SVEUČILIŠTE U ZAGREBU
FAKULTET ELEKTROTEHNIKE I RAČUNARSTVA

Bartul Brajković, 0036507098

23. ožujka 2021.

LABORATORIJ PROFILA 2

Odjeljak Sustavi baza podataka

2. Vježba

2. zadatak

KREIRANJE TABLICE:

```
DROP TABLE IF EXISTS myTable;
CREATE TABLE myTable (
         salesOrderID INTEGER NOT NULL
       , salesOrderItemID INTEGER NOT NULL
       , orderQty INTEGER NOT NULL
       , productID INTEGER NOT NULL
       , specialOfferID INTEGER NOT NULL
       , unitPrice DECIMAL(10,2) NOT NULL
       , unitPriceDiscount DECIMAL(10,2) NOT NULL
);
```

INSERT BEZ INDEKSA:

```
SET STATISTICS TIME ON;
BULK INSERT myTable FROM 'D:\Download\salesOrderItem.csv' WITH (FIELDTERMINATOR = ';',
KEEPNULLS);
SET STATISTICS TIME OFF;
```

CPU: 719 ms

DELETE BEZ INDEKSA:

```
SET STATISTICS TIME ON;
DELETE FROM myTable;
SET STATISTICS TIME OFF;
```

CPU: 250 ms

INSERT S 2 INDEKSA:

```
CREATE INDEX indeks ON myTable(salesOrderID, salesOrderItemID);
--DROP INDEX indeks ON myTable;
SET STATISTICS TIME ON;
BULK INSERT myTable FROM 'D:\Download\salesOrderItem.csv' WITH (FIELDTERMINATOR = ';',
KEEPNULLS);
SET STATISTICS TIME OFF;
```

CPU: 1094 ms

DELETE S 2 INDEKSA:

```
CREATE INDEX indeks ON myTable(salesOrderID, salesOrderItemID);
--DROP INDEX indeks ON myTable;
SET STATISTICS TIME ON;
DELETE FROM myTable;
SET STATISTICS TIME OFF;
```

CPU: 1875 ms

INSERT S 4 INDEKSA:

```
CREATE INDEX indeks ON myTable(salesOrderID, salesOrderItemID, orderQty, productID);
--DROP INDEX indeks ON myTable;
SET STATISTICS TIME ON;
BULK INSERT myTable FROM 'D:\Download\salesOrderItem.csv' WITH (FIELDTERMINATOR = ';',
KEEPNULLS);
SET STATISTICS TIME OFF;
```

CPU: 1453 ms

DELETE S 4 INDEKSA:

```
CREATE INDEX indeks ON myTable(salesOrderID, salesOrderItemID, orderQty, productID);
--DROP INDEX indeks ON myTable;
SET STATISTICS TIME ON;
DELETE FROM myTable;
SET STATISTICS TIME OFF;
```

CPU: 1843 ms

3. zadatak

UPDATE BEZ INDEKSA:

```
DROP TABLE IF EXISTS myTable;
CREATE TABLE myTable (
         salesOrderID INTEGER NOT NULL
       , salesOrderItemID INTEGER NOT NULL
       , orderQty INTEGER NOT NULL
       , productID INTEGER NOT NULL
       , specialOfferID INTEGER NOT NULL
       , unitPrice DECIMAL(10,2) NOT NULL
       , unitPriceDiscount DECIMAL(10,2) NOT NULL
);

BULK INSERT myTable FROM 'D:\Download\salesOrderItem.csv' WITH (FIELDTERMINATOR = ';',
KEEPNULLS);
SET STATISTICS TIME ON;
UPDATE myTable SET unitPrice = 73.50 WHERE orderQty = 2;
SET STATISTICS TIME OFF;
```

CPU: 47 ms (14200 rows affected)

UPDATE S INDEKSOM NA unitPrice:

```
DROP TABLE IF EXISTS myTable;
CREATE TABLE myTable (
         salesOrderID INTEGER NOT NULL
       , salesOrderItemID INTEGER NOT NULL
       , orderQty INTEGER NOT NULL
       , productID INTEGER NOT NULL
       , specialOfferID INTEGER NOT NULL
       , unitPrice DECIMAL(10,2) NOT NULL
       , unitPriceDiscount DECIMAL(10,2) NOT NULL
);

BULK INSERT myTable FROM 'D:\Download\salesOrderItem.csv' WITH (FIELDTERMINATOR = ';',
KEEPNULLS);
CREATE INDEX unitIndeks ON myTable(unitPrice);
SET STATISTICS TIME ON;
UPDATE myTable SET unitPrice = 73.50 WHERE orderQty = 2;
SET STATISTICS TIME OFF;
```

