# Final Exam Practice Problems

CSC 321/621 – 5/1/2012

# Views

- What is a materialized view?

- Suggest a scenario when materialized view is likely a more appropriate approach than view resolution?

# Views

- Given this view definition,

```
CREATE VIEW HotelBookingcount(hotelNo,
bookingCount) AS SELECT h.hotelNo, COUNT(*)
FROM Hotel h, Room r, Booking b WHERE
h.hotelNo=r.hotelNo AND r.roomNo=b.roomNo
GROUP BY h.hotelNo.
```

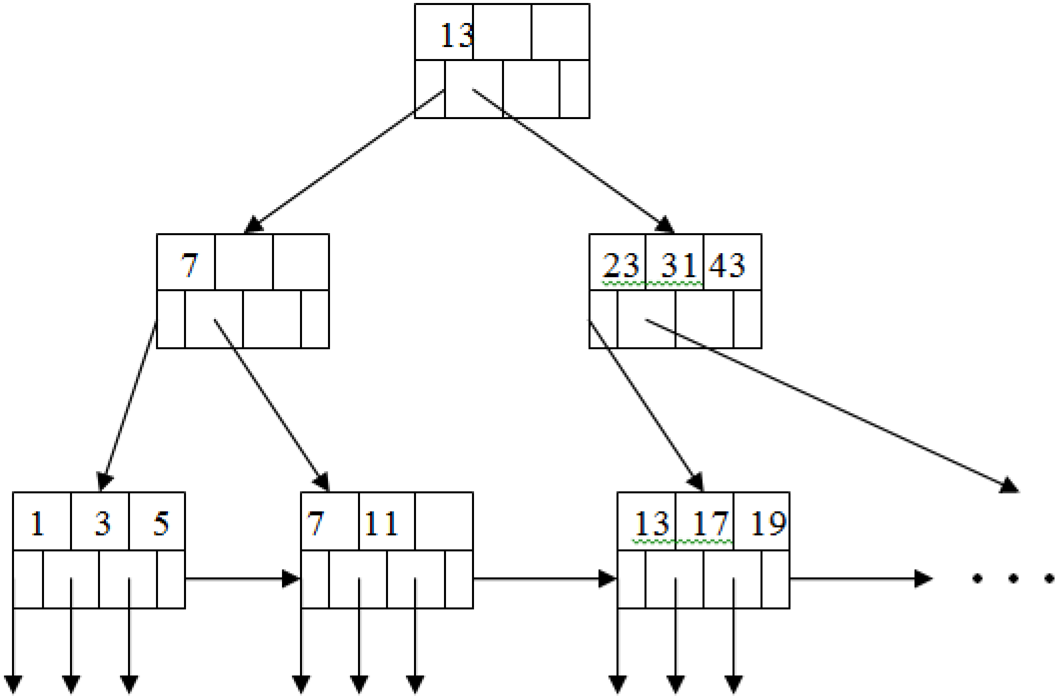
How would the following query be implemented using view resolution?

```
        SELECT hotelno FROM HotelBookingCount
        where hotelNo= ‘H001’
```

# Indexes

- A) For hashing and B+-tree indices, what are the effective costs of using an index to retrieve a piece of data?
- B) Assume that a change is made to a tuple. What are the costs one may incur in maintaining a B+-tree index? (Note this is an update, not an add)

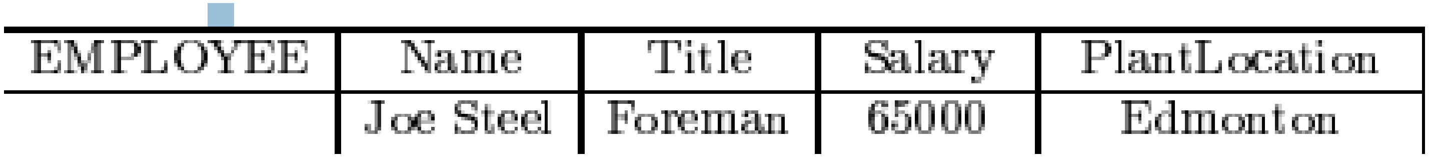
# Indexes



- Given the B+-tree above, show the insertion of value 12 and describe how the process works to get to the insertion point.
- Pretend you didn’t insert 12 but instead inserted 15.

