Week 9

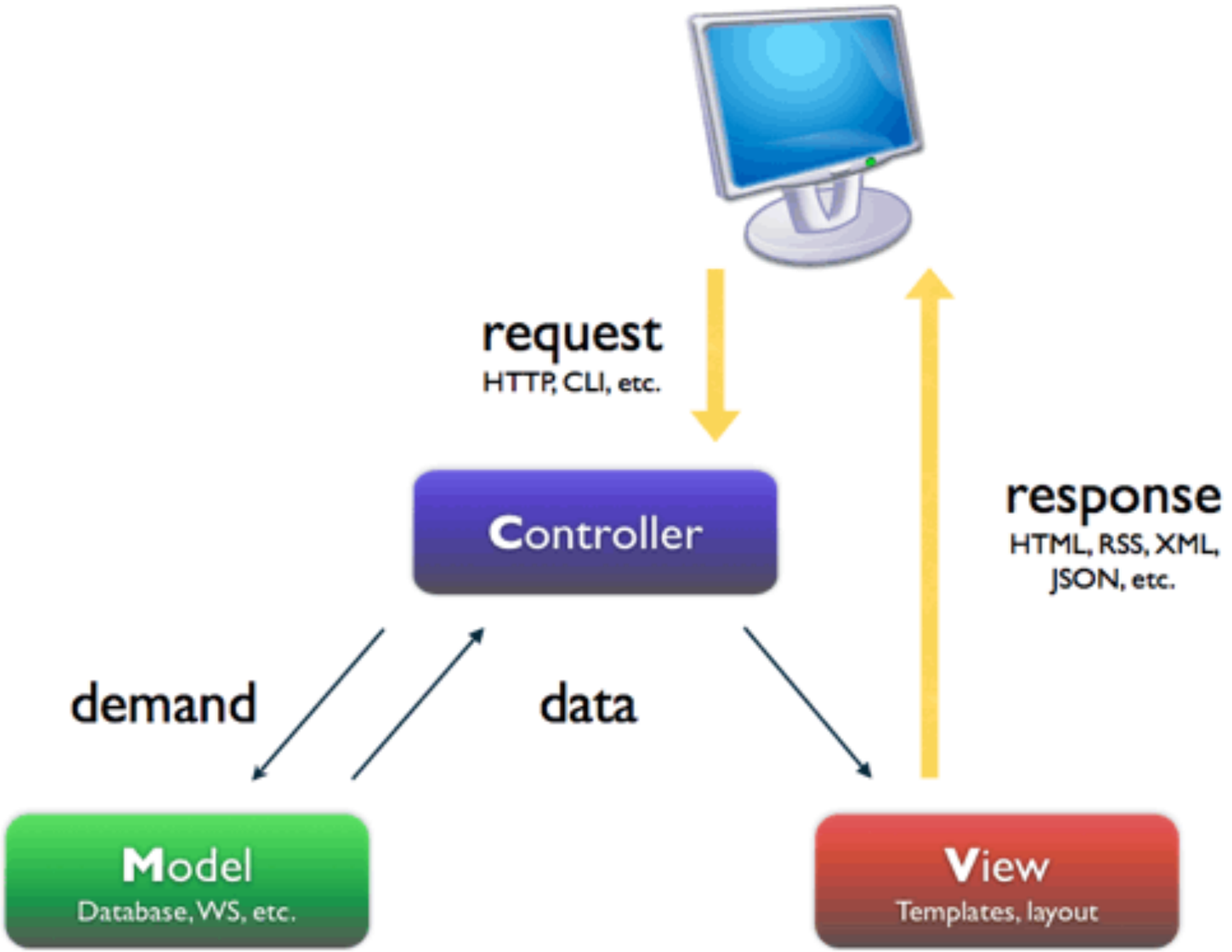
last time

C

Python

```
def main():
    print("hello, world")

if __name__ == "__main__":
    main()
```


request
HTTP, CLI, etc.
Controller
response
HTML, RSS, XML,
JSON, etc.
demand
data
Model
Database, WS, etc.
View
Templates, layout

