLE Book;
    END;
```