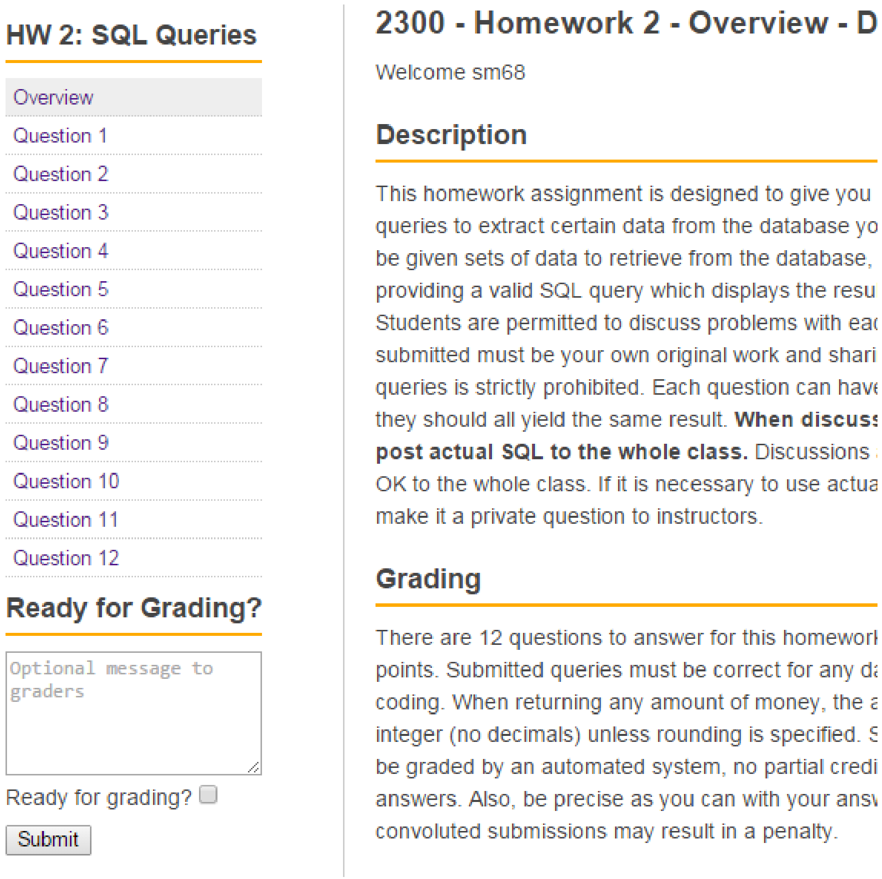
Modifying DBs and using MySQL

INFO/CS 2300:
Intermediate Web Design and
Programming

HW 2

Due Tuesday, March 8 at 5 pm

Remember



2300 - Homework 2 - Overview - D

Welcome sm68

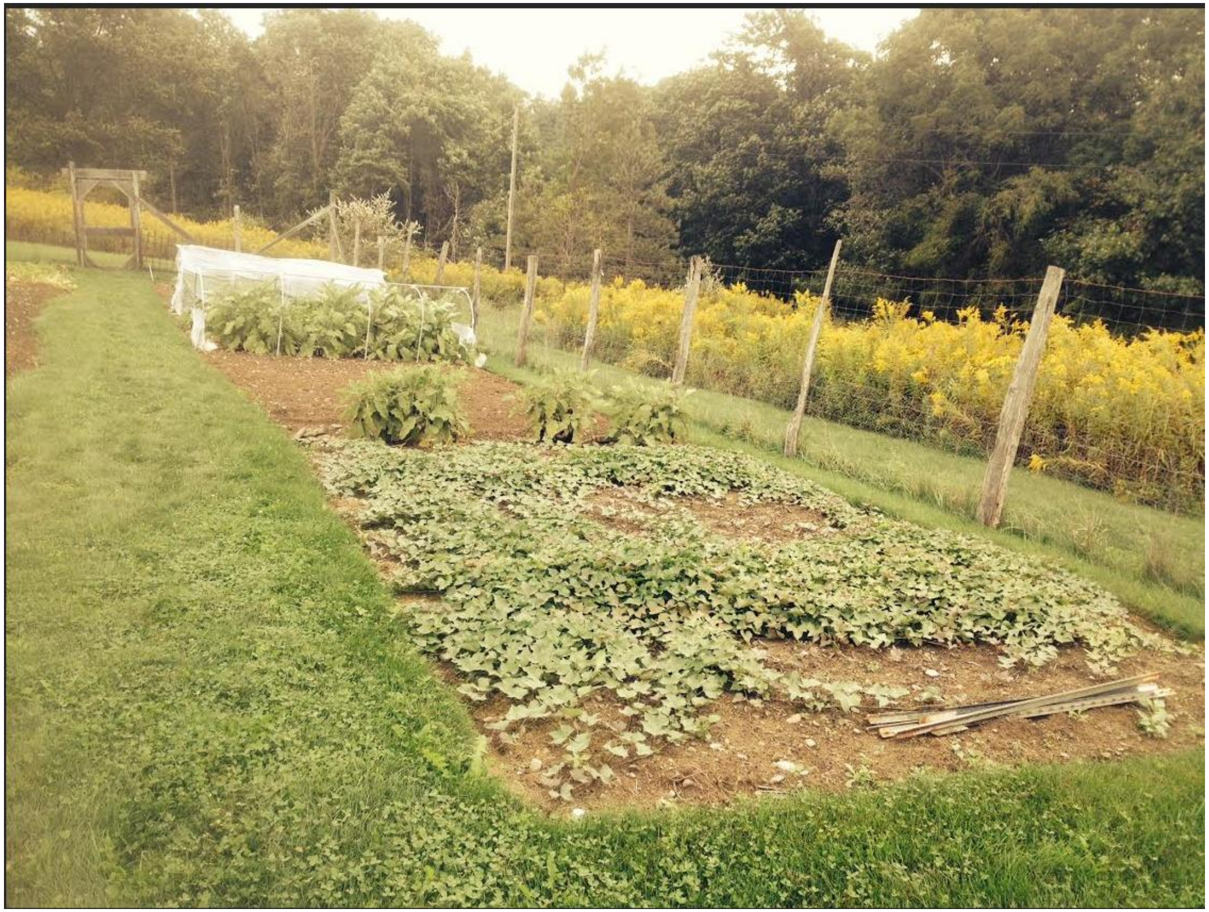
Description

This homework assignment is designed to give you queries to extract certain data from the database yo be given sets of data to retrieve from the database, providing a valid SQL query which displays the resu Students are permitted to discuss problems with eac submitted must be your own original work and shari queries is strictly prohibited. Each question can have they should all yield the same result. **When discuss post actual SQL to the whole class.** Discussions OK to the whole class. If it is necessary to use actua make it a private question to instructors.

