

Just in Time with Kotlin

Project Journey at Pivotal Labs



Pivotal **Labs**

| **Kotlin Meetup**

Agenda

Nice stuff that Kotlin offers with a sample project

- Start a project
- Kotlin Compiler and Plugins
- Data class and fun single-expression
- Nullables, it and IDE
- Sealed Classes and when





I want the cheapest beer!

I have this app "Mr Beer" that tells you the prices of beer around.

But I prefer Rosé, does the app have that?

No :(






Where is my Rosé?



Backlog

- See a list of places 
- See the location of a place
- Add a new place
- Add location to a place
- ...
- See places within a price range
- Remove a place
- See the list in a map
- ...

See a list of places

As a wine enthusiast

I want to see a list of places with rosé

So that I can find the best price of rosé

Given I want to find the best price of rosé in Paris

When I open Where is my rosé page

Then I see a list of places with the name and price



<http://start.spring.io/>



Spring Initializr

start.spring.io

SPRING INITIALIZR bootstrap your application now

Generate a

Maven Project

 with

Kotlin

 and Spring Boot

1.5.4

Project Metadata

Artifact coordinates

Group

io.pivotal

Artifact

whereismyrose

Dependencies

Add Spring Boot Starters and dependencies to your application

Search for dependencies

Web, Security, JPA, Actuator, Devtools...

Selected Dependencies

Web

Rest Repositories

DevTools

Generate Project

Don't know what to look for? Want more options? [Switch to the full version.](#)

start.spring.io is powered by [Spring Initializr](#) and [Pivotal Web Services](#)



Kotlin Compiler and Plugins

```
<build>
  <sourceDirectory>${project.basedir}/src/main/kotlin</sourceDirectory>
  <testSourceDirectory>${project.basedir}/src/test/kotlin</testSourceDirectory>
  <plugins>
    <plugin>
      <groupId>org.springframework.boot</groupId>
      <artifactId>spring-boot-maven-plugin</artifactId>
    </plugin>
    <plugin>
      <artifactId>kotlin-maven-plugin</artifactId>
      <groupId>org.jetbrains.kotlin</groupId>
      <version>${kotlin.version}</version>
      <configuration>
        <compilerPlugins>
          <plugin>spring</plugin>
        </compilerPlugins>
        <jvmTarget>1.8</jvmTarget>
      </configuration>
      <executions>
        <execution>
          <id>compile</id>
          <phase>compile</phase>
          <goals>
            <goal>compile</goal>
          </goals>
        </execution>
        <execution>
          <id>test-compile</id>
          <phase>test-compile</phase>
          <goals>
            <goal>test-compile</goal>
          </goals>
        </execution>
      </executions>
      <dependencies>
        <dependency>
          <groupId>org.jetbrains.kotlin</groupId>
          <artifactId>kotlin-maven-allopen</artifactId>
          <version>${kotlin.version}</version>
        </dependency>
      </dependencies>
    </plugin>
  </plugins>
</build>
```

