

Documentation- The document includes 5 different Query optimization plans with the snipped pictures of time and Query plans. Then it included XML generation of 5 different query plans each with the Screen shots and some snipped pictures of times & plans. It has the Table that states the time of Query optimization with the Forced XML generation.

Query Optimizer Decisions/Results- In the descriptive cases for all the 5 different query plans, the query optimizer took **Right decision 4 times**. The time taken by query optimizer is less. Only 1 time it made a wrong decision when I forced **XML Plan2 in query 5- that is when the query plan includes 2000 rows generated by ran_dt and then tested the query**.

Time taken by the original Query plan 5 is 329ms while the time taken by the Forced XML is 312ms.

Dataset Description- I have created two tables and one database. The database name is player score. It is real data of players score. I have three tables one with the name records, house and ran_dt. The records include the data of player score it has 15 columns and 11151 rows. House dataset is the Kaggle real dataset it includes 18 different columns 21614 rows. Another table is the random generated table with the records. It has 8 different columns and 2000 rows.

Observations- While trying to get around 2000 records the random generation of data took half an hour for the data generation.

Generating Query-

```
CREATE Table ran_dt
(
    col1 int,
    col2 nvarchar(50),
    col3 nvarchar(50),
    col4 nvarchar(50),
    col5 nvarchar(50),
    col6 nvarchar(50),
    col7 nvarchar(50),
    col8 nvarchar(50)
);

Declare @Id int
Set @Id = 478
While @Id <= 2000
Begin
    Insert Into ran_dt values (@Id,'col2-' + CAST(Round(@Id*Rand(),0) as
nvarchar(10)), 'col3-' + CAST(@Id*Rand() as nvarchar(10)),
                           'col4-' + CAST(Round(@Id*Rand(),0) as nvarchar(10)), 'col5-' +
CAST(@Id*Rand() as nvarchar(10)),
                           'col6-' + CAST(Round(@Id*Rand(),0) as nvarchar(10)), 'col7-' +
CAST(@Id*Rand() as nvarchar(10)),                                'col8-' +
CAST(Round(@Id*Rand(),0) as nvarchar(10)))      Print @Id
    Set @Id = @Id + 1
End
```

Query Plan change in response to change in Cardinalities The query used to generate these 5 different plans-

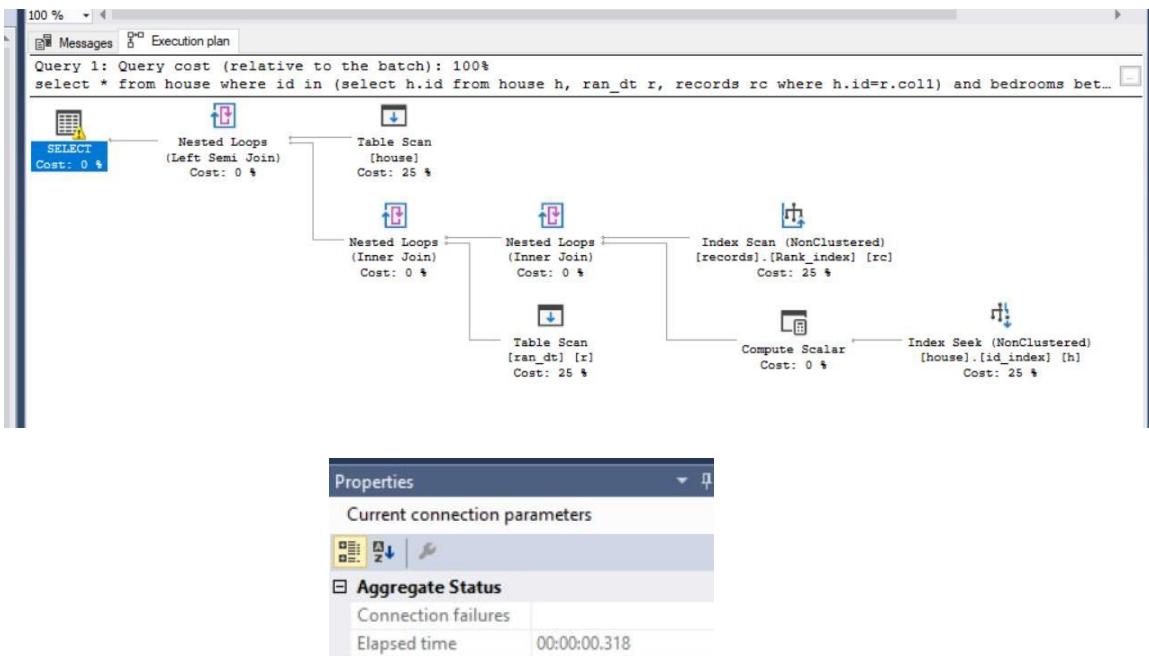
```
select * from house where id in (select h.id from house h, ran_dt r, records rc
where h.id=r.col1) and bedrooms between 1 and 33;
```

Below are the 5 different query optimizations with respect to change in cardinalities by adding and deleting number of rows.

1. Query plan with one row in ran_dt and with one row in house.

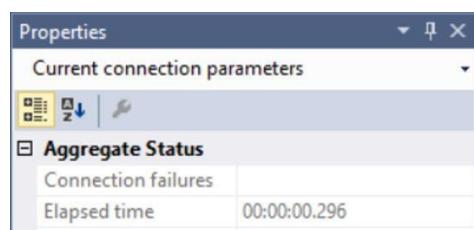
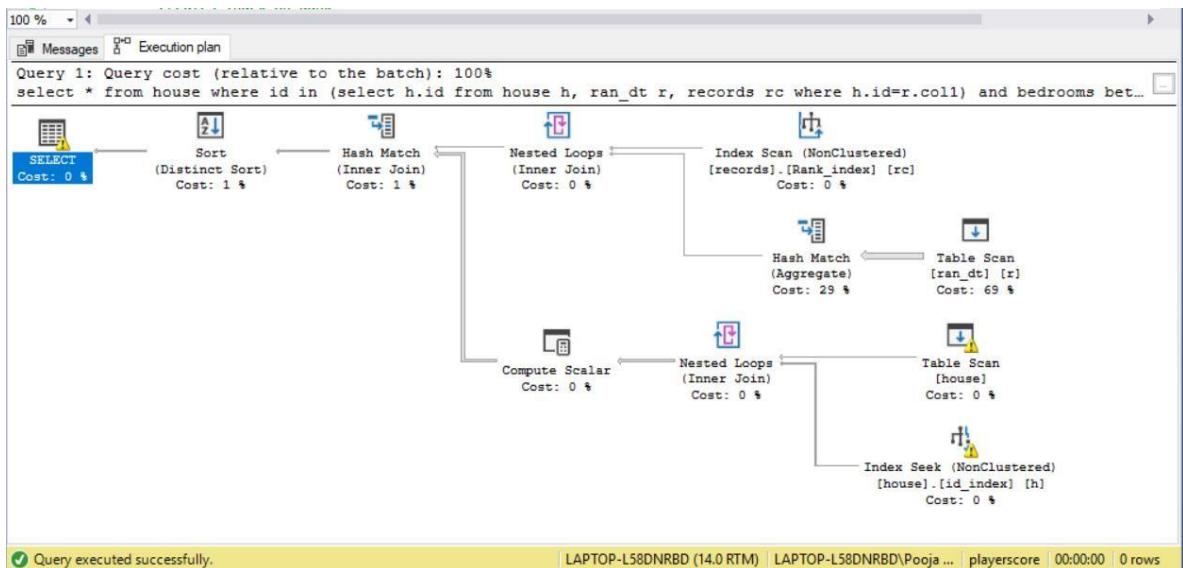
Observations- With only one row in two different tables it computes non-clustered index seek on one table and index scan on another table. Note- The one table having big columns(house) it performs index seek on that and the one having less columns it performs scan.

Query Optimization & Time-



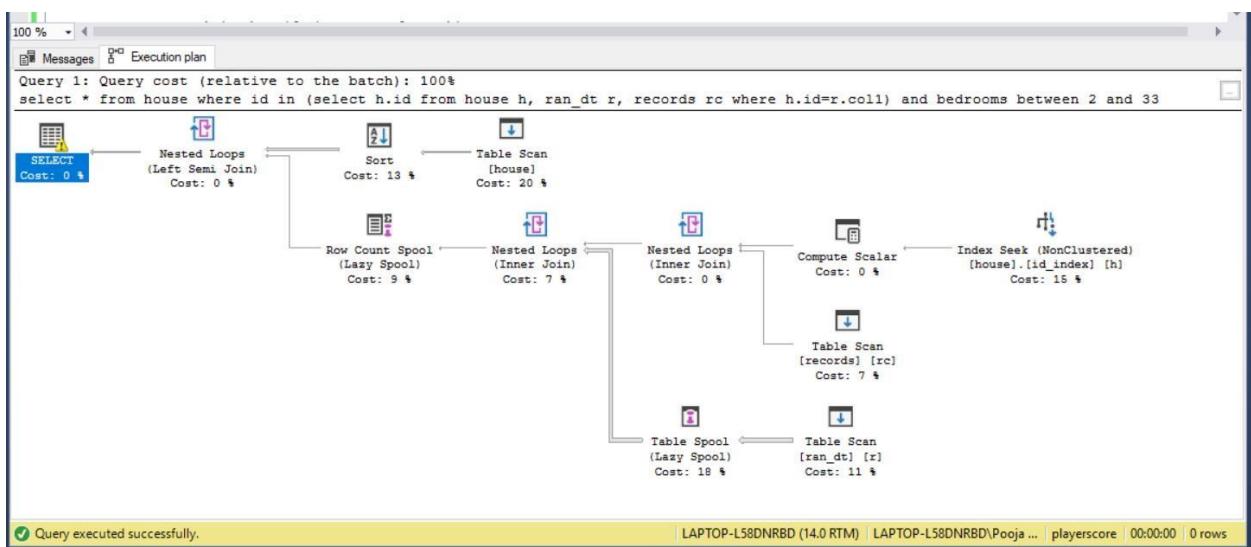
¹ . With 10 rows in random dataset and 100 in house.

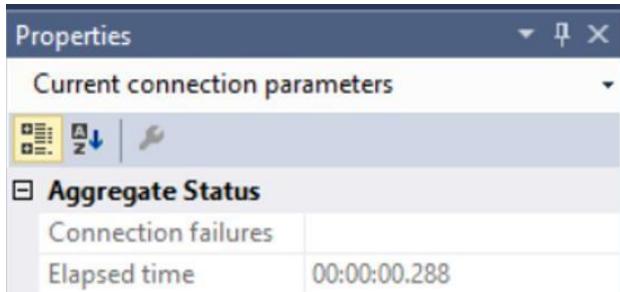
Observations- the query performs Index seek (non-clustered), table scan on house & ran_dt, Index scan (nonclustered) on records table, nested loops (inner join), and nested loops (inner join). Below are the Query plans-



