

INF1343, Winter 2011

Data Modeling and Database Design

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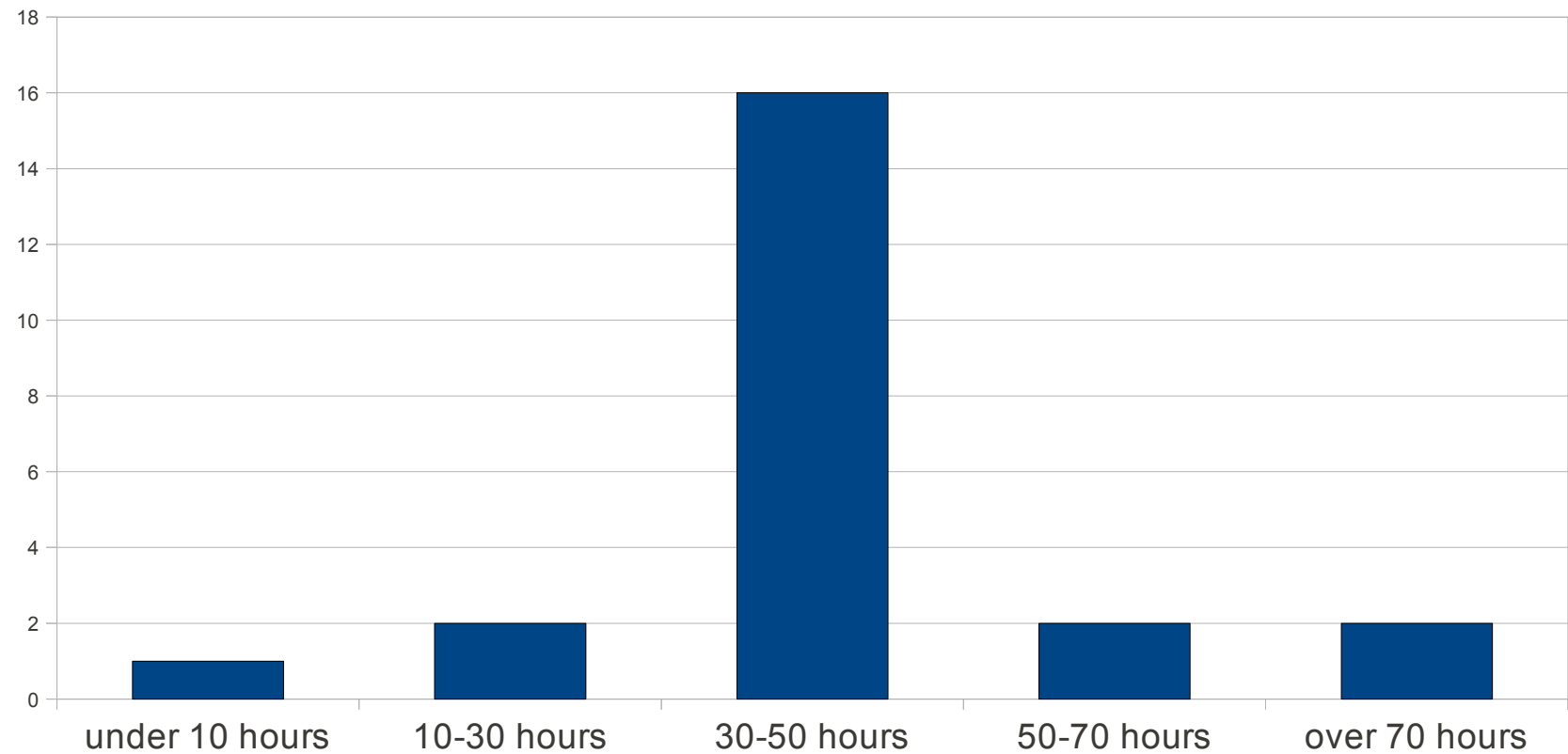


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Week 7

Embedded SQL

The Survey



The Final Project

(See the handout on the website)

Facebook runs on MySQL

facebook

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MySQL at Facebook is on Facebook

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Devoted to making MySQL better. Written by people who work at Facebook.

