

# UE20CS344 – Database Technologies

## Assignment-3

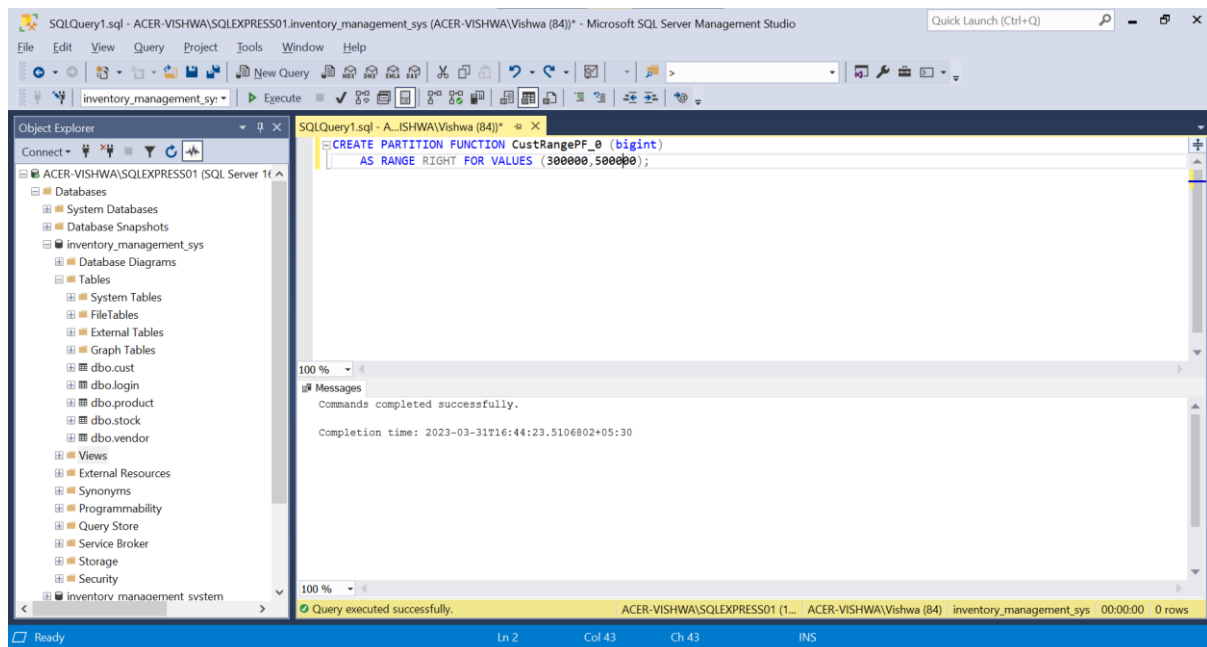
Name: Vishwa Mehul Mehta