Flask

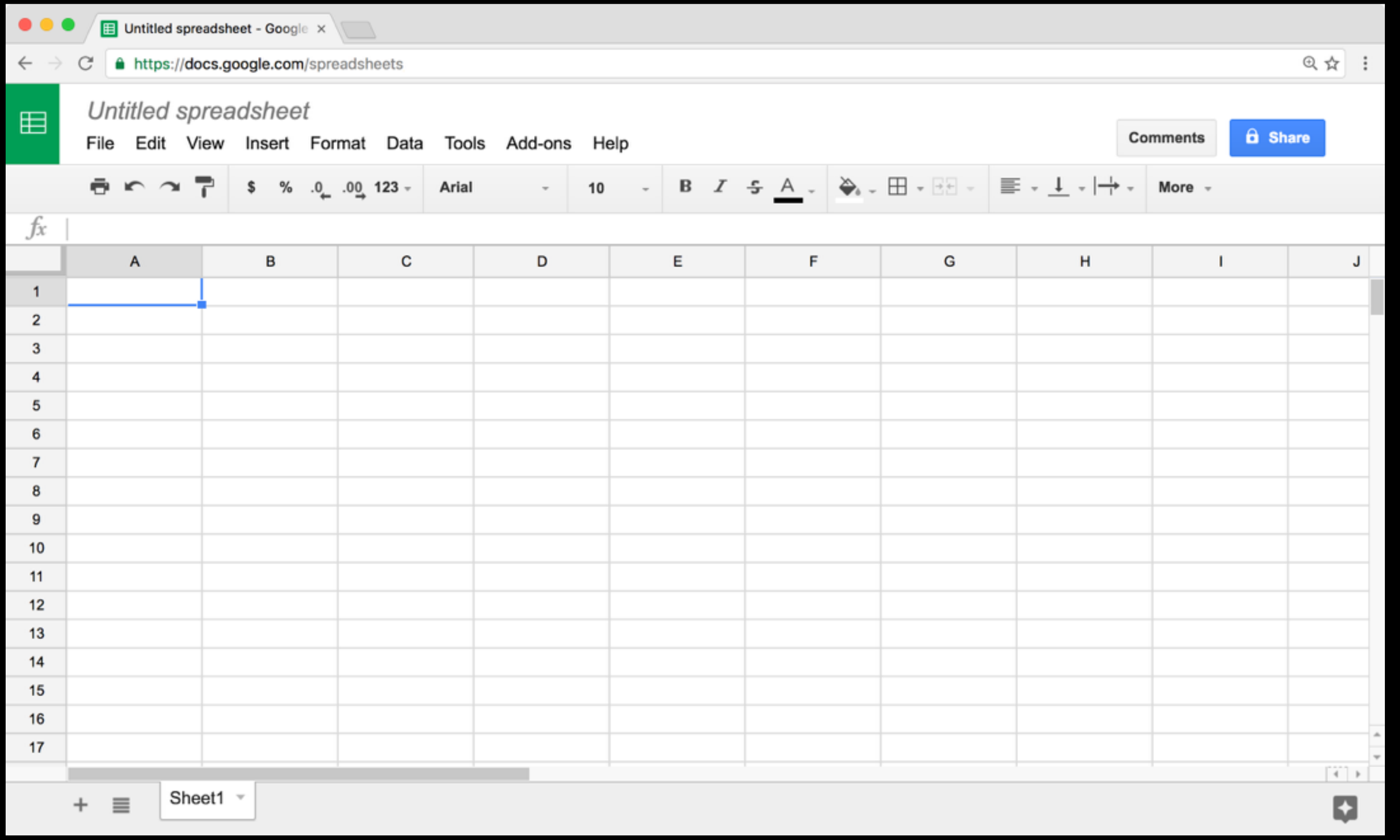
web development,
one drop at a time

```
from flask import Flask, render_template

app = Flask(__name__)

@app.route("/")
def index():
    return render_template("index.html")
```


SQLite


Untitled spreadsheet - Google
https://docs.google.com/spreadsheets
Untitled spreadsheet
File Edit View Insert Format Data Tools Add-ons Help
Comments
Share
$ % .0 .00 123
Arial
10
More
A B C D E F G H I J
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
Sheet1

```
CREATE ...

INSERT ...

SELECT ...

UPDATE ...

DELETE ...

...
```

```
CREATE TABLE 'registrants'
    ('id' INTEGER PRIMARY KEY, 'name' TEXT, 'dorm' TEXT)

INSERT INTO 'registrants' (name, dorm)
    VALUES('David', 'Matthews')

SELECT * FROM 'registrants'

UPDATE 'registrants' SET name = 'David Malan' where id = 1

DELETE FROM 'registrants' WHERE id = 1

...
```

INTEGER

REAL

TEXT

BLOB

```
date

time

datetime

...
```

PRIMARY KEY

UNIQUE

INDEX

NOT NULL

FOREIGN KEY

...

