Regression Testing

Capstone: Photo Tourist Web Application

In this lecture, we will discuss...

✧ Value of tests

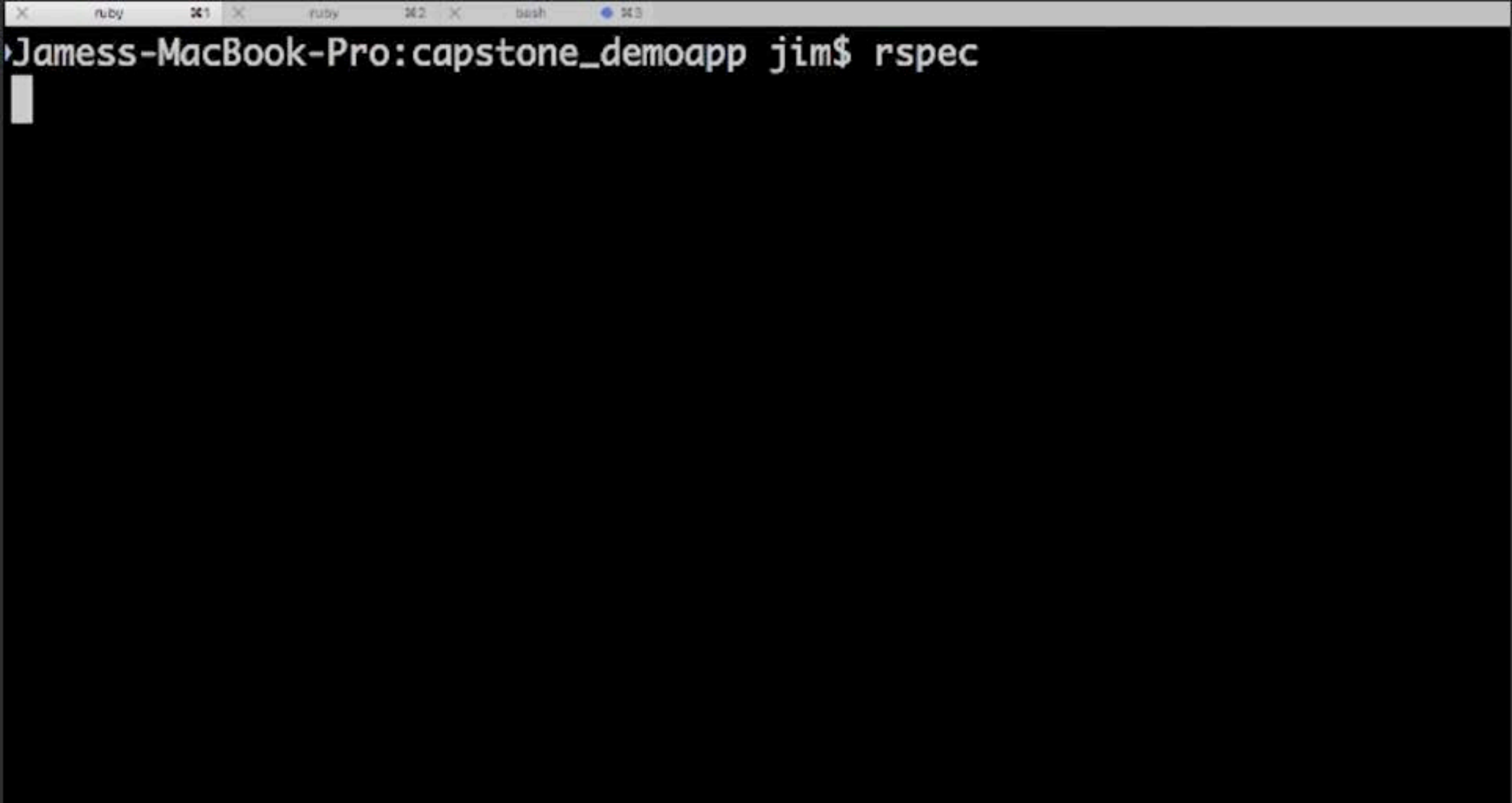✧ Value of automated tests for regression testing