Information

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MySQL at Facebook



Wall

Info

Notes

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Links

MySQL at Facebook + Others

Just MySQL at Facebook

Just Others



MySQL at Facebook I just registered for PgWest 2010. I look forward to learning more about current work on PostgreSQL.



PgWest 2010 | The PostgreSQL Conference
www.postgresqlconference.org

Thursday at 12:18pm · Comment · Like

Paul Saab, Bill Blum, Chetan Tanna and 51 others like this.

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MySQL at Facebook I think they both have awesome technology and continue to improve.
Yesterday at 9:24am · 2 people · Flag



Ricky Elrod Indeed they do, I was just pulling your leg. Have fun at the conference :)
Yesterday at 9:26am · Flag

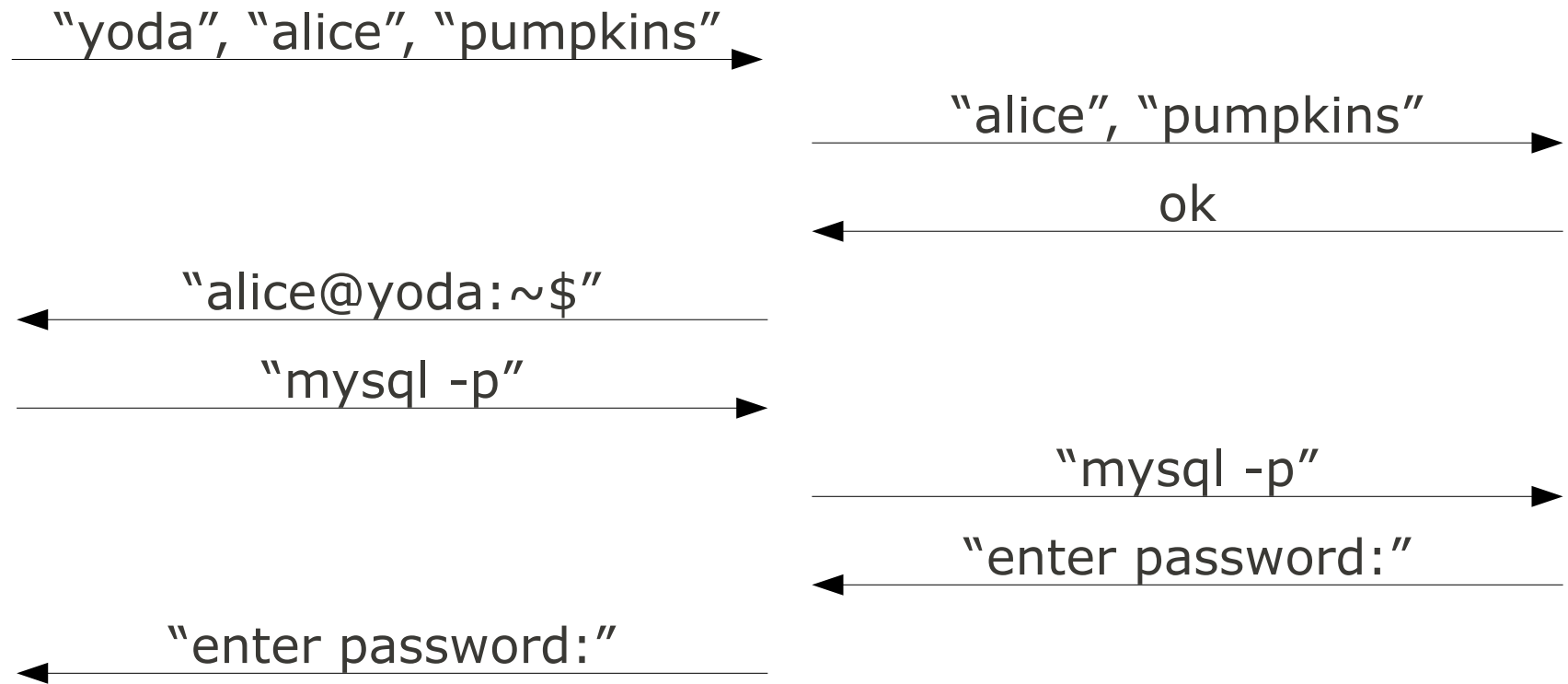


MySQL at Facebook Kristian Nielsen had a very interesting presentation on making replication better in MariaDB. Perhaps one day he will share that (hint, hint).

