SVEUČILIŠTE U ZAGREBU
FAKULTET ELEKTROTEHNIKE I RAČUNARSTVA

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LABORATORIJ PROFILA 2

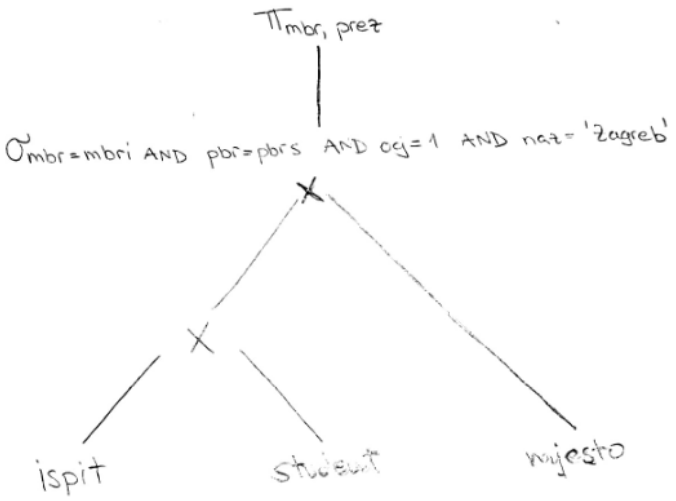
Odjeljak Sustavi baza podataka

5. Vježba

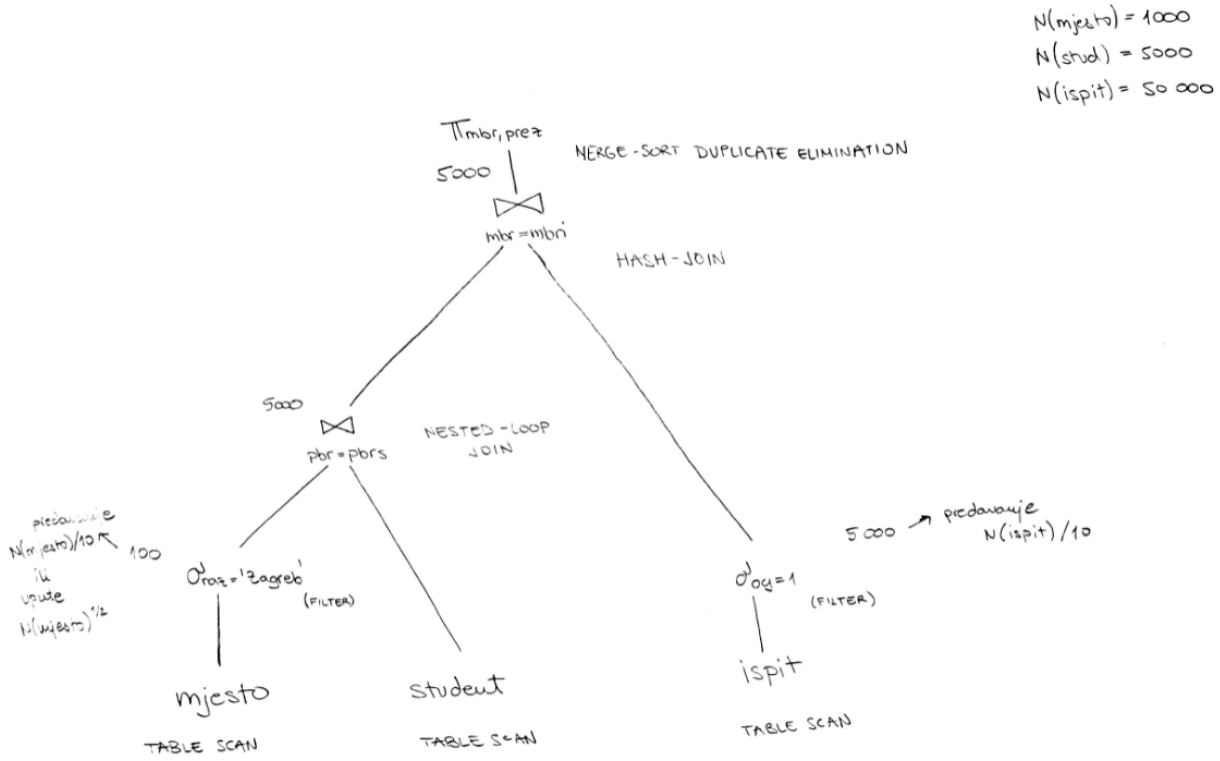
1.1. Zadatak

1) $\Pi_{mbr,\ prez}\left(\sigma_{mbr=mbri\ AND\ pbr=pbrs\ AND\ ocj=1\ AND\ naz='Zagreb'}((ispit \times student) \times mjesto)\right)$