Value of Tests

✧ Provides verification of
- Working
- Meeting requirements

Automated Tests for Regression Testing

✧ Systems accumulate features
  - Potential to drown in features

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(reverse-i-search)`':
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Jamess-MacBook-Pro:capstone_demoapp jim$ rspec -e MongoDB
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Jamess-MacBook-Pro:capstone_demoapp jim$ rspec
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Jamess-MacBook-Pro:capstone_demoapp jim$ rspec
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4 examples, 0 failures

Jamess-MacBook-Pro:capstone_demoapp jim$ ▮
```

```
Jamess-MacBook-Pro:capstone_demoapp jim$ rspec --format documentation
```

```
Jamess-MacBook-Pro:capstone_demoapp jim$ rspec --format documentation

ApiDevelopments
  RDBMS-backed
    create RDBMS-backed model
    expose RDBMS-backed API resource
  MongoDB-backed
    create MongoDB-backed model
    expose MongoDB-backed API resource

Finished in 0.06718 seconds (files took 1.7 seconds to load)
4 examples, 0 failures

Jamess-MacBook-Pro:capstone_demoapp jim$
```

```
Jamess-MacBook-Pro:capstone_demoapp jim$ rspec --format documentation

ApiDevelopments
  RDBMS-backed
    create RDBMS-backed model
    expose RDBMS-backed API resource
  MongoDB-backed
    create MongoDB-backed model
    expose MongoDB-backed API resource


Finished in 0.06718 seconds (files took 1.7 seconds to load)
4 examples, 0 failures

Jamess-MacBook-Pro:capstone_demoapp jim$ rspec -fd

ApiDevelopments
  RDBMS-backed
    create RDBMS-backed model
    expose RDBMS-backed API resource
  MongoDB-backed
    create MongoDB-backed model
    expose MongoDB-backed API resource


Finished in 0.06665 seconds (files took 1.68 seconds to load)
4 examples, 0 failures
```

```
Jamess-MacBook-Pro:capstone_demoapp jim$ rspec --format documentation

ApiDevelopments
  RDBMS-backed
    create RDBMS-backed model
    expose RDBMS-backed API resource
  MongoDB-backed
    create MongoDB-backed model
    expose MongoDB-backed API resource

Finished in 0.06718 seconds (files took 1.7 seconds to load)
4 examples, 0 failures

Jamess-MacBook-Pro:capstone_demoapp jim$ rspec -fd

ApiDevelopments
  RDBMS-backed
    create RDBMS-backed model
    expose RDBMS-backed API resource
  MongoDB-backed
    create MongoDB-backed model
    expose MongoDB-backed API resource

Finished in 0.06665 seconds (files took 1.68 seconds to load)
4 examples, 0 failures
```

