No API? No problem!

API mocking with WireMock

An open source workshop by …

Originally created by Bas Dijkstra - bas@ontestautomation.com - https://www.ontestautomation.com

What are we going to do?

_Stubbing, mocking and service virtualization

_WireMock

_Exercises, examples, …

Preparation

_Install JDK (Java 8 preferred)

_Install IntelliJ IDEA (or any other IDE)

_Download or clone project

_Import Maven project in IDE

Section 0:

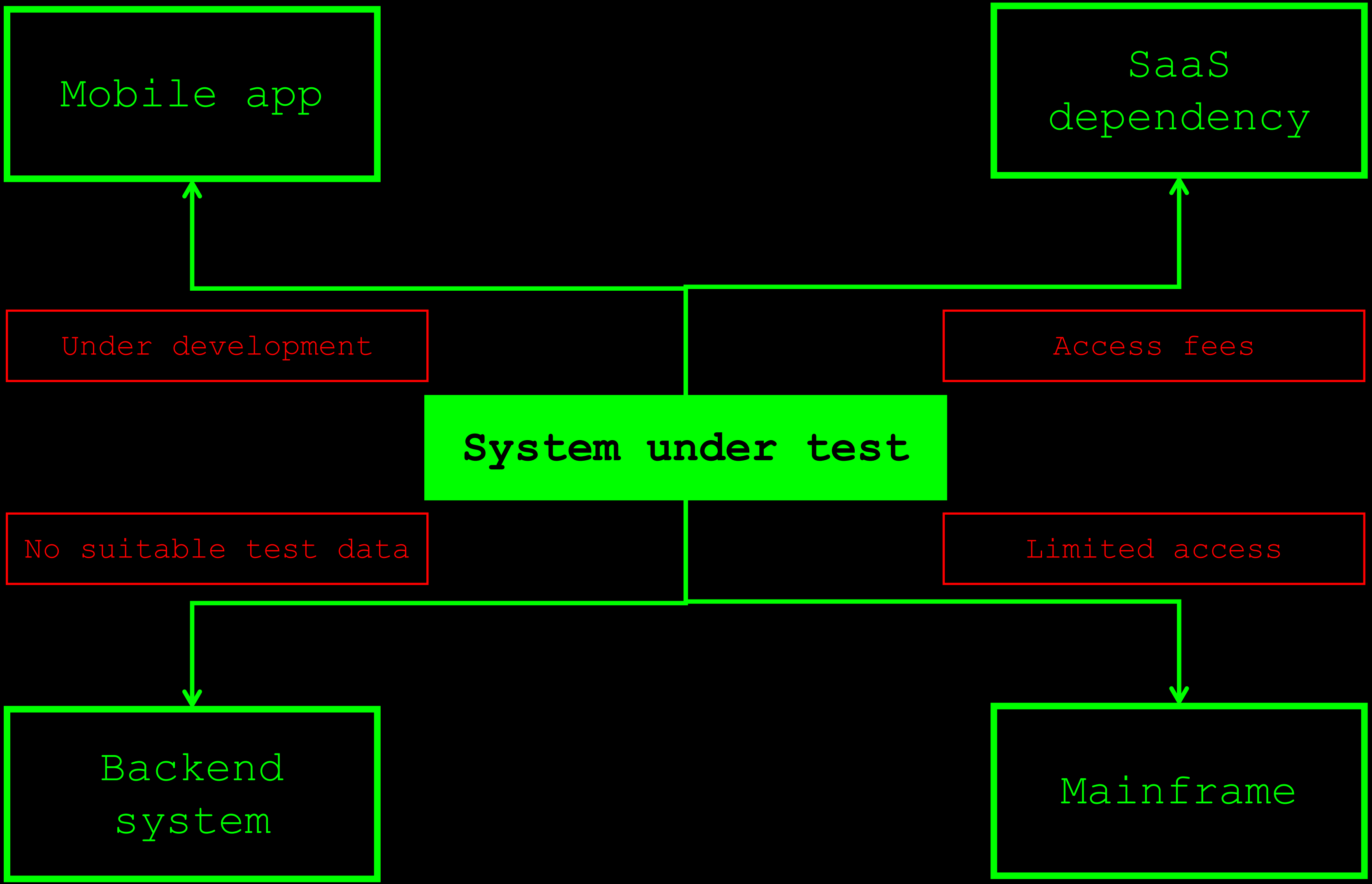
An introduction to service virtualization

Problems in test environments

- Systems are constructed out of of many different components

- Not all of these components are always available for testing
  - Parallel development
  - No control over testdata
  - Fees required for using third party component
  - …

Problems in test environments



Simulation during test execution

- _Simulate dependency **behaviour**

- _Regain full control over test environment
  - _Available on demand
  - _Full control over test data (edge cases!)
  - _No third party component usage fees
  - _…