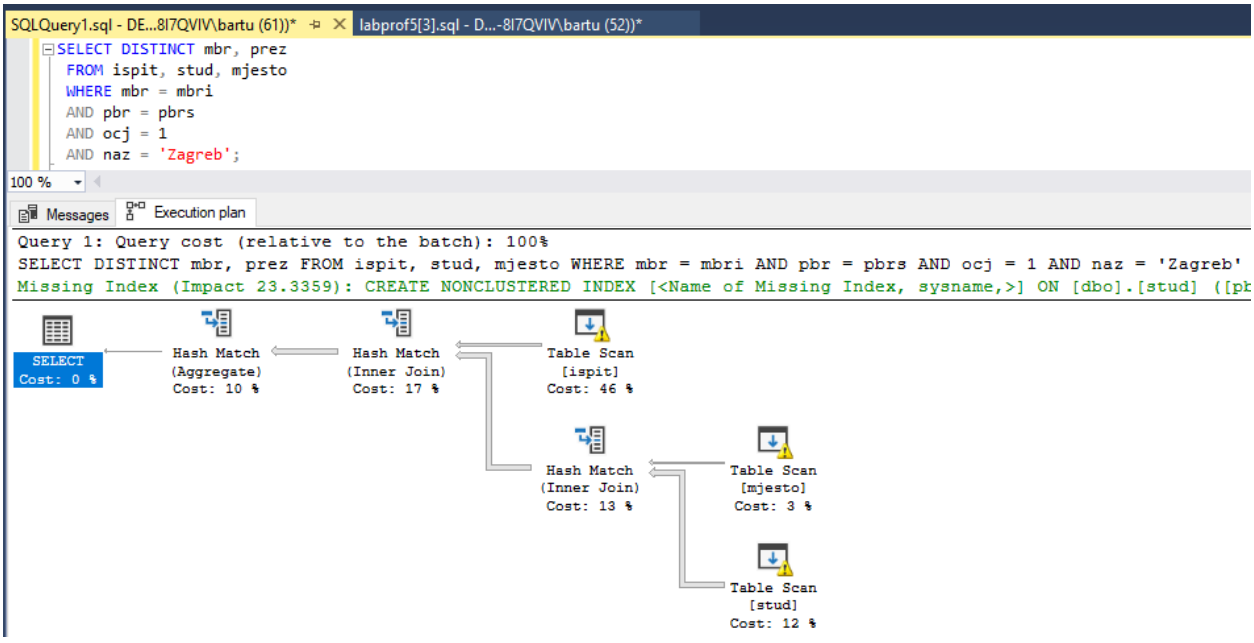
2)



1.2. Zadatak

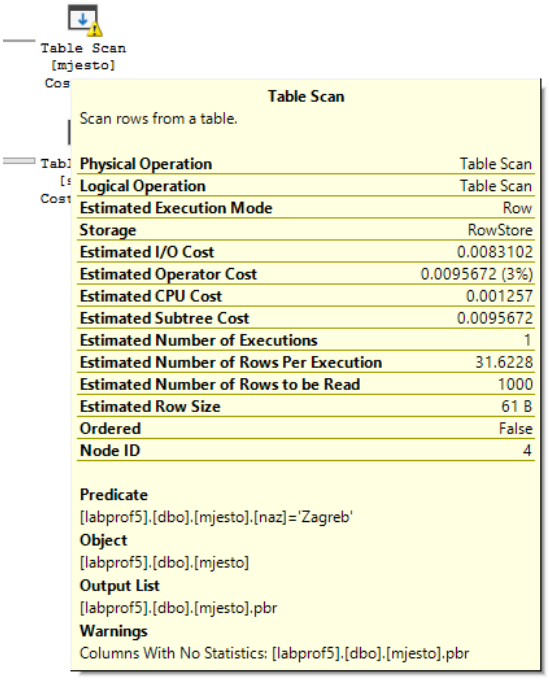


1.3. Zadatak



SQL Server je pretpostavio da će se na oba spajanja koristiti Hash Match. Ja sam pretpostavio da će na prvom spajanju biti korišten Nested-loop join budući da spajam tablice s relativno malim brojem n-torki (posebice nakon uvjeta za naziv mjesta).