```
  1 --color
  2 --require spec_helper
  3 --format documentation
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```

```
4 examples, 0 failures


Jamess-MacBook-Pro:capstone_demoapp jim$ rspec -fd

ApiDevelopments
  RDBMS-backed
    create RDBMS-backed model
    expose RDBMS-backed API resource
  MongoDB-backed
    create MongoDB-backed model
    expose MongoDB-backed API resource

Finished in 0.06665 seconds (files took 1.68 seconds to load)
4 examples, 0 failures

Jamess-MacBook-Pro:capstone_demoapp jim$ vi .rspec
Jamess-MacBook-Pro:capstone_demoapp jim$ rspec

ApiDevelopments
  RDBMS-backed
    create RDBMS-backed model
    expose RDBMS-backed API resource
  MongoDB-backed
    create MongoDB-backed model
    expose MongoDB-backed API resource

Finished in 0.08019 seconds (files took 1.68 seconds to load)
4 examples, 0 failures
```
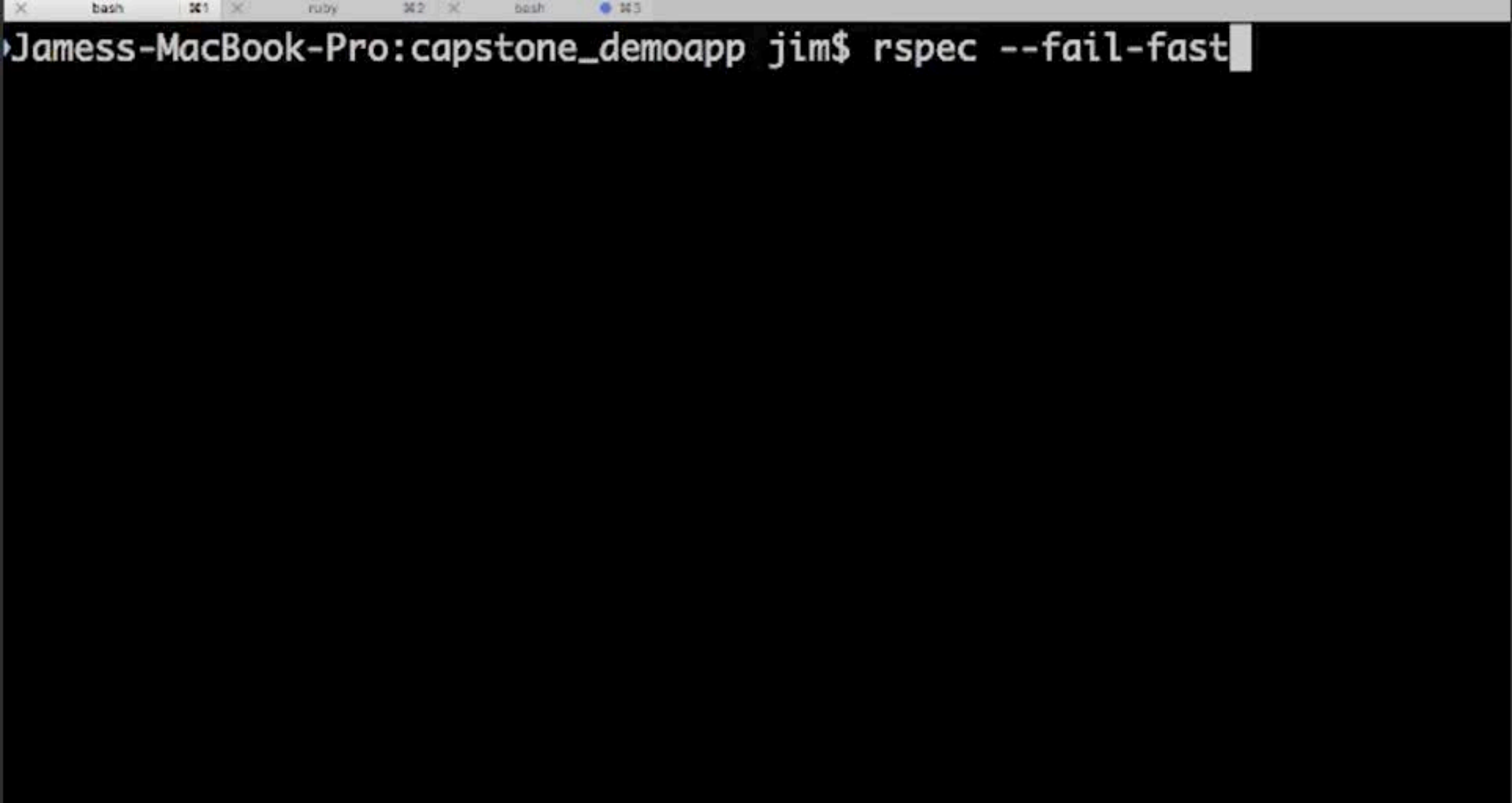
```
Jamess-MacBook-Pro:capstone_demoapp jim$ rspec --fail-fast
```

```
Jamess-MacBook-Pro:capstone_demoapp jim$ rspec --fail-fast

ApiDevelopments
  RDBMS-backed
    create RDBMS-backed model
    expose RDBMS-backed API resource
  MongoDB-backed
    create MongoDB-backed model
    expose MongoDB-backed API resource


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4 examples, 0 failures


Jamess-MacBook-Pro:capstone_demoapp jim$
```

```
Jamess-MacBook-Pro:capstone_demoapp jim$ rspec --no-fail-fast

ApiDevelopments
  RDBMS-backed
    create RDBMS-backed model
    expose RDBMS-backed API resource
  MongoDB-backed
    create MongoDB-backed model
    expose MongoDB-backed API resource

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4 examples, 0 failures

Jamess-MacBook-Pro:capstone_demoapp jim$
```

```
Jamess-MacBook-Pro:capstone_demoapp jim$ rspec --no-fail-fast

ApiDevelopments
  RDBMS-backed
    create RDBMS-backed model
    expose RDBMS-backed API resource
  MongoDB-backed
    create MongoDB-backed model
    expose MongoDB-backed API resource

Finished in 0.08403 seconds (files took 2.13 seconds to load)
4 examples, 0 failures

Jamess-MacBook-Pro:capstone_demoapp jim$ vi .rspec
```

```
  1 --color
  2 --require spec_helper
  3 --format documentation
  4 --no-fail-fast
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```