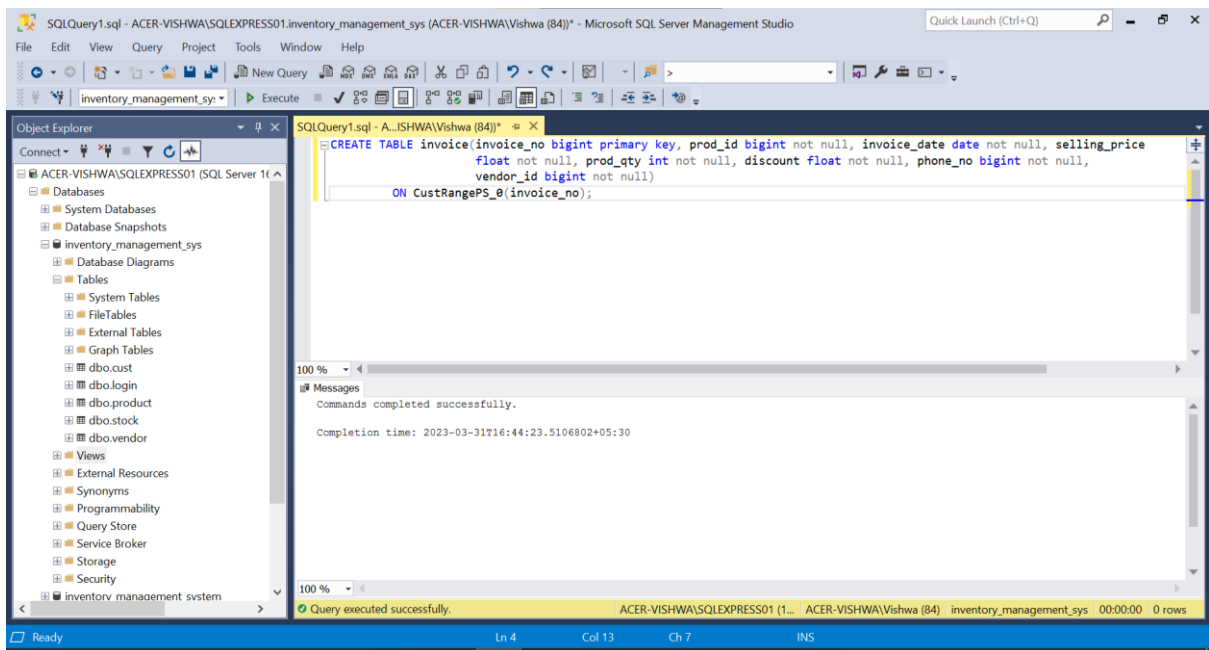
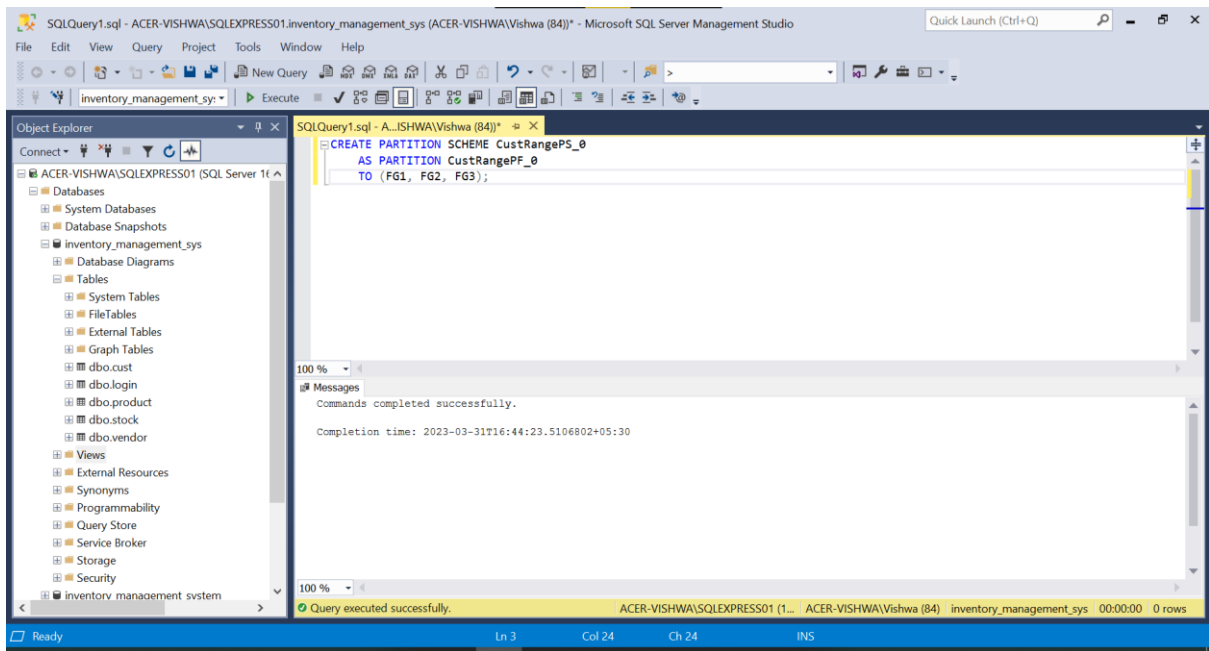
SRN: PES2UG20CS389

