Practice queries

• What are the names of all teachers Bart has had?

```sql
SELECT DISTINCT t.name
FROM teachers t
JOIN courses c ON c.teacher_id = t.id
JOIN grades g ON g.course_id = c.id
JOIN students s ON s.id = g.student_id
WHERE s.name = 'Bart';
```

• How many total students has Ms. Krabappel taught, and what are their names?

```sql
SELECT DISTINCT s.name
FROM students s
JOIN grades g ON s.id = g.student_id
JOIN courses c ON g.course_id = c.id
JOIN teachers t ON t.id = c.teacher_id
WHERE t.name = 'Krabappel';
```
HTML tables: `<table>`, `<tr>`, `<td>`

A 2D table of rows and columns of data (block element)

```html
<table>
  <tr><td>1,1</td><td>1,2 okay</td></tr>
  <tr><td>2,1 real wide</td><td>2,2</td></tr>
</table>
```

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1,1</td>
<td>1,2 okay</td>
</tr>
<tr>
<td>2,1 real wide</td>
<td>2,2</td>
</tr>
</tbody>
</table>

- **table** defines the overall table, **tr** each row, and **td** each cell's data
- tables are useful for displaying large row/column data sets
- **NOTE:** tables are sometimes used by novices for web page layout, but this is not proper semantic HTML and should be avoided
Table headers, captions: `<th>`, `<caption>`

```html
<table>
  <caption>My important data</caption>
  <tr><th>Column 1</th><th>Column 2</th></tr>
  <tr><td>1,1</td><td>1,2 okay</td></tr>
  <tr><td>2,1 real wide</td><td>2,2</td></tr>
</table>
```

My important data

<table>
<thead>
<tr>
<th>Column 1</th>
<th>Column 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,1</td>
<td>1,2 okay</td>
</tr>
<tr>
<td>2,1 real wide</td>
<td>2,2</td>
</tr>
</tbody>
</table>

- `<th>` cells in a row are considered headers; by default, they appear bold
- A `<caption>` at the start of the table labels its meaning
Styling tables

<table>
<thead>
<tr>
<th>Column 1</th>
<th>Column 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,1</td>
<td>1,2 okay</td>
</tr>
<tr>
<td>2,1 real wide</td>
<td>2,2</td>
</tr>
</tbody>
</table>

My important data

- all standard CSS styles can be applied to a table, row, or cell
- table specific CSS properties:
  - `border-collapse`, `border-spacing`, `caption-side`, `empty-cells`, `table-layout`
The border-collapse property

```css
table, td, th { border: 2px solid black; }

table { border-collapse: collapse; }
```

**Without border-collapse**

<table>
<thead>
<tr>
<th>Column 1</th>
<th>Column 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,1</td>
<td>1,2</td>
</tr>
<tr>
<td>2,1</td>
<td>2,2</td>
</tr>
</tbody>
</table>

**With border-collapse**

<table>
<thead>
<tr>
<th>Column 1</th>
<th>Column 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,1</td>
<td>1,2</td>
</tr>
<tr>
<td>2,1</td>
<td>2,2</td>
</tr>
</tbody>
</table>

- by default, the overall table has a separate border from each cell inside
- the `border-collapse` property merges these borders into one
The `rowspan` and `colspan` attributes

```html
<table>
  <tr>
    <th>Column 1</th>
    <th>Column 2</th>
    <th>Column 3</th>
  </tr>
  <tr>
    <td colspan="2">1,1-1,2</td>
  </tr>
  <tr>
    <td rowspan="3">1,3-3,3</td>
  </tr>
  <tr>
    <td>2,1</td>
  </tr>
  <tr>
    <td>3,1</td>
  </tr>
</table>
```

- **colspan** makes a cell occupy multiple columns; **rowspan** multiple rows
- **text-align** and **vertical-align** control where the text appears within a cell
Column styles: `<col>`, `<colgroup>`

- `<col>` tag can be used to define styles that apply to an entire column (self-closing)
- `<colgroup>` tag applies a style to a group of columns (NOT self-closing)

```html
<table>
  <col class="urgent" />
  <colgroup class="highlight" span="2"></colgroup>

  <tr>
    <th>Column 1</th><th>Column 2</th><th>Column 3</th>
  </tr>
  <tr>
    <td>1,1</td><td>1,2</td><td>1,3</td>
  </tr>
  <tr>
    <td>2,1</td><td>2,2</td><td>2,3</td>
  </tr>
</table>
```

<table>
<thead>
<tr>
<th>Column 1</th>
<th>Column 2</th>
<th>Column 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,1</td>
<td>1,2</td>
<td>1,3</td>
</tr>
<tr>
<td>2,1</td>
<td>2,2</td>
<td>2,3</td>
</tr>
</tbody>
</table>
Don't use tables for layout!

- (borderless) tables appear to be an easy way to achieve grid-like page layouts
  - many "newbie" web pages do this (including many UW CSE web pages...)
- but, a table has semantics; it should be used only to represent an actual table of data
- instead of tables, use divs, widths/margins, floats, etc. to perform layout

- tables should not be used for layout!

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- TABLES SHOULD NOT BE USED FOR LAYOUT!!!

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Designing a query

- Figure out the proper SQL queries in the following way:
  - Which table(s) contain the critical data? (FROM)
  - Which columns do I need in the result set? (SELECT)
  - How are tables connected (JOIN) and values filtered (WHERE)?
- Test on a small data set (imdb_small).
- Confirm on the real data set (imdb).
- Try out the queries first in the MySQL console.
- Write the PHP code to run those same queries.
  - Make sure to check for SQL errors at every step!!