```
Jamess-MacBook-Pro:capstone_demoapp jim$ rake
/Users/jim/.rbenv/versions/2.2.3/bin/ruby -I/Users/jim/.rbenv/versions/2.2.3/lib/ruby/gems/2.2.0/gems/rspec-core
-3.5.4/lib:/Users/jim/.rbenv/versions/2.2.3/lib/ruby/gems/2.2.0/gems/rspec-support-3.5.0/lib /Users/jim/.rbenv/v
ersions/2.2.3/lib/ruby/gems/2.2.0/gems/rspec-core-3.5.4/exe/rspec --pattern spec/\*\*\{,/\*/\*\*\}/\*_spec.rb

ApiDevelopments
  RDBMS-backed
    create RDBMS-backed model
    expose RDBMS-backed API resource
  MongoDB-backed
    create MongoDB-backed model
    expose MongoDB-backed API resource


Finished in 0.10558 seconds (files took 1.58 seconds to load)
4 examples, 0 failures


Jamess-MacBook-Pro:capstone_demoapp jim$
```

```
Jamess-MacBook-Pro:capstone_demoapp jim$ docker-compose run railsvm rake db:create
Starting capstonedemoapp_mongo_1
Starting capstonedemoapp_postgres_1
Jamess-MacBook-Pro:capstone_demoapp jim$
```

```
Jamess-MacBook-Pro:capstone_demoapp jim$ docker-compose run railsvm rake db:create
Starting capstonedemoapp_mongo_1
Starting capstonedemoapp_postgres_1
Jamess-MacBook-Pro:capstone_demoapp jim$ docker-compose run railsvm rake db:migrate
== 20161202054453 CreateFoos: migrating =======================================
-- create_table(:foos)
   -> 0.0779s
== 20161202054453 CreateFoos: migrated (0.0781s) ==============================

Jamess-MacBook-Pro:capstone_demoapp jim$ docker-compose run railsvm rake
/usr/local/bin/ruby -I/usr/local/bundle/gems/rspec-core-3.5.4/lib:/usr/local/bundle/gems/rspec-support-3.5.0/lib
 /usr/local/bundle/gems/rspec-core-3.5.4/exe/rspec --pattern spec/\*\*\{,/\*/\*\*\}/\*_spec.rb
Running via Spring preloader in process 21


ApiDevelopments
  RDBMS-backed
    create RDBMS-backed model
    expose RDBMS-backed API resource
  MongoDB-backed
    create MongoDB-backed model
    expose MongoDB-backed API resource

Finished in 0.40674 seconds (files took 7.93 seconds to load)
4 examples, 0 failures