Sec: F

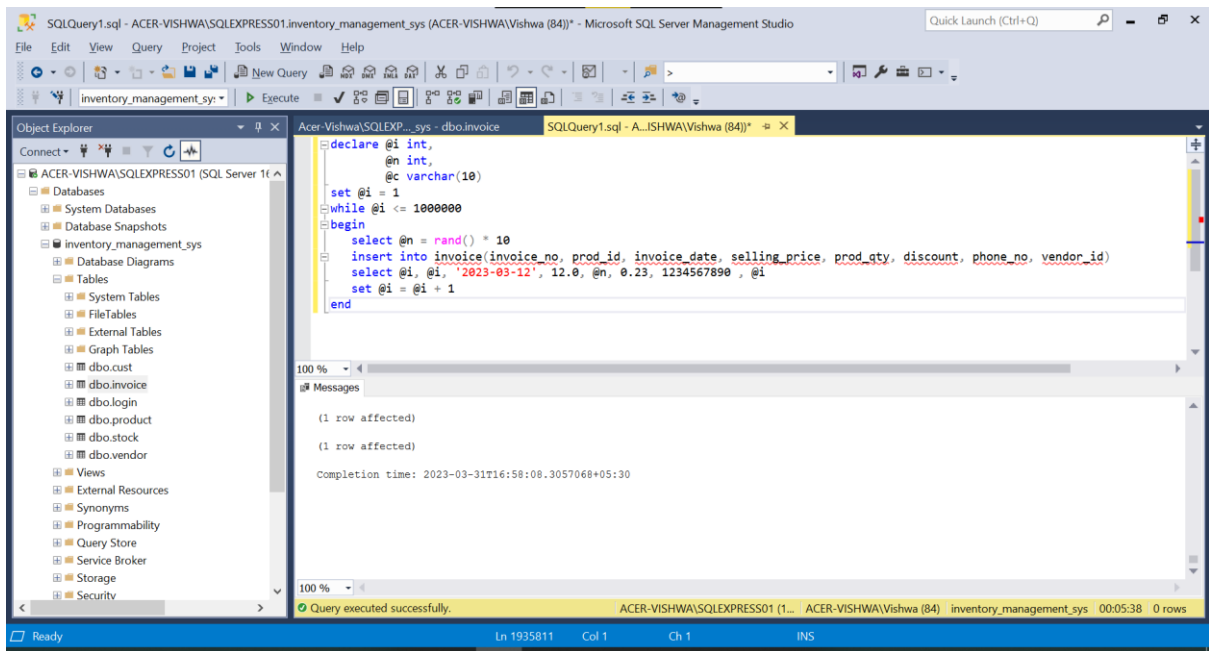
Date: 31-03-2023

1. Partition function creation and partition scheme creation on tables:

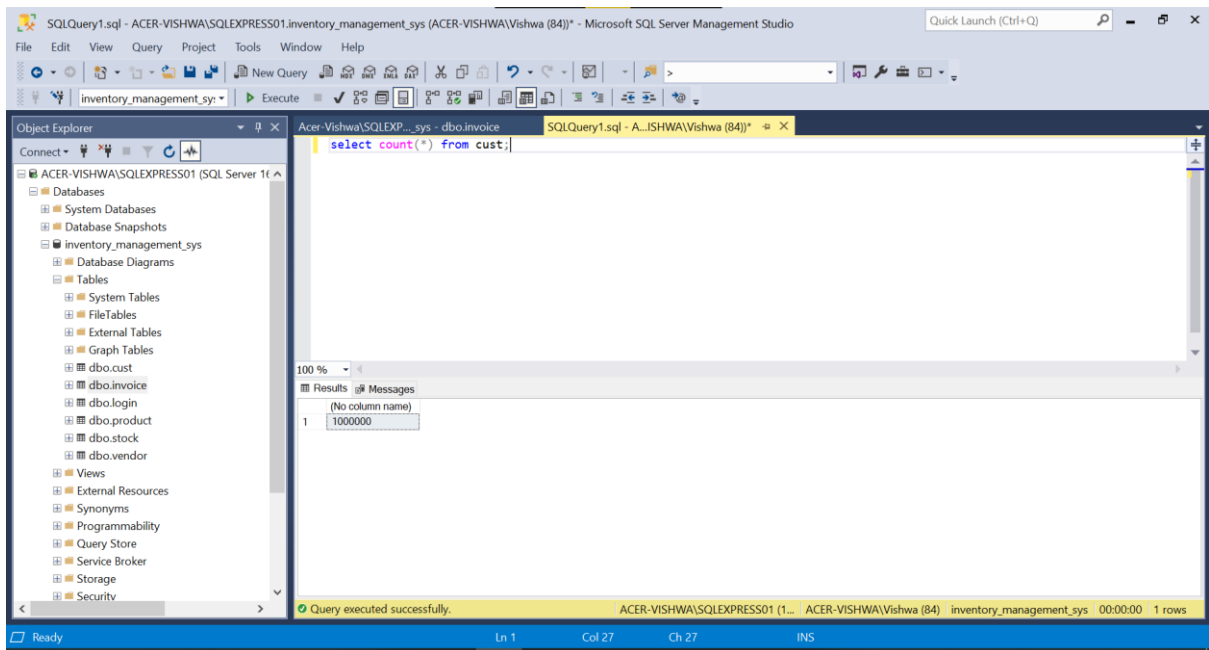


