Lab 17: Performance tuning with Indexes.

1. Create the following table:

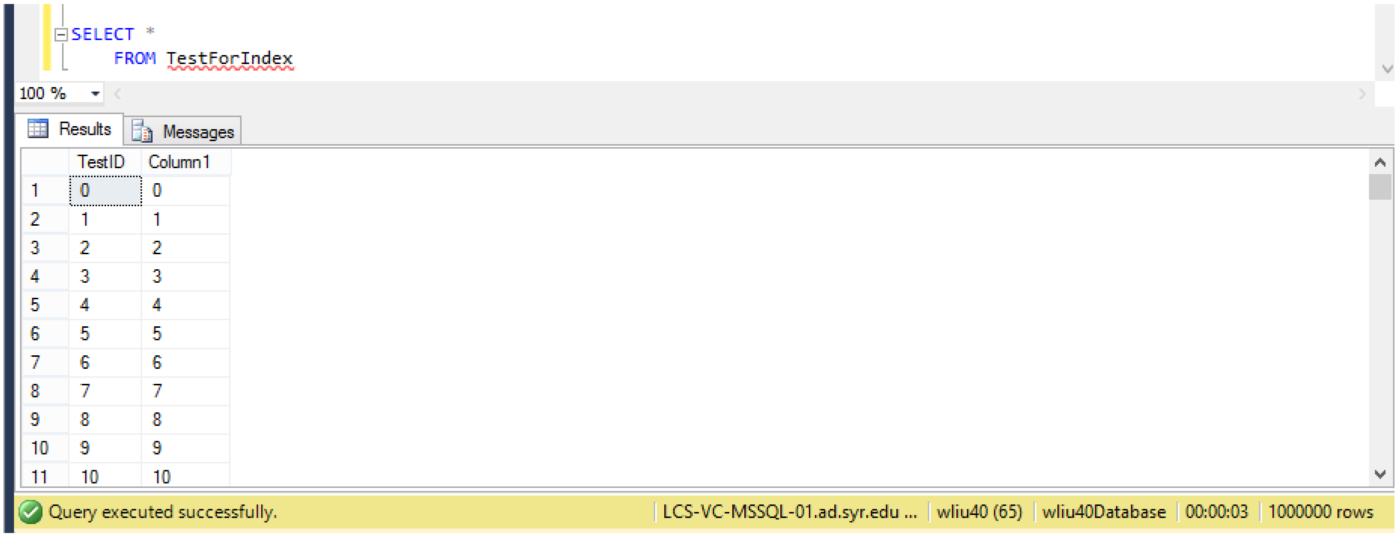
```
CREATE TABLE TestForIndex
(
        TestID                  INT             PRIMARY KEY,
        Column1                 INT             NOT NULL
);
```

2. Write a stored procedure that will insert 1 million records into the TestForIndex table. The values[1] for both testId and column1 should start at 0 and increase by 1.

```
CREATE PROCEDURE dbo.MyInsertProcedure(@number AS INT)
        AS
        DECLARE @counter INT
        SET @counter = 0;
        BEGIN
                WHILE (@counter < @number)
                        BEGIN
                                INSERT INTO TestForIndex(TestID, Column1)
                                        VALUES(@counter, @counter)
                                SET @counter = @counter + 1
                        END
        END;
```