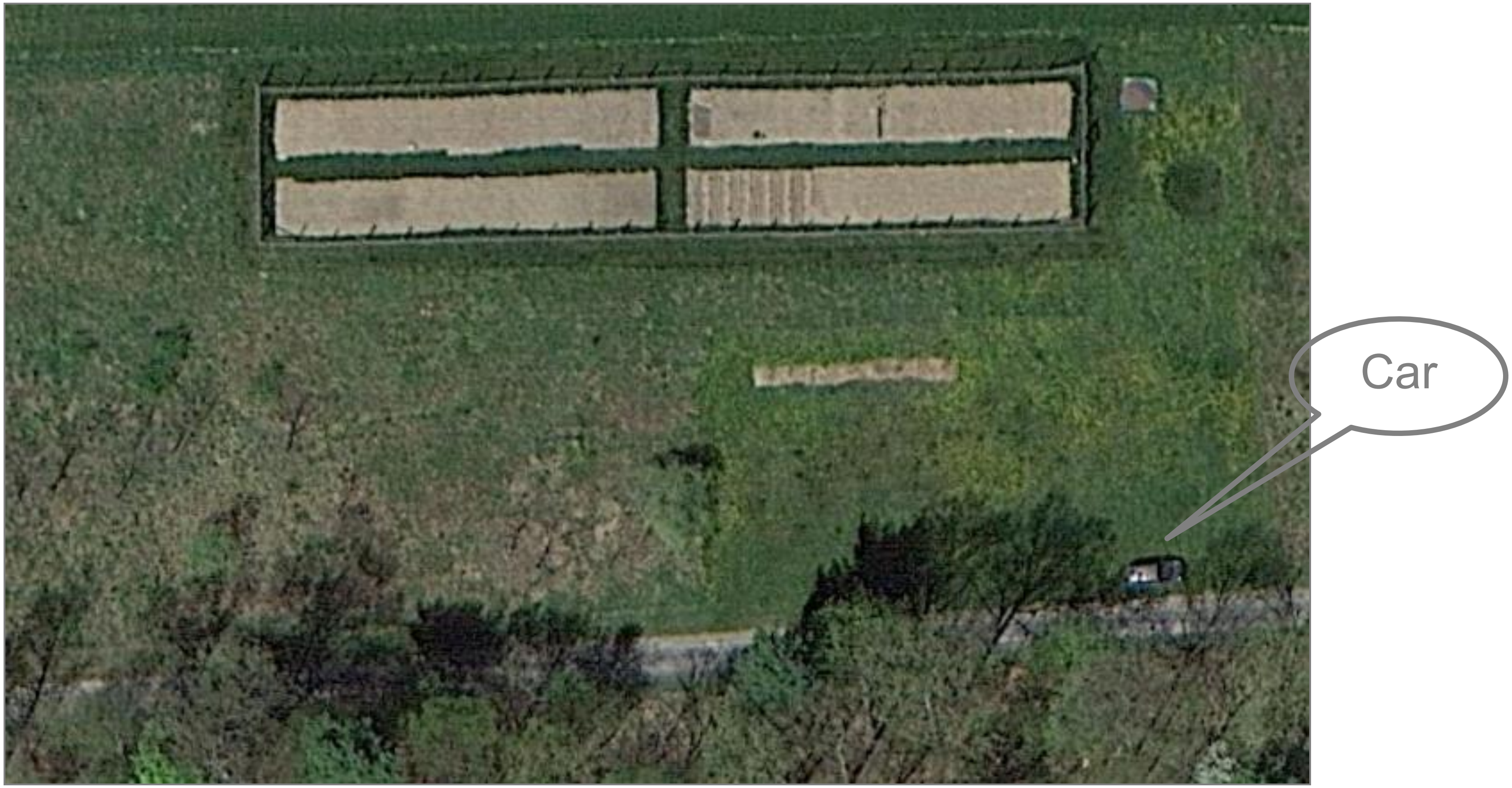
Grading

There are 12 questions to answer for this homewor points. Submitted queries must be correct for any da coding. When returning any amount of money, the a integer (no decimals) unless rounding is specified. S be graded by an automated system, no partial credi answers. Also, be precise as you can with your ansv convoluted submissions may result in a penalty.