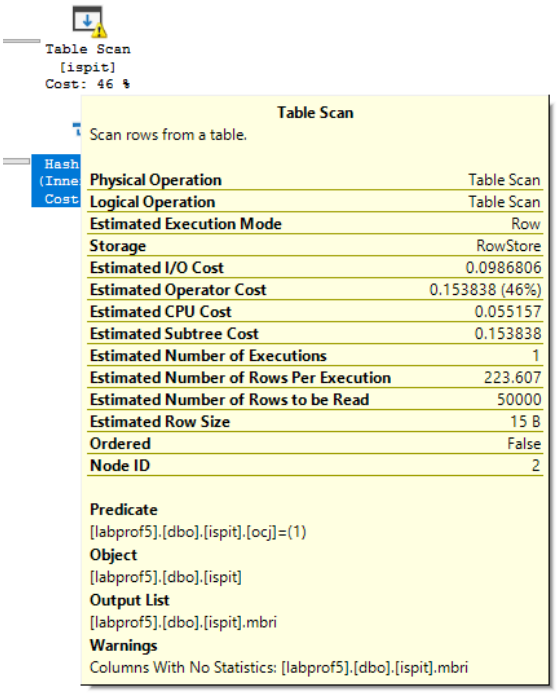
Tablica mjesto:



Procijenjeni broj n-torki koje predviđa SQL Server je 31.6228 (to je dobiveno formulom N(mjesto)**0.5 gdje je N = 1000).

Procijenjeni broj n-torki na predavanjima se računao kao N(mjesto) / 10 što bi dalo 100 n-torki.

Tablica ispit:

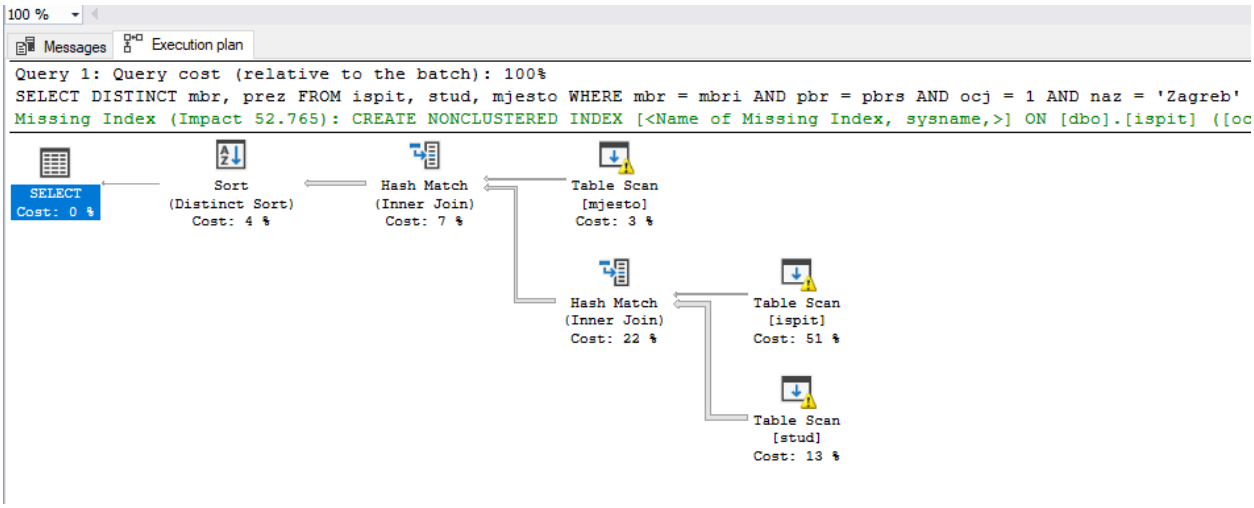


Procijenjeni broj n-torki koje predviđa SQL Server je 223.607 (to je dobiveno formulom N(mjesto)**0.5 gdje je N = 50000).