3. Execute the SP. Once it finishes running, verify that the data was inserted.

```
EXEC MyInsertProcedure 1000000;
```

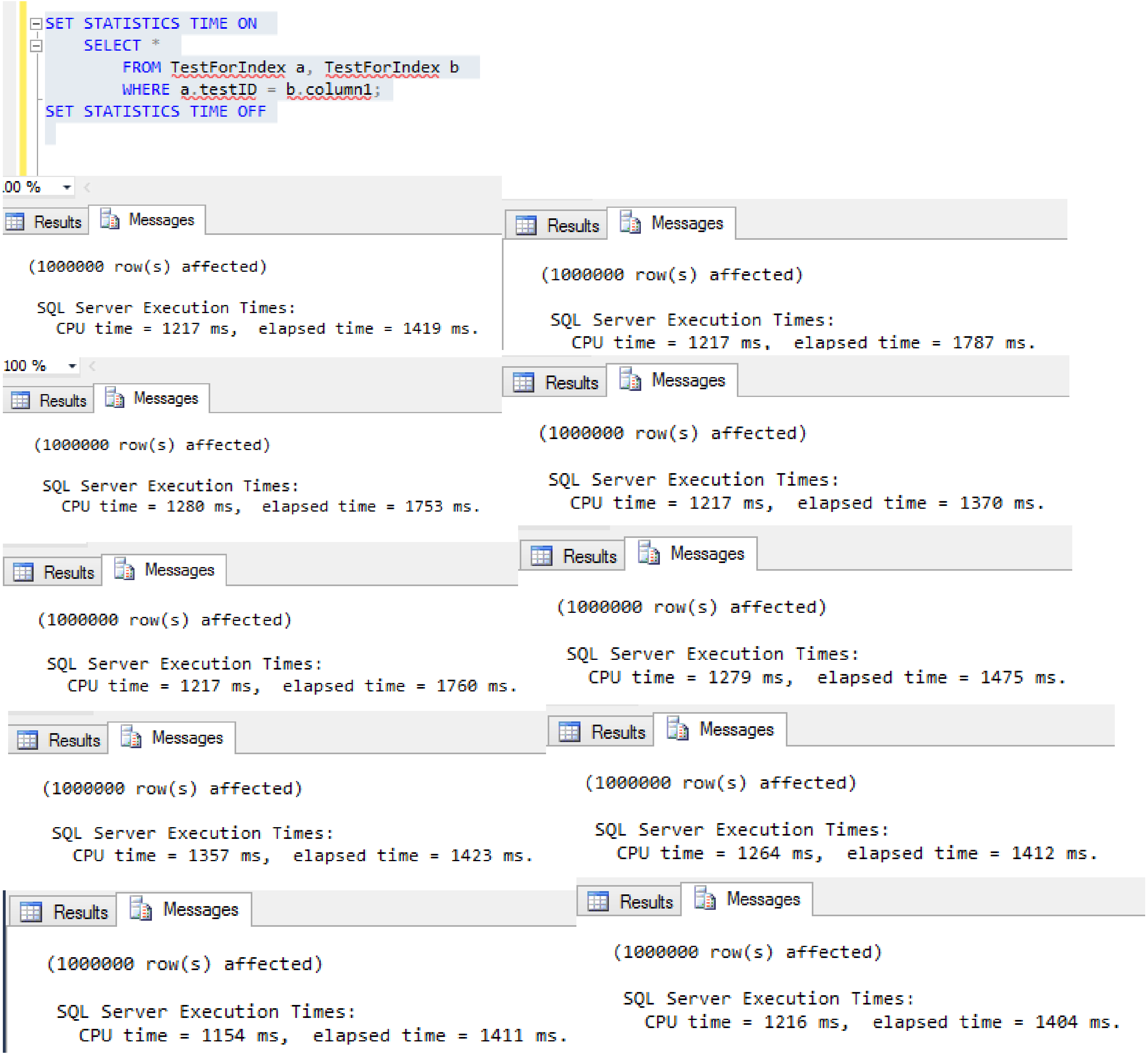


```
SELECT *
    FROM TestForIndex
```

	TestID	Column1
1	0	0
2	1	1
3	2	2
4	3	3
5	4	4
6	5	5
7	6	6
8	7	7
9	8	8
10	9	9
11	10	10

Query executed successfully. | LCS-VC-MSSQL-01.ad.syr.edu ... | wliu40 (65) | wliu40Database | 00:00:03 | 1000000 rows