Jamess-MacBook-Pro:capstone_demoapp jim$
```

```
Jamess-MacBook-Pro:capstone_demoapp jim$ vi docker-compose.yml
```

```yaml
1 version: '2'
2 services:
3   postgres:
4     image: postgres
5     environment:
6       - POSTGRES_PASSWORD
7   mongo:
8     image: mongo
9   railsvm:
10    build: .
11    command: bundle exec rails s -p 3000 -b '0.0.0.0'
12    volumes:
13      - .:/myapp
14    ports:
15      - "3000:3000"
16    depends_on:
17      - postgres
18      - mongo
19    environment:
20      - POSTGRES_USER=postgres
21      - POSTGRES_HOST=postgres
22      - POSTGRES_PASSWORD
23      - MONGO_HOST=mongo:27017
```
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~

```yaml
 8        image: mongo
 9     railsvm:
10       build: .
11       command: bundle exec rails s -p 3000 -b '0.0.0.0'
12       volumes:
13         - .:/myapp
14       ports:
15         - "3000:3000"
16       depends_on:
17         - postgres
18         - mongo
19       environment:
20         - POSTGRES_USER=postgres
21         - POSTGRES_HOST=postgres
22         - POSTGRES_PASSWORD
23         - MONGO_HOST=mongo:27017
24   rake:
25       build: .
26       command: docker/docker-rake-commands.sh
27       volumes:
28         - .:/myapp
29       depends_on:
30         - postgres
31         - mongo
32       environment:
33         - POSTGRES_USER=postgres
34         - POSTGRES_HOST=postgres
35         - POSTGRES_PASSWORD
36         - MONGO_HOST=mongo:27017
```

```
Jamess-MacBook-Pro:capstone_demoapp jim$ vi docker-compose.yml
Jamess-MacBook-Pro:capstone_demoapp jim$ mkdir docker
Jamess-MacBook-Pro:capstone_demoapp jim$ vi docker/docker-rake-commands.sh
```

```bash
1 #!/bin/bash
2
3 set -x
4 rake db:create
5 rake db:migrate
6 rake
```

```
Jamess-MacBook-Pro:capstone_demoapp jim$ vi docker-compose.yml
Jamess-MacBook-Pro:capstone_demoapp jim$ mkdir docker
Jamess-MacBook-Pro:capstone_demoapp jim$ vi docker/docker-rake-commands.sh
Jamess-MacBook-Pro:capstone_demoapp jim$ chmod +x docker/docker-rake-commands.sh
Jamess-MacBook-Pro:capstone_demoapp jim$ 
```

```
Jamess-MacBook-Pro:capstone_demoapp jim$ docker-compose up rake
```

```
Jamess-MacBook-Pro:capstone_demoapp jim$ docker-compose up rake
Building rake
Step 1 : FROM ejavaguy/capstone_rails-onbuild:latest
# Executing 3 build triggers...
Step 1 : COPY Gemfile $APP_HOME
Step 1 : COPY Gemfile.lock $APP_HOME
Step 1 : RUN bundle install
 ---> Running in c48f21145f47
Fetching gem metadata from https://rubygems.org/.........
Fetching version metadata from https://rubygems.org/..
Fetching dependency metadata from https://rubygems.org/.
Using rake 11.3.0
Using i18n 0.7.0
Using json 1.8.3
Using minitest 5.9.1
Using thread_safe 0.3.5
Using builder 3.2.2
Using erubis 2.7.0
Using mini_portile2 2.1.0
Using rack 1.6.5
Using mime-types-data 3.2016.0521
Using arel 6.0.3
Using bson 4.1.1
Using concurrent-ruby 1.0.2
Using diff-lcs 1.2.5
Using multi_json 1.12.1
Using origin 2.2.2
Using pg 0.19.0
Using bundler 1.13.6
```

5:56 / 7:54