Procijenjeni broj n-torki na predavanjima se računao kao N(ispit) / 10 što bi dalo 5000 n-torki.

1.4. Zadatak

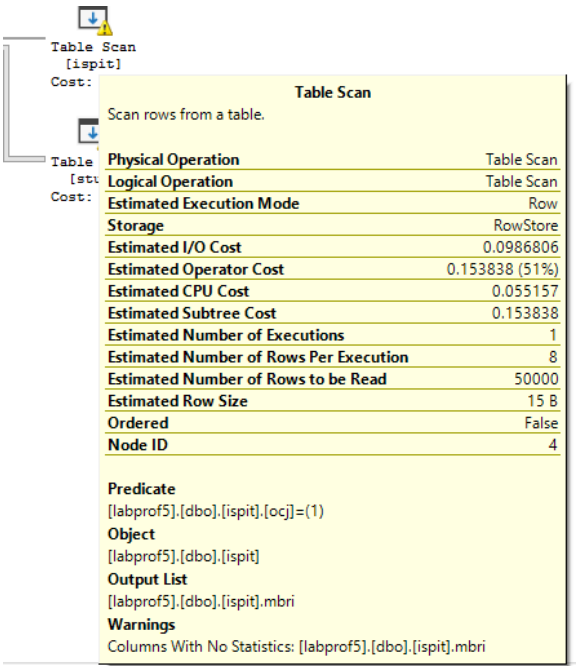
```
CREATE STATISTICS stat1 ON mjesto(naz) WITH FULLSCAN;
CREATE STATISTICS stat2 ON ispit(ocj) WITH FULLSCAN;
```



Ovaj put ponavljamo upit, ali sam prije izvršavanja upita stvorio statističke podatke nad atributom naz tablice mjesto i nad atributom ocj tablice ispit.

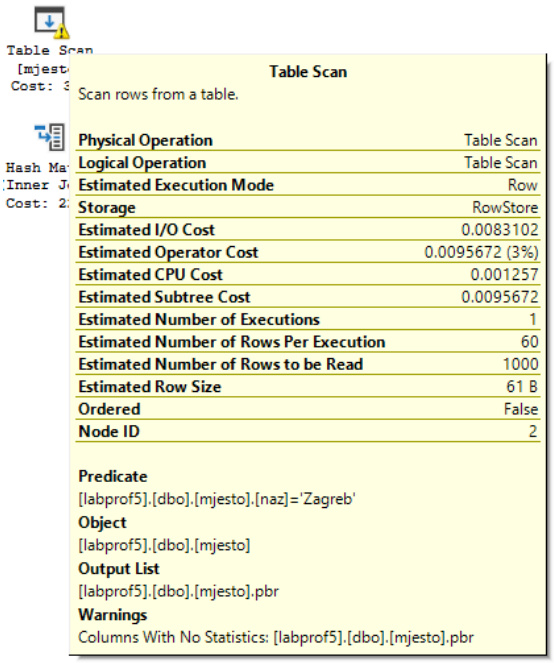
Sada se i plan izvođenja promjenio – prvo se spajaju tablice ispit i stud, a tek onda se one zajedno spajaju s tablicom mjesto.

Tablica ispit:



Procijenjeni broj n-torki koje predviđa SQL Server za tablicu ispit je 8. Zbog toga se tablica ispit prva spaja s tablicom stud.

Tablica mjesto:

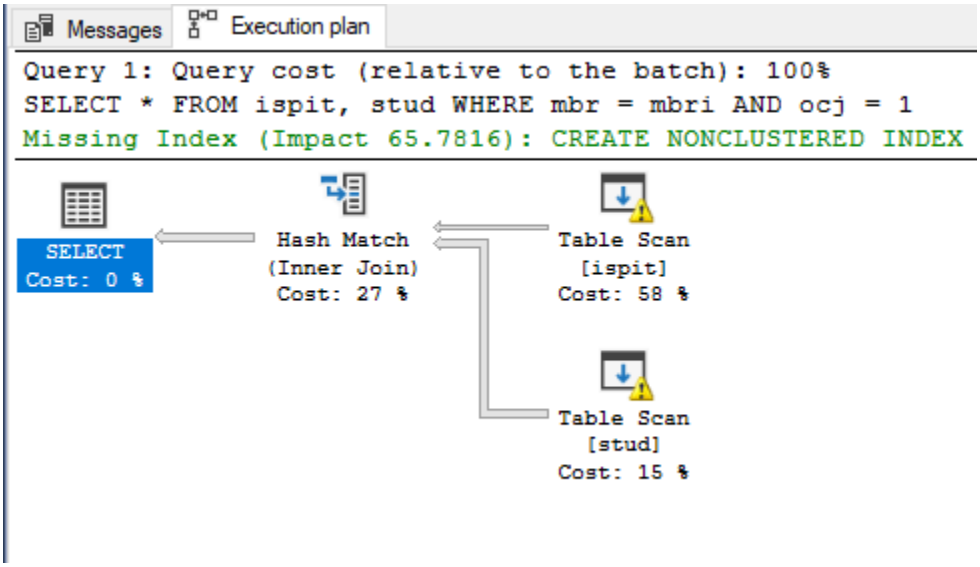


Procijenjeni broj n-torki koje predviđa SQL Server za tablicu mjesto je 60. Zbog toga se tablica mjesto sada spaja tek nakon što se spoje tablice ispit i stud.

1.5. Zadatak

```
DROP STATISTICS mjesto.stat1
DROP STATISTICS ispit.stat2

SELECT *
 FROM ispit, stud
 WHERE mbr = mbri
 AND ocj = 1;
```



SQL Server je pretpostavio da će se raditi Hash Join budući da imamo spajanje uz uvjet s izjednačavanjem (equi-join) - r (A, B) >< s (B, C). – mjesto.mbr = stud.mbri

(isplativije je nego raditi Kartezijev produkt)

Također SQL Server je pretpostavio da će se selekcija nad relacijom ispit obaviti prije spajanja relacije ispit s relacijom stud.

Tablica ispit:

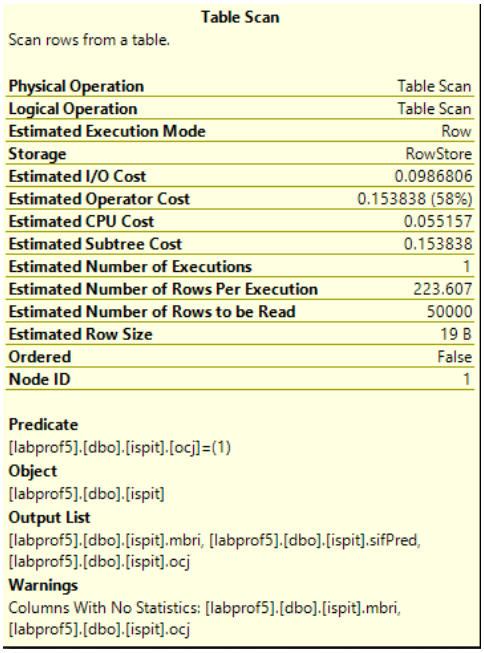


Table Scan

Scan rows from a table.

Physical Operation	Table Scan
Logical Operation	Table Scan
Estimated Execution Mode	Row
Storage	RowStore
Estimated I/O Cost	0.0986806
Estimated Operator Cost	0.153838 (58%)
Estimated CPU Cost	0.055157
Estimated Subtree Cost	0.153838
Estimated Number of Executions	1
Estimated Number of Rows Per Execution	223.607
Estimated Number of Rows to be Read	50000
Estimated Row Size	19 B
Ordered	False
Node ID	1