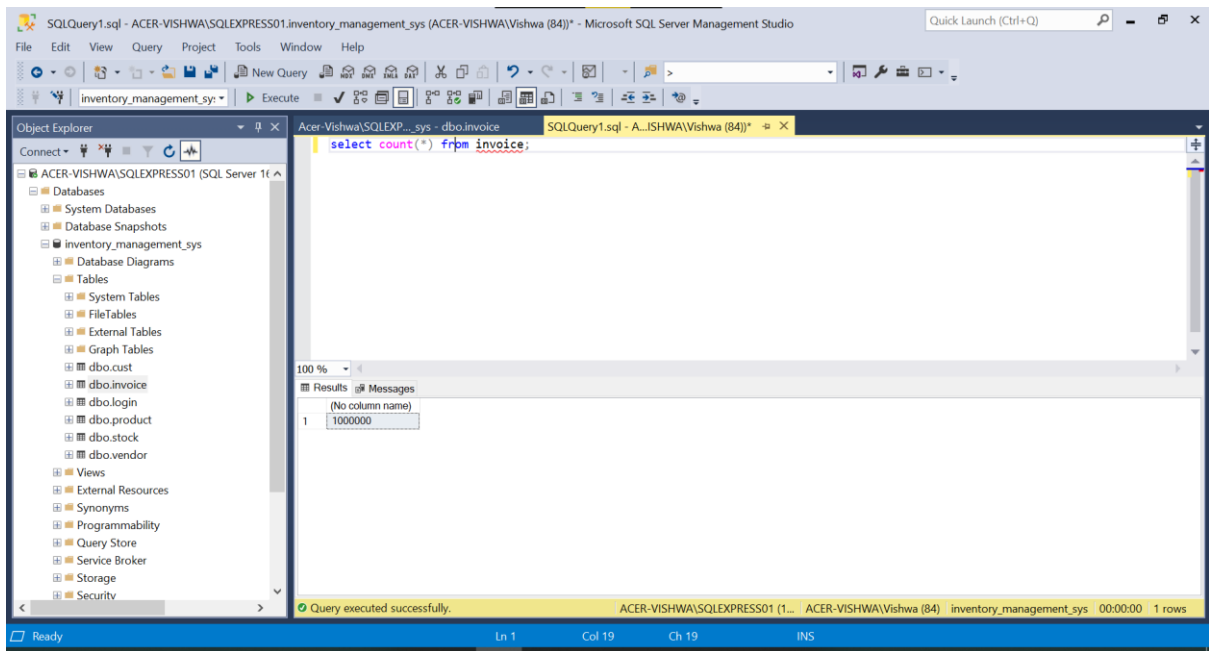


## 2. Insertion of data:



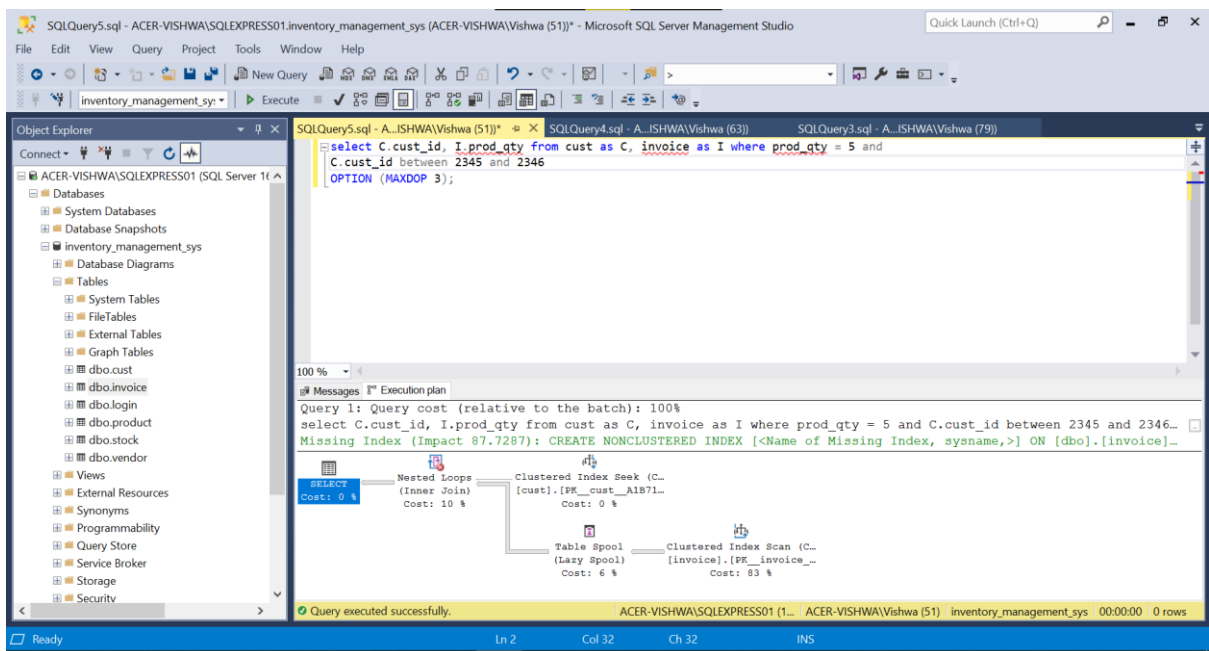
### 3. Count number of rows in tables:





#### 4. SQL Query:

a.