```
Removing intermediate container c48f2114bf47
Removing intermediate container 4636fc5641f7
Successfully built 56e023786c9d
WARNING: Image for service rake was built because it did not already exist. To rebuild this image you must use `
docker-compose build` or `docker-compose up --build`.
capstonedemoapp_postgres_1 is up-to-date
capstonedemoapp_mongo_1 is up-to-date
Creating capstonedemoapp_rake_1
Attaching to capstonedemoapp_rake_1
rake_1      | + rake db:create
rake_1      | capstone_demoapp_development already exists
rake_1      | capstone_demoapp_test already exists
rake_1      | + rake db:migrate
rake_1      | + rake
rake_1      | /usr/local/bin/ruby -I/usr/local/bundle/gems/rspec-core-3.5.4/lib:/usr/local/bundle/gems/rspec-sup
port-3.5.0/lib /usr/local/bundle/gems/rspec-core-3.5.4/exe/rspec --pattern spec/\*\*\{,/\*/\*\*\}/\*_spec.rb
rake_1      |
rake_1      | ApiDevelopments
rake_1      |   RDBMS-backed
rake_1      |     create RDBMS-backed model
rake_1      |     expose RDBMS-backed API resource
rake_1      |   MongoDB-backed
rake_1      |     create MongoDB-backed model
rake_1      |     expose MongoDB-backed API resource
rake_1      |
rake_1      | Finished in 0.21835 seconds (files took 3.42 seconds to load)
rake_1      | 4 examples, 0 failures
rake_1      |
capstonedemoapp_rake_1 exited with code 0
James-MacBook-Pro:capstone_demoapp jim$
5:58 / 7:54
```

```
capstonedemoapp_postgres_1 is up-to-date
capstonedemoapp_mongo_1 is up-to-date
Starting capstonedemoapp_rake_1
```

6:03 / 7:54

```
capstonedemoapp_postgres_1 is up-to-date
capstonedemoapp_mongo_1 is up-to-date
Starting capstonedemoapp_rake_1
Attaching to capstonedemoapp_rake_1
rake_1      | + rake db:create
rake_1      | capstone_demoapp_development already exists
rake_1      | capstone_demoapp_test already exists
rake_1      | + rake db:migrate
rake_1      | + rake
rake_1      | /usr/local/bin/ruby -I/usr/local/bundle/gems/rspec-core-3.5.4/lib:/usr/local/bundle/gems/rspec-sup
port-3.5.0/lib /usr/local/bundle/gems/rspec-core-3.5.4/exe/rspec --pattern spec/\*\*\{,/\*/\*\*\}/\*_spec.rb
rake_1      |
rake_1      | ApiDevelopments
rake_1      |   RDBMS-backed
rake_1      |     create RDBMS-backed model
rake_1      |     expose RDBMS-backed API resource
rake_1      |   MongoDB-backed
rake_1      |     create MongoDB-backed model
rake_1      |     expose MongoDB-backed API resource
rake_1      |
rake_1      | Finished in 0.22147 seconds (files took 3.29 seconds to load)
rake_1      | 4 examples, 0 failures
rake_1      |
capstonedemoapp_rake_1 exited with code 0
Jamess-MacBook-Pro:capstone_demoapp jim$
```

▶   6:07 / 7:54   ⌑   ◀)   ⚙   ↗

Juiless-MacBook-Pro:capstone_demoapp jtill$ vi docker-compose.yiit

6:17 / 7:54

```
 9   railsvm:
10     build: .
11     command: bundle exec rails s -p 3000 -b '0.0.0.0'
12     volumes:
13       - .:/myapp
14     ports:
15       - "3000:3000"
16     depends_on:
17       - postgres
18       - mongo
19     environment:
20       - POSTGRES_USER=postgres
21       - POSTGRES_HOST=postgres
22       - POSTGRES_PASSWORD
23       - MONGO_HOST=mongo:27017
24   rake:
25     build: .
26     command: docker/docker-rake-commands.sh
27     volumes:
28       - .:/myapp
29     depends_on:
30       - postgres
31       - mongo
32     environment:
33       - POSTGRES_USER=postgres
34       - POSTGRES_HOST=postgres
35       - POSTGRES_PASSWORD
36       - MONGO_HOST=mongo:27017
```

-- VISUAL LINE --

6:18 / 7:54