pom.xml

```
<properties>
  <kotlin.compiler.incremental>true</kotlin.compiler.incremental>
  <project.build.sourceEncoding>UTF-8</project.build.sourceEncoding>
  <project.reporting.outputEncoding>UTF-8</project.reporting.outputEncoding>
  <java.version>1.8</java.version>
  <kotlin.version>1.1.3-2</kotlin.version>
</properties>

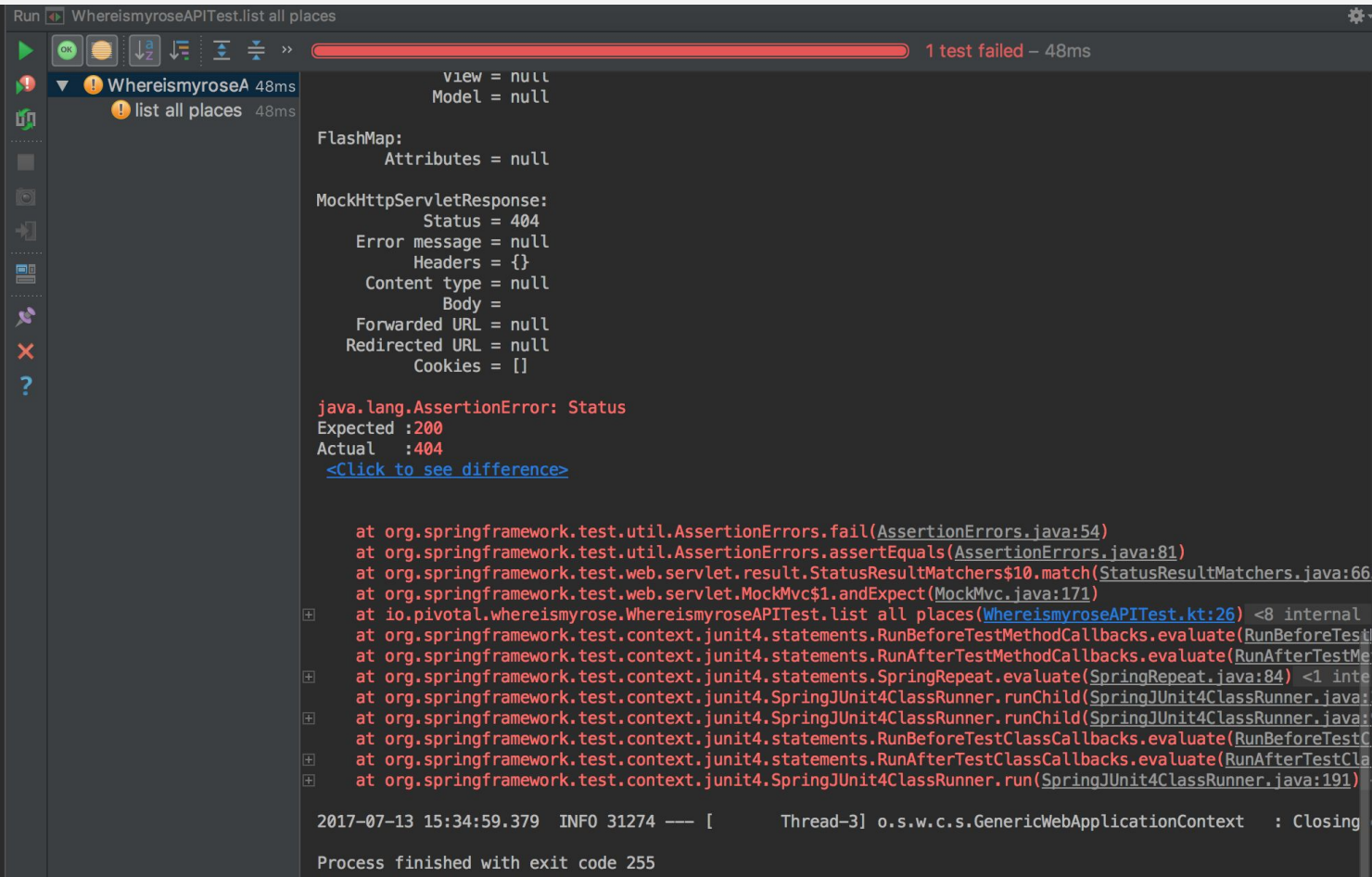
<dependency>
  <groupId>org.jetbrains.kotlin</groupId>
  <artifactId>kotlin-stdlib-jre8</artifactId>
  <version>${kotlin.version}</version>
</dependency>
<dependency>
  <groupId>org.jetbrains.kotlin</groupId>
  <artifactId>kotlin-reflect</artifactId>
  <version>${kotlin.version}</version>
</dependency>
```

TDD & Learning with pairing

```
@RunWith(SpringRunner::class)
@WebMvcTest
class WhereIsMyRoseAPITest {
    @Autowired lateinit var mockMvc: MockMvc

    @Test fun `list all places`() {
        mockMvc.perform(get("/api/places"))
            .andExpect(status().isOk)
            .andExpect(jsonPath(
                "$[*].name",
                equalTo(listOf("Kotlin Meetup", "Rose Bar"))
            ))
            .andExpect(jsonPath(
                "$[*].price",
                equalTo(listOf(2.0, 3.3))
            ))
    }
}
```