SQLQuery5.sql - ACER-VISHWA\SQLEXPRESS01.inventory\_management\_sys (ACER-VISHWA\Vishwa (51)) - Microsoft SQL Server Management Studio

File Edit View Query Project Tools Window Help

Object Explorer

Connect +

ACER-VISHWA\SQLEXPRESS01 (S)

Databases

System Databases

Database Snapshots

inventory\_management\_sys

Database Diagrams

Tables

System Tables

FileTables

External Tables

Graph Tables

dbo.cust

dbo.invoice

dbo.login

dbo.product

dbo.stock

dbo.vendor

Views

External Resources

Synonyms

Programmability

Query Store

Service Broker

Storage

Security

SQLQuery5.sql - A...ISHWA\Vishwa (51) \* SQLQuery4.sql - A...ISHWA\Vishwa (63) SQLQuery3.sql - A...ISHWA\Vishwa (79)

```

select C.cust_id, I.prod_qty from cust as C, invoice as I where prod_qty = 5 and
C.cust_id between 2345 and 2346
OPTION (MAXDOP 3);

```

100 %

Messages 8 Execution p

Query 1: Query co

select C.cust\_id,

Missing Index (Im

SELECT

Cost: 0 %

Nested

Cost: 0 %

100 %

Physical Operation

Logical Operation

Estimated Execution Mode

Estimated Operator Cost

Estimated I/O Cost

Estimated Subtree Cost

Estimated CPU Cost

Estimated Number of Executions

Estimated Number of Rows Per Execution

Estimated Number of Rows for All Executions

Estimated Row Size

Node ID

Output List

inventory\_management\_sys].[dbo].[cust].cust\_id,

inventory\_management\_sys].[dbo].[invoice].prod\_qty

Warnings

No Join Predicate

prod\_qty = 5 and C.cust\_id between 2345 and 2346 OPTION...

of Missing Index, sysname,>) ON [dbo].[invoice] ([prod\_...

RESS01 (1... ACER-VISHWA\Vishwa (51) inventory\_management\_sys 00:00:00 0 rows

Ready

SQLQuery5.sql - ACER-VISHWA\SQLEXPRESS01.inventory\_management\_sys (ACER-VISHWA\Vishwa (51)) - Microsoft SQL Server Management Studio

File Edit View Query Project Tools Window Help

Object Explorer

Connect +

ACER-VISHWA\SQLEXPRESS01 (SQL

Databases

System Databases

Database Snapshots

inventory\_management\_sys

Database Diagrams

Tables

Views

External Resources

Synonyms

Programmability

Query Store

Service Broker

Storage

Security

inventory\_management\_system

Security

Server Objects

Replication

Management

XEvent Profiler

SQLQuery5.sql - A...ISHWA\Vishwa (51) \* SQLQuery4.sql - A...ISHWA\Vishwa (63) SQLQuery3.sql - A...ISHWA\Vishwa (79)

```

select C.cust_id, I.prod_qty from cust as C, invoice as I where prod_qty = 5 and
C.cust_id between 2345 and 2346
OPTION (MAXDOP 3);

```

100 %

Results 8 Messages 8 Execution plan

Query 1: Query cost (relative to the batch): 100%

select C.cust\_id, I.prod\_qty from cust as C, invoice as I where prod\_qty = 5 and C.cust\_id between 2345 and 2346 OPTION...

Missing Index (Impact 87.7287): CREATE NONCLUSTERED INDEX [<Name of Missing Index, sysname,>) ON [dbo].[invoice] ([prod\_...

SELECT

Cost: 0 %

Nested Loops

(Inner Join)

Cost: 10 %

0.882s

200792 of

204293 (98%)

Clustered Index Seek (C...

[cust].[FK\_cust\_A1B71...

Cost: 0 %

0.000s

2 of

2 (100%)

Table Spool

(Lazy Spool)

Cost: 6 %

0.844s

200792 of

204294 (98%)

Clustered Index Scan (C...

[invoice].[PK\_invoice\_...

Cost: 83 %

0.268s

100396 of

102147 (98%)

Query executed successfully.

ACER-VISHWA\SQLEXPRESS01 (1... ACER-VISHWA\Vishwa (51) inventory\_management\_sys 00:00:01 2,00,792 rows

Ready

b.

