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An Introduction to Developing Web Applications with Flask



Prudhvi Boyapalli

Rice Computer Science Club Hack & Learn Workshop January 13, 2017 Complete We

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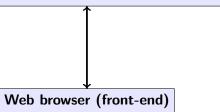
How does a web app work? What does Flask do?

Flask is a Python microframework for building web applications.

Flask

Server (back-end)

- Python
- Flask runs here
- Computes and serves HTML to front-end



- HTML, CSS, JavaScript
- Rendered by the browser

Install Python

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- Basic level of Python knowledge is needed for this tutorial
 - If you've taken COMP140 you're in good shape
- Install Python if you haven't already: python.org
- I'm using 2.7, Flask also supports 3.3+

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Install Flask using PIP

 Pip Installs Packages from the Python Package Index a.k.a. PyPI

Flask Installation

> sudo pip install Flask

Editing

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An IDE is overkill for this workshop. Use a programmer's editor that you're comfortable with:

- Vim (All platforms)
- Atom (All platforms)
- Visual Studio Code (All platforms)
- Sublime Text (All platforms)
- Notepad++ (Windows)
- TextMate (OSX)
- Whatever floats your boat

Debugging

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Putting It All Together Conclusion You'll be testing and debugging your code from the browser, so use one with good developer tools:

- Chrome
- Firefox

Other browsers can be used, but Chrome or Firefox will minimize the chance of running into browser specific issues.

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Super basic hello world example

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This is the bare minimum code needed on the back-end to serve a web page

```
./code/hello_world_example/hello_world.py
```

```
from flask import Flask
app = Flask(\_name\_\_)
@app.route("/")
def hello():
    return "Hello World!"
if __name__ == "__main__":
    app.run()
```

Running the web app

Once we've written the flask code, we can run the server locally and view the results in our web browser

Execute these commands to run the code:

- > cd /directory/with/project
- > export FLASK_APP=hello_world.py
- > flask run

Then you'll see something like:

- * Serving Flask app "hello_world"
- * Running on http://127.0.0.1:5000/
 (Press CTRL+C to quit)

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- We started up a local flask server which is listening at IP address 127.0.0.1, port 5000
- We visited this page and the browser sent a request to our flask server
- 3 Because we visited 127.0.0.1:5000/ (emphasis on the "/"), the method bound to "/" was invoked
- ① The hello() method in hello_world.py was executed and the return value is sent to the browser as HTML
- **5** The browser received the HTML and rendered the webpage

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Interactive hello world with variable routing

Now that we have a basic idea of how flask works, we can do some cool stuff with routing:

```
./code/hello_world_example/hello_user.py
from flask import Flask
app = Flask(\_name\_\_)
@app.route("/world")
def hello():
    return "Hello World!"
@app.route("/user/<name>")
def hello_user(name):
    return "Hello %s, how are you today?" % name
if __name__ == "__main__":
    app.run()
```

```
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As before:

> export FLASK_APP=hello_user.py

> flask run

* Serving Flask app "hello_user"

* Running on http://127.0.0.1:5000/ (Press CTRL+C to quit)

Hello World

http://127.0.0.1:5000/world

Hello <user>

http://127.0.0.1:5000/user/Foo http://127.0.0.1:5000/user/Bar

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- * Running on http://127.0.0.1:5000/ (Press CTRL+C to quit)

Hello World

http://127.0.0.1:5000/world

Hello <user>

http://127.0.0.1:5000/user/Foo http://127.0.0.1:5000/user/Bar

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We covered:

- Basic & and variable routing
- GET and POST requests
- Accessing request data
- Building and serving a "complex" web app with HTML, CSS and JavaScript

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More Flask Features

- URL Building
- Additional HTTP Methods (GET, POST, DELETE, etc.)
- HTML templates with placeholders
- User file uploads
- Reading and writing cookies
- Redirects and error handling
- Managing sessions

Deploying your web app

Once you've developed and tested you app locally, you can deploy your flask code and make it publicly accessible. There lots of tutorials on how to do this for various cloud providers (AWS, Azure, DigitalOcean, etc).

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Summary Resources github.com/hack-rice/flask-tutorial

 Flask website & awesome documentation flask.pocoo.org

This presentation & and all of the code

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- Fall 2017
- Annual hackathon right here on campus
- Great way to hone your skills and make something cool

RiceApps

- Work on a team of students to build useful applications
- Great way to gain hands on development experience
- http://riceapps.org

Rice CS Facebook Group

• https://facebook.com/groups/365985373415471

CS Club Facebook Page

https://facebook.com/ricecsclub

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