Stubbing

_Predefined responses

_No flexibility

_Status verification

Mocking

_Define mock behavior during test initialization

_(Somewhat) more flexible

_Behaviour verification

Service virtualization

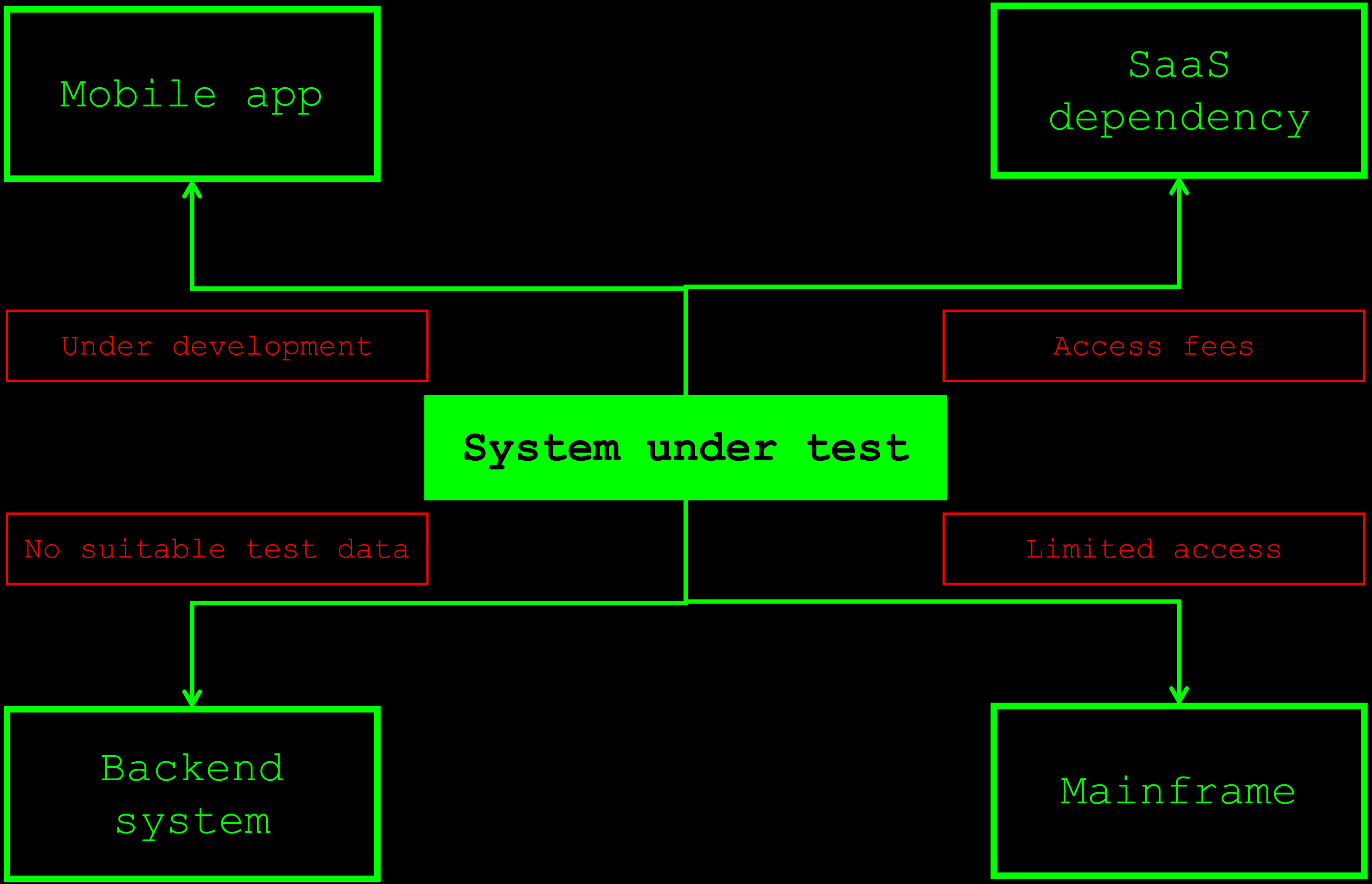
_Simulate complex dependency behaviour

_'Enterprise level' stubbing / mocking

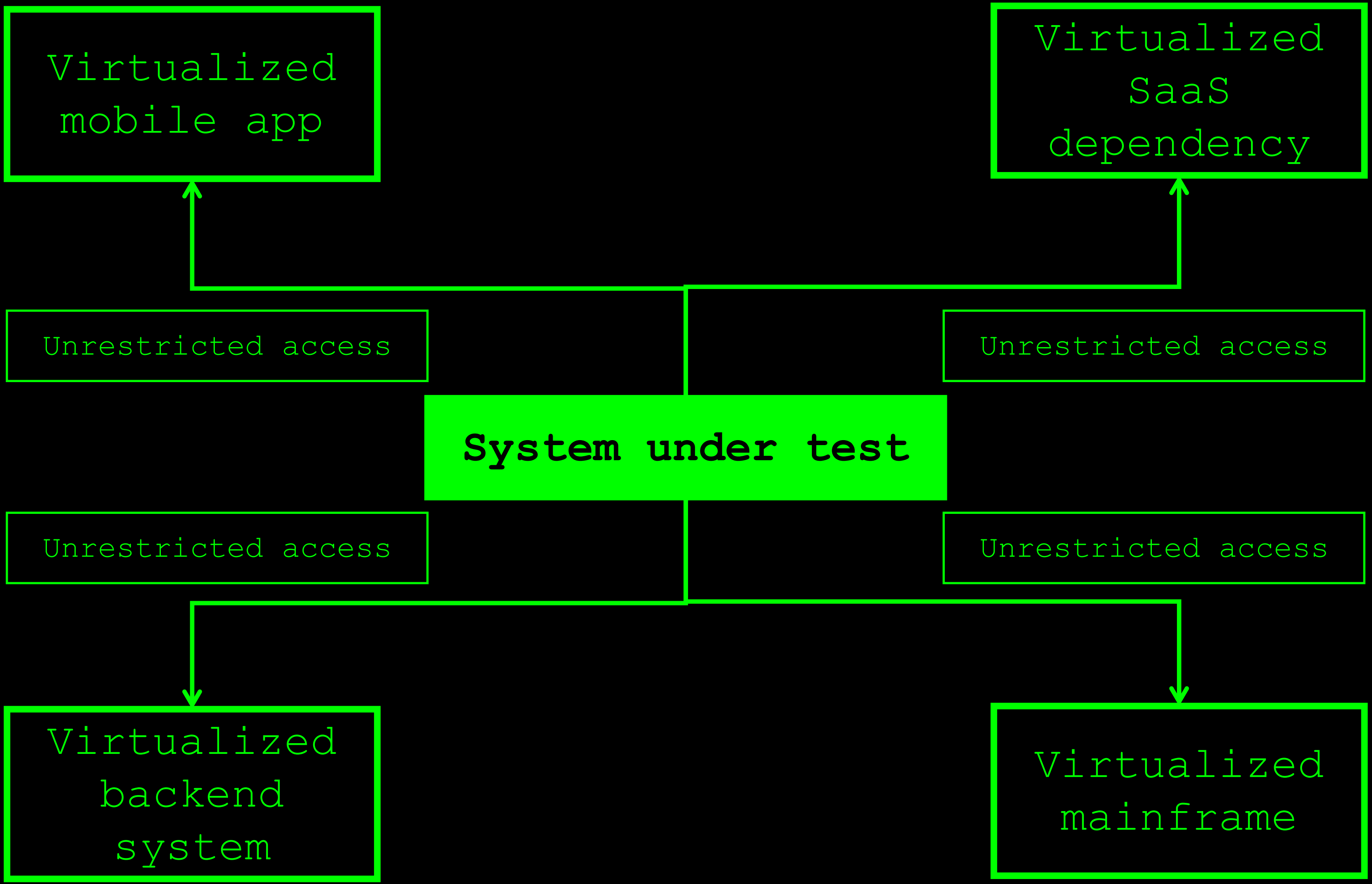
_Support for many different protocols and message formats