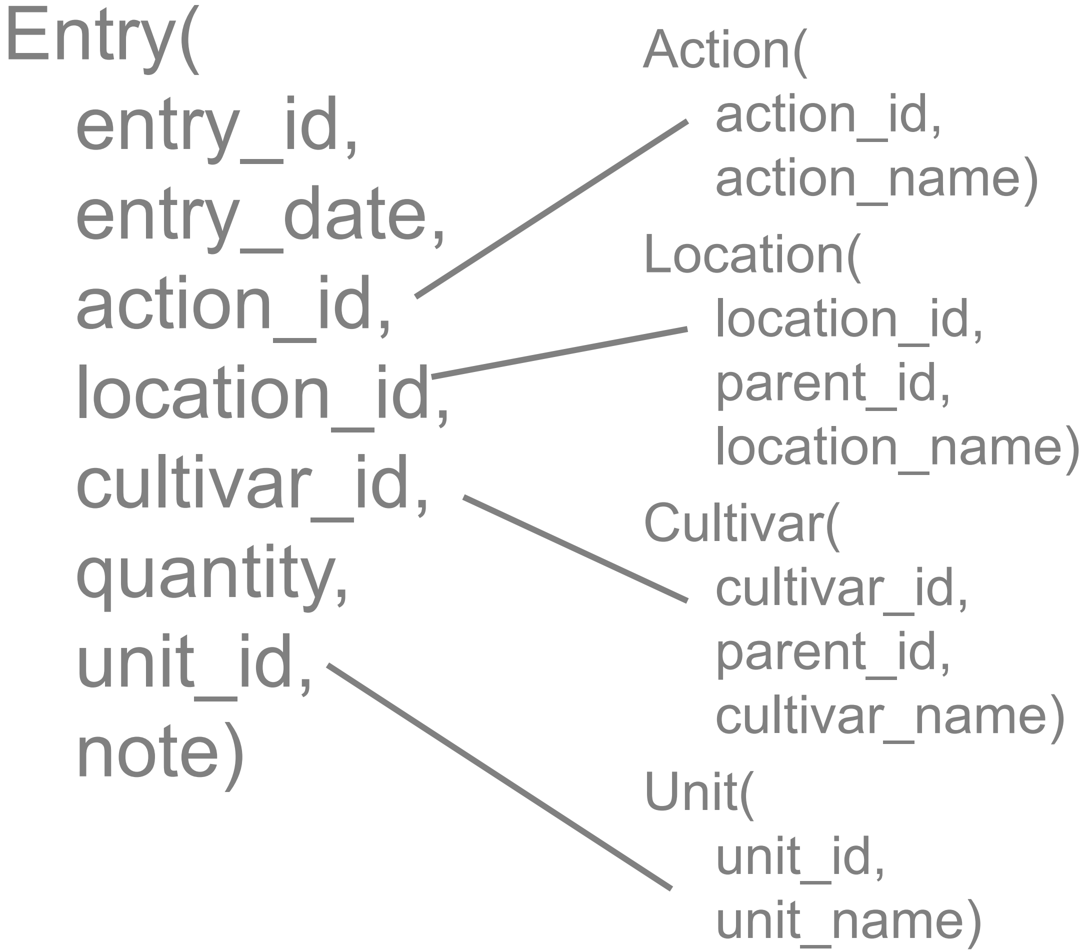
Steve's Garden



Steve's Garden



Garden activity log schema



```
Entry(
  entry_id,
  entry_date,
  action_id,
  location_id,
  cultivar_id,
  quantity,
  unit_id,
  note)
```

```
Action(
  action_id,
  action_name)
Location(
  location_id,
  parent_id,
  location_name)
Cultivar(
  cultivar_id,
  parent_id,
  cultivar_name)
Unit(
  unit_id,
  unit_name)
```

Click In!

Modifying databases via SQL

We can `INSERT` records into a table, `UPDATE` records, and `DELETE` records from a table.

Create
Read
Update
Delete

Browse
Read
Edit
Add
Delete

INSERT

Title	Year	Length
Gladiator	2000	155
A Beautiful Mind	2001	135
Chicago	2002	113
The Return of the King	2003	201
Million Dollar Baby	2004	132

What do I need to add a movie?

```
INSERT INTO
VALUES
```

```
INSERT INTO          (Length, Title, Year)
VALUES
```

INSERT generalized

```
INSERT INTO table (field1, field2, …, fieldk);
VALUES
   (value1, value2, …, valuek),
   (value1, value2, …, valuek),
   (value1, value2, …, valuek);
```

Specifying the field names is not required.

If fields are not specified and a field is added to this table, what happens if this query is not rewritten?

INSERT

title	year	length
Gladiator	2000	155
Chicago	2002	113

name	title	year
Russell Crowe	Gladiator	2000
Russell Crowe	A Beautiful Mind	2001
Viggo Mortensen	Return of the King	2003
Hillary Swank	Million Dollar Baby	2004

How do I create movies from the StarsIn table?

```
INSERT INTO Movies(title, year)
  SELECT DISTINCT title, year
  FROM StarsIn
```

What goes here so we don't add duplicates

INSERT

title	year	length
Gladiator	2000	155
Chicago	2002	113

name	title	year
Russell Crowe	Gladiator	2000
Russell Crowe	A Beautiful Mind	2001
Viggo Mortensen	Return of the King	2003
Hillary Swank	Million Dollar Baby	2004

How do I create movies from the StarsIn table?

```
INSERT INTO Movies(title, year)
  SELECT DISTINCT title, year
  FROM StarsIn
  LEFT OUTER JOIN Movies
     ON Movies.title = StarsIn.title
     AND Movies.year = StarsIn.year
  WHERE Movies.title IS NULL;
```

Don’t include movies already in Movies

UPDATE

Title	Year	Length
Gladiator	2000	155
A Beautiful Mind	2001	135
Chicago	2002	113
The Return of the King	2003	201
Million Dollar Baby	2004	132

How do I change the length of all movies to hours not minutes?

```
UPDATE
SET LENGTH = LENGTH / 60
```