3. This query plan has 999 rows on table house and 100 rows on ran_dt.

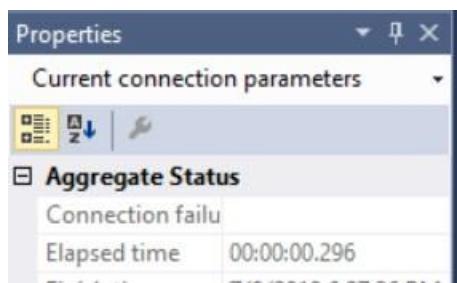
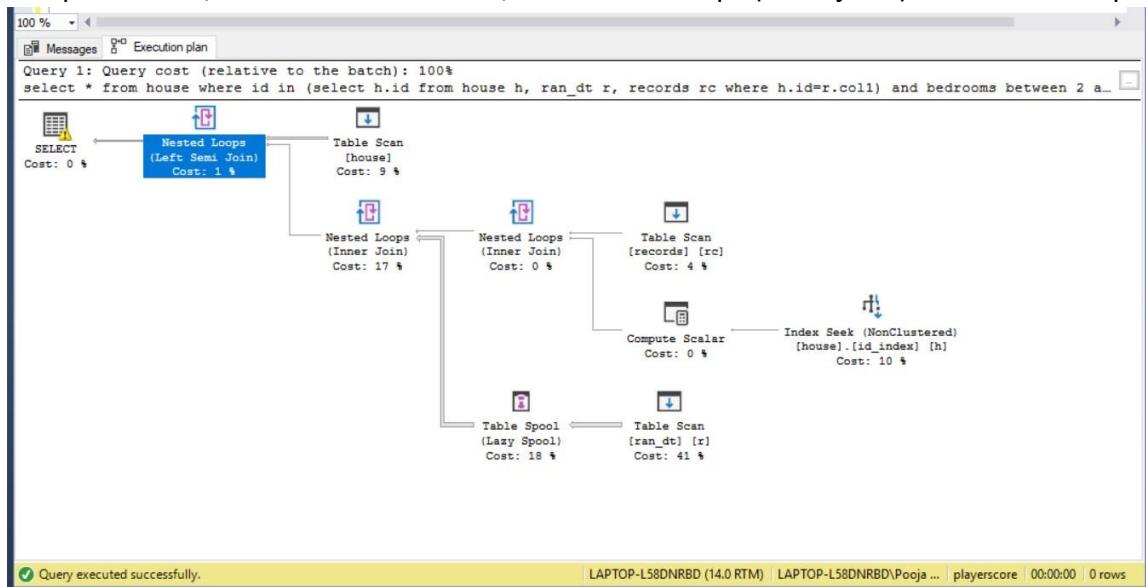
Observations- This query plan does table scan on ran_dt & records, index seek on house, Nested loop inner join & let semi join and sort. Below is the Query optimization plan and time-





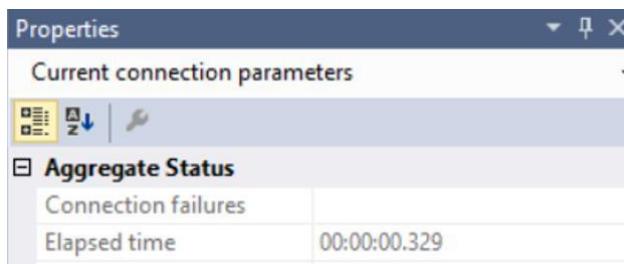
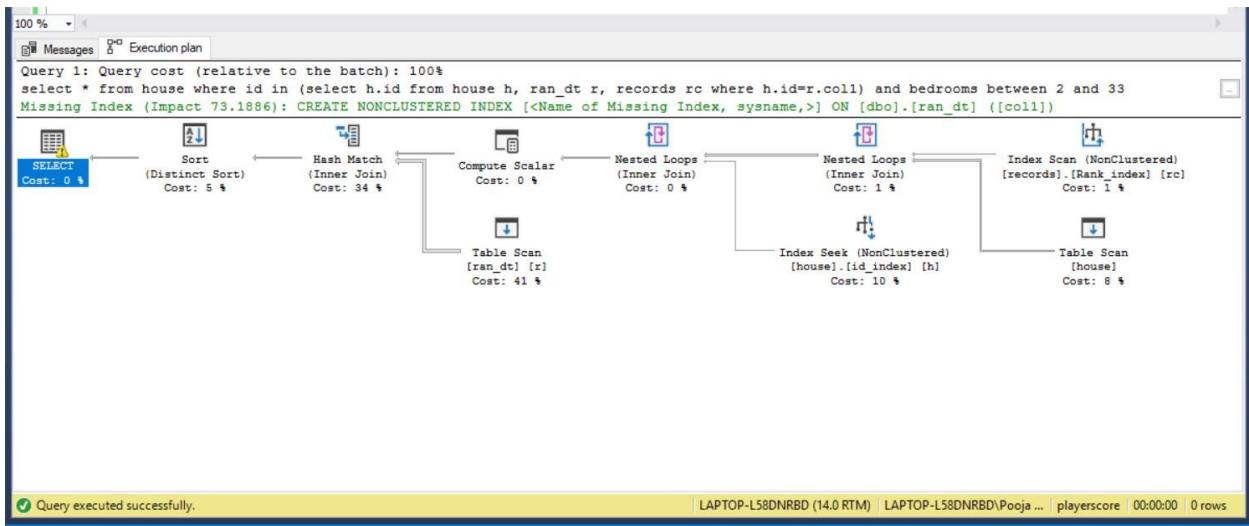
4. This query plan has 999 rows on house and 477 Rows on ran_dt.

Observation- This query plan does table scan on ran_dt, Index seek(non-clustered) on house, table spool, compute scalar, Table scan on records, two Nested loops (inner joins) and Nested loops (left semi join).



5. This query plan includes 2000 rows generated by ran_dt and then tested the query.

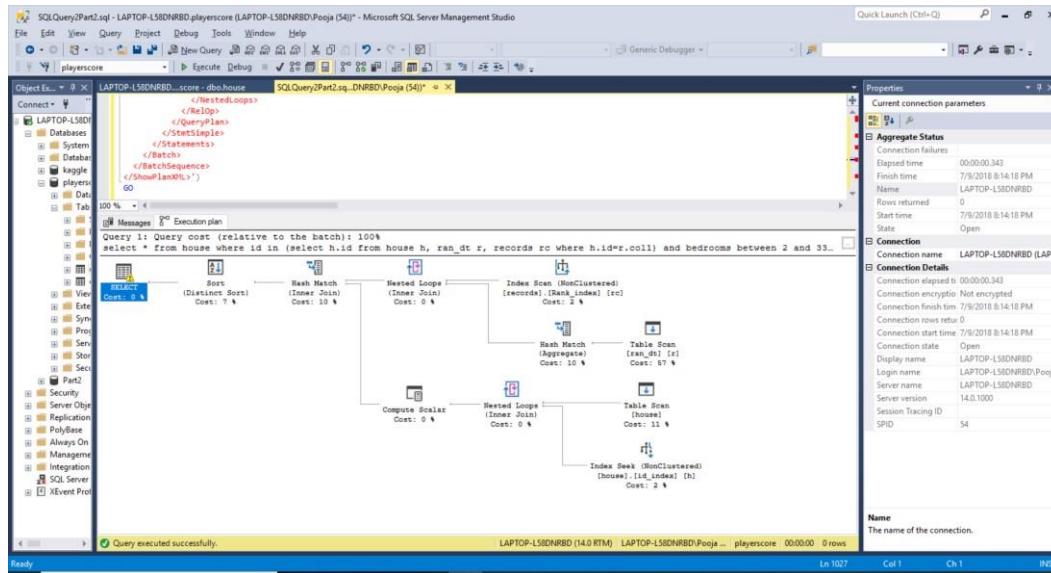
Observations- In this query plan it performs Table scan, Index scan non-Clustered , Index Scan on records, compute scalar, table scan on ra_dt, Nested loop (inner join), hash match (inner join), sort (distinct sort).

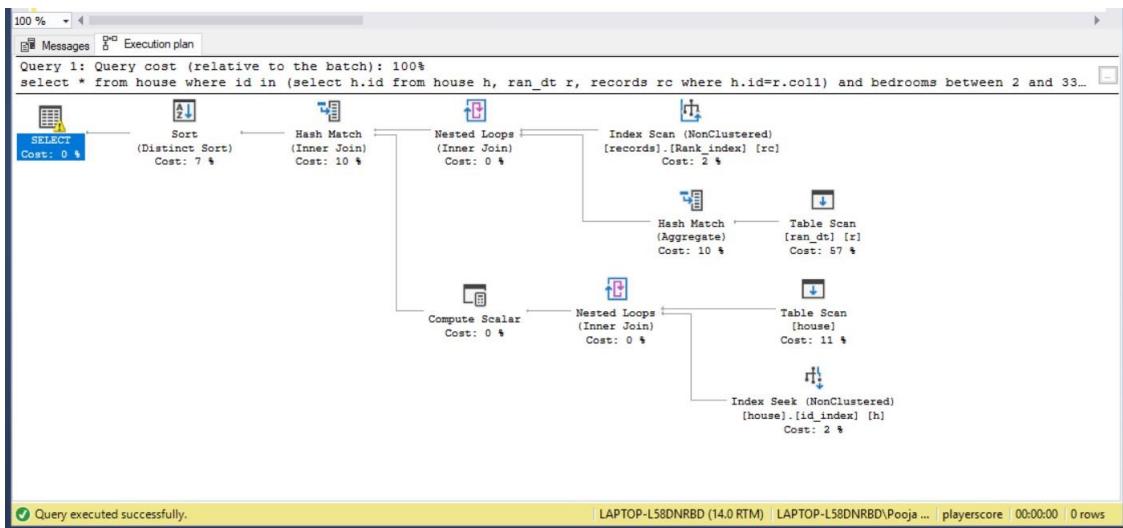


***** XML GENERATION *****

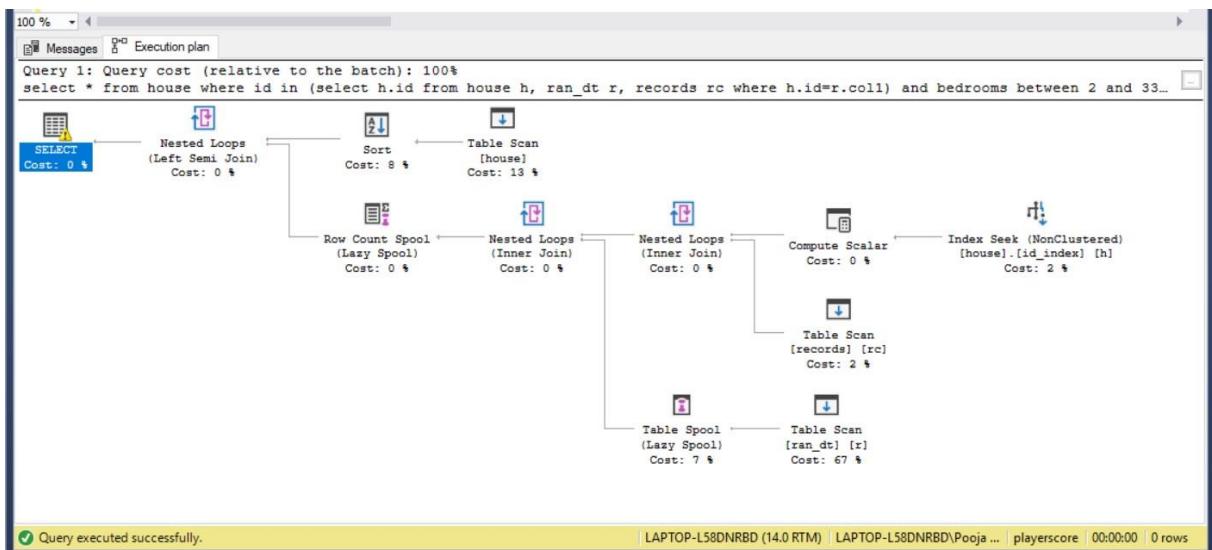
Query Plan 1- 1 row in house, records and ran_dt