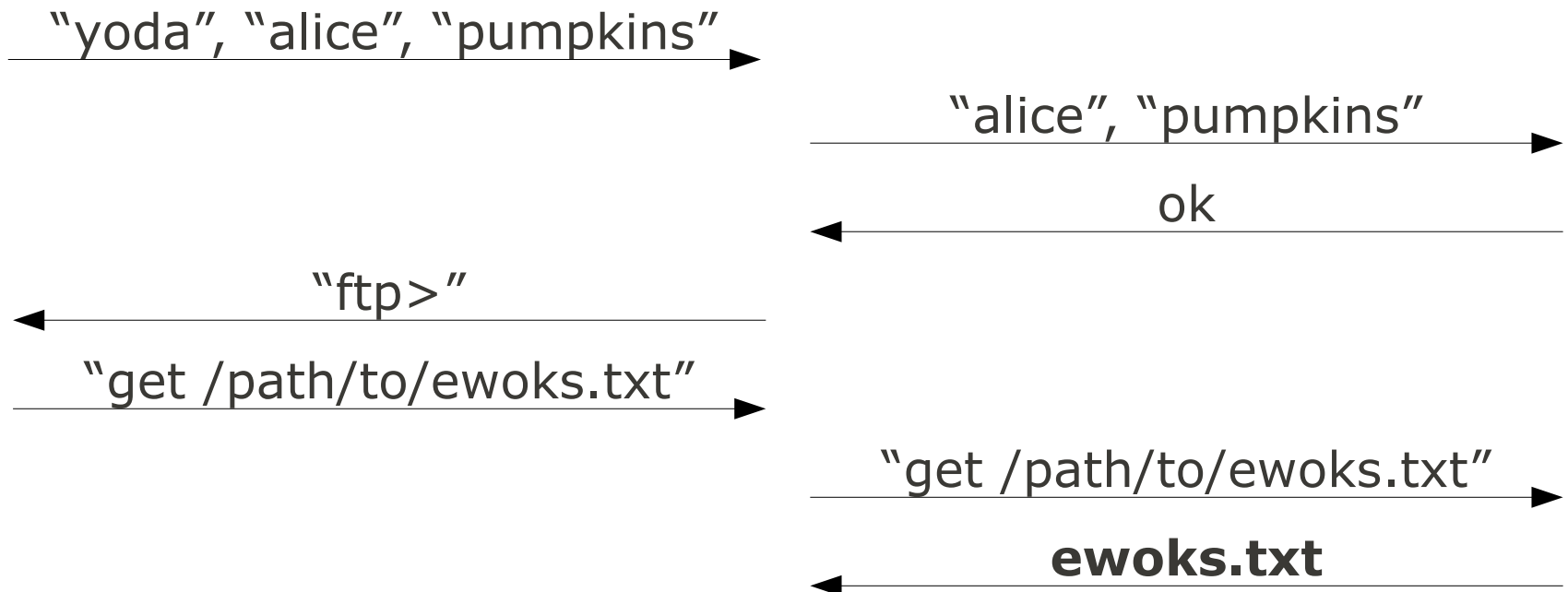
October 11 at 8:21am · Comment · Like

Kian Sin Teo, Donald G. Lane Jr., Roja Rani Penmetsa and 38 others like this.

Telnet (1969)



FTP (1971)



the file is saved locally

Anonymous FTP



"yoda", "/path/to/ewoks.txt" →

→ "get /path/to/ewoks.txt" →

← **ewoks.txt** ←

the file is saved locally

`ftp://yoda/path/to/ewoks.txt`

HTTP (1991)



"yoda", "/path/to/ewoks.html" →

"GET /path/to/ewoks.html" →

← the **content** of ewoks.html

← **ewoks.html** is displayed

`http://yoda/path/to/ewoks.html`

HTML

```
<html xmlns="http://www.w3.org/1999/xhtml">  
  <head>  
    <title>  
      Ewoks  
    </title>  
  </head>  
  <body>  
    <h1>  
      The List of Ewoks  
    </h1>  
    ...
```