15

SQLQuery5.sql - ACER-VISHWA\SQLEXPRESS01.inventory\_management\_sys (ACER-VISHWA\Vishwa (51)) - Microsoft SQL Server Management Studio

File Edit View Query Project Tools Window Help

Object Explorer

Connect

ACER-VISHWA\SQLEXPRESS01 (SQL)

Databases

System Databases

Database Snapshots

inventory\_management\_sys

Database Diagrams

Tables

Views

External Resources

Synonyms

Programmability

Query Store

Service Broker

Storage

Security

inventory\_management\_system

Security

Server Objects

Replication

Management

XEvent Profiler

SQLQuery5.sql - A...ISHWA\Vishwa (51) \* SQLQuery4.sql - A...ISHWA\Vishwa (63) SQLQuery3.sql - A...ISHWA\Vishwa (79)

```

select C.cust_id, I.prod_qty from cust as C, invoice as I where prod_qty = 8 and
C.cust_id between 2345 and 2348
OPTION (MAXDOP 3);

```

100 %

Physical Operation

Nested Loops

For each row in the top (outer) input, scan the bottom (inner) input, and output matching rows.

Logical Operation

Inner Join

Estimated Execution Mode

Row

Estimated Operator Cost

1.6692436 (18%)

Estimated I/O Cost

0

Estimated Subtree Cost

9.22244

Estimated CPU Cost

1.66925

Estimated Number of Executions

1

Estimated Number of Rows Per Execution

399341

Estimated Number of Rows for All Executions

399341

Estimated Row Size

19 B

Node ID

0

Output List

[inventory\_management\_sys].[dbo].[cust].cust\_id,  
[inventory\_management\_sys].[dbo].[invoice].prod\_qty

Warnings

No Join Predicate

Query executed successfully.

INS

SQLQuery5.sql - ACER-VISHWA\SQLEXPRESS01.inventory\_management\_sys (ACER-VISHWA\Vishwa (51)) - Microsoft SQL Server Management Studio

File Edit View Query Project Tools Window Help

Object Explorer

Connect

ACER-VISHWA\SQLEXPRESS01 (SQL)

Databases

System Databases

Database Snapshots

inventory\_management\_sys

Database Diagrams

Tables

Views

External Resources

Synonyms

Programmability

Query Store

Service Broker

Storage

Security

inventory\_management\_system

Security

Server Objects

Replication

Management

XEvent Profiler

SQLQuery5.sql - A...ISHWA\Vishwa (51) \* SQLQuery4.sql - A...ISHWA\Vishwa (63) SQLQuery3.sql - A...ISHWA\Vishwa (79)

```

select C.cust_id, I.prod_qty from cust as C, invoice as I where prod_qty = 8 and
C.cust_id between 2345 and 2348
OPTION (MAXDOP 3);

```

100 %

Results

Messages

Execution plan

Query 1: Query cost (relative to the batch): 100%

select C.cust\_id, I.prod\_qty from cust as C, invoice as I where prod\_qty = 8 and C.cust\_id between 2345 and 2348 OPTION...

Missing Index (Impact 79.6373): CREATE NONCLUSTERED INDEX [<Name of Missing Index, sysname,>] ON [dbo].[invoice] ([prod\_...

Physical Operation

Nested Loops (Inner Join)

Cost: 18 %

1.098s

400464 of 399341 (100%)

Clustered Index Seek (C... [cust].[PK\_cust\_AIB71...]

Cost: 0 %

0.000s

4 of 4 (100%)

Table Spool (Lazy Spool)

Cost: 6 %

1.029s

400464 of 399341 (100%)

Clustered Index Scan (C... [invoice].[PK\_invoice\_...]

Cost: 76 %

0.284s

100116 of 99835 (100%)

Query executed successfully.

ACER-VISHWA\SQLEXPRESS01 (1... ACER-VISHWA\Vishwa (51) inventory\_management\_sys 00:00:02 4,00,464 rows

SQLQuery5.sql - ACER-VISHWA\SQLEXPRESS01.inventory\_management\_sys (ACER-VISHWA\Vishwa (51)) - Microsoft SQL Server Management Studio

File Edit View Query Project Tools Window Help

Object Explorer

Connect - ACER-VISHWA\SQLEXPRESS01 (SQL Server)

Database: inventory\_management\_sys

Tables: C, I, invoice

Query: select C.cust\_id, I.prod\_qty from cust as C, invoice as I where prod\_qty = 8 and C.cust\_id between 2345 and 2348 OPTION (MAXDOP 3);

Execution Plan: Nested Loops

Physical Operation: Nested Loops

Logical Operation: Inner Join

Actual Execution Mode: Row

Estimated Execution Mode: Row

Actual Number of Rows for All Executions: 400464

Actual Number of Batches: 0

Estimated I/O Cost: 0

Estimated Operator Cost: 1.6692436 (18%)

Estimated CPU Cost: 1.66925

Estimated Subtree Cost: 9.22244

Number of Executions: 1

Estimated Number of Executions: 1

Estimated Number of Rows for All Executions: 399341

Estimated Number of Rows Per Execution: 399341

Estimated Row Size: 19 B

Actual Rebinds: 0

Actual Rewinds: 0

Node ID: 0

Output List: [inventory\_management\_sys].[dbo].[cust].cust\_id, [inventory\_management\_sys].[dbo].[invoice].prod\_qty

Warnings: No Join Predicate

Query executed successfully.