UPDATE generalized

`UPDATE` *table*

`SET` *field = expression*

`WHERE` *condition*;

E.g.

```
UPDATE Movies
SET Length = 156
WHERE Title = ‘Gladiator’;
```

INSERT / UPDATE

They can be combined – mostly makes sense when using natural keys:

```
INSERT INTO table
   (`netid`, `query_number`, `query`)
   VALUES (?, ?, ?)
ON DUPLICATE KEY UPDATE `query` = ?,
   `timestamp` = ?;
```

Primary key is netid and query_number combined

This is the INSERT query for HW2 submissions

DELETEs

DELETE
FROM *table*
WHERE *condition;*

E.g.

```
DELETE
FROM Movies
WHERE Title IN (SELECT Title
               FROM StarsIn
               WHERE Name='Tom Hanks');
```

Add a new blue boat, id 105, named ‘Clipper’ .

```
INSERT INTO Boats (boatID, boatName, color)
        VALUES (105, ‘Clipper’, ‘blue)
```

Increase the rating of every sailor by 1.

```
UPDATE Sailors
        SET rating = rating + 1;
```

Remove every sailor whose age is over 65.

```
DELETE FROM Sailors
        WHERE age > 65;
```

Creating tables in SQL

CREATE TABLE

To make a table in a database, we use the CREATE TABLE command.

```
CREATE TABLE table_name (
  field1 type1,
  field2 type2,
  …
  fieldk typek
);
```

MySQL numeric field types

Common numeric types:

- int / integer (size)
- tinyint (size)
- bigint (size)
- float (size,d)
- double (size,d)
- decimal (size,d)

Boolean:

- tinyint(1)
- bit

size = max number of digits
d = digits to the right of the decimal point

More details:
http://www.w3schools.com/sql/sql_datatypes.asp

MySQL text field types

Common text types:

- char*(m)*: string of exactly *m* characters (spaces added if necessary)
- varchar(*m*): string of up to *m* characters
- text: string of up to 64K bytes
- blob: a "binary large object" up to 64K bytes long

More fields and details:
http://www.w3schools.com/sql/sql_datatypes.asp

MySQL date field types

Common text types:

- date: a date in YYYY-MM-DD format
- time: a time in HH:MM:SS format
- datetime: date & time in YYYY-MM-DD HH:MM:SS format
- year: year in YY or YYYY format
- timestamp: the number of seconds since the Unix epoch ('1970-01-01 00:00:00' UTC). Format: YYYY-MM-DD HH:MM:SS

More details:
http://www.w3schools.com/sql/sql_datatypes.asp

Try not to have reserved words for fields words

E.g.

```
CREATE TABLE Movies (
  title varchar(150),
  year year,
  length int(5)
);
```

Not null

Specify whether to be null or not

We can impose that certain fields are not null.

```
CREATE TABLE Movies (
  Title varchar(150) NOT NULL,
  Year year NOT NULL,
  Length int(5)
);
```

Default values

We can specify the default value for some fields – to be used when no value is given when creating a record.

```
CREATE TABLE Movies (
  Title varchar(150) NOT NULL,
  Year year NOT NULL DEFAULT 2002,
  Length int(5) DEFAULT 120,

  PRIMARY KEY (Title, Year)
);
```

Primary key

What has to be true of a primary key?

Unique in a table
Not null

Primary key MySQL

```
CREATE TABLE relation (
  field1 type1 NOT NULL,
  field2 type2 NOT NULL,
  field3 type3,
  …
  fieldk typek

  PRIMARY KEY (field1, field2)
);
```