XML of Query plan 2 in query plan 1-

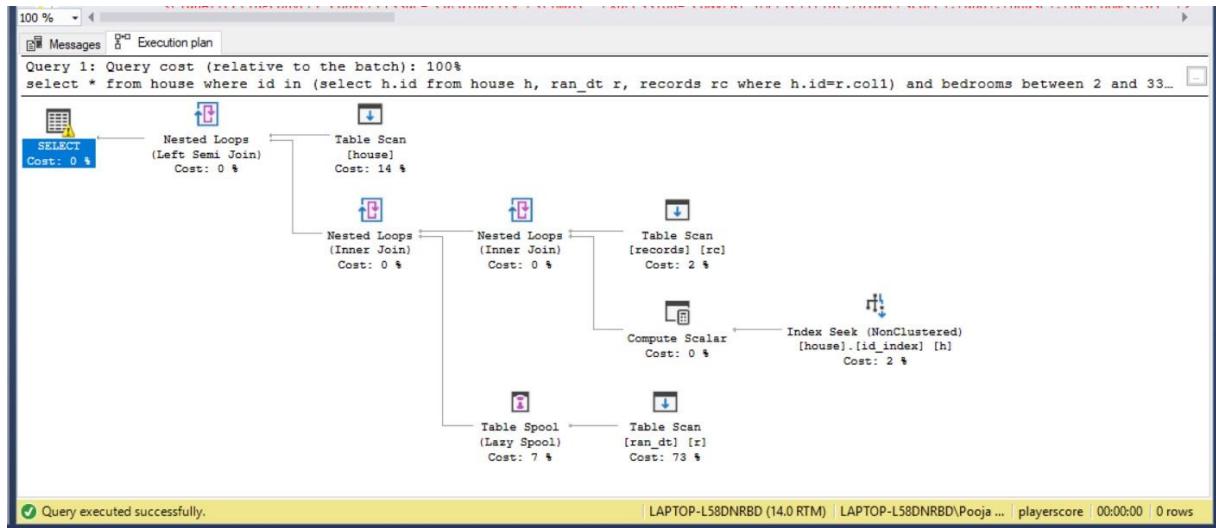
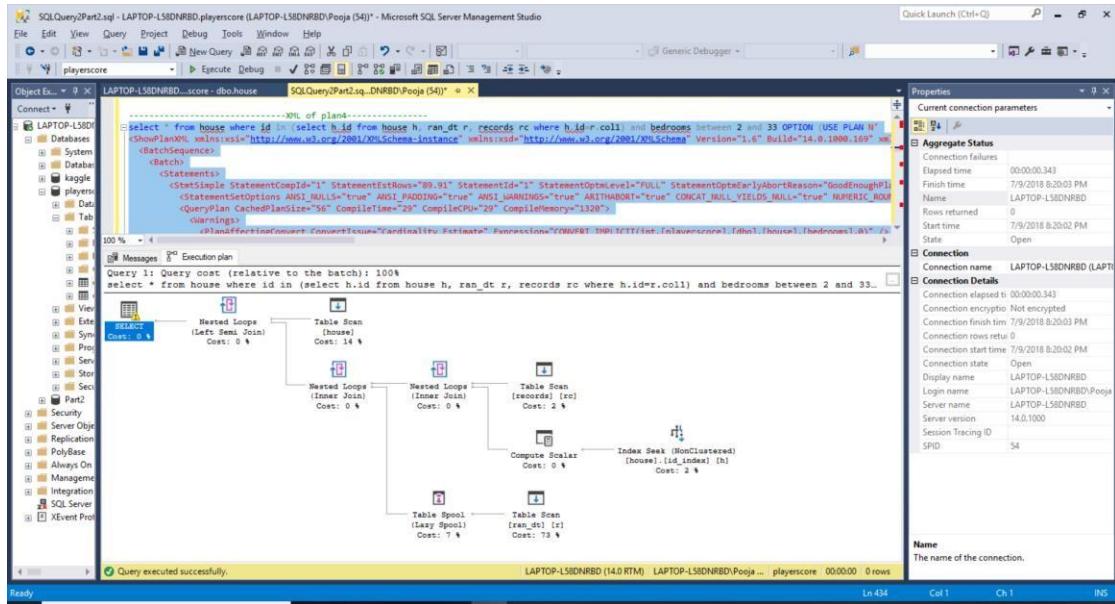




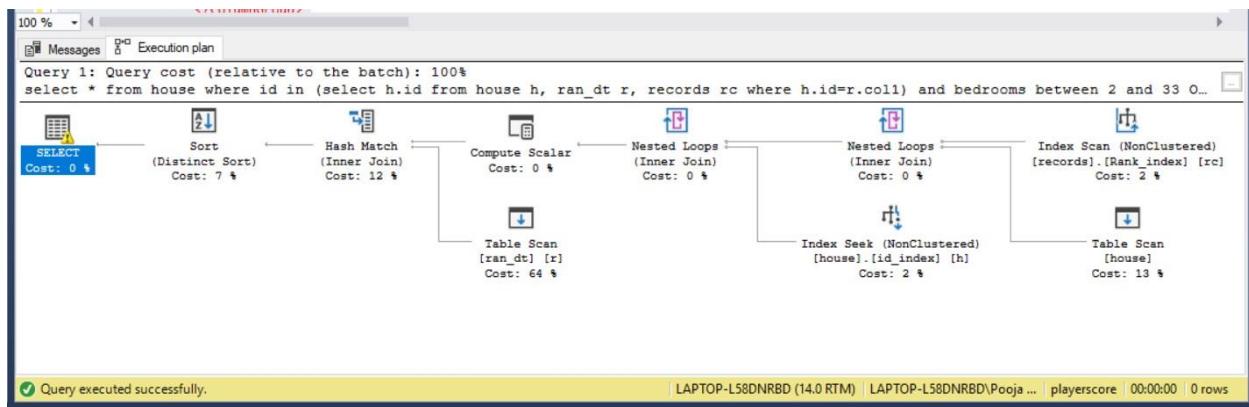
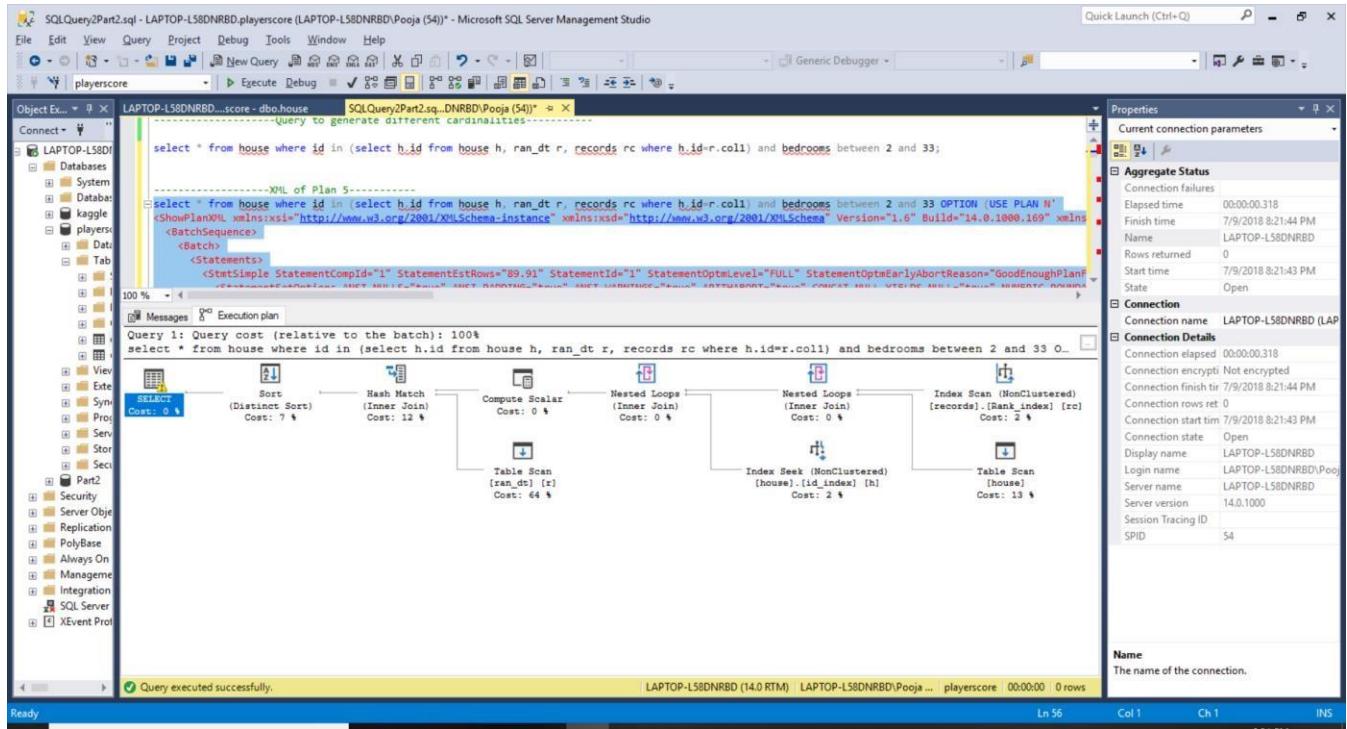
XML of plan 3 in query plan 1-



XML of 4 in query plan 1-



XML of plan 5 in query plan 1-



Query Plan 2- With 10 rows in random dataset and 100 in house Query plan 1 XML in Query plan2-

```

<?xml version="1.0" encoding="utf-16"?>
<ShowPlanXML xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xsd="http://www.w3.org/2001/XMLSchema" Version="1.6" Build="14.0.1000.169" xmlns="http://schemas.microsoft.com/sqlserver/2004/07/showplan">
<BatchSequence>
  <Batch>
    <Statements>
      <SetSimple StatementCompId="1" StatementEstRows="1" StatementOptLevel="FULL" StatementOptEarlyAbortReason="TimeOut" CardinalityEstimationMode="Value" StatementSetOptions="ANSI_NULLS='true' ANSI_PADDING='true' ANSI_WARNINGS='true' ARITHABORT='true' CONCAT_NULL_YIELDS_NULL='true' NUMERIC_ROUNDABORT='false' QUOTED_IDENTIFIER='true' />
      <QueryPlan CachedPlanSize="112" CompileTime="73" CompileCPU="47" CompileMemory="1520">
        <Warnings>
          <PlanAffectingConvert ConvertIssue="Cardinality Estimate" Expression="CONVERT_IMPLICIT(int,[playerscore].[dbo].[house].[bedrooms],0)" />
        </Warnings>
      </QueryPlan>
    </Statements>
  </Batch>
</BatchSequence>

```

Query cost (relative to the batch): 100%

```

select * from house where id in (select h.id from house h, ran_dt r, records rc where h.id=r.col1) and bedrooms between 2 and 33 OPTION (USE PLAN N)

```

Execution plan diagram showing a Hash Match (Inner Join) operator, which is highlighted in red.

Properties pane on the right shows:

- Aggregate Status: Connect, Elapsed time 00:00:00.343, Finish time 7/9/2018 8:07 PM, Name: LAPTOP-L58DNRBD, Rows returned: 0, Start time 7/9/2018 8:07 PM, State: Open
- Connection: Connect LAPTOP-L58DNRBD, Connection name: LAPTOP-L58DNRBD, Connection elapsed: 00:00:00.421, Connection encrypted: Not encrypted, Connection fail: 0, Connection start: 7/9/2018 8:04:13 PM, Connection state: Open, Display name: LAPTOP-L58DNRBD, Login name: LAPTOP-L58DNRBD\poja, Server name: LAPTOP-L58DNRBD, Server version: 14.0.1000, Session Tracing ID: 54

XML Query plan 3 in query plan2-

```

<?xml version="1.0" encoding="utf-16"?>
<ShowPlanXML xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xsd="http://www.w3.org/2001/XMLSchema" Version="1.6" Build="14.0.1000.169" xmlns="http://schemas.microsoft.com/sqlserver/2004/07/showplan">
<BatchSequence>
  <Batch>
    <Statements>
      <SetSimple StatementCompId="1" StatementEstRows="89.91" StatementOptLevel="Full" StatementOptEarlyAbortReason="GoodEnoughPlanFound" StatementSetOptions="ANSI_NULLS='true' ANSI_PADDING='true' ANSI_WARNINGS='true' ARITHABORT='true' CONCAT_NULL_YIELDS_NULL='true' NUMERIC_ROUNDABORT='false' QUOTED_IDENTIFIER='true' />
      <QueryPlan CachedPlanSize="64" CompileTime="48" CompileCPU="47" CompileMemory="1520">
        <Warnings>
          <PlanAffectingConvert ConvertIssue="Cardinality Estimate" Expression="CONVERT_IMPLICIT(int,[playerscore].[dbo].[house].[bedrooms],0)" />
        </Warnings>
      </QueryPlan>
    </Statements>
  </Batch>
</BatchSequence>

```

Query cost (relative to the batch): 100%

```

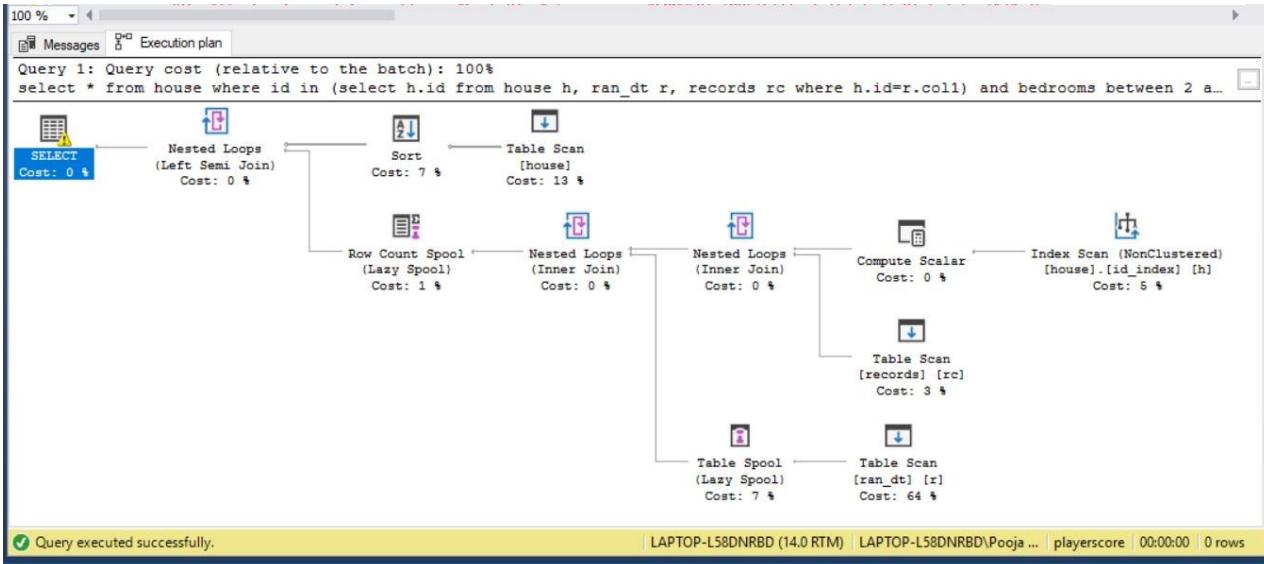
select * from house where id in (select h.id from house h, ran_dt r, records rc where h.id=r.col1) and bedrooms between 2 and 33 OPT...