ACER-VISHWA\SQLEXPRESS01 (1... ACER-VISHWA\Vishwa (51) inventory\_management\_sys 00:00:02 4,00,464 rows

C.

SQLQuery5.sql - ACER-VISHWA\SQLEXPRESS01.inventory\_management\_sys (ACER-VISHWA\Vishwa (51)) - Microsoft SQL Server Management Studio

File Edit View Query Project Tools Window Help

Object Explorer

Connect - ACER-VISHWA\SQLEXPRESS01 (SQL Server)

Database: inventory\_management\_sys

Tables: C, I, invoice

Query: select C.cust\_id, I.prod\_id, I.prod\_qty from cust as C, invoice as I where prod\_qty = 0 and C.cust\_id between 2345 and 2348 OPTION (MAXDOP 3);

Execution Plan: Nested Loops (Inner Join)

Physical Operation: Nested Loops

Logical Operation: Inner Join

Actual Execution Mode: Row

Estimated Execution Mode: Row

Actual Number of Rows for All Executions: 0

Actual Number of Batches: 0

Estimated I/O Cost: 0

Estimated Operator Cost: 1.6692436 (18%)

Estimated CPU Cost: 1.66925

Estimated Subtree Cost: 9.22244

Number of Executions: 1

Estimated Number of Executions: 1

Estimated Number of Rows for All Executions: 399341

Estimated Number of Rows Per Execution: 399341

Estimated Row Size: 19 B

Actual Rebinds: 0

Actual Rewinds: 0

Node ID: 0

Output List: [inventory\_management\_sys].[dbo].[cust].cust\_id, [inventory\_management\_sys].[dbo].[invoice].prod\_id, [inventory\_management\_sys].[dbo].[invoice].prod\_qty

Warnings: No Join Predicate

Query executed successfully.

ACER-VISHWA\SQLEXPRESS01 (1... ACER-VISHWA\Vishwa (51) inventory\_management\_sys 00:00:00 0 rows



SQLQuery5.sql - ACER-VISHWA\SQLEXPRESS01.inventory\_management\_sys (ACER-VISHWA\Vishwa (51)) - Microsoft SQL Server Management Studio

File Edit View Query Project Tools Window Help

Object Explorer

Connect +

ACER-VISHWA\SQLEXPRESS01 (SQL)

Databases

System Databases

Database Snapshots

inventory\_management\_sys

Database Diagrams

Tables

Views

External Resources

Synonyms

Programmability

Query Store

Service Broker

Storage

Security

inventory\_management\_system

Security

Server Objects

Replication

Management

XEvent Profiler

SQLQuery5.sql - A..ISHWA\Vishwa (51) \* SQLQuery4.sql - A..ISHWA\Vishwa (63) SQLQuery3.sql - A..ISHWA\Vishwa (79)

```

select C.cust_id, I.prod_id, I.prod_qty from cust as C, invoice as I where prod_qty = 0 and
C.cust_id between 2345 and 2348
OPTION (MAXDOP 3);

```

100 %

Messages 8<sup>th</sup> Execution

Query 1: Query cost (relative to the batch): 100%

select C.cust\_id, I.prod\_id, I.prod\_qty from cust as C, invoice as I where prod\_qty = 0 and C.cust\_id between 2345 and 2348

Missing Index (Impact 78.6975): CREATE NONCLUSTERED INDEX [<Name of Missing Index, sysname>] ON [dbo].[invoice] ([prod\_id], [prod\_qty])

Nested Loops

For each row in the top (outer) input, scan the bottom (inner) input, and output matching rows.