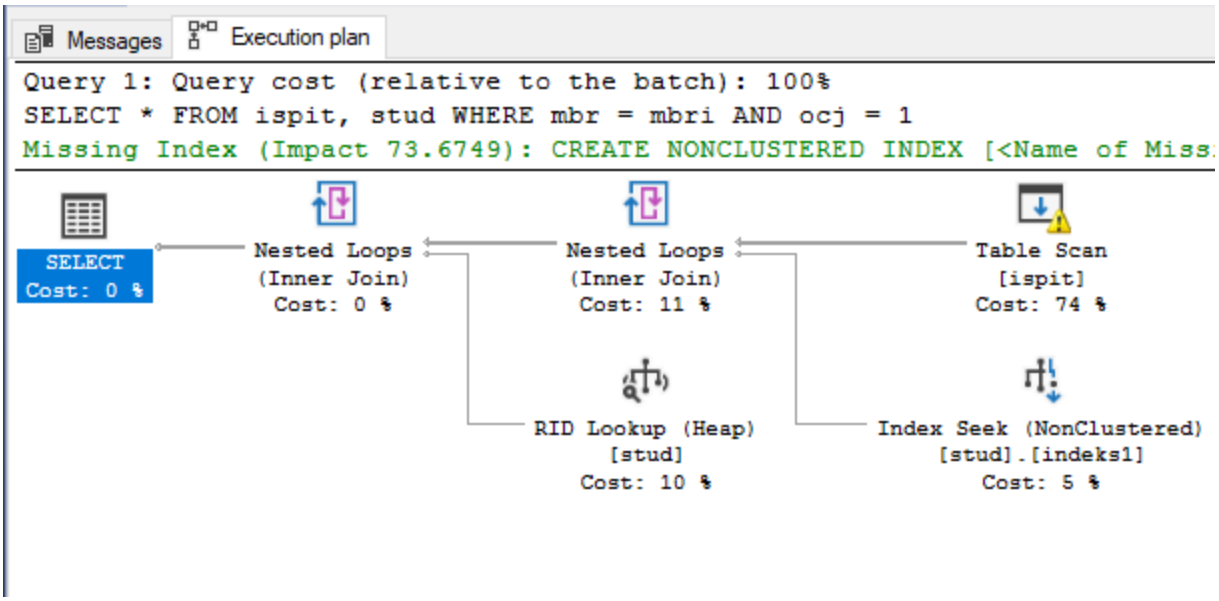
Predicate
[labprof5].[dbo].[ispit].[ocj]=(1)
Object
[labprof5].[dbo].[ispit]
Output List
[labprof5].[dbo].[ispit].mbri, [labprof5].[dbo].[ispit].sifPred, [labprof5].[dbo].[ispit].ocj
Warnings
Columns With No Statistics: [labprof5].[dbo].[ispit].mbri, [labprof5].[dbo].[ispit].ocj

1.6. Zadatak

```
CREATE INDEX indeks1 ON stud(mbr);

CREATE STATISTICS stat2 ON ispit(ocj) WITH FULLSCAN;

SELECT *
 FROM ispit, stud
 WHERE mbr = mbri
 AND ocj = 1;
```



Ovaj put smo ponovili upit iz 2.6. zadatka, ali sam prije izvršavanja upita kreirao indeks nad atributom mbr tablice stud te stvorio statističke podatke za atribut ocj tablice ispit.

Podaci relacije stud dohvaćaju se pomoću Indeks Seek jer sam stvorio indeks nad atributom mbr tablice stud. Tako dohvaćena tablica se spaja s tablicom ispit nad kojom je već izvršen uvjet selekcije te budući da su nad relacijom ispit kreirani statistički podaci – procijenjeni broj redaka nakon uvjeta ispit.ocj = 1 je 8.

Spajanje te dvije relacije će se izvršiti pomoću Nested-loopa zbog malog broja n-torki koje je potrebno spojiti.

Na kraju imamo još jedno spajanje pomoću Nested-Loop jer se koristi RID Lookup, a on nam služi kako bismo dohvatili ostale atribute relacija stud i ispit. (zbog SELECT *).

Tablica ispit:

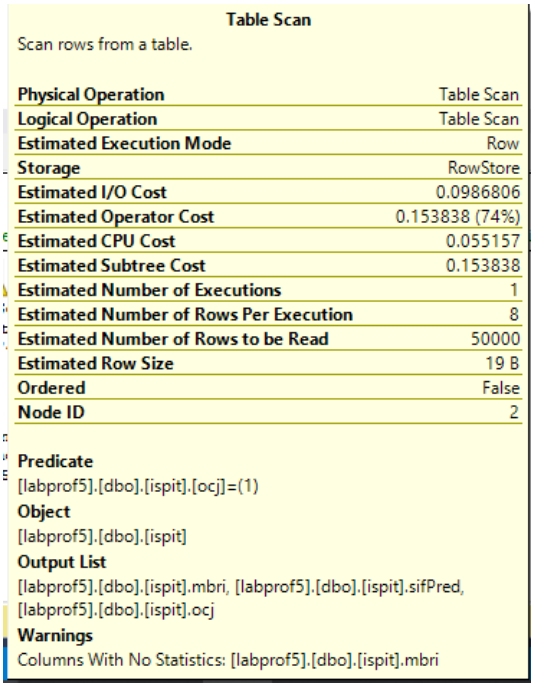


Table Scan

Scan rows from a table.