```

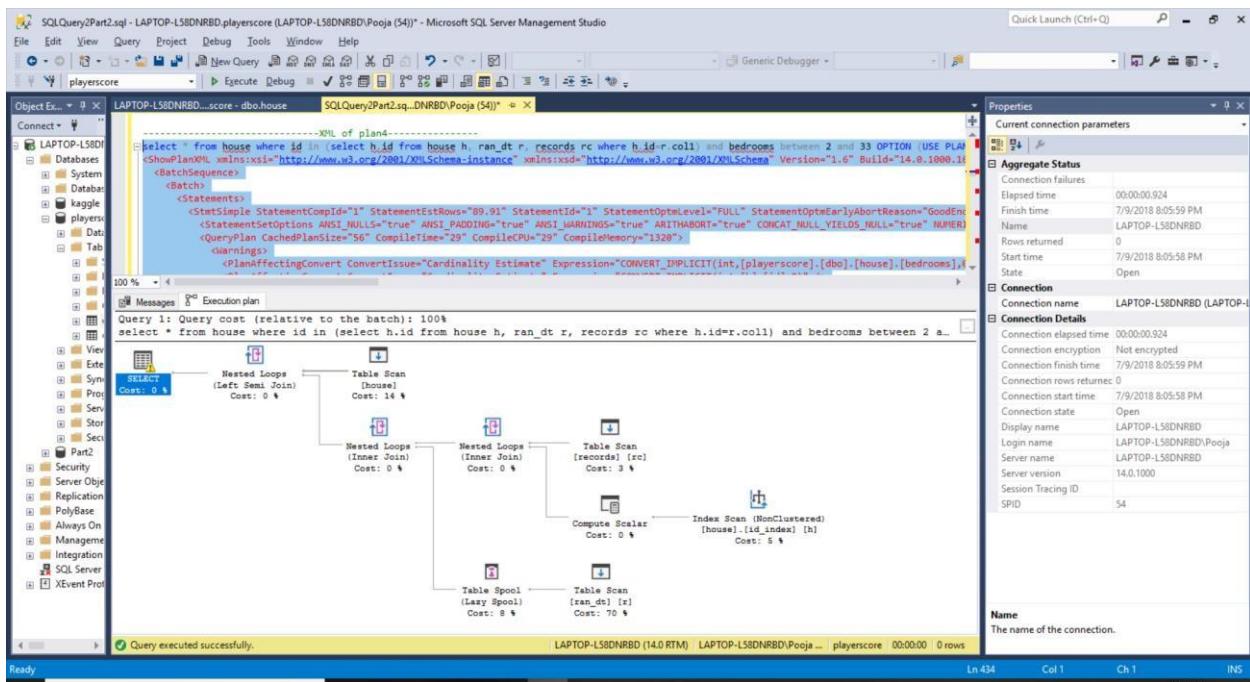
Execution plan diagram showing a Nested Loops (Left Semi Join) operator, which is highlighted in red.

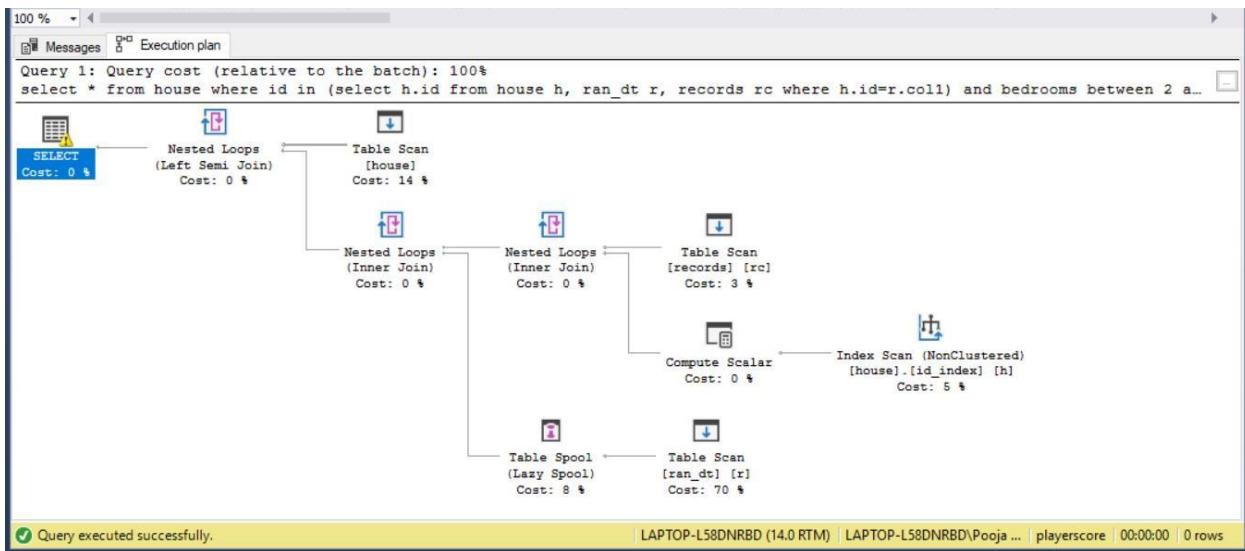
Properties pane on the right shows:

- Aggregate Status: Connection failure, Elapsed time 00:00:00.421, Finish time 7/9/2018 8:04:13 PM, Name: LAPTOP-L58DNRBD, Rows returned: 0, Start time 7/9/2018 8:04:13 PM, State: Open
- Connection: Connection name: LAPTOP-L58DNRBD, Connection elapsed: 00:00:00.421, Connection encrypted: Not encrypted, Connection fail: 0, Connection start: 7/9/2018 8:04:13 PM, Connection state: Open, Display name: LAPTOP-L58DNRBD, Login name: LAPTOP-L58DNRBD\poja, Server name: LAPTOP-L58DNRBD, Server version: 14.0.1000, Session Tracing ID: 54

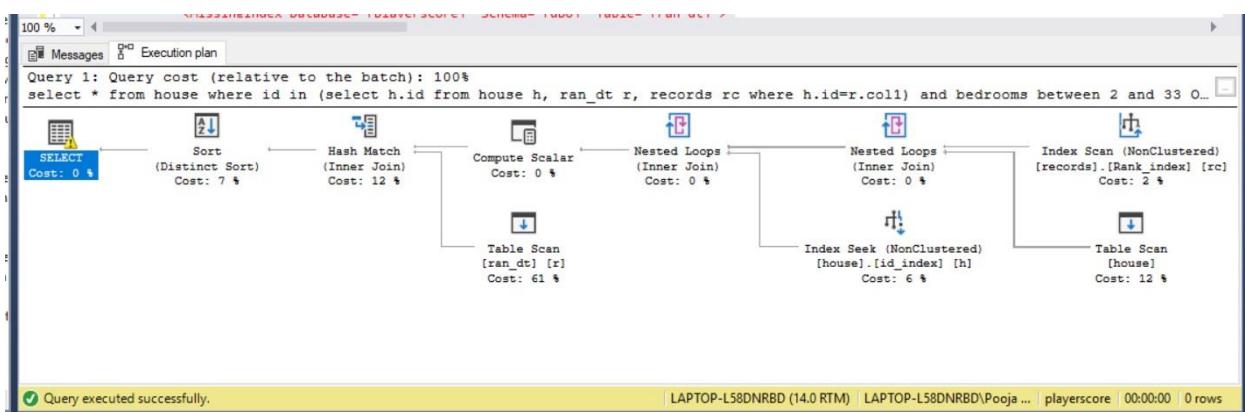
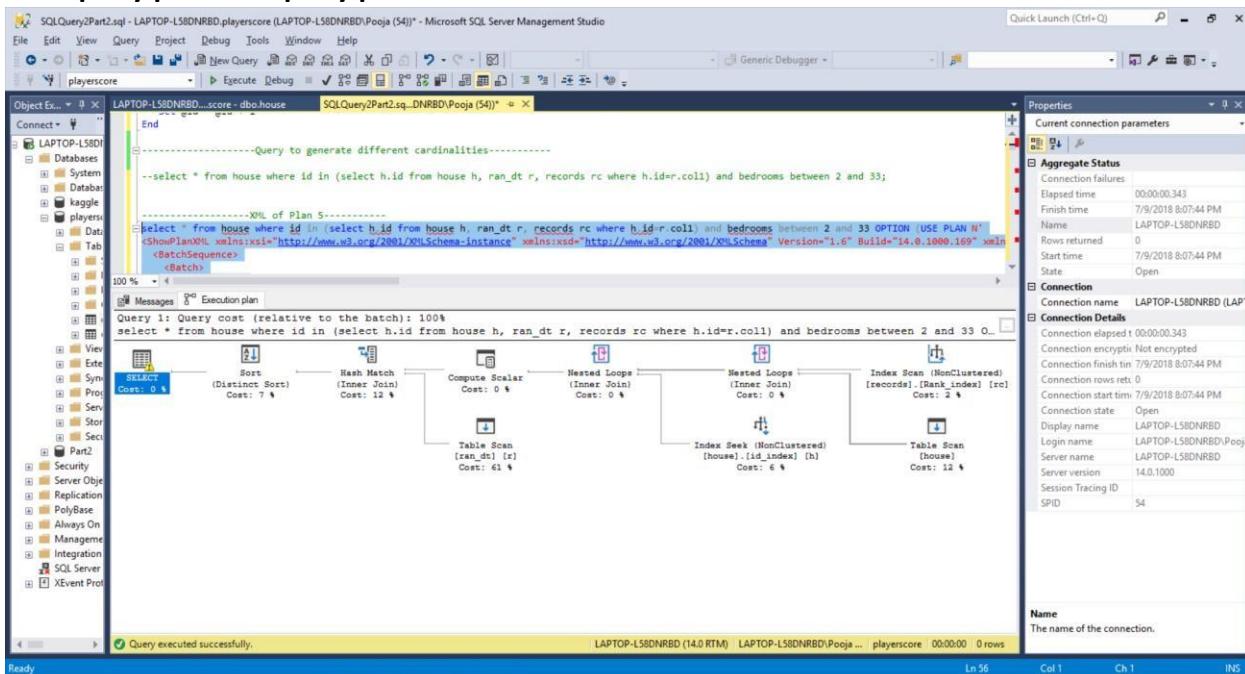


XML Query plan 4 in query plan 2-





XML query plan 5 in query plan 2-



Query plan 3- This query plan has 999 rows on table house and 100 rows on ran_dt

XML Query plan1 in query plan 3-

SQLQuery2Part2.sql - LAPTOP-L58DNRBD.playerscore (LAPTOP-L58DNRBD\Pooja (54)) - Microsoft SQL Server Management Studio

File Edit View Query Project Debug Tools Window Help

New Query Execute Debug Generic Debugger

Object Explorer

Connect Databases System Databases Database Snapshots kaggle playerscore Database Diagrams Tables System Tables FileTables External Tables Graph Tables dbo.house Columns Keys Constraints Triggers

SQLQuery2Part2.sql - LAPTOP-L58DNRBD.playerscore (LAPTOP-L58DNRBD\Pooja (54))

```
<Re10>
</QueryPlan>
</Statements>
</Batch>
</BatchSequence>
</ShowPlanXML>
```

Messages Execution plan

Query 1: Query cost (relative to the batch): 100%
select * from house where id in (select h.id from house h, ran_dt r, records rc where h.id=r.col1) and bedrooms between...