Auto increment

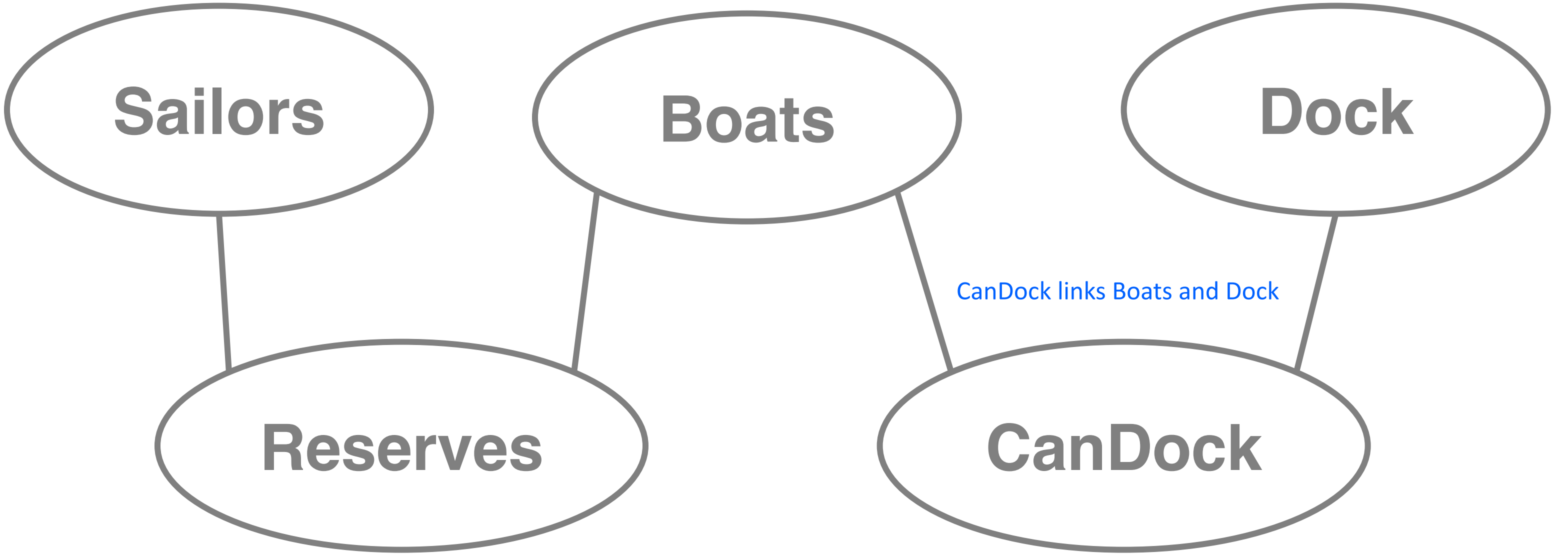
```
CREATE TABLE Students {
  id int(5) auto_increment,
  name varchar(50);
}
```

What does this do and why would it be useful?

Create new tables for the database with the following schema:

Dock(dockId: integer, dockDescription: string)

CanDock(boatId: integer, dockId: integer)



Sailors

Boats

Dock

CanDock links Boats and Dock

Reserves

CanDock

Create new tables for the database with the following schema:

Dock(did: integer, ddescription: string)

CanDock(bid: integer, did: integer)

```
CREATE TABLE Dock (
          int(5): 5 digits long   NOT NULL: bc primary key   auto_inc: so that db automatically increments ID
  dockId int(5) NOT NULL auto_increment,
  dockDescription varchar(255)
  PRIMARY KEY  (`dockId`)
);
CREATE TABLE CanDock (
  boatId int(5) NOT NULL,
  dockId int(5) NOT NULL
                                 Yes or No
  canDock tinyint(1)
  PRIMARY KEY ( boatId, dockId ),
);
```

Quote is required if the field name has spaces but avoid spaces

This field may or may not be necessary

Using phpMyAdmin

XAMPP phpMyAdmin

phpMyAdmin is part of the XAMPP install we recommended earlier, so if you installed XAMPP on you own machine, you already have it.