4. Run the following selects from the table, take note of the time it took to select the data. Run each statement 10 times, Average out the rest of the runs (for both the CPU time and the overall times).



```
SET STATISTICS TIME ON
    SELECT *
        FROM TestForIndex a, TestForIndex b
        WHERE a.testID = b.column1;
SET STATISTICS TIME OFF
```

```
(1000000 row(s) affected)

 SQL Server Execution Times:
   CPU time = 1217 ms,  elapsed time = 1419 ms.
```

```
(1000000 row(s) affected)

 SQL Server Execution Times:
   CPU time = 1217 ms,  elapsed time = 1787 ms.
```

```
(1000000 row(s) affected)

 SQL Server Execution Times:
   CPU time = 1280 ms,  elapsed time = 1753 ms.
```

```
(1000000 row(s) affected)

 SQL Server Execution Times:
   CPU time = 1217 ms,  elapsed time = 1370 ms.
```

```
(1000000 row(s) affected)

 SQL Server Execution Times:
   CPU time = 1217 ms,  elapsed time = 1760 ms.
```

```
(1000000 row(s) affected)

 SQL Server Execution Times:
   CPU time = 1279 ms,  elapsed time = 1475 ms.
```

```
(1000000 row(s) affected)

 SQL Server Execution Times:
   CPU time = 1357 ms,  elapsed time = 1423 ms.
```

```
(1000000 row(s) affected)

 SQL Server Execution Times:
   CPU time = 1264 ms,  elapsed time = 1412 ms.
```

```
(1000000 row(s) affected)

 SQL Server Execution Times:
   CPU time = 1154 ms,  elapsed time = 1411 ms.
```

```
(1000000 row(s) affected)

 SQL Server Execution Times:
   CPU time = 1216 ms,  elapsed time = 1404 ms.
```

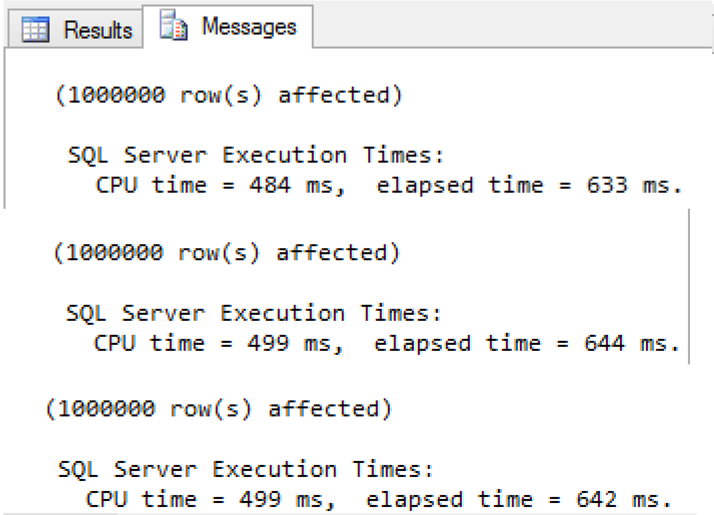
Run without index

#	CPU Time(ms)	Overall Time(ms)
1	1217	1419
2	1217	1787
3	1280	1753
4	1217	1370
5	1217	1760
6	1279	1475
7	1357	1423
8	1264	1412
9	1154	1411
10	1216	1404
Avg	1241.8	1521.4

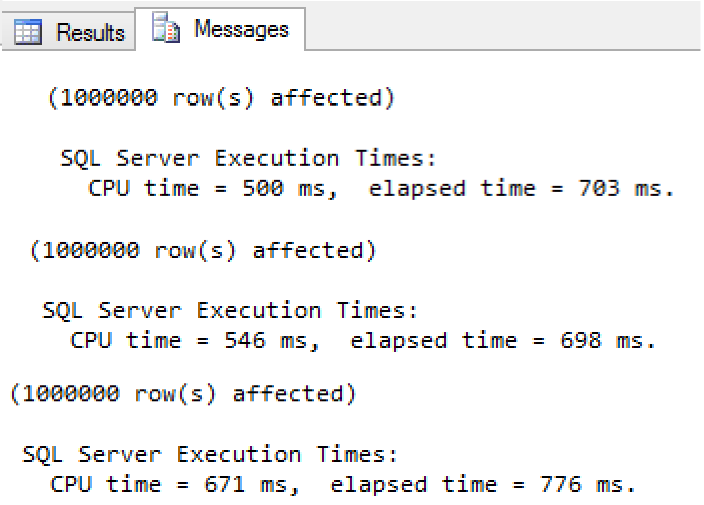
5. Create an index on the column1 column.

```
CREATE INDEX MyIndex ON TestForIndex(Column1);
```

