CSE 135

Discussion Section

SQL

Yupeng Fu

y4fu@ucsd.edu
### Relational schema (lecture)

#### Classes

<table>
<thead>
<tr>
<th>id</th>
<th>name</th>
<th>number</th>
<th>date_code</th>
<th>start_time</th>
<th>end_time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Web stuff</td>
<td>CSE135</td>
<td>TuTh</td>
<td>2:00</td>
<td>3:20</td>
</tr>
<tr>
<td>2</td>
<td>Databases</td>
<td>CSE132A</td>
<td>TuTh</td>
<td>3:30</td>
<td>4:50</td>
</tr>
<tr>
<td>3</td>
<td>VLSI</td>
<td>CSE121</td>
<td>F</td>
<td>11:00</td>
<td>12:00</td>
</tr>
</tbody>
</table>

#### Enrollment

<table>
<thead>
<tr>
<th>id</th>
<th>class</th>
<th>student</th>
<th>credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Students

<table>
<thead>
<tr>
<th>id</th>
<th>pid</th>
<th>first_name</th>
<th>last_name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8888888</td>
<td>John</td>
<td>Smith</td>
</tr>
<tr>
<td>2</td>
<td>1111111</td>
<td>Mary</td>
<td>Doe</td>
</tr>
<tr>
<td>3</td>
<td>2222222</td>
<td>Jay</td>
<td>Chen</td>
</tr>
</tbody>
</table>
• **Problem:** List students’ id, name and the number of total credits for which they have registered no less than 4 credits

```
SELECT s.id, s.first_name, s.last_name, SUM(e.credits)
FROM students AS s, enrollment AS e
WHERE s.id = e.student
GROUP BY s.id, s.first_name, s.last_name
HAVING SUM(e.credits) >= 4
```
Meaning of SQL query?
FROM clause

• Perform combinations

• **Problem:** List all students and the enrollment

**Tip:** Use aliases (even when they are optional)
Alias is referred as *tuple variable*
WHERE clause

- Keep the tuples that satisfy the conditions

- **Problem:** List all students and their registration

**Tip:** Never forget join condition
SELECT clause

• Chooses the attributes to keep

• **Problem:** List students’ id, name and the credits for which they have registered

**Tip:** Use tuple variable (even when they are optional)
GROUP BY clause

- Make partitions of the tuples according to the grouping attributes

- **Problem:** List students’ id, name and the number of total credits for which they have registered

**Tip:** the attributes used in the SELECT clause must
1. be in GROUP BY clause, or
2. be aggregate function
HAVING clause

• Keep the **grouped** tuples that satisfy the conditions

• **Problem**: List students and the number of total credits for which they have registered no less than 4 credits

**Tip**: Having conditions must only use aggregate functions or grouped by attributes
Keep in mind

• Each clause operates on tuples and produces tuples
• The sequence of clauses (SELECT is special)
• The tips we gave
• Step-by-step SQL tutorials
  – http://www.firstsql.com/tutor.htm
  – http://sqlzoo.net/