The execution plan shows a SELECT statement with a cost of 0. A Nested Loops (Left Semi Join) operator has a cost of 1. It joins a Table Scan [house] (cost: 12) and a Nested Loops (Inner Join) operator. The Nested Loops (Inner Join) operator has a cost of 0 and joins a Table Scan [records] [rc] (cost: 6) and a Compute Scalar operator. The Compute Scalar operator has a cost of 0 and joins an Index Seek (NonClustered) [house].[id_index] [h] (cost: 13). This is followed by a Table Spool (Lazy Spool) operator with a cost of 11, which then joins a Table Scan [ran_dt] [r] (cost: 56).

Properties

- Aggregate Status
- Connection failures
- Elapsed time: 00:00:00.339
- Finish time: 7/9/2018 7:44:25 PM
- Name: LAPTOP-L58DNRBD
- Rows returned: 0
- Start time: 7/9/2018 7:44:25 PM
- State: Open

Connection

- Connection name: LAPTOP-L58DNRBD (LA)
- Connection Details
- Connection elapsed: 00:00:00.339
- Connection encrypt: Not encrypted
- Connection finish t: 7/9/2018 7:44:25 PM
- Connection rows r: 0
- Connection start t: 7/9/2018 7:44:25 PM
- Connection state: Open
- Display name: LAPTOP-L58DNRBD
- Login name: LAPTOP-L58DNRBD\Pooja
- Server name: LAPTOP-L58DNRBD
- Server version: 14.0.1000
- Session Tracing ID: SPID: 54

Name: The name of the connection.

Query executed successfully.

LAPTOP-L58DNRBD (14.0 RTM) | LAPTOP-L58DNRBD\Pooja ... | playerscore | 00:00:00 | 0 rows

Ready Col 1 Ch 1 INS

**XML plan 2
in query
plan 3-**

100 %

Messages Execution plan

Query 1: Query cost (relative to the batch): 100%
select * from house where id in (select h.id from house h, ran_dt r, records rc where h.id=r.col1) and bedrooms between...

The execution plan shows a SELECT statement with a cost of 0. A Nested Loops (Left Semi Join) operator has a cost of 1. It joins a Table Scan [house] (cost: 12) and a Nested Loops (Inner Join) operator. The Nested Loops (Inner Join) operator has a cost of 0 and joins a Nested Loops (Inner Join) operator and a Table Scan [records] [rc] (cost: 6). The Nested Loops (Inner Join) operator has a cost of 0 and joins an Index Seek (NonClustered) [house].[id_index] [h] (cost: 13). This is followed by a Table Spool (Lazy Spool) operator with a cost of 11, which then joins a Table Scan [ran_dt] [r] (cost: 56).

Query executed successfully.

LAPTOP-L58DNRBD (14.0 RTM) | LAPTOP-L58DNRBD\Pooja ... | playerscore | 00:00:00 | 0 rows

**XML of plan
4 in query
plan 3-**

XML plan 5 in query plan 3-

SQLQuery2Part2.sql - LAPTOP-L58DNRBD.playerscore (LAPTOP-L58DNRBD\Pooja (54)) - Microsoft SQL Server Management Studio

File Edit View Query Project Debug Tools Window Help

New Query Home Generic Debugger

playerscore Execute Debug

Object Explorer Properties

LAPTOP-L58DNRBD (SQL Server) Current connection para.

Databases Aggregate Status

System Databases Connector Elapsed time: 00:00:00.319

Database Snapshots Finish time: 7/9/2018 7:46:2

kaggle Name: LAPTOP-L58DNRBD

playerscore Rows returned: 0

Database Diagrams Start time: 7/9/2018 7:46:2

Tables State: Open

System Tables Connection

FileTables Connection Graph Tables Connection Details

External Tables Connection

Graph Tables Connection Open

dbo.house Connection

Columns Connection Not encrypted

id (nvarchar)

date (nvarchar)

price (nvarchar)

bedroom (nvarchar)

bathroom (nvarchar)

soft_living (nvarchar)

floors (nvarchar)

waterfront (nvarchar)

condition (nvarchar)

grade (nvarchar)

soft_abv

soft_base

yr_built (nvarchar)

yr_renova (nvarchar)

zipcode (nvarchar)

latitude (nvarchar)

longitude (nvarchar)

Keys

Constraints

Triggers

Print @Id
Set @Id = @Id + 1
End

-----Query to generate different cardinalities-----
--select * from house where id in (select h.id from house h, ran_dt r, records rc where h.id=r.col1) and bedrooms between 2 and 33;

-----XML of Plan 5-----
Select * from house where id in (select h.id from house h, ran_dt r, records rc where h.id=r.col1) and bedrooms between 2 and 33 OPTION (USE PLAN N)

100 %

Messages Execution plan

Query 1: Query cost (relative to the batch): 100%
select * from house where id in (select h.id from house h, ran_dt r, records rc where h.id=r.col1) and bedrooms between 2 and 33 O...

The execution plan diagram illustrates a query with the following steps:
1. A SELECT node with a cost of 0 %.
2. A Sort (Distinct Sort) node with a cost of 5 %.
3. A Hash Match (Inner Join) node with a cost of 31 %.
4. A Compute Scalar node with a cost of 0 %.
5. Nested Loops (Inner Join) nodes with costs of 0 % and 1 %.
6. Index Seek (NonClustered) nodes with costs of 10 % and 100 %.
7. Table Scan nodes for tables [ran_dt] [r], [house] [h], and [records] [rc].
8. Index Scan (NonClustered) nodes for [records].[Rank_index] [rc] and [house].[id_index] [h].

Properties pane shows:
- Aggregate Status: Connector Elapsed time: 00:00:00.319, Finish time: 7/9/2018 7:46:2, Name: LAPTOP-L58DNRBD, Rows returned: 0, Start time: 7/9/2018 7:46:2, State: Open.
- Connection: Connection LAPTOP-L58DNRBD, Connection 00:00:00.319, Connection Not encrypted, Connection 7/9/2018 7:46:2, Connection 0, Connection 7/9/2018 7:46:2, Connection Open, Display name: LAPTOP-L58DNRBD, Login name: LAPTOP-L58DNRBD, Server name: LAPTOP-L58DNRBD, Server version: 14.0.1000, Session ID: 54.

Ready

Query executed successfully.

LAPTOP-L58DNRBD (14.0 RTM) | LAPTOP-L58DNRBD\Pooja ... | playerscore | 00:00:00 | 0 rows

Ln 56 Col 1 Ch 1 INS

100 %

Messages Execution plan

Query 1: Query cost (relative to the batch): 100%
select * from house where id in (select h.id from house h, ran_dt r, records rc where h.id=r.col1) and bedrooms between 2 and 33 O...

The execution plan diagram illustrates a query with the following steps:
1. A SELECT node with a cost of 0 %.
2. A Sort (Distinct Sort) node with a cost of 5 %.
3. A Hash Match (Inner Join) node with a cost of 31 %.
4. A Compute Scalar node with a cost of 0 %.
5. Nested Loops (Inner Join) nodes with costs of 0 % and 1 %.
6. Index Seek (NonClustered) nodes with costs of 10 % and 100 %.
7. Table Scan nodes for tables [ran_dt] [r], [house] [h], and [records] [rc].

Properties pane shows:
- Aggregate Status: Connector Elapsed time: 00:00:00.319, Finish time: 7/9/2018 7:46:2, Name: LAPTOP-L58DNRBD, Rows returned: 0, Start time: 7/9/2018 7:46:2, State: Open.
- Connection: Connection LAPTOP-L58DNRBD, Connection 00:00:00.319, Connection Not encrypted, Connection 7/9/2018 7:46:2, Connection 0, Connection 7/9/2018 7:46:2, Connection Open, Display name: LAPTOP-L58DNRBD, Login name: LAPTOP-L58DNRBD, Server name: LAPTOP-L58DNRBD, Server version: 14.0.1000, Session ID: 54.

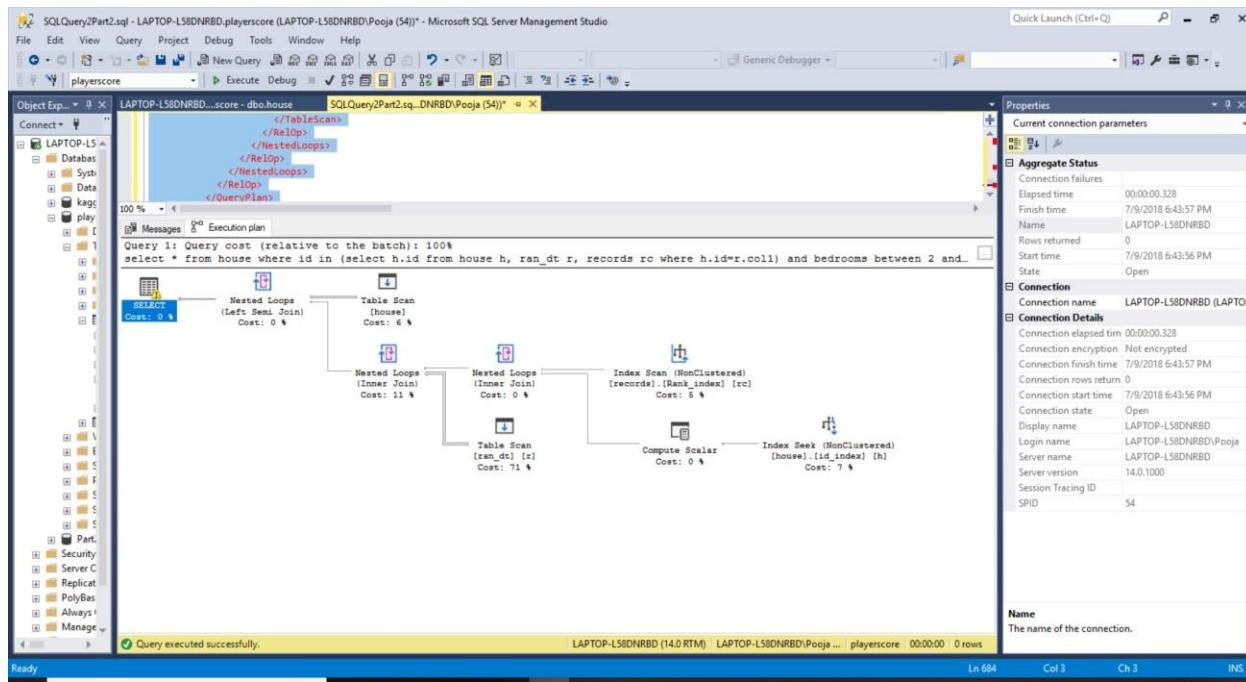
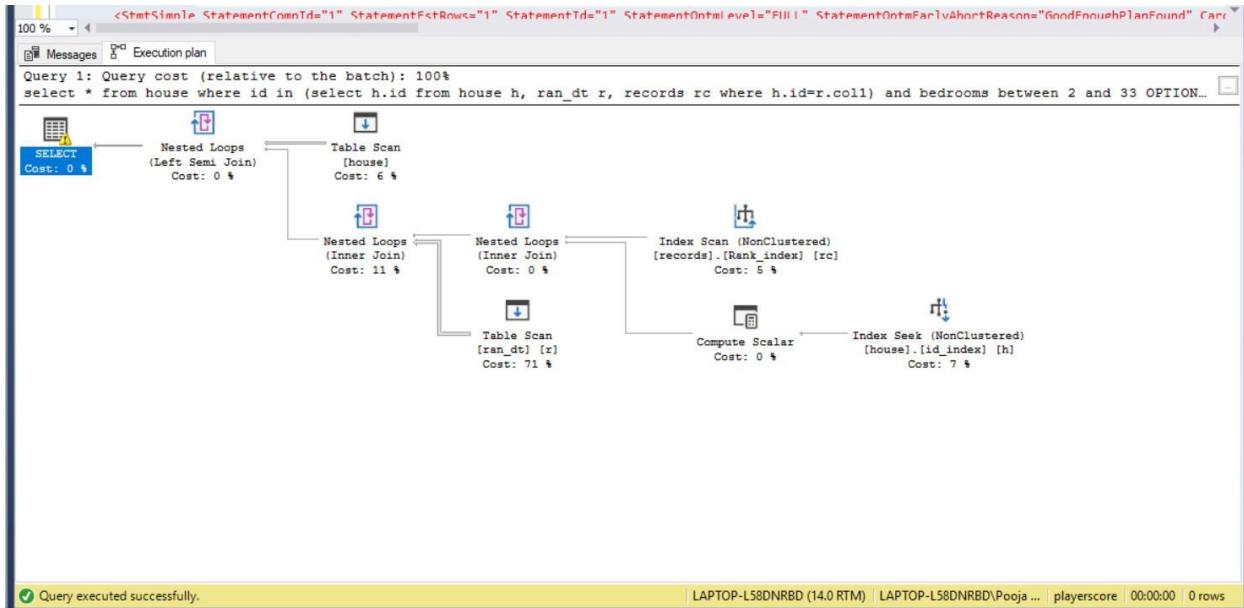
Ready

Query executed successfully.