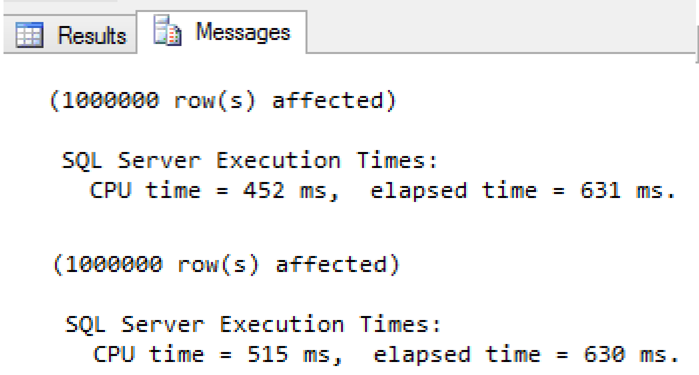
6. Run the selects again, following the same process as in #4.



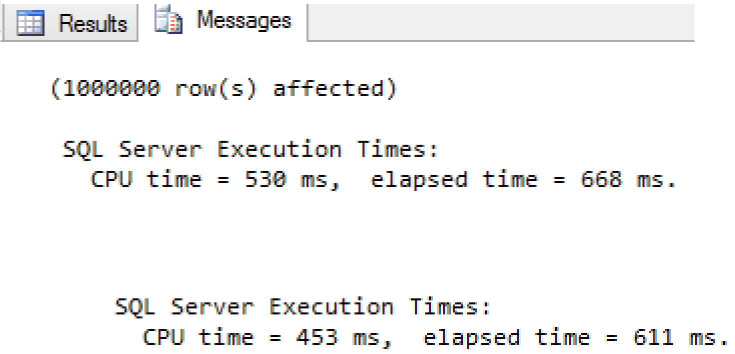
```
(1000000 row(s) affected)

 SQL Server Execution Times:
   CPU time = 484 ms,  elapsed time = 633 ms.

(1000000 row(s) affected)

 SQL Server Execution Times:
   CPU time = 499 ms,  elapsed time = 644 ms.

(1000000 row(s) affected)

 SQL Server Execution Times:
   CPU time = 499 ms,  elapsed time = 642 ms.
```



```
(1000000 row(s) affected)

 SQL Server Execution Times:
   CPU time = 500 ms,  elapsed time = 703 ms.

(1000000 row(s) affected)

 SQL Server Execution Times:
   CPU time = 546 ms,  elapsed time = 698 ms.

(1000000 row(s) affected)

 SQL Server Execution Times:
   CPU time = 671 ms,  elapsed time = 776 ms.
```



```
(1000000 row(s) affected)

 SQL Server Execution Times:
   CPU time = 452 ms,  elapsed time = 631 ms.

(1000000 row(s) affected)

 SQL Server Execution Times:
   CPU time = 515 ms,  elapsed time = 630 ms.
```



```
(1000000 row(s) affected)

 SQL Server Execution Times:
   CPU time = 530 ms,  elapsed time = 668 ms.


 SQL Server Execution Times:
   CPU time = 453 ms,  elapsed time = 611 ms.
```

Run with index

	CPU Time(ms)	Overall Time(ms)
1	484	633
2	500	703
3	499	644
4	546	698
5	499	642
6	671	776
7	452	631
8	530	668
9	515	630
10	453	611
Avg	514.9	663.6

7. Compute the difference (percentage change and actual change) between the indexed and non-indexed runs. Make sure that the performance increased as expected.

Conclusion:

The performance was improved obviously.

The absolute time was decreased by 726.9ms (CPU time) and 857.8ms (Overall time).

The percentage change was calculated by 729.9/1241.8 = 58.5% (CPU time) and 56.4% (Overall time).