_Data driven

Problems in test environments



Simulation in test environments



Our API under test

_Zippopotam.us

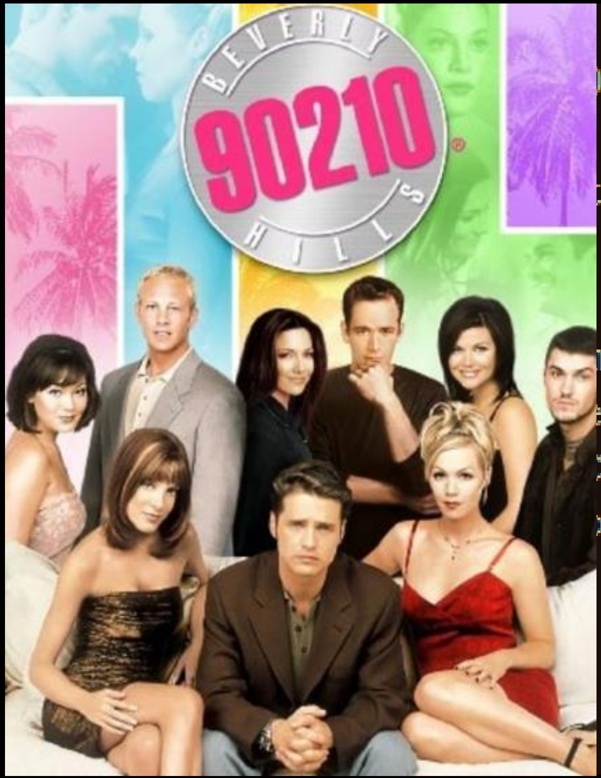
_Returns location data based on country and zip code

_http://api.zippopotam.us/

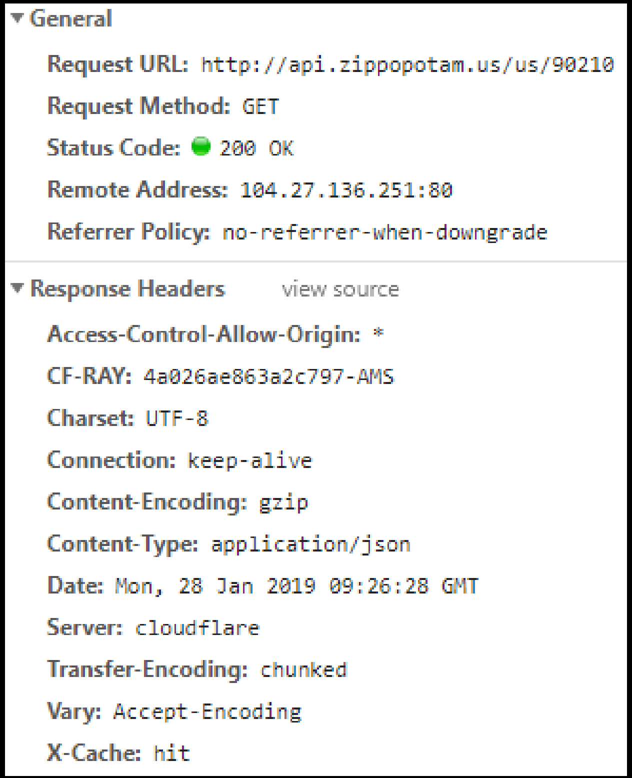
_RESTful API

An example

_GET http://api.zippopotam.us/us/90210



```
)",
 States",
:ion: "US",

le: "Beverly Hills",
e: "-118.4065",
California",
oreviation: "CA",
 "34.0901"
```

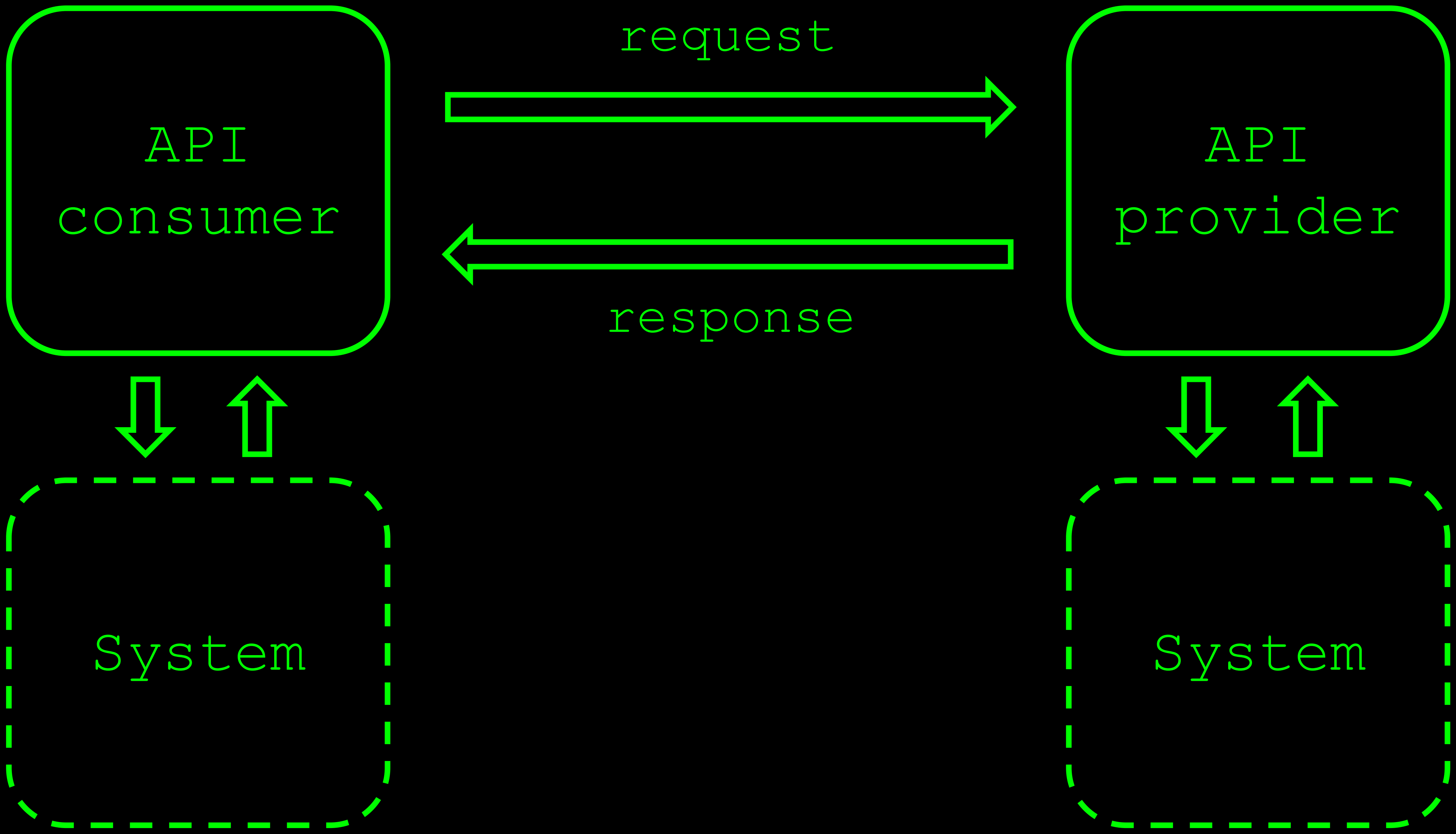


▼ General

Request URL: http://api.zippopotam.us/us/90210
Request Method: GET
Status Code: ● 200 OK
Remote Address: 104.27.136.251:80
Referrer Policy: no-referrer-when-downgrade

▼ Response Headers view source

Access-Control-Allow-Origin: *
CF-RAY: 4a026ae863a2c797-AMS
Charset: UTF-8
Connection: keep-alive
Content-Encoding: gzip
Content-Type: application/json
Date: Mon, 28 Jan 2019 09:26:28 GMT
Server: cloudflare
Transfer-Encoding: chunked
Vary: Accept-Encoding
X-Cache: hit


request
API consumer
API provider
response
System
System

Supporting operations other than GET

Creating specific responses for edge cases

What might we want to simulate?