See: <http://www.w3schools.com/html/default.asp>

On Yoda

1. Put the file in `~/public_html/`

2. Let the server see it:

`chmod a+r ewoks.html`

Locally:

```
scp ewoks.html kenobio1@yoda.ischool.utoronto.ca:~/public_html/
```

Remotely:

```
cd ~/public_html/  
chmod a+r ewoks.html
```

CGI



"yoda", "/path/to/ewoks.cgi" →

"GET /path/to/ewoks.cgi" →

← **the html output of ewoks.cgi**

← **html output** is displayed

ewoks.cgi contains **code**, but **returns** HTML

ewoks.cgi



ewoks.cgi

```
#!/usr/bin/python  
  
print "Content-Type: text/html"  
print  
print "<h1>Ewoks</h1>"
```

Set permissions to `a+rx`

Remotely:

```
cd ~/public_html  
mkdir cgi-bin  
chmod a+x cgi-bin  
cd cgi-bin  
cp /play/ewoks.cgi .  
chmod a+rx ewoks.cgi
```

Python Console

On Yoda:

type "python"

Locally:

Install from <http://python.org/>

Use Python **2.x**, not Python **3** ("2000").

Elements of Python

Constants and Expressions:

```
5
```

```
"Ewoks"
```

Variables:

```
count = 5
```

```
count = count + 1
```

```
species = "Ewoks"
```

```
"Hello, " + species + "!"
```


Elements of Python

Print:

```
print count  
print species, count
```

Functions:

```
print str(count)  
print str(count) + " " + species
```

Functions in Libraries/Modules:

```
import math  
print math.sqrt(2)
```

Python is “Procedural”

(We describe the steps rather than the results.)

ewoks2.cgi

```
#!/usr/bin/python
import cgi
cgi.enable()
print "Content-Type: text/html"
print

species = "Ewoks"
count = 5
print "<h1>", species, "</h1>"
print count, species, "<br/>"
count = count + 1
print count, species, "<br/>"
```

Elements of Python

Lists:

```
names = ["Chirpa", "Warok",  
———"Wicket"]  
print names[1]  
print len(names)
```

Loops:

```
for name in names:  
——print name
```

ewoks3.cgi

```
#!/usr/bin/python
import cgi
cgi.enable()
print "Content-Type: text/html"
print

names = ["Chirpa", "Warok", "Wicket"]
species = "Ewoks"

print "<h1>", len(names), species
print "</h1>"
for name in names:
    print name, "<br/>"
```

Always the Same?

Parameters

- additional data from the user

Database

- information that we store

MySQLdb

```
import MySQLdb

config = "/home/kenobio1/.my.cnf"
db = MySQLdb.connect(db="starwars",
                    read_default_file=config)
print db

cursor=db.cursor()
query = "select * from persona";
cursor.execute(query);
rows = cursor.fetchall()
print len(rows)
print rows[0]
```

Elements of Python

Objects:

```
db = MySQLdb.connect(...)
```

Methods (Objects' Functions):

```
cursor = db.cursor()  
cursor.execute(query)  
cursor.fetchall()
```


Loops Revisited

A Loop over the Rows:

```
for row in rows:  
— print row[0]
```

Nested Loops (Rows, Records):

```
for row in rows:  
— print "<tr>"  
— for x in [0,1,2]:  
— print "<td>", row[x], "</td>"  
— print "</tr>"
```

MySQLdb

```
import MySQLdb

config = "/home/kenobi01/.my.cnf"
db = MySQLdb.connect(db="starwars",
                     read_default_file=config)

cursor=db.cursor()
query = "select * from persona";
cursor.execute(query);
rows = cursor.fetchall()
print "<table>"
for row in rows:
    print "<tr>"
    for x in [0,1,2]:
        print "<td>", row[x], "</td>"
    print "</tr>"
print "</table>"
```

personas.cgi

```
#!/usr/bin/python
import cgi
cgi.enable()
print "Content-Type: text/html;charset=utf-8"
print

import MySQLdb

config = "/home/kenobi01/.my.cnf"
db = MySQLdb.connect(db="starwars",
                    read_default_file=config)

cursor=db.cursor()
query = "select * from persona";
cursor.execute(query);
rows = cursor.fetchall()
print "<table>"
for row in rows:
    print "<tr>"
    for x in [0,1,2]:
        print "<td>", row[x], "</td>"
    print "</tr>"
print "</table>"
```