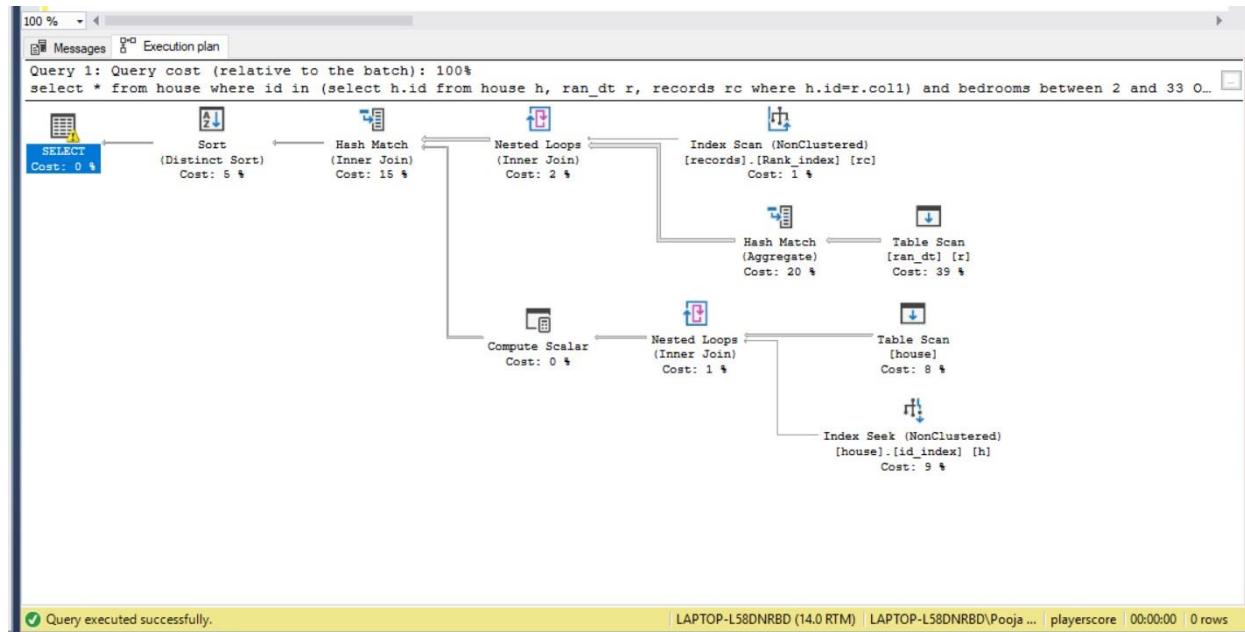
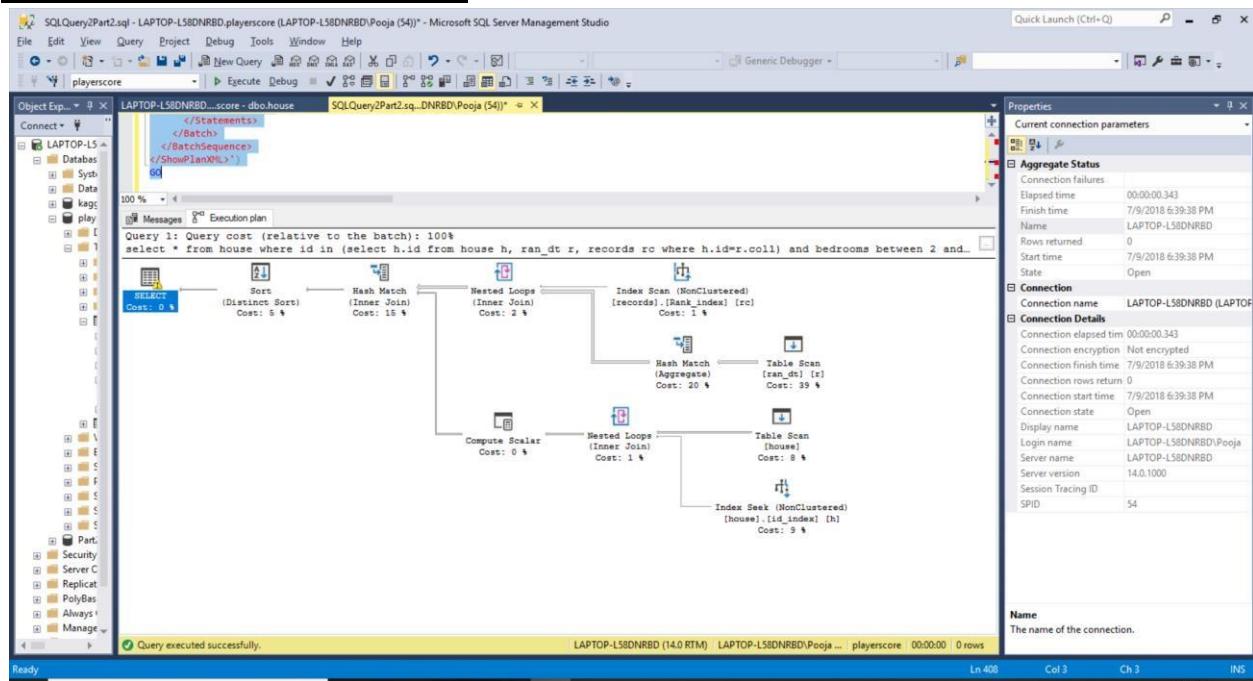
LAPTOP-L58DNRBD (14.0 RTM) | LAPTOP-L58DNRBD\Pooja ... | playerscore | 00:00:00 | 0 rows

Query plan4- This query plan has 999 rows on house and 477 Rows on ran_dt

Query plan 1 XML on Query plan 4-



Query plan 2 XML on Query plan 4-



QUERY plan 3 XML on query plan 4-

SQlQuery2Part2.sql - LAPTOP-L58DNRBD.playerscore (LAPTOP-L58DNRBD\Pooja (54)) - Microsoft SQL Server Management Studio

File Edit View Query Project Debug Tools Window Help

playerScore

Object Explorer

Connect to... LAPTOP-L58DNRBD -> playScore

SQLQuery2Part2.sql -> DMRBD(Pooja (54))

Properties

Current connection parameters

Aggregate Status

- Connection failures: 0
- Elapsed time: 00:00:00.343
- Finish time: 7/9/2018 6:49:55 PM
- Name: LAPTOP-L58DNRBD
- Rows returned: 0
- Start time: 7/9/2018 6:49:55 PM
- State: Open

Connection

- Connection name: LAPTOP-L58DNRBD (LAPTOP-L58DNRBD)

Connection Details

- Connection elapsed time: 00:00:00.343
- Connection encryption: Not encrypted
- Connection finish time: 7/9/2018 6:49:55 PM
- Connection rows return: 0
- Connection start time: 7/9/2018 6:49:55 PM
- Connection state: Open
- Display name: LAPTOP-L58DNRBD
- Login name: LAPTOP-L58DNRBD\Pooja
- Server name: LAPTOP-L58DNRBD
- Server version: 14.0.1000
- Session Tracing ID: 54
- SPID: 54

Messages

Execution plan

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

```
select * from house where id in (select h.id from house h, ran_dt r, records rc where h.id=r.col1) and bedrooms between 2 and 33 OPTION (USE PLAN XML)
```

SELECT Cost: 0 %

Nested Loops (Left Semi Join) Cost: 0 %

Sort Cost: 5 %

Table Scan [house] Cost: 8 %

Row Count Spool (Lazy Spool) Cost: 3 %

Nested Loops (Inner Join) Cost: 16 %

Nested Loops (Inner Join) Cost: 0 %

Compute Scalar Cost: 0 %

Index Seek (NonClustered) [house].[id_index] [h] Cost: 9 %

Table Scan [records] [rc] Cost: 4 %

Table Spool (Lazy Spool) Cost: 17 %

Table Scan [ran_dt] [r] Cost: 38 %

Table Scan [ran_dt] [r] Cost: 38 %

Properties

Current connection parameters

Aggregate Status

- Connection failures: 0
- Elapsed time: 00:00:00.343
- Finish time: 7/9/2018 6:49:55 PM
- Name: LAPTOP-L58DNRBD
- Rows returned: 0
- Start time: 7/9/2018 6:49:55 PM
- State: Open

Connection

- Connection name: LAPTOP-L58DNRBD (LAPTOP-L58DNRBD)

Connection Details

- Connection elapsed time: 00:00:00.343
- Connection encryption: Not encrypted
- Connection finish time: 7/9/2018 6:49:55 PM
- Connection rows return: 0
- Connection start time: 7/9/2018 6:49:55 PM
- Connection state: Open
- Display name: LAPTOP-L58DNRBD
- Login name: LAPTOP-L58DNRBD\Pooja
- Server name: LAPTOP-L58DNRBD
- Server version: 14.0.1000
- Session Tracing ID: 54
- SPID: 54

Name

The name of the connection.

Matches: (

Ln 330 Col 3 Ch 3 INS

Query executed successfully.

LAPTOP-L58DNRBD (14.0 RTM) | LAPTOP-L58DNRBD\Pooja ... | playerscore | 00:00:00 | 0 rows

100 %

Messages Execution plan

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

```
select * from house where id in (select h.id from house h, ran_dt r, records rc where h.id=r.col1) and bedrooms between 2 and...
```

SELECT Cost: 0 %

Nested Loops (Left Semi Join) Cost: 0 %

Sort Cost: 5 %

Table Scan [house] Cost: 8 %

Row Count Spool (Lazy Spool) Cost: 3 %

Nested Loops (Inner Join) Cost: 16 %

Nested Loops (Inner Join) Cost: 0 %

Compute Scalar Cost: 0 %

Index Seek (NonClustered) [house].[id_index] [h] Cost: 9 %

Table Scan [records] [rc] Cost: 4 %

Table Spool (Lazy Spool) Cost: 17 %

Table Scan [ran_dt] [r] Cost: 38 %

Table Scan [ran_dt] [r] Cost: 38 %

Properties

Current connection parameters

Aggregate Status

- Connection failures: 0
- Elapsed time: 00:00:00.343
- Finish time: 7/9/2018 6:49:55 PM
- Name: LAPTOP-L58DNRBD
- Rows returned: 0
- Start time: 7/9/2018 6:49:55 PM
- State: Open

Connection

- Connection name: LAPTOP-L58DNRBD (LAPTOP-L58DNRBD)

Connection Details

- Connection elapsed time: 00:00:00.343
- Connection encryption: Not encrypted
- Connection finish time: 7/9/2018 6:49:55 PM
- Connection rows return: 0
- Connection start time: 7/9/2018 6:49:55 PM
- Connection state: Open
- Display name: LAPTOP-L58DNRBD
- Login name: LAPTOP-L58DNRBD\Pooja
- Server name: LAPTOP-L58DNRBD
- Server version: 14.0.1000
- Session Tracing ID: 54
- SPID: 54

Name

The name of the connection.