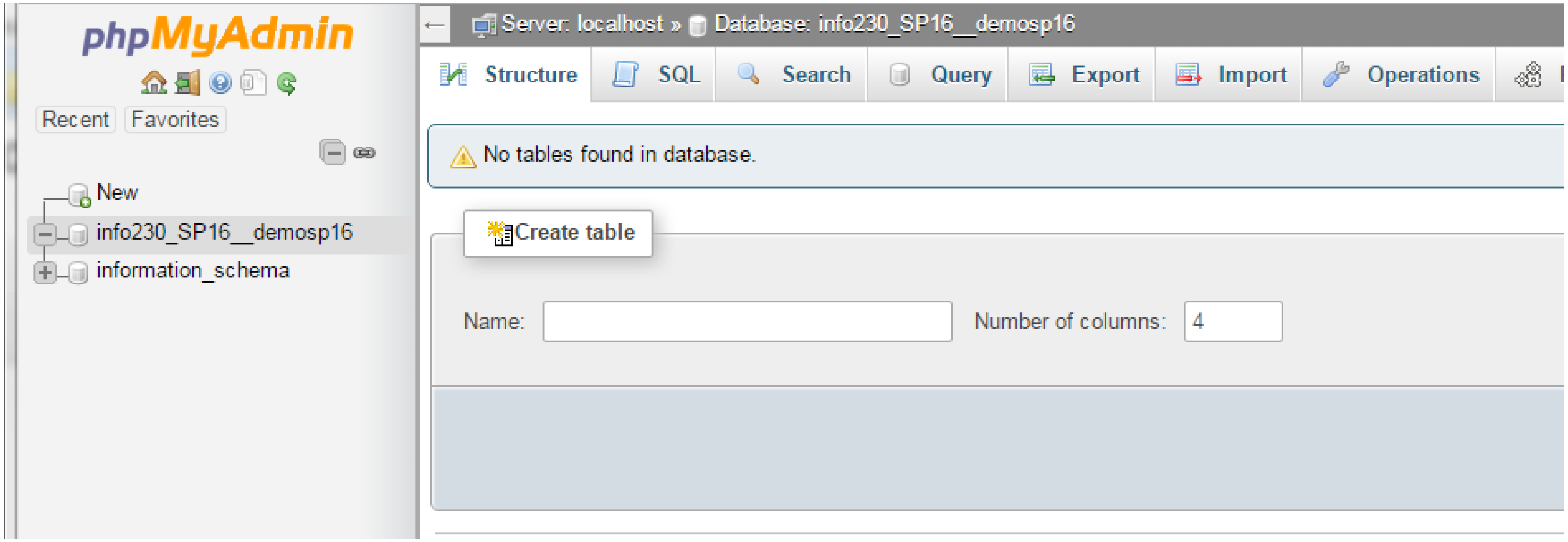
http://localhost/phpmyadmin/

MySQL DBs on the course server

Each user on the 2300 server has a MySQL DB info230_SP16_*username*. You can use it for your upcoming projects and to do whatever experimentation you want (within reason…)

phpMyAdmin

https://info2300.coecis.cornell.edu/phpMyAdmin/



No tables found in database.

Name:

Number of columns: 4

Log in with your course server username and password to continue.

Create and populate 2 tables

```
CREATE TABLE Movies (
    Title VARCHAR(150) NOT NULL,
    Year YEAR NOT NULL,
    Length INT(5),

    PRIMARY KEY (Title, Year)
);

CREATE TABLE StarsIn (
    Name VARCHAR(50) NOT NULL,
    Title VARCHAR(150) NOT NULL,
    Year YEAR NOT NULL,

    PRIMARY KEY (Name, Title, Year)
);
```

```
INSERT INTO `Movies`
(`Title`, `Year`, `Length`) VALUES
('Gladiator', 2000, 155),
('Crouching Tiger, Hidden Dragon', 2000, 120),
('Moulin Rouge', 2001, 127),
('A Beautiful Mind', 2001, 135),
('Chicago', 2002, 113),
('Lost in Translation', 2003, 102),
('The Return of the King', 2003, 201),
('Million Dollar Baby', 2004, 132);

INSERT INTO `StarsIn`
(`Name`, `Title`, `Year`) VALUES
('Hillary Swank', 'Million Dollar Baby', 2000),
('Russell Crowe', 'A Beautiful Mind', 2001),
('Russell Crowe', 'Gladiator', 2000),
('Viggo Mortensen', 'The Return of the King',
   2003);
```

A familiar query

```
SELECT
  Movies.Title,
  StarsIn.Name
  Movies.Length
FROM Movies
INNER JOIN StarsIn
  ON Movies.Title = StarsIn.Title
    AND Movies.Year = StarsIn.Year;
```

More familiar queries

```
SELECT
  Title,
  Year,
  Length
FROM Movies
WHERE
  Length > (SELECT AVG(Length) FROM Movies);

SELECT
  Year,
  AVG(Length) AS AvgLength
FROM Movies
GROUP BY Year;
```

Review

- SQL allows us to state constraints on the data in the CREATE TABLE statement, including domain constraints and key constraints.
- We' re now ready to exercise our SQL skills in the MySQL DB, either through installs on own machine or via phpMyAdmin on the INFO 2300 server.