Parameters

- additional data from the user

Database

- information that we store

Passing Parameters

Option 1, "GET" (in the URL)

<http://yoda.ischool.utoronto.ca/~kenobio1/cgi-bin/personas.cgi?species=Human>

.../personas.cgi?species=Human

Option 2, "POST" (invisibly)

(we'll get back to this)

Accessing Parameters

```
#!/usr/bin/python
import cgi
cgi.enable()
print "Content-Type: text/html;charset=utf-8"
print

import cgi
form = cgi.FieldStorage()
print form["species"].value
```

1. Save in test_form.cgi. (Set permissions.)
2. Test with .../test_form.cgi?species=Human

Handling an Error

Try just "test_form.cgi" (no parameters).
Oops.

```
#!/usr/bin/python
import cgi
cgi.enable()
print "Content-Type: text/html;charset=utf-8"
print

import cgi
form = cgi.FieldStorage()
if form.has_key("species") :
    print form["species"].value
else :
    print "No species specified"
```

Dynamic SQL (Wrong)

```
import cgi
form = cgi.FieldStorage()
if form.has_key("species") :
    cursor=db.cursor()
    species = form["species"].value
    query = ( "select * from persona"
            + " where species="
            + "'" + species + "'" )
    print query
    cursor.execute(query);
    rows = cursor.fetchall()
    print "<table>"
    for row in rows:
        print "<tr>"
        for x in [0,1,2]:
            print "<td>", row[x], "</td>"
        print "</tr>"
    print "</table>"
```


Python Templates

```
TEMPLATE = """
select * from persona
where species='%s';
"""

query = TEMPLATE % species
```

Dynamic SQL (Wrong)

```
TEMPLATE = """select * from persona
where species='%s';"""
import cgi
form = cgi.FieldStorage()
if form.has_key("species") :
    cursor=db.cursor()
    species = form["species"].value
    query = TEMPLATE % species
    print query
    cursor.execute(query);
    rows = cursor.fetchall()
    print "<table>"
    for row in rows:
        print "<tr>"
        for x in [0,1,2]:
            print "<td>", row[x], "</td>"
        print "</tr>"
    print "</table>"
```

Don't do this!

Here Is Why

```
http://yoda.ischool.utoronto.ca/~keno  
bio1/cgi-bin/personas2.cgi?  
species=Human'%3Binsert+into+pers  
ona+(name,species)+values+  
( 'X','Human' )  
'%3Bselect+*+from+persona+where+'
```

Dynamic SQL - Right

```
TEMPLATE = """select * from persona
where species='%s';"""
import cgi
form = cgi.FieldStorage()
if form.has_key("species") :
    cursor=db.cursor()
    species = form["species"].value
    query = TEMPLATE % db.escape_string(species)
    print query
    cursor.execute(query);
    rows = cursor.fetchall()
    print "<table>"
    for row in rows:
        print "<tr>"
        for x in [0,1,2]:
            print "<td>", row[x], "</td>"
        print "</tr>"
    print "</table>"
```

HTML Forms

```
<form action="/~kenobio1/cgi-bin/personas3.cgi"
      method="get">
  Please select a species:
  <input type="text" name="species" />
  <input type="submit" />
</form>
```

HTML Forms

```
<form action="/~kenobio1/cgi-bin/personas3.cgi"
      method="get">
  Please select a species:
  <select name="species">
    <option value="Human">Human</option>
    <option value="Ewok">Ewok</option>
    <option value="Wookiee">Wookiee</option>
  </select>
  <input type="submit" />
</form>
```

HTML Forms: POST

```
<form action="/~kenobio1/cgi-bin/personas3.cgi"
      method="post">
  Please select a species:
  <select name="species">
    <option value="Human">Human</option>
    <option value="Ewok">Ewok</option>
    <option value="Wookiee">Wookiee</option>
  </select>
  <input type="submit" />
</form>
```

Questions?