Delays, fault status codes, malformatted responses, …

…

Section 1:

Getting started with WireMock

WireMock

_http://wiremock.org

_Java

_HTTP mock server

  _only supports HTTP(S)

_open source

  _developed and maintained by Tom Akehurst

Install WireMock

_Maven

```
<dependency>
     <groupId>com.github.tomakehurst</groupId>
     <artifactId>wiremock-jre8</artifactId>
     <version>2.23.0</version>
    <scope>test</test>
</dependency>
```

Starting WireMock (JUnit 4)

_Via JUnit 4 @Rule

```
@Rule
public WireMockRule wireMockRule = new WireMockRule( port: 9876);
```

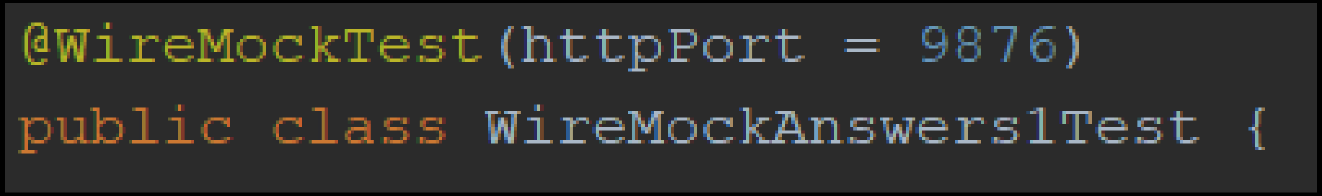
_Without using JUnit 4 @Rule

```
WireMockServer wireMockServer =
        new WireMockServer(new WireMockConfiguration().port(9876));

wireMockServer.start();
```

Starting WireMock (JUnit 5)

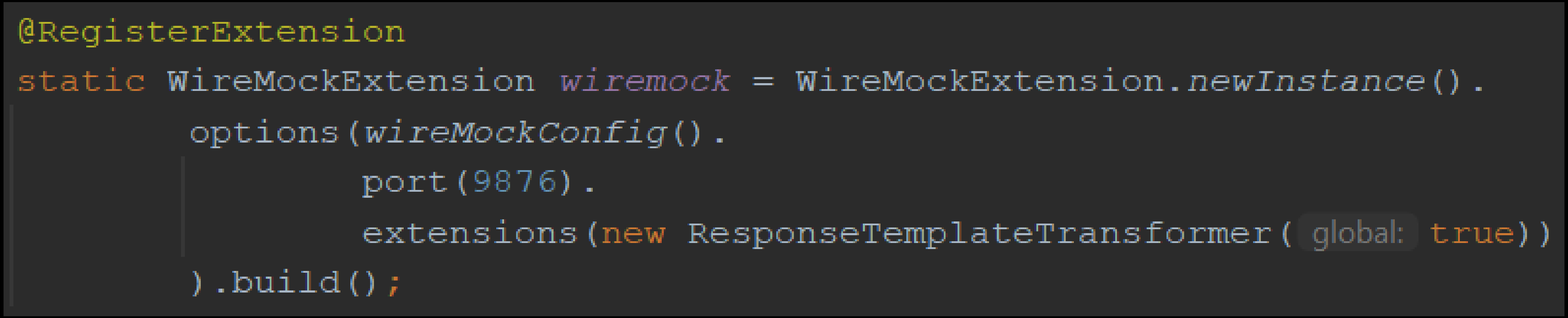
_Uses the JUnit 5 Jupiter extension mechanism

_Via @WireMockTest class annotation (basic configuration)



```java
@WireMockTest(httpPort = 9876)
public class WireMockAnswers1Test {
```

_Programmatically using @RegisterExtension (full control)



```java
@RegisterExtension
static WireMockExtension wiremock = WireMockExtension.newInstance().
        options(wireMockConfig().
                port(9876).
                extensions(new ResponseTemplateTransformer( global: true))
        ).build();
```

Starting WireMock (standalone)

_Useful for exploratory testing purposes

_Allows you to share WireMock instances between teams

_Long-running instances

_Download the .jar first

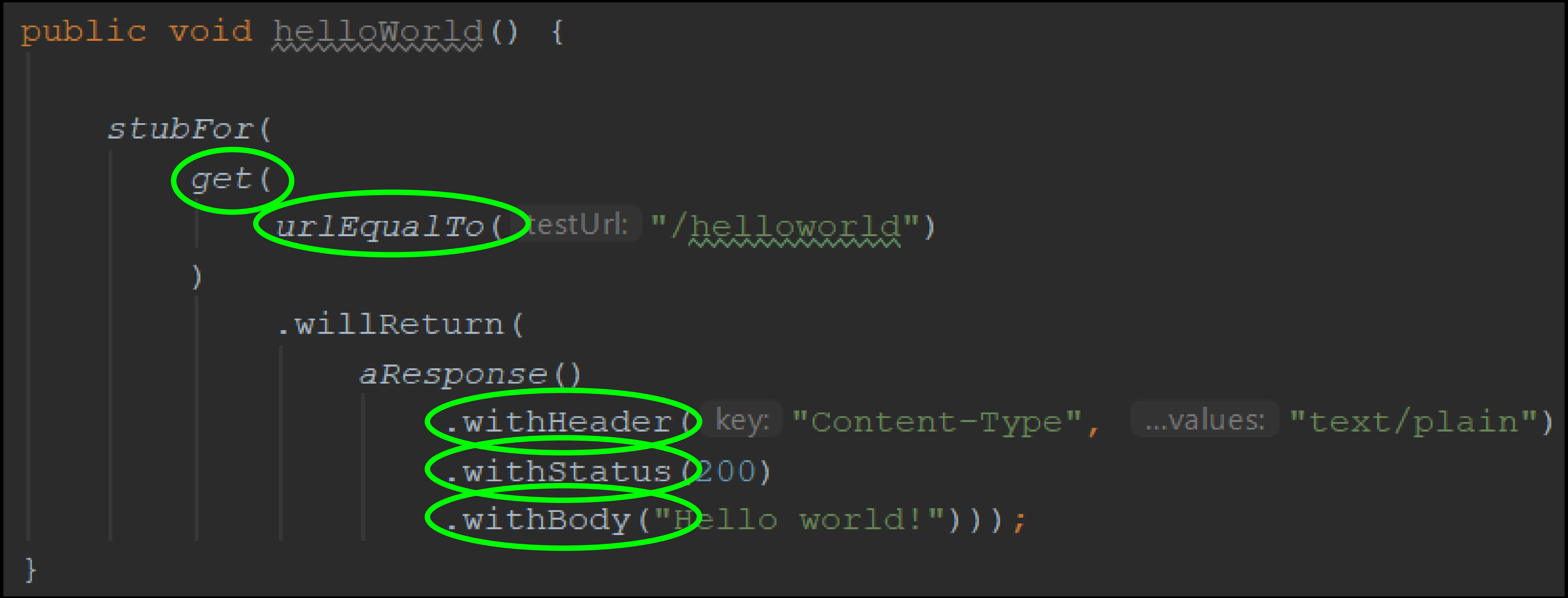
```
java -jar wiremock-standalone-2.32.0.jar --port 9876
```

