Review on DAC
DAC

- Draw the grant diagram for the following sequences of grant statements

<table>
<thead>
<tr>
<th>User</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>U</td>
<td>Grant p, q, r to V, W with grant option</td>
</tr>
<tr>
<td>V</td>
<td>Grant p, q, r to T with grant option</td>
</tr>
<tr>
<td>V</td>
<td>Grant r(a) to T</td>
</tr>
<tr>
<td>W</td>
<td>Grant p, q, r to T</td>
</tr>
</tbody>
</table>

Grant on p

Grant on q

Grant on r
DAC

• Now, consider the following revocation statements:

<table>
<thead>
<tr>
<th>User</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>U</td>
<td>Revoke p from W cascade</td>
</tr>
<tr>
<td>U</td>
<td>Revoke q, r from W cascade</td>
</tr>
<tr>
<td>V</td>
<td>Revoke r from T</td>
</tr>
</tbody>
</table>

- Grant on p
- Grant on q
- Grant on r
More Examples

• Specifying INSERT privilege in a GRANT command is not the same as specifying INSERT(column-name) for each column currently in the table
  – GRANT INSERT ON Sailors TO Michael
  – GRANT INSERT ON Sailors(sid), Sailors(name), Sailors(rating), Sailors(age) TO Michael

• What if you add a new column (using ALTER TABLE), say address?
More Examples

- Boats(bid, …) where bid is key

- GRANT SELECT ON Boats TO Bill
- Bill can CREATE TABLE Reserves:
  
```sql
  CREATE TABLE Reserves(
    sid INT,
    bid INT,
    day DATE,
    PRIMARY KEY (bid,day),
  )
```

- bid cannot be defined as a foreign key

Why bother to introduce REFERENCES?

- GRANT REFERENCES (bid) ON Boats TO Bill
- Bill can CREATE TABLE Reserves:
  
```sql
  CREATE TABLE Reserves(
    sid INT,
    bid INT,
    day DATE,
    PRIMARY KEY (bid,day),
    FOREIGN KEY (bid) REFERENCES Boats
    ON DELETE NO ACTION
  )
```

- If Bill loses the REFERENCES privilege at a later time, then …foreign key constraint in Reserves is dropped but Reserves is not dropped
More Examples

- Sailors(sid, name, rating, age)
- Boats(bid, …)

- GRANT UPDATE(rating) ON Sailors TO Leah
- Leah
  - UPDATE Sailors S SET S.rating = 10
  - UPDATE Sailors S SET S.rating = S.rating+1
More Examples

- Sailors(sid, name, rating, age)
- Boats(bid, …)

- GRANT UPDATE(rating) ON Sailors TO Leah
- Leah
  - UPDATE Sailors S SET S.rating = 10
  - UPDATE Sailors S SET S.rating = S.rating + 1 (incorrect!! – unless Leah also has SELECT privilege)
More examples

- A view may be dropped because a SELECT privilege is revoked from the user who created the view
  - Joe: GRANT SELECT ON Sailors TO Michael with GRANT OPTION
  - Mich: CREATE VIEW YoungSailors(name, age, rating) AS SELECT S.name, S.age, S.rating FROM Sailors WHERE age < 18
  - Mich: GRANT SELECT ON YoungSailors TO Eric
  - Eric: CREATE VIEW FineYoungSailors (name, age, rating) AS SELECT S.name, S.age, S.rating FROM YoungSailors WHERE rating > 6

- What if Joe revokes the SELECT privilege on Sailors from Michael?
More examples

• If the creator of a view gains additional privileges on the underlying tables, (s)he automatically gains additional privileges on the view

• What if Joe gives Michael INSERT on Sailors from Michael?
  – Michael’s view is (becomes) updatable.
  – What about Eric’s view?