JOIN

...

```
BEGIN TRANSACTION

COMMIT

ROLLBACK
```

```
db = cs50.SQL("sqlite:///lecture.db")
```

SQL injection attack

Login required

You may establish Yale authentication now in order to access protected services later.

NetID:

Password:

Warn me before logging me in to other sites.

Login

Please Log In

To log in, please select your login type from the tabs below and enter your credentials. If you're not sure what login type to use, **look here for how you login with HarvardKey.**

HarvardKey	HUID	eCommons	XID

Login Name (in the form of an email address):

me@examplemailprovider.com

Password:

Login

Please Log In

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HarvardKey	HUID	eCommons	XID

Login Name (in the form of an email address):

me@examplemailprovider.com

Password:

' OR '1' = '1

Login

```
username = request.form["username"]
password = request.form["password"]

db.execute("SELECT * FROM users
WHERE username = '{}' AND password = '{}'".format(username, password))
```

```
username = request.form["username"]
password = request.form["password"]

db.execute("SELECT * FROM users
WHERE username = 'me@examplemailprovider.com' AND password = '' OR '1' = '1'")
```

```
username = request.form["username"]
password = request.form["password"]

db.execute("SELECT * FROM users
WHERE username = '" + username + "' AND password = '" + password + "'"))
```

```
username = request.form["username"]
password = request.form["password"]

db.execute("SELECT * FROM users
WHERE username = 'me@examplemailprovider.com' AND password = '' OR '1' = '1'")
```

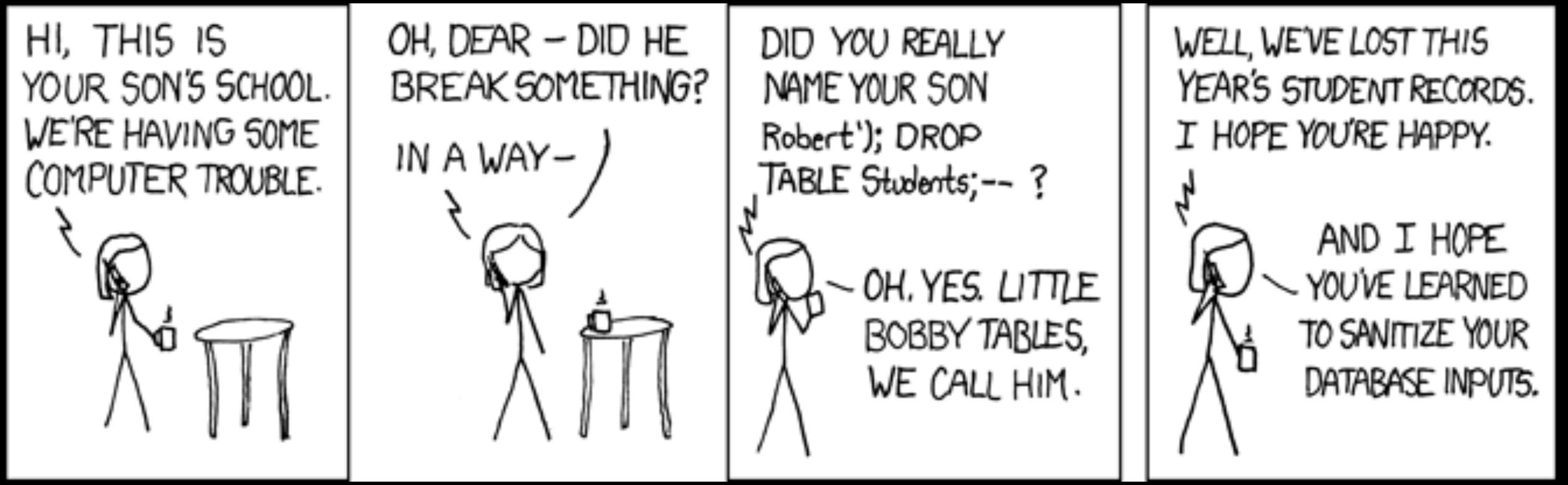
```
username = request.form["username"]
password = request.form["password"]

db.execute("SELECT * FROM users
WHERE username = :username AND password = :password", username=username, password=password)
```

```
username = request.form["username"]
password = request.form["password"]

db.execute("SELECT * FROM users
WHERE username = 'me@examplemailprovider.com' AND password = '\' OR \'1\' = \'1'")
```


ZU 0666', 0, 0); DROP DATABASE TABLICE;



http://xkcd.com/327/

Week 9