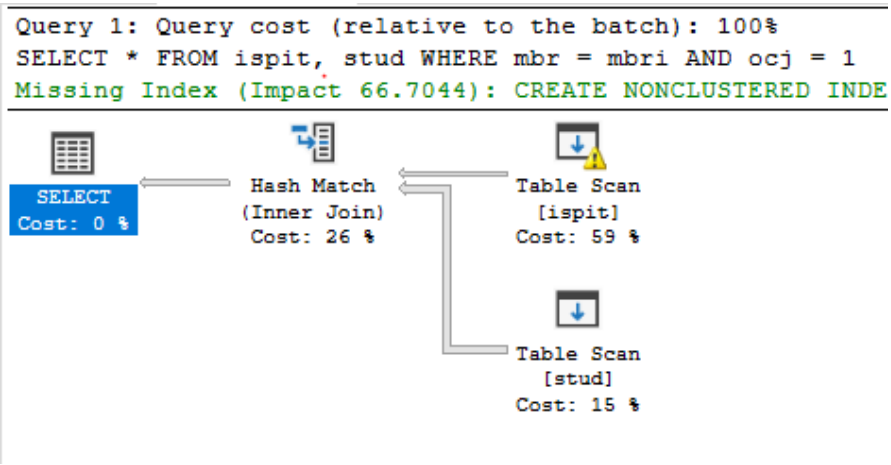
Physical Operation	Table Scan
Logical Operation	Table Scan
Estimated Execution Mode	Row
Storage	RowStore
Estimated I/O Cost	0.0986806
Estimated Operator Cost	0.153838 (74%)
Estimated CPU Cost	0.055157
Estimated Subtree Cost	0.153838
Estimated Number of Executions	1
Estimated Number of Rows Per Execution	8
Estimated Number of Rows to be Read	50000
Estimated Row Size	19 B
Ordered	False
Node ID	2

Predicate
[labprof5].[dbo].[ispit].[ocj]=(1)
Object
[labprof5].[dbo].[ispit]
Output List
[labprof5].[dbo].[ispit].mbri, [labprof5].[dbo].[ispit].sifPred, [labprof5].[dbo].[ispit].ocj
Warnings
Columns With No Statistics: [labprof5].[dbo].[ispit].mbri

1.7. Zadatak

```
SELECT *
 FROM ispit, stud
 WHERE mbr = mbri
 AND ocj = 1;
```

```
CREATE INDEX indeks1 ON stud(mbr);
```



Radimo ispit upit kao i u 2.6. zadatku. Također imamo indeks nad relacijom stud, ali ovaj puta nemamo kreirane statističke podatke za relaciju ispit.

Procijenjeni broj n-torki koje predviđa SQL Server je 223.607 (to je dobiveno formulom N(mjesto)**0.5 gdje je N = 50000). – jer nemamo statističke podatke

Sada se za spajanje koristi Hash Match jer je SQL Server pretpostavio da je to isplativije budući da imamo znatno više n-torki – 223.607 naprema 8 n-torki kada imamo statističke podatke.

Iz tog razloga se ne koristi Nested-Loop nego se koristi Hash Match.

Tablica ispit:

Table Scan

Scan rows from a table.

Physical Operation	Table Scan
Logical Operation	Table Scan
Estimated Execution Mode	Row
Storage	RowStore
Estimated I/O Cost	0.0986806
Estimated Operator Cost	0.153838 (59%)
Estimated CPU Cost	0.055157
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Estimated Row Size	19 B
Ordered	False
Node ID	1

Predicate
[labprof5].[dbo].[ispit].[ocj]=(1)
Object
[labprof5].[dbo].[ispit]
Output List
[labprof5].[dbo].[ispit].mbri, [labprof5].[dbo].[ispit].sifPred, [labprof5].[dbo].[ispit].ocj
Warnings
Columns With No Statistics: [labprof5].[dbo].[ispit].mbri, [labprof5].[dbo].[ispit].ocj