TDD & Learning with pairing



The screenshot shows an IDE window titled "WhereismyroseAPITest.list all places". The top status bar indicates "1 test failed - 48ms". The left sidebar shows a tree view with "WhereismyroseA 48ms" and "list all places 48ms". The main editor displays the following content:

```
view = null
Model = null

FlashMap:
  Attributes = null

MockHttpServletResponse:
  Status = 404
  Error message = null
  Headers = {}
  Content type = null
  Body =
  Forwarded URL = null
  Redirected URL = null
  Cookies = []

java.lang.AssertionError: Status
Expected :200
Actual   :404
<Click to see difference>

at org.springframework.test.util.AssertionErrors.fail(AssertionErrors.java:54)
at org.springframework.test.util.AssertionErrors.assertEquals(AssertionErrors.java:81)
at org.springframework.test.web.servlet.result.StatusResultMatchers$10.match(StatusResultMatchers.java:66)
at org.springframework.test.web.servlet.MockMvc$1.andExpect(MockMvc.java:171)
at io.pivotal.whereismyrose.WhereismyroseAPITest.list all places(WhereismyroseAPITest.kt:26) <8 internal
at org.springframework.test.context.junit4.statements.RunBeforeTestMethodCallbacks.evaluate(RunBeforeTestMe
at org.springframework.test.context.junit4.statements.RunAfterTestMethodCallbacks.evaluate(RunAfterTestMe
at org.springframework.test.context.junit4.statements.SpringRepeat.evaluate(SpringRepeat.java:84) <1 inte
at org.springframework.test.context.junit4.SpringJUnit4ClassRunner.runChild(SpringJUnit4ClassRunner.java:
at org.springframework.test.context.junit4.SpringJUnit4ClassRunner.runChild(SpringJUnit4ClassRunner.java:
at org.springframework.test.context.junit4.statements.RunBeforeTestClassCallbacks.evaluate(RunBeforeTestC
at org.springframework.test.context.junit4.statements.RunAfterTestClassCallbacks.evaluate(RunAfterTestCla
at org.springframework.test.context.junit4.SpringJUnit4ClassRunner.run(SpringJUnit4ClassRunner.java:191)

2017-07-13 15:34:59.379 INFO 31274 --- [ Thread-3] o.s.w.c.s.GenericWebApplicationContext : Closing
Process finished with exit code 255
```


Data class and fun single-expression

```
data class Place(val name: String, val price: Double)

@RestController
@RequestMapping("/api")
class WhereIsMyRoseAPI {

    @RequestMapping("/places")
    fun listPlaces() = listOf(
        Place(name = "Kotlin Meetup", price = 2.0),
        Place(name = "Rose Bar", price = 3.3)
    )
}
```

Run WhereismyroseAPITest.list all places



WhereismyroseAPITest (io.pivotal.whereismyrose)	92ms
list all places	92ms

1 test passed – 92ms

Backlog

- ✓ ~~See a list of places~~
- ✓ ~~See the location of a place~~
- ✓ ~~Add a new place~~
- ✓ ~~Add location to a place~~
- ✓ ...
- **See places within a price range** ←
- Remove a place
- See the list in a map
- ...

