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Guest Lecture: Project and Apps

Duke CoLab

App Development

- You're in a database class. You're learning different techniques and theories on how to best manage data.
- How do you express that data to an end user in a meaningful ways?
- Web applications are a great way to express data and publish it on the web. It allows us control over how/what data is expressed, and to whom, without requiring users to understand how to use a database.
- The database is a key component of "the stack".

The Stack

- Client Side

- Browser
- HTML
- CSS
- JS

- Server Side

- Web and/or App server (apache, nginx, gunicorn, passenger, etc.)
- Language (Python, Ruby, NodeJS, etc.)
- Framework (Flask, Django, Rails, etc.)
- Database (MySQL, MariaDB, MongoDB, etc.)

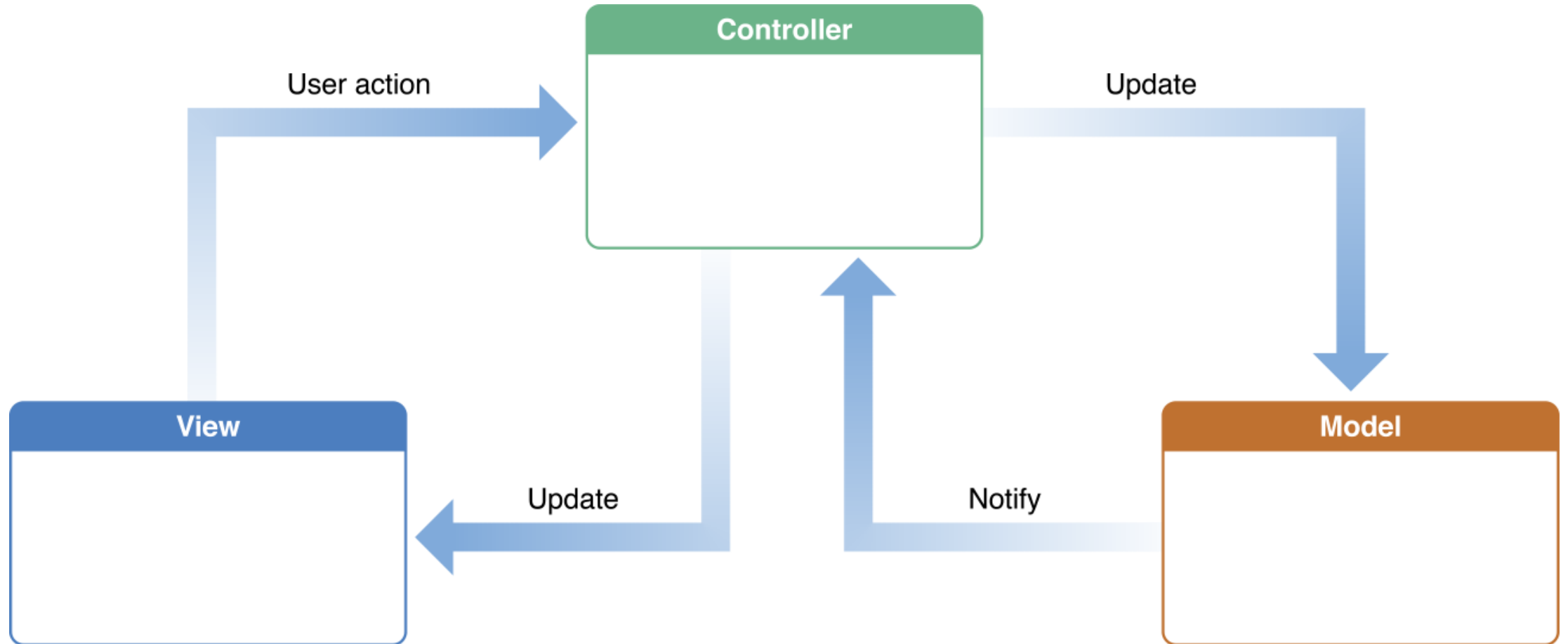
Deployment

- “Turn Key” options (e.g. Heroku)
 - Usually you will need to configure your app in a specific way.
 - You do not always have full control on the host env
 - BUT “less” for you to manage
- Standard VM (e.g. Duke VCM, Digital Ocean)
 - You do all of the work
 - However because of this, you have full control
- Docker
 - Few to zero issues going to production
 - But the learning curve is REAL
 - Still need a VM, but it only needs Docker installed

Model, View, Controller (MVC)

- View
 - What the user sees and interacts with
 - Typically a web page
- Controller
 - Defines what logic should run given the path and request
 - In most cases will call on logic that lives in a model
 - Provides results and directs traffic to new view
- Model
 - Typically defines database objects and performs CRUD actions
 - Also where most of your business logic lives

Model, View, Controller (MVC)



Flask

- <http://flask.palletsprojects.com/en/1.1.x/>
- Barebones web development framework(and I mean BAREbones)
- "Full Stack"

```
from flask import Flask
app = Flask(__name__)

@app.route('/')
def hello_world():
    return 'Hello, World!'
```

Innovation Co-Lab

- Resource on campus for technology and engineering projects.
- Part of the Office of Information Technology(OIT)
- Workshops and consultation on ongoing projects for students staff and faculty



Co-Lab Resources for 316

- Co-Lab office hours <https://colab.duke.edu/resources>
 - Student staffed hours
 - FTEs available by appointment
- Roots Courses
 - 1-3 hour workshops on various topics
 - Web frameworks
 - Programming languages
 - Design
 - Etc
- Advising with Danai (da129@duke.edu)

Helpful Links

- Flask documentation: <http://flask.palletsprojects.com/en/1.1.x/>
- Co-Lab Website: <https://colab.duke.edu>
- SQLAlchemy: <https://docs.sqlalchemy.org/en/13/>
- Bootstrap: <https://getbootstrap.com/>
- jQuery: <https://api.jquery.com/>
- Example flask app: https://gitlab.oit.duke.edu/colab/flask_template
- <https://reactjs.org/>
- <https://vuejs.org/>