```yaml
22      - POSTGRES_PASSWORD
23      - MONGO_HOST=mongo:27017
24  rake:
25      build: .
26      command: docker/docker-rake-commands.sh
27      volumes:
28        - .:/myapp
29      depends_on:
30        - postgres
31        - mongo
32      environment:
33        - POSTGRES_USER=postgres
34        - POSTGRES_HOST=postgres
35        - POSTGRES_PASSWORD
36        - MONGO_HOST=mongo:27017
37  test:
38      build: .
39      command: docker/docker-rake-commands.sh
40      volumes:
41        - .:/myapp
42      depends_on:
43        - postgres
44        - mongo
45      environment:
46        - POSTGRES_USER=postgres
47        - POSTGRES_HOST=postgres
48        - POSTGRES_PASSWORD
49        - MONGO_HOST=mongo:27017
```

▶ 6:23 / 7:54

```
22      - POSTGRES_PASSWORD
23      - MONGO_HOST=mongo:27017
24   rake:
25       build: .
26       command: docker/docker-rake-commands.sh
27       volumes:
28         - .:/myapp
29       depends_on:
30         - postgres
31         - mongo
32       environment:
33         - POSTGRES_USER=postgres
34         - POSTGRES_HOST=postgres
35         - POSTGRES_PASSWORD
36         - MONGO_HOST=mongo:27017
37   test:
38       build: .
39       command: docker/docker-test-commands.sh
40       volumes:
41         - .:/myapp
42       depends_on:
43         - postgres
44         - mongo
45       environment:
46         - POSTGRES_USER=postgres
47         - POSTGRES_HOST=postgres
48         - POSTGRES_PASSWORD
49         - MONGO_HOST=mongo:27017
```
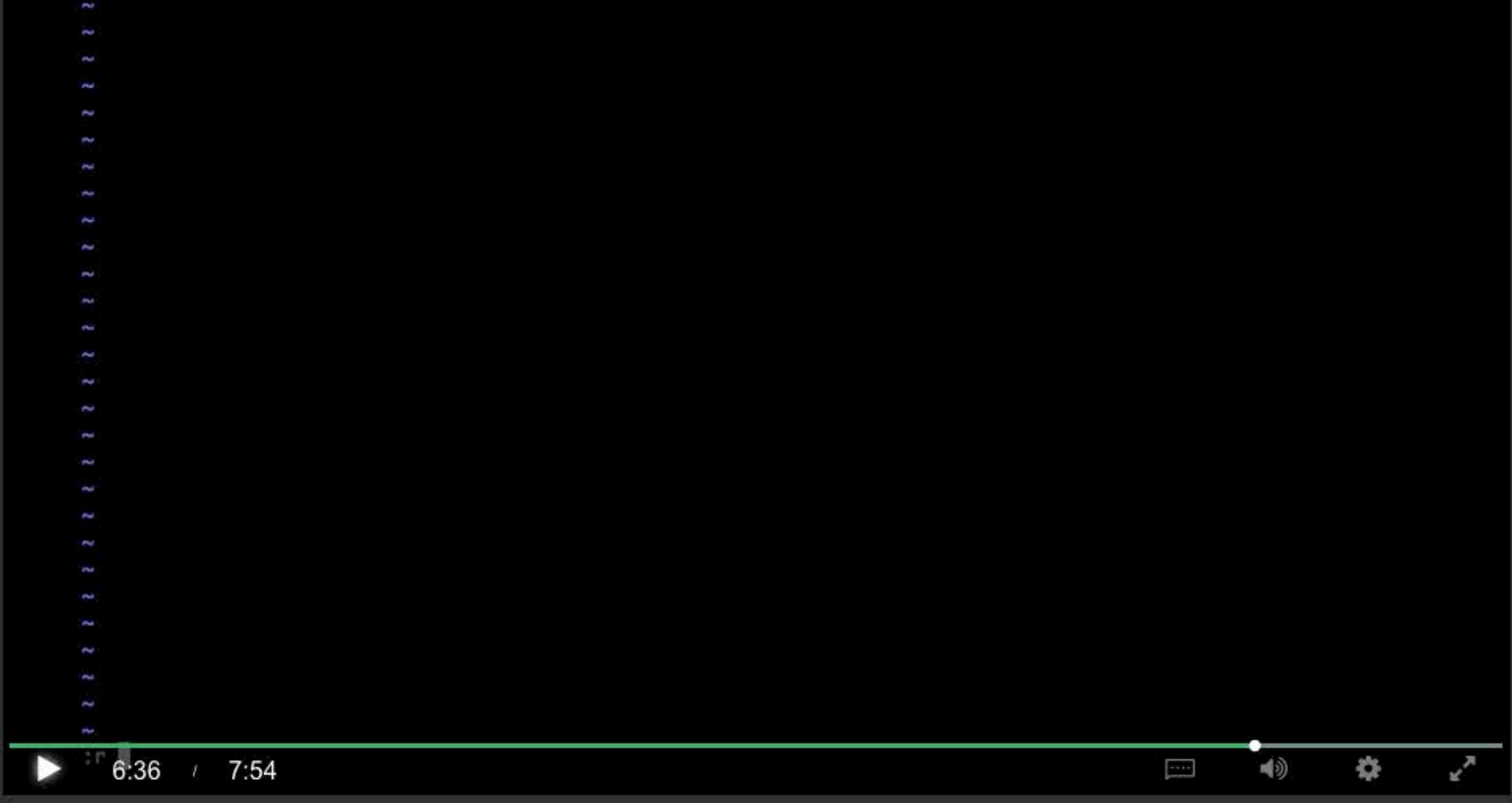
```
Jamess-MacBook-Pro:capstone_demoapp jim$ vi docker/docker-test-commands.sh
```