Configure responses

_In (Java) code

_Using JSON mapping files

An example mock defined in Java



```
public void helloWorld() {

    stubFor(
        get(
            urlEqualTo( testUrl: "/helloworld")
        )
            .willReturn(
                aResponse()
                    .withHeader( key: "Content-Type",  ...values: "text/plain")
                    .withStatus(200)
                    .withBody("Hello world!")));
}
```

Some useful WireMock features

- _Verification
  - _Verify that certain requests are sent by application under test
- _Record and playback
  - _Generate mocks based on request-response pairs (traffic)
- _Fault simulation
- _…
- _Full documentation at http://wiremock.org/docs/

Now it's your turn!

_exercises > WireMockExercises1Test.java

_Create a couple of basic mocks
  _Implement the responses as described in the comments

_Verify your solution by running the tests in the same file

_Answers are in answers > WireMockAnswers1Test.java

_Examples are in examples > WireMockExamples.java

Section 2:

Request matching strategies and fault simulation

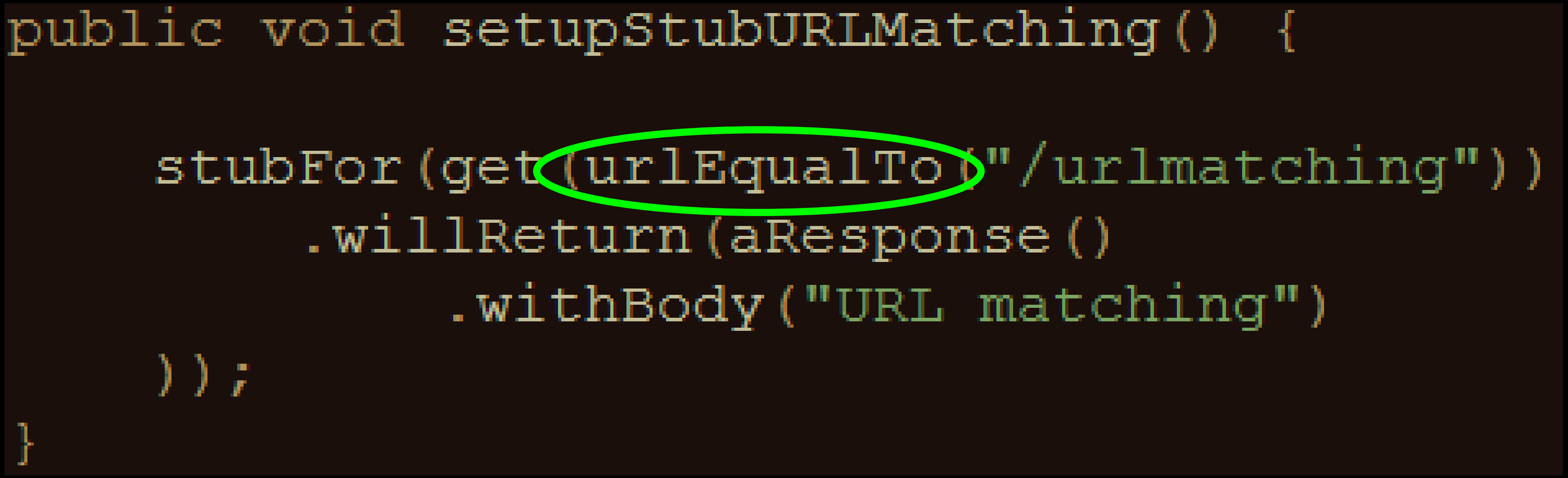
Request matching

_Send a response only when certain properties in the request are matched

_Options for request matching:

- _URL
- _HTTP method
- _Query parameters
- _Headers
- _Request body elements
- _…

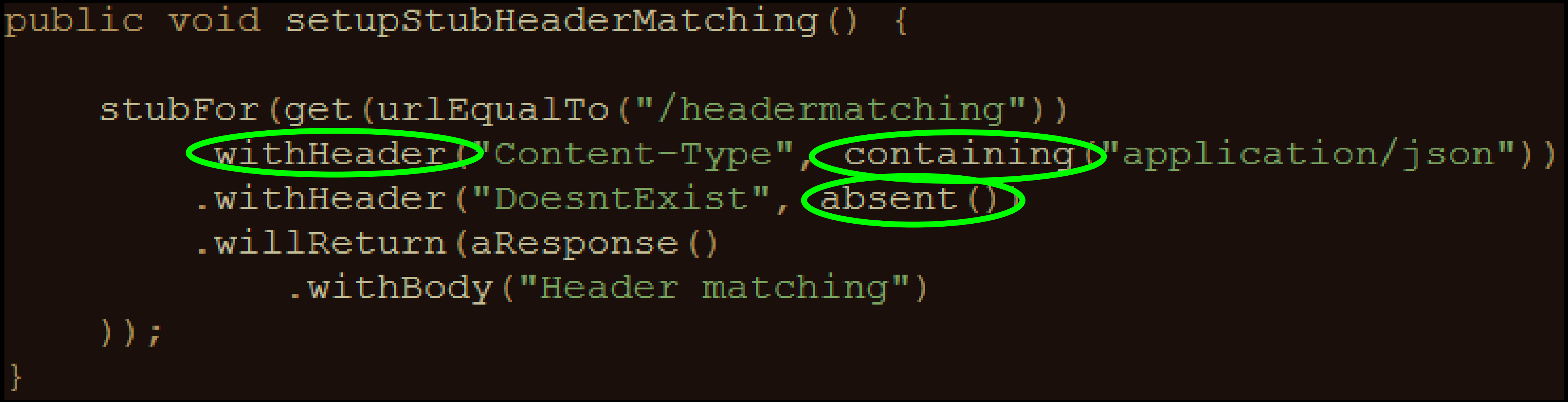
Example: URL matching (Java)



```
public void setupStubURLMatching() {

    stubFor(get(urlEqualTo("/urlmatching"))
        .willReturn(aResponse()
            .withBody("URL matching")
    ));
}
```