See places within a price range

As a wine enthusiast

I want to see a list of places regarding their price

So that I can find the location within my price range

Given I want to find a location of rosé in Paris

When I inform a price range

Then I see a list of places with rosé price in the range



Nullables, it and IDE

```
@Test fun `list places within a price range`() {
    mockMvc.perform(get("/api/places?minPrice=2.0&maxPrice=3.0"))
        .andExpect(status().isOk)
        .andExpect(jsonPath("$.[*].name", equalTo(listOf("Kotlin Meetup"))))
        .andExpect(jsonPath("$.[*].price", equalTo(listOf(2.0))))
    mockMvc.perform(get("/api/places?minPrice=2.0&maxPrice=3.3"))
        .andExpect(status().isOk)
        .andExpect(jsonPath("$.[*].name", equalTo(listOf("Kotlin Meetup", "Rose Bar"))))
        .andExpect(jsonPath("$.[*].price", equalTo(listOf(2.0, 3.3))))
    mockMvc.perform(get("/api/places?minPrice=3.0&maxPrice=4.0"))
        .andExpect(status().isOk)
        .andExpect(jsonPath("$.[*].name", equalTo(listOf("Rose Bar"))))
        .andExpect(jsonPath("$.[*].price", equalTo(listOf(3.3))))
}
```

Run WhereIsMyRoseAPITest.list places within a price range

1 test failed – 563ms

WhereIsMyRoseAPITest (ic 563ms)

list places within a price range 563ms

Looks like = []

java.lang.AssertionError: JSON path "\$[*].name"
Expected: <[Kotlin Meetup]>
but: was <["Kotlin Meetup","Rose Bar"]>

at org.hamcrest.MatcherAssert.assertThat(MatcherAssert.java:20)
at org.springframework.test.util.JsonPathExpectationsHelper.assertValue(JsonPathExpectationsHelper.java:75)
at org.springframework.test.web.servlet.result.JsonPathResultMatchers.lambda\$value\$0(JsonPathResultMatchers.java:85)
at org.springframework.test.web.servlet.MockMvc\$1.andExpect(MockMvc.java:162)
at io.pivotal.WhereIsMyRose.controllers.WhereIsMyRoseAPITest.list places within a price range(WhereIsMyRoseAPITest.kt:42) <8 in
at org.springframework.test.context.junit4.statements.RunBeforeTestExecutionCallbacks.evaluate(RunBeforeTestExecutionCallbacks

Nullables, it and IDE

```
@RequestMapping("/places")
fun listPlaces(
    @RequestParam(required = false) minPrice: Double?,
    @RequestParam(required = false) maxPrice: Double?
) = listOf(
    Place(name = "Kotlin Meetup", price = 2.0),
    Place(name = "Rose Bar", price = 3.3)
).filter {
    it.price >= minPrice && it.price <= maxPrice
}
```

Convert to range check [more...](#) (%F1)

```
it.price >= minPrice && it.price <= maxPrice
```

None of the following functions can be called with the arguments supplied.

- `compareTo(Byte)` defined in `kotlin.Double`
- `compareTo(Double)` defined in `kotlin.Double`
- `compareTo(Float)` defined in `kotlin.Double`
- `compareTo(Int)` defined in `kotlin.Double`
- `compareTo(Long)` defined in `kotlin.Double`
- `compareTo(Short)` defined in `kotlin.Double`

Nullables, it and IDE

```
@RequestMapping("/places")
fun listPlaces(
    @RequestParam(required = false) minPrice: Double?,
    @RequestParam(required = false) maxPrice: Double?
) = listOf(
    Place(name = "Kotlin Meetup", price = 2.0),
    Place(name = "Rose Bar", price = 3.3)
).filter {
    it.price in (minPrice ?: Double.NEGATIVE_INFINITY)..(maxPrice ?: Double.POSITIVE_INFINITY)
}
```


Run WhereIsMyRoseAPITest

All 2 tests passed – 631ms

▼ OK WhereIsMyRoseAPITest (io 631ms)
OK list all places 585ms
OK list places within a price 46ms

/Library/Java/JavaVirtualMachines/jdk1.8.0_121.jdk/Contents/Home/bin/java ...
objc[17479]: Class JavaLaunchHelper is implemented in both /Library/Java/JavaVirtualMachines/jdk1.8.0_121.jdk/Contents/Home/bin/java (0x...
18:21:00.844 [main] DEBUG org.springframework.test.context.junit4.SpringJUnit4ClassRunner - SpringJUnit4ClassRunner constructor called w...
18:21:00.876 [main] DEBUG org.springframework.test.context.BootstrapUtils - Instantiating CacheAwareContextLoaderDelegate from class [org...
18:21:00.900 [main] DEBUG org.springframework.test.context.BootstrapUtils - Instantiating BootstrapContext using constructor [public org...
18:21:00.962 [main] DEBUG org.springframework.test.context.BootstrapUtils - Instantiating TestContextBootstrapper for test class [io.piv...
18:21:00.988 [main] INFO org.springframework.test.context.BootstrapUtils - Instantiating TestContextBootstrapper: org.springframework.test.context.BootstrapUtils