```bash
 2 #!/bin/bash
 3
 4 set -x
 5 rake db:create
 6 rake db:migrate
 7 rake
```

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"docker/docker-rake-commands.sh" 6L, 57C

6:40 / 7:54

```
  2
  3 set -x
  4 rake db:create
  5 rake db:migrate
  6 rake
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"docker/docker-test-commands.sh" [New] 6L, 57C written
```

```
2
3 set -x
4 rake db:create
5 rake db:migrate
6 rspec spec/requests --fail-fast
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:w
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```
Jamess-MacBook-Pro:capstone_demoapp jim$ docker-compose up test
capstonedemoapp_mongo_1 is up-to-date
capstonedemoapp_postgres_1 is up-to-date
Starting capstonedemoapp_test_1

ERROR: for test  Cannot start service test: invalid header field value "oci runtime error: container_linux.go:24
7: starting container process caused \"exec: \\\"docker/docker-test-commands.sh\\\": permission denied\"\n"
ERROR: Encountered errors while bringing up the project.
Jamess-MacBook-Pro:capstone_demoapp jim$
```

```
Jamess-MacBook-Pro:capstone_demoapp jim$ chmod +x docker/docker-test-commands.sh
Jamess-MacBook-Pro:capstone_demoapp jim$ docker-compose up test
capstonedemoapp_mongo_1 is up-to-date
capstonedemoapp_postgres_1 is up-to-date
Starting capstonedemoapp_test_1
Attaching to capstonedemoapp_test_1
test_1     | + rake db:create
test_1     | capstone_demoapp_development already exists
test_1     | capstone_demoapp_test already exists
test_1     | + rake db:migrate
test_1     | + rspec spec/requests --fail-fast
test_1     |
test_1     | ApiDevelopments
test_1     |   RDBMS-backed
test_1     |     create RDBMS-backed model
test_1     |     expose RDBMS-backed API resource
test_1     |   MongoDB-backed
test_1     |     create MongoDB-backed model
test_1     |     expose MongoDB-backed API resource
test_1     |
test_1     | Finished in 0.2378 seconds (files took 3.72 seconds to load)
test_1     | 4 examples, 0 failures
test_1     |
capstonedemoapp_test_1 exited with code 0
```

Summary

- ♢ Tests
  - Are necessary
  - Are not always easy
- ♢ Automated Tests
  - May be even harder to implement than manual tests
  - Provide time savings and peace of mind when making late changes

What's Next?

- ♢ Web Service Development Wrap-up Topics