CPU: 156 ms

UPDATE S INDEKSOM NA orderQty:

```
DROP TABLE IF EXISTS myTable;
CREATE TABLE myTable (
         salesOrderID INTEGER NOT NULL
       , salesOrderItemID INTEGER NOT NULL
       , orderQty INTEGER NOT NULL
       , productID INTEGER NOT NULL
       , specialOfferID INTEGER NOT NULL
       , unitPrice DECIMAL(10,2) NOT NULL
       , unitPriceDiscount DECIMAL(10,2) NOT NULL
);

BULK INSERT myTable FROM 'D:\Download\salesOrderItem.csv' WITH (FIELDTERMINATOR = ';',
KEEPNULLS);
CREATE INDEX orderIndeks ON myTable(orderQty);
```

```
SET STATISTICS TIME ON;
UPDATE myTable SET unitPrice = 73.50 WHERE orderQty = 2;
SET STATISTICS TIME OFF;
```

CPU: 63ms

Indeks će biti koristan za one naredbe gdje je atribut za koji je izgrađen indeks u WHERE dijelu naredbe, a štetan ukoliko se atribut za koji je izgrađen indeks nalazi u SET dijelu naredbe.

4. zadatak

a)

```
DROP TABLE IF EXISTS myTable;
CREATE TABLE myTable (
         salesOrderID INTEGER NOT NULL
       , salesOrderItemID INTEGER NOT NULL
       , orderQty INTEGER NOT NULL
       , productID INTEGER NOT NULL
       , specialOfferID INTEGER NOT NULL
       , unitPrice DECIMAL(10,2) NOT NULL
       , unitPriceDiscount DECIMAL(10,2) NOT NULL
);


BULK INSERT myTable FROM 'D:\Download\salesOrderItem.csv' WITH (FIELDTERMINATOR = ';',
KEEPNULLS);


CREATE INDEX unitIndex ON myTable(unitPrice) WITH (FILLFACTOR = 100);
```

- DUBINA INDEKSA: 3
- UTROŠAK PROSTORA ZA FIZIČKU POHRANU INDEKSA: 345 stranica

```
SET STATISTICS TIME ON;
BULK INSERT myTable FROM 'D:\Download\salesOrderItem.csv' WITH (FIELDTERMINATOR = ';',
KEEPNULLS);
SET STATISTICS TIME ON;
```

- DUBINA INDEKSA: 3
- UTROŠAK PROSTORA ZA FIZIČKU POHRANU INDEKSA: 1085 stranica
- CPU = 1250 ms

b)

```
DROP TABLE IF EXISTS myTable;
CREATE TABLE myTable (
         salesOrderID INTEGER NOT NULL
       , salesOrderItemID INTEGER NOT NULL
       , orderQty INTEGER NOT NULL
       , productID INTEGER NOT NULL
       , specialOfferID INTEGER NOT NULL
       , unitPrice DECIMAL(10,2) NOT NULL
       , unitPriceDiscount DECIMAL(10,2) NOT NULL
);

BULK INSERT myTable FROM 'D:\Download\salesOrderItem.csv' WITH (FIELDTERMINATOR = ';',
KEEPNULLS);

CREATE INDEX unitIndex ON myTable(unitPrice) WITH (FILLFACTOR = 10);
```

- DUBINA INDEKSA: 3
- UTROŠAK PROSTORA ZA FIZIČKU POHRANU INDEKSA: 3370 stranica

```
SET STATISTICS TIME ON;
```

```
BULK INSERT myTable FROM 'D:\Download\salesOrderItem.csv' WITH (FIELDTERMINATOR = ';',
KEEPNULLS);
SET STATISTICS TIME ON;
```

- DUBINA INDEKSA: 3
- UTROŠAK PROSTORA ZA FIZIČKU POHRANU INDEKSA: 3424 stranica
- CPU = 1328 ms

5. zadatak

```
DROP TABLE IF EXISTS myTable;
CREATE TABLE myTable (
         salesOrderID INTEGER NOT NULL
       , salesOrderItemID INTEGER NOT NULL
       , orderQty INTEGER NOT NULL
       , productID INTEGER NOT NULL
       , specialOfferID INTEGER NOT NULL
       , unitPrice DECIMAL(10,2) NOT NULL
       , unitPriceDiscount DECIMAL(10,2) NOT NULL
);


BULK INSERT myTable FROM 'D:\Download\salesOrderItem.csv' WITH (FIELDTERMINATOR = ';',
KEEPNULLS);

CREATE INDEX orderIndex ON myTable(orderQty);


CREATE CLUSTERED INDEX orderIndex ON myTable2(orderQty);
```

Utrošak prostora za fizičku pohranu *non-clustered* indeksa mi je ispao manji nego utrošak fizičkog prostora clustered indeksa.

Kada napravimo običan (non-clustered) indeks nad tablicom, on će u listovima spremiti adresu na n-torke. Međutim ukoliko napravimo clustered indeks nad tablicom, on ne može pokazivati na adresu n-torke jer ih mijenja cijelo vrijeme. Tada clustered indeks umjesto adresa n-torki spremi vrijednost ključa clustered indeksa za tu n-torku.

Budući da su adrese n-torki INTEGER tipovi podataka, ključevi su najčešće STRING tipovi podataka logično je da će clustered indeks imati veći utrošak fizičkog prostora jer nam je potrebno više memorije za spremiti INTEGER nego STRING.