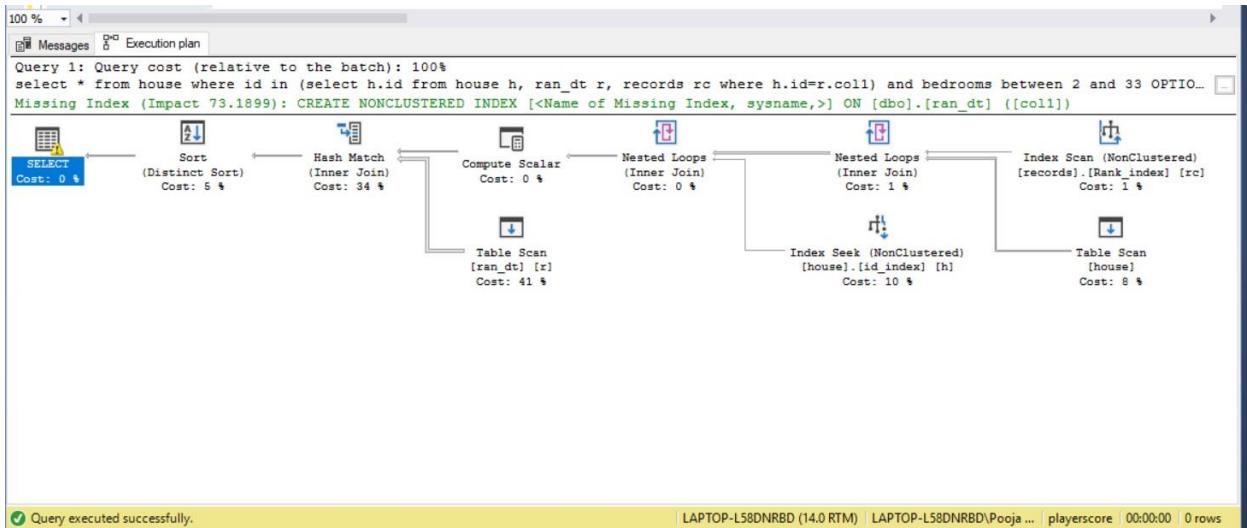
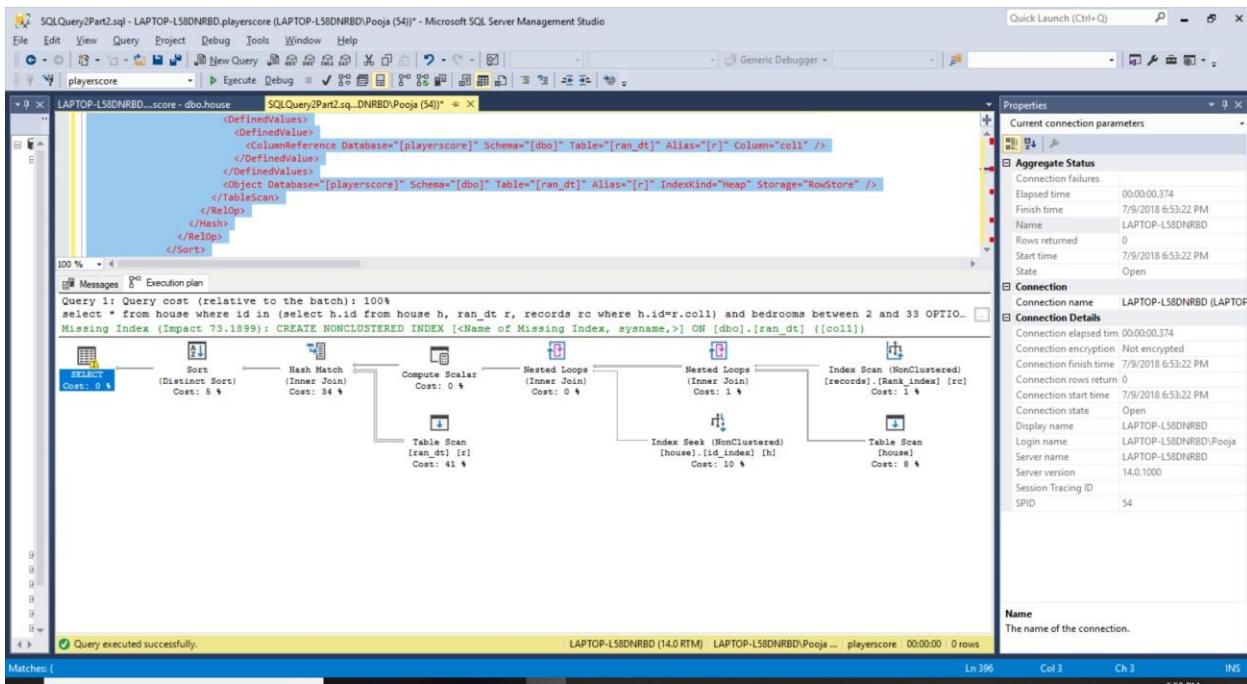
Matches: (

Ln 330 Col 3 Ch 3 INS

Query executed successfully.

LAPTOP-L58DNRBD (14.0 RTM) | LAPTOP-L58DNRBD\Pooja ... | playerscore | 00:00:00 | 0 rows

QUERY plan 5 on query plan 4-



Query plan 5- This query plan includes 2000 rows generated by ran_dt and then tested the query.

XML of Plan 1 in Query plan 5-

SQLQuery2Part2.sql - LAPTOP-L58DNRBD.playerscore (LAPTOP-L58DNRBD\Pooja (54)) - Microsoft SQL Server Management Studio

File Edit View Query Project Debug Tools Window Help

New Query Execute Debug Generic Debugger

playerscore

Object Explorer

LAPTOP-L58DNRBD (SQL Server 14.0)

Databases Tables System Tables External Tables Graph Tables dbo.house Columns Keys Constraints Triggers Indexes Statistics Views External Resources Synonyms Programmability Service Broker Storage Security Part2 Security Server Objects Replication PolyBase Always On High Availability Management

SQLQuery2Part2.sql - LAPTOP-L58DNRBD.playerscore (LAPTOP-L58DNRBD\Pooja (54))

Execution plan

Properties

Current connection parameters

Aggregate Status

Connection failures: 0

Elapsed time: 00:00:00.359

Finish time: 7/9/2018 7:09:58 PM

Name: LAPTOP-L58DNRBD

Rows returned: 0

Start time: 7/9/2018 7:09:58 PM

State: Open

Connection

Connection name: LAPTOP-L58DNRBD (LAPTOP-L58DNRBD\Pooja (54))

Connection details

Connection elapsed: 00:00:00.359

Connection encrypt: Not encrypted

Connection finish time: 7/9/2018 7:09:58 PM

Connection rows retd: 0

Connection start time: 7/9/2018 7:09:58 PM

Connection state: Open

Display name: LAPTOP-L58DNRBD

Login name: LAPTOP-L58DNRBD\Pooja

Server name: LAPTOP-L58DNRBD

Server version: 14.0.1000

Session Tracing ID: SPID: 54

Name

The name of the connection.

Ready

Query executed successfully.

LAPTOP-L58DNRBD (14.0 RTM) | LAPTOP-L58DNRBD\Pooja ... | playerscore | 00:00:00 | 0 rows

Ln 1147 Col 1 Ch 1 INS

Messages Execution plan

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

select * from house where id in (select h.id from house h, ran_dt r, records rc where h.id=r.col1) and bedrooms b... Missing Index (Impact 56.0167): CREATE NONCLUSTERED INDEX [<Name of Missing Index, sysname,>] ON [dbo].[ran_dt] (...)

SELECT Cost: 0 %

Nested Loops (Left Semi Join) Cost: 0 %

Table Scan [house] Cost: 2 %

Nested Loops (Inner Join) Cost: 66 %

Table Scan [ran_dt] [r] Cost: 27 %

Index Scan (NonClustered) [records].[Rank_index] [rc] Cost: 2 %

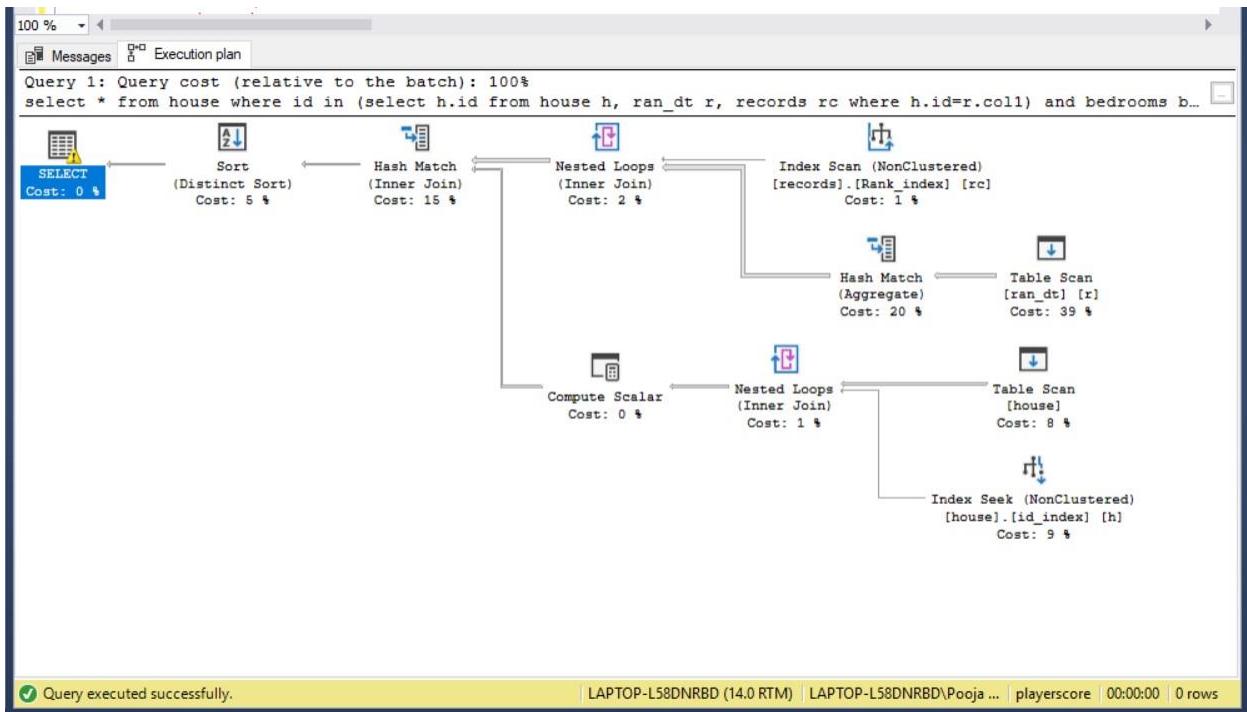
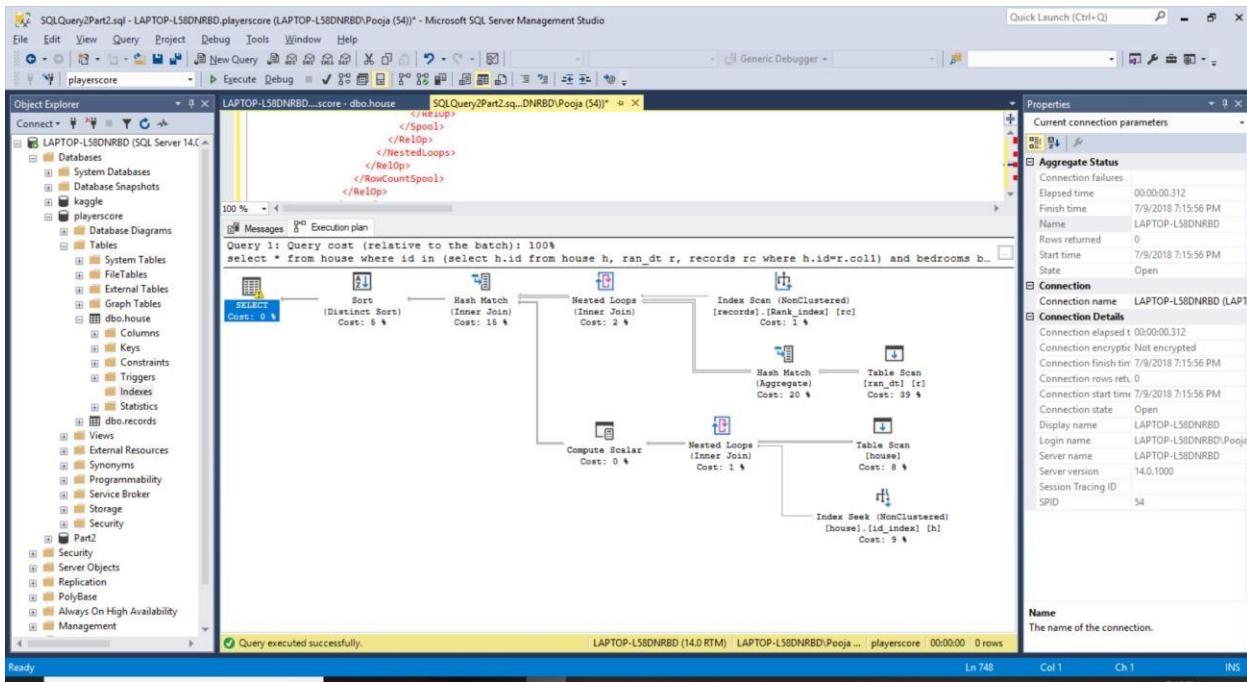
Compute Scalar Cost: 0 %