Backlog

- ✓ ~~See a list of places~~
- ✓ ~~See the location of a place~~
- ✓ ~~Add a new place~~
- ✓ ~~Add location to a place~~
- ✓ ...
- ✓ See places within a price range
 - **See error when price range is invalid** 
 - See the list in a map
 - ...

See error when price range is invalid

As a wine enthusiast

I want to see a list of places and their location

So that I can find the location with best price of rosé

Given I want to find a location of rosé in Paris

When I open Where is my rosé page

Then I see a list of places with the location



Sealed Classes and when

```
@Test fun `get error if minPrice is bigger than maxPrice`() {  
    mockMvc.perform(get("/api/places?minPrice=42.0&maxPrice=1.0"))  
        .andExpect(status().isBadRequest)  
        .andExpect(jsonPath("$.message", equalTo("maxPrice must be bigger than minPrice")))  
}
```

Run WhereIsMyRoseAPITest.get error if minPrice is bigger than maxPrice

1 test failed – 545ms

WhereIsMyRoseAPITest (ic 545ms)
get error if minPrice is | 545ms

Headers = {Content-Type=[application/json;charset=UTF-8]}
Content type = application/json;charset=UTF-8
Body = []
Forwarded URL = null
Redirected URL = null
Cookies = []

java.lang.AssertionError: Status
Expected :400
Actual :200
[<Click to see difference>](#)

Sealed Classes and when

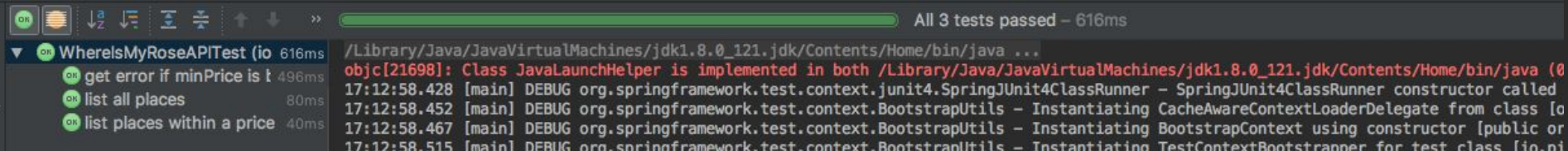
```
fun getListPlaces(minPrice: Double?, maxPrice: Double?) = listOf(
    Place(name = "Kotlin Meetup", price = 2.0),
    Place(name = "Rose Bar", price = 3.3)
).filter {
    it.price in (minPrice ?: Double.NEGATIVE_INFINITY)..(maxPrice ?: Double.POSITIVE_INFINITY)
}
```

Sealed Classes and when

```
sealed class PriceStatus(val message: String)
object ErrorInvalidRange : PriceStatus("maxPrice must be bigger than minPrice")
object OK : PriceStatus("Price is OK")

fun validatePrice(minPrice: Double?, maxPrice: Double?): PriceStatus =
    if (minPrice != null && maxPrice != null && minPrice > maxPrice) ErrorInvalidRange
    else OK

@RequestMapping("/places")
fun listPlaces(
    @RequestParam(required = false) minPrice: Double?,
    @RequestParam(required = false) maxPrice: Double?
): ResponseEntity<Any> = when (validatePrice(minPrice, maxPrice)) {
    is ErrorInvalidRange -> ResponseEntity.badRequest().body(ErrorInvalidRange)
    is OK -> ResponseEntity.ok().body(getListPlaces(minPrice, maxPrice))
}
```



<https://github.com/karinepires/kotlin-meetup>



Thanks!

Do the right thing

Do what works

Be kind