_Other URL options:
- _urlPathEqualTo (using exact values)
- _urlMatching (using regular expressions)
- _urlPathMatching (using regular expressions)

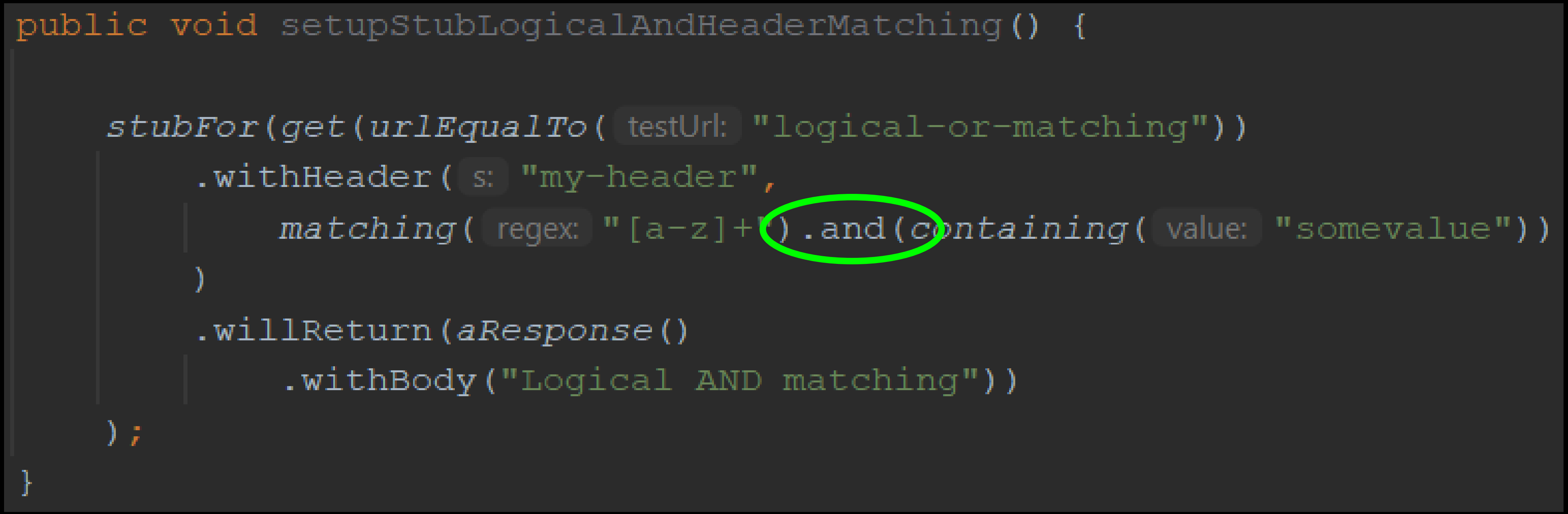
Example: header matching (Java)



```
public void setupStubHeaderMatching() {

    stubFor(get(urlEqualTo("/headermatching"))
        .withHeader("Content-Type", containing("application/json"))
        .withHeader("DoesntExist", absent())
        .willReturn(aResponse()
            .withBody("Header matching")
    ));
}
```

_absent(): check that parameter is **not** in request

Example: using logical AND and OR



```
public void setupStubLogicalAndHeaderMatching() {

    stubFor(get(urlEqualTo( testUrl: "logical-or-matching"))
        .withHeader( s: "my-header",
            matching( regex: "[a-z]+").and(containing( value: "somevalue"))
        )
        .willReturn(aResponse()
            .withBody("Logical AND matching"))
    );
}
```

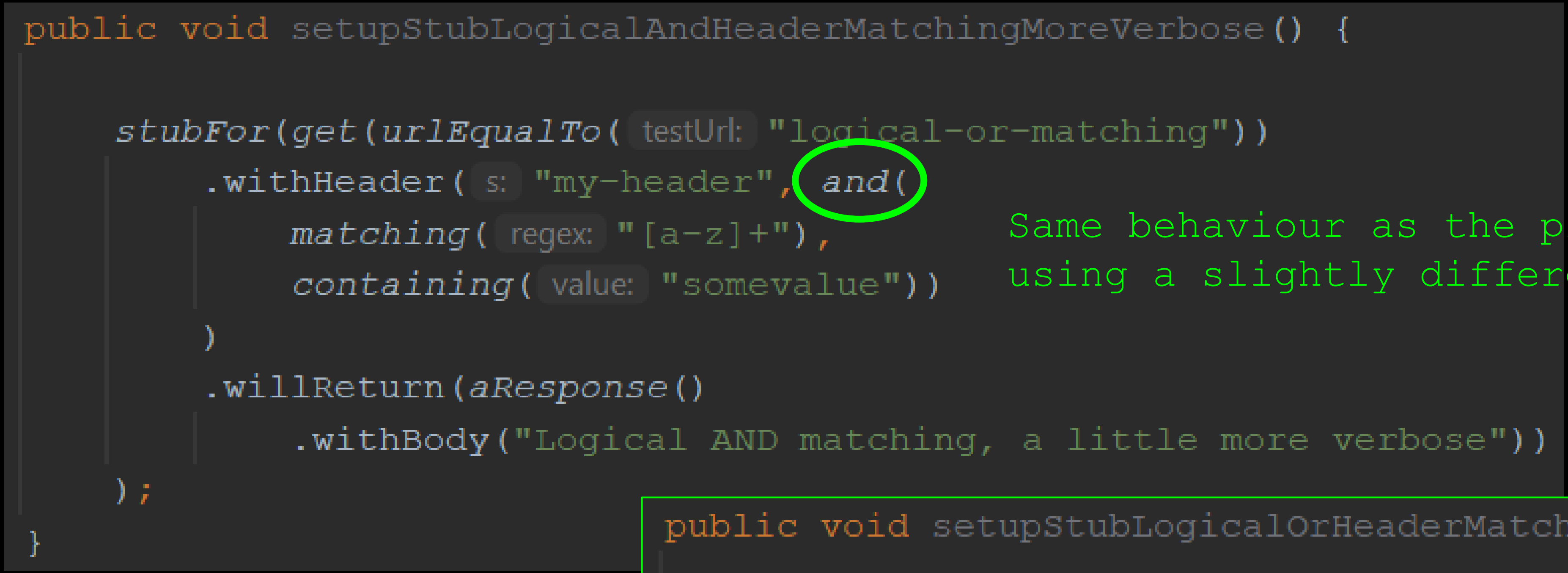
_ 'somevalue' is matched

_ 'bananasomevaluebanana' is matched

_ 'banana' is not matched (does not contain 'somevalue')