# Fragmentation

- Argue for why fragmentation on PlantLocation is one of the most reasonable ways to fragment the following relation

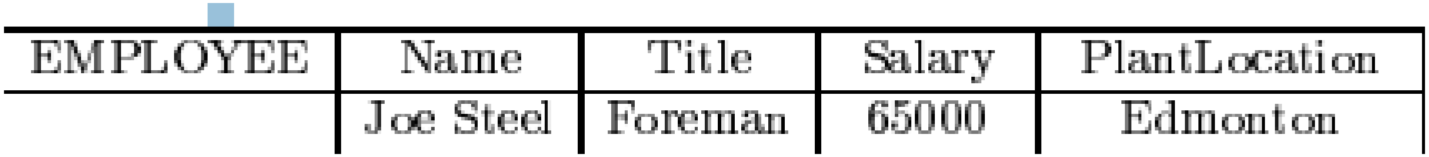


| EMPLOYEE | Name | Title | Salary | PlantLocation |
|---|---|---|---|---|
| | Joe Steel | Foreman | 65000 | Edmonton |

- What type of fragmentation is the above fragmentation?

# Fragmentation

- For the type of fragmentation given, what type of relational operation is employed to generate the fragment?



| EMPLOYEE | Name | Title | Salary | PlantLocation |
|---|---|---|---|---|
| | Joe Steel | Foreman | 65000 | Edmonton |

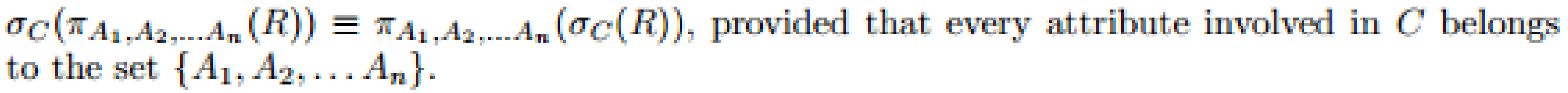
- What do we need to show to demonstrate the fragmentation is “complete”?

# Triggers

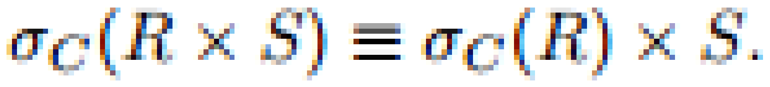
- Of the times at which triggers can be set to fire, indicate which is most appropriate for implementing the following on a University Student Database:
  - Ensuring an instructor is not assigned to teach two different courses at the same time
  - Ensuring a student cannot register for more than 18 cred hours.
  - Implementing a tuition management system that modifies the students tuition based on the student’s current enrollment (add a class, tuition goes up; drop a class, tuition goes down).

# Query Optimization

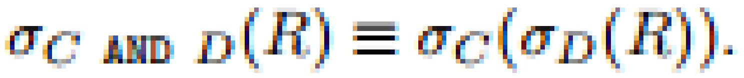
- For the three queries below, indicate whether they are equivalent or not.  If not, suggest a condition (as general as possible where they are equivalent)



$\sigma_C(\pi_{A_1,A_2,\ldots A_n}(R)) \equiv \pi_{A_1,A_2,\ldots A_n}(\sigma_C(R))$, provided that every attribute involved in $C$ belongs to the set $\{A_1, A_2, \ldots A_n\}$.



$$\sigma_C(R \times S) \equiv \sigma_C(R) \times S.$$



$$\sigma_{C \text{ AND } D}(R) \equiv \sigma_C(\sigma_D(R)).$$

# Query Optimization

- Given the following relations

```
Branch(BranchName, Assets, City)
Customer(CustomerName, Address, City).
Account(AccountNumber, BranchName, CustomerName, Balance).
```

suggest an equivalent relation that speeds up significantly this expression.

$$\pi_{\texttt{Asset, BranchName}}(\sigma_{\texttt{Customer.City='Blacksburg' AND Balance}>100000}(\texttt{Customer} \bowtie \texttt{Account} \bowtie \texttt{Branch}))$$

# Serializability/Concurrency Control

- Is the following concurrent schedule serializable, and if so, what is the appropriate serial schedule?

read(T1, balx), read(T2, baly), write(T3, balx),
read(T2, balx), read(T1, baly)

# Serializability/Concurrency Control

- Using 2PL, would this schedule actually occur?

read(T1, balx), read(T2, baly), write(T3, balx), read(T2, balx), read(T1, baly)