Physical Operation Nested Loops

Logical Operation Inner Join

Estimated Execution Mode Row

Estimated Operator Cost 1.6692436 (18%)

Estimated I/O Cost 0

Estimated Subtree Cost 9.22244

Estimated CPU Cost 1.66925

Estimated Number of Executions 1

Estimated Number of Rows Per Execution 399341

Estimated Number of Rows for All Executions 399341

Estimated Row Size 27 B

Node ID 0

Output List

[inventory\_management\_sys].[dbo].[cust].cust\_id,

[inventory\_management\_sys].[dbo].[invoice].prod\_id,

[inventory\_management\_sys].[dbo].[invoice].prod\_qty

Warnings

No Join Predicate

Ready

INS

SQLQuery5.sql - ACER-VISHWA\SQLEXPRESS01.inventory\_management\_sys (ACER-VISHWA\Vishwa (51)) - Microsoft SQL Server Management Studio

File Edit View Query Project Tools Window Help

Object Explorer

Connect +

ACER-VISHWA\SQLEXPRESS01 (SQL)

Databases

System Databases

Database Snapshots

inventory\_management\_sys

Database Diagrams

Tables

Views

External Resources

Synonyms

Programmability

Query Store

Service Broker

Storage

Security

inventory\_management\_system

Security

Server Objects

Replication

Management

XEvent Profiler

SQLQuery5.sql - A..ISHWA\Vishwa (51) \* SQLQuery4.sql - A..ISHWA\Vishwa (63) SQLQuery3.sql - A..ISHWA\Vishwa (79)

```

select C.cust_id, I.prod_id, I.prod_qty from cust as C, invoice as I where prod_qty = 0 and
C.cust_id between 2345 and 2348
OPTION (MAXDOP 3);

```

100 %

Results 8<sup>th</sup> Execution plan

Query 1: Query cost (relative to the batch): 100%

select C.cust\_id, I.prod\_id, I.prod\_qty from cust as C, invoice as I where prod\_qty = 0 and C.cust\_id between 2345 and 2348

Missing Index (Impact 78.6975): CREATE NONCLUSTERED INDEX [<Name of Missing Index, sysname>] ON [dbo].[invoice] ([prod\_id], [prod\_qty])

Nested Loops (Inner Join)

Cost: 18 %

1.036s

402112 of 399341 (100%)

Clustered Index Seek (C..[cust].[PK\_cust\_A1B71...])

Cost: 0 %

0.000s

4 of 4 (100%)

Table Spool (Lazy Spool)

Cost: 6 %

0.965s

402112 of 399341 (100%)

Clustered Index Scan (C..[invoice].[PK\_invoice\_...])

Cost: 76 %

0.256s

100528 of 99835 (100%)

Ready

Query executed successfully.

ACER-VISHWA\SQLEXPRESS01 (1... ACER-VISHWA\Vishwa (51) inventory\_management\_sys 00:00:02 4,02,112 rows

SQLQuery5.sql - ACER-VISHWA\SQLEXPRESS01.inventory\_management\_sys (ACER-VISHWA\Vishwa (51)) - Microsoft SQL Server Management Studio

File Edit View Query Project Tools Window Help

Object Explorer

- Connect
- ACER-VISHWA\SQLEXPRESS01 (SQL Server)
- Databases
  - System Databases
  - Database Snapshots
  - inventory\_management\_sys
    - Database Diagrams
    - Tables
    - Views
    - External Resources
    - Synonyms
    - Programmability
    - Query Store
    - Service Broker
    - Storage
    - Security
  - Security
  - Server Objects
  - Replication
  - Management
  - XEvent Profiler

SQLQuery5.sql - A...ISHWA\Vishwa (51) \* SQLQuery4.sql - A...ISHWA\Vishwa (63) SQLQuery3.sql - A...ISHWA\Vishwa (79)

```
select C.cust_id, I.prod_id, I.prod_qty from cust as C, invoice as I where prod_qty = 8 and C.cust_id between 2345 and 2348 OPTION (MAXDOP 3);
```

100 %

Results Messages

Query 1: Query C

select C.cust\_id

Missing Index (J

Cost: 0 %

**Nested Loops**

For each row in the top (outer) input, scan the bottom (inner) input, and output matching rows.

Physical Operation	Nested Loops
Logical Operation	Inner Join
Actual Execution Mode	Row
Estimated Execution Mode	Row
Actual Number of Rows for All Executions	400464
Actual Number of Batches	0
Estimated I/O Cost	0
Estimated Operator Cost	1.6692436 (18%)
Estimated CPU Cost	1.66925
Estimated Subtree Cost	9.22244
Number of Executions	1
Estimated Number of Executions	1
Estimated Number of Rows for All Executions	399341
Estimated Number of Rows Per Execution	399341
Estimated Row Size	27 B
Actual Rebinds	0
Actual Rewinds	0
Node ID	0

**Output List**

[inventory_management_sys].[dbo].[cust].cust_id,
[inventory_management_sys].[dbo].[invoice].prod_id,
[inventory_management_sys].[dbo].[invoice].prod_qty

**Warnings**

No Join Predicate

01 (1... ACER-VISHWA\Vishwa (51) inventory\_management\_sys 00:00:02 4,00,464 rows

Ready