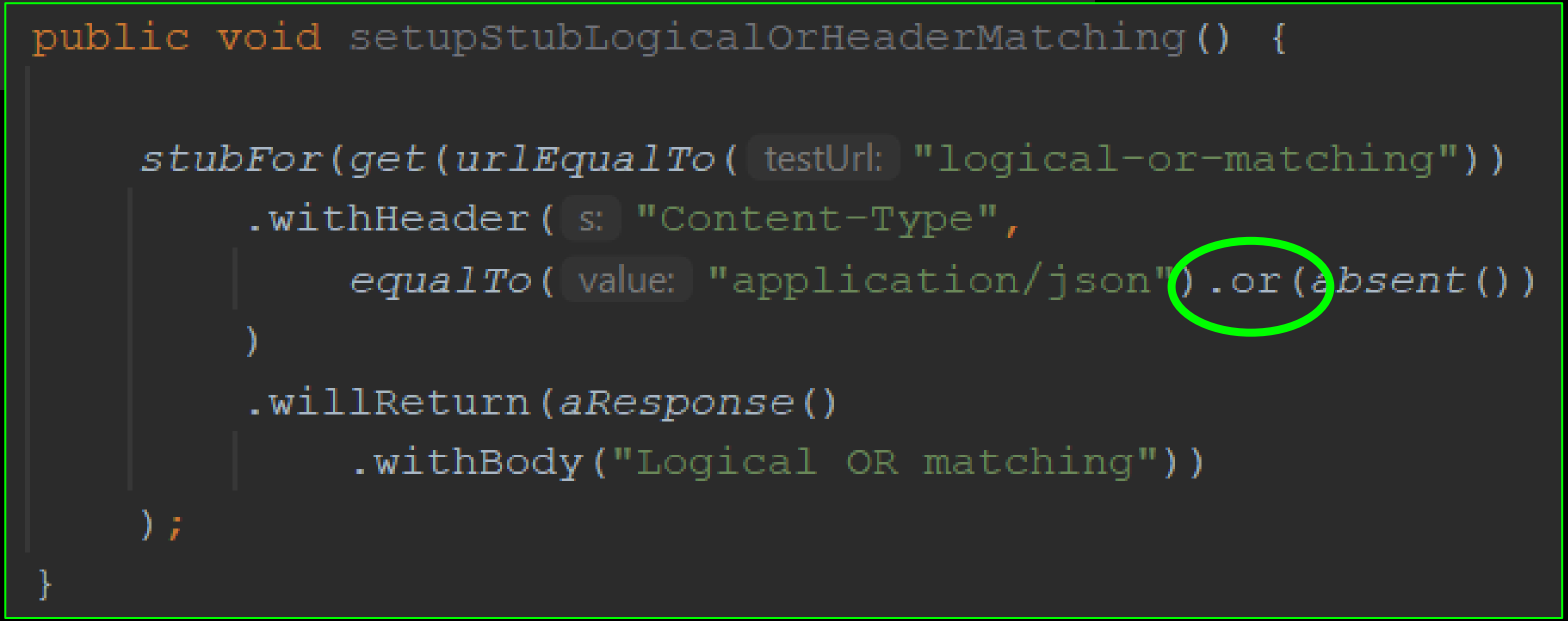
_ '123somevalue' is not matched (contains numeric characters)

Some more examples…



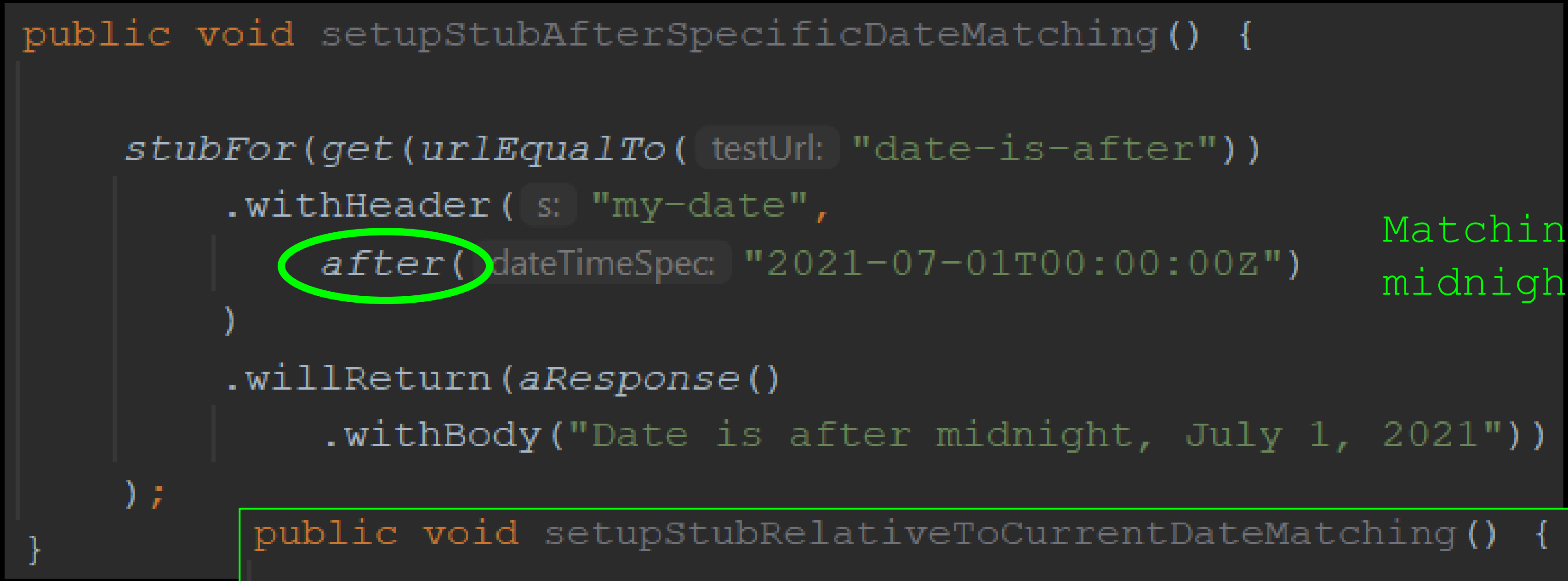
```java
public void setupStubLogicalAndHeaderMatchingMoreVerbose() {

    stubFor(get(urlEqualTo( testUrl: "logical-or-matching"))
            .withHeader( s: "my-header", and(
                    matching( regex: "[a-z]+"),
                    containing( value: "somevalue"))
            )
            .willReturn(aResponse()
                    .withBody("Logical AND matching, a little more verbose"))
    );
}
```

Same behaviour as the previous example, using a slightly different syntax



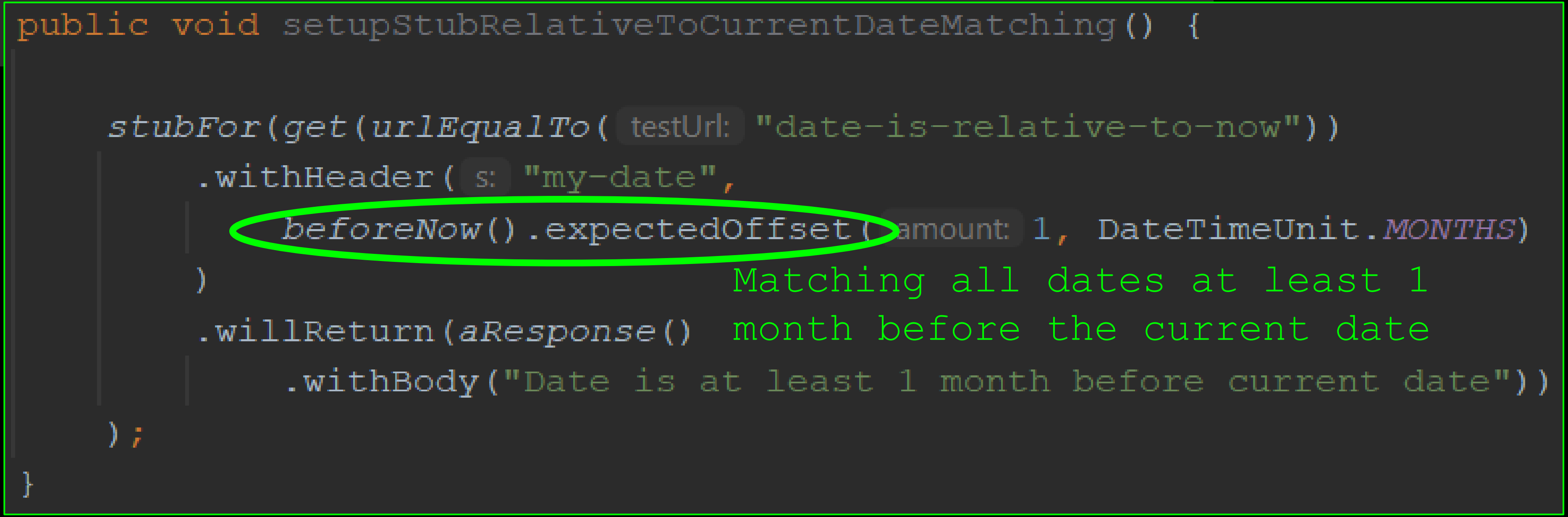
```java
public void setupStubLogicalOrHeaderMatching() {

    stubFor(get(urlEqualTo( testUrl: "logical-or-matching"))
            .withHeader( s: "Content-Type",
                    equalTo( value: "application/json").or(absent())
            )
            .willReturn(aResponse()
                    .withBody("Logical OR matching"))
    );
}
```

Matching using date/time properties



```
public void setupStubAfterSpecificDateMatching() {

    stubFor(get(urlEqualTo( testUrl: "date-is-after"))
        .withHeader( s: "my-date",
            after( dateTimeSpec: "2021-07-01T00:00:00Z")
        )
        .willReturn(aResponse()
            .withBody("Date is after midnight, July 1, 2021"))
    );
}
```

Matching all dates after midnight of July 1, 2021



```
public void setupStubRelativeToCurrentDateMatching() {

    stubFor(get(urlEqualTo( testUrl: "date-is-relative-to-now"))
        .withHeader( s: "my-date",
            beforeNow().expectedOffset( amount: 1, DateTimeUnit.MONTHS)
        )
        .willReturn(aResponse()
            .withBody("Date is at least 1 month before current date"))
    );
}
```

Matching all dates at least 1 month before the current date

Other matching strategies

_Authentication (Basic, OAuth(2))

_Query parameters

_Request body content

_Multipart/form-data

_You can write your own matching logic, too

Fault simulation

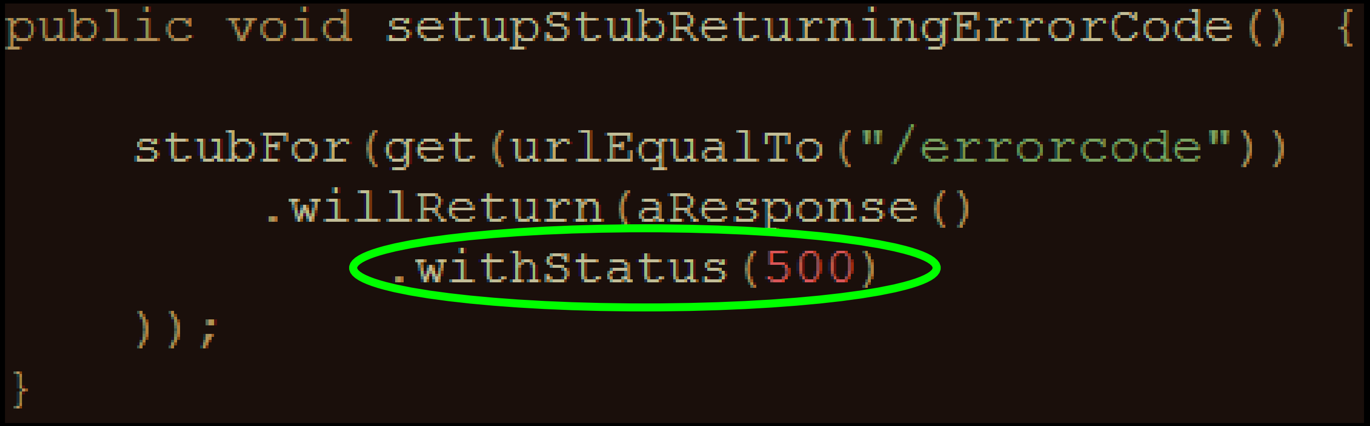
_Extend test coverage by simulating faults

_Often hard to do in real systems

_Easy to do using stubs or mocks

_Used to test the exception handling of your application under test

Example: HTTP status code (Java)