Index Seek (NonClustered) [house].[id_index] [h] Cost: 3 %

Query executed successfully.

LAPTOP-L58DNRBD (14.0 RTM) | LAPTOP-L58DNRBD\Pooja ... | playerscore | 00:00:00 | 0 rows

XML Plan2 in query 5-



XML Plan 3 in query Plan5-

SQLQuery2Part2.sql - LAPTOP-L58DNRBD.playerscore (LAPTOP-L58DNRBD\Pooja (54)) - Microsoft SQL Server Management Studio

File Edit View Query Project Debug Tools Window Help

New Query Generic Debugger

playerscore Execute Debug

LAPTOP-L58DNRBD - score - dbo.house SQLQuery2Part2.sql [Pooja (54)]

Object Explorer Properties Current connection parameters

Connect Aggregate Status

Databases Connection failures

System Databases Elapsed time 00:00:00.374

Database Snapshots Finish time 7/9/2018 7:18:16 PM

kaggle Name LAPTOP-L58DNRBD

playerscore Rows returned 0

Database Diagrams Start time 7/9/2018 7:18:15 PM

Tables State Open

System Tables

FileTables

External Tables

Graph Tables

dbo.house

Columns

Keys

Constraints

Triggers

Indexes

Statistics

dbo.records

Views

External Resources

Synonyms

Programmability

Service Broker

Storage

Security

Part2

Security

Server Objects

Replication

PolyBase

Always On High Availability

Management

Properties

Aggregate Status

Current connection parameters

Connection failures

Elapsed time 00:00:00.374

Finish time 7/9/2018 7:18:16 PM

Name LAPTOP-L58DNRBD

Rows returned 0

Start time 7/9/2018 7:18:15 PM

State Open

Connection

Connection name LAPTOP-L58DNRBD (LAP)

Connection Details

Connection elapsed t 00:00:00.374

Connection encrypt: Not encrypted

Connection finish tim 7/9/2018 7:18:16 PM

Connection rows rett: 0

Connection start tim 7/9/2018 7:18:15 PM

Connection state Open

Display name LAPTOP-L58DNRBD

Login name LAPTOP-L58DNRBD\Pooj

Server name LAPTOP-L58DNRBD

Server version 14.0.1000

Session Tracing ID SPID 54

Messages Execution plan

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

```
select * from house where id in (select h.id from house h, ran_dt r, records rc where h.id=r.col1) and bedrooms b...
```

Missing Index (Impact 49.1433): CREATE NONCLUSTERED INDEX [<Name of Missing Index, sysname,>] ON [dbo].[ran_dt] (...

The execution plan consists of several stages:

- SELECT**: Cost: 0 \$
- Nested Loops (Left Semi Join)**: Cost: 0 \$
- Sort**: Cost: 2 %
- Table Scan [house]**: Cost: 2 %
- Row Count Spool (Lazy Spool)**: Cost: 1 %
- Nested Loops (Inner Join)**: Cost: 73 %
- Index Seek (Non [house].[id_in])**: Cost: 3
- Compute Scalar**: Cost: 0 %
- Table Scan [records] [rc]**: Cost: 1 %
- Table Spool (Lazy Spool)**: Cost: 5 %
- Table Scan [ran_dt] [r]**: Cost: 12 %

100 %

Messages Execution plan

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

```
select * from house where id in (select h.id from house h, ran_dt r, records rc where h.id=r.col1) and bedrooms b...
```

Missing Index (Impact 49.1433): CREATE NONCLUSTERED INDEX [<Name of Missing Index, sysname,>] ON [dbo].[ran_dt] (...

The execution plan consists of several stages:

- SELECT**: Cost: 0 \$
- Nested Loops (Left Semi Join)**: Cost: 0 \$
- Sort**: Cost: 2 %
- Table Scan [house]**: Cost: 2 %
- Row Count Spool (Lazy Spool)**: Cost: 1 %
- Nested Loops (Inner Join)**: Cost: 73 %
- Index Seek (Non [house].[id_in])**: Cost: 3
- Compute Scalar**: Cost: 0 %
- Table Scan [records] [rc]**: Cost: 1 %
- Table Spool (Lazy Spool)**: Cost: 5 %
- Table Scan [ran_dt] [r]**: Cost: 12 %

Query executed successfully.

LAPTOP-L58DNRBD (14.0 RTM) | LAPTOP-L58DNRBD\Pooja ... | playerscore | 00:00:00 | 0 rows

XML plan 4 in Query plan 5-

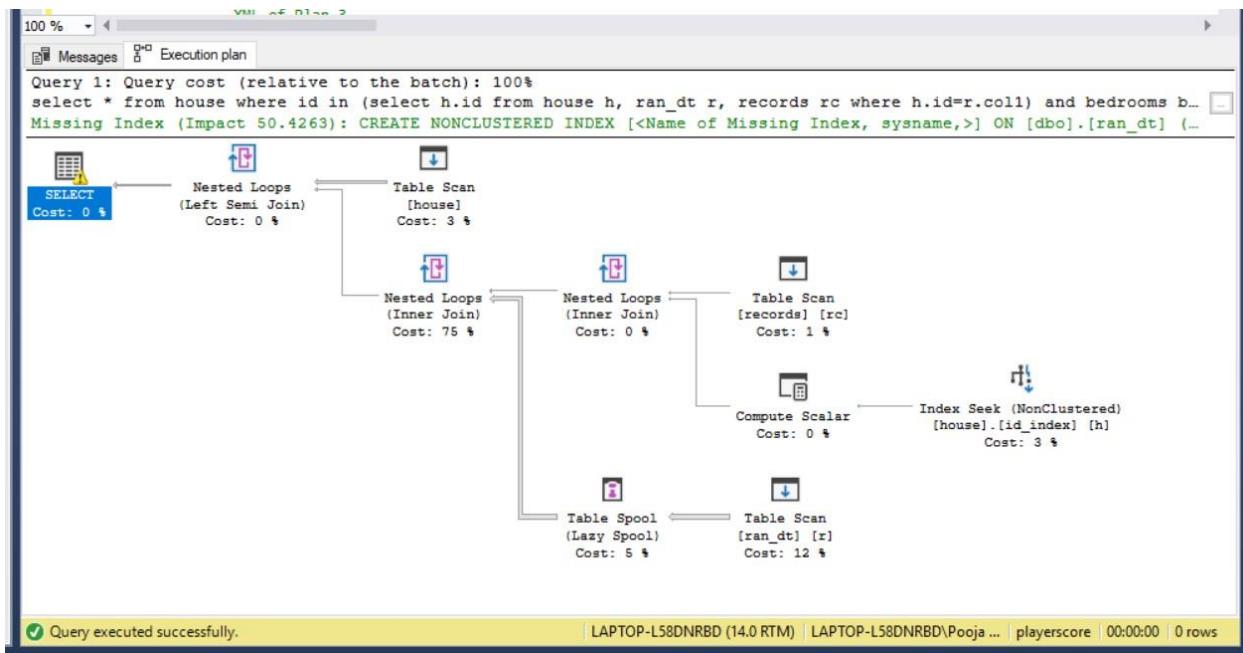
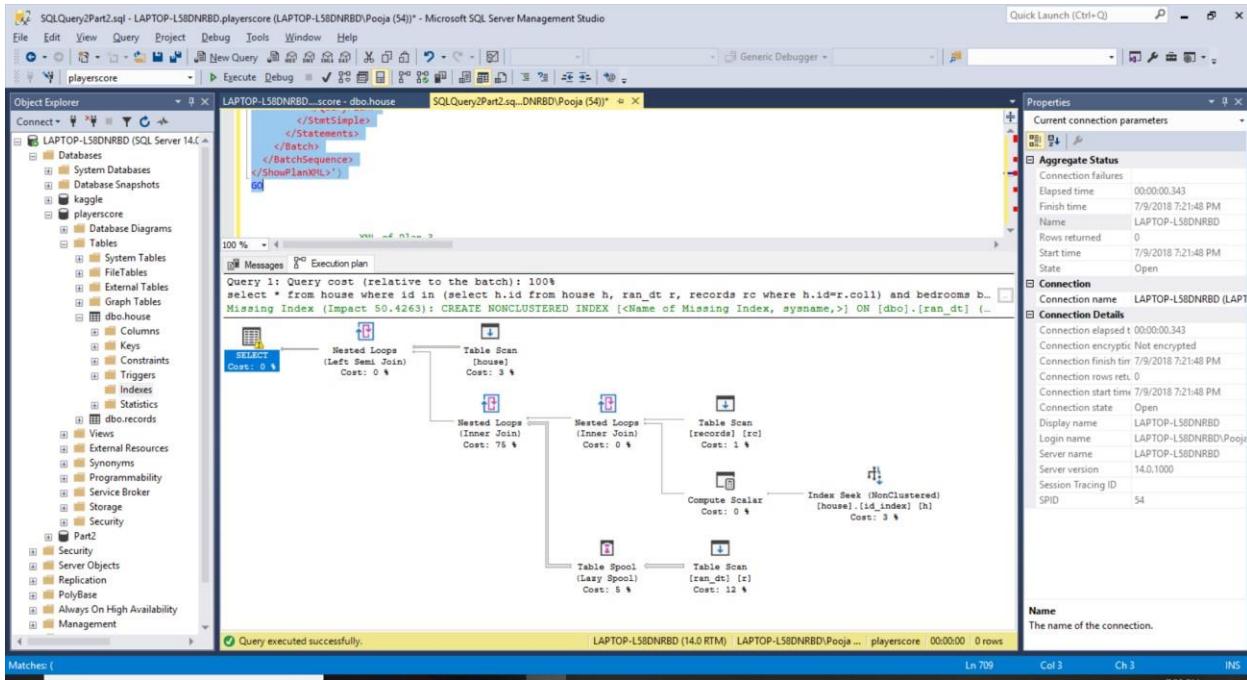


Table of all the XML and Query plans-

- The table includes the query plans and XML. The query plans are the default query without xml generation with cardinalities changes.
- The XML column is the xml generation of all the 5 different query plans.
- The time highlighted in blue is the time taken by the query optimizer for the default runs.

	Query plan 1	Query plan 2	Query plan 3	Query plan 4	Query plan 5
XML 1	318ms	343ms	343ms	328ms	359ms
XML2	343ms	296ms	343ms	343ms	312ms
XML3	328ms	421ms	288ms	343ms	374ms
XML4	343ms	924ms	339ms	296ms	343ms
XML5	318ms	343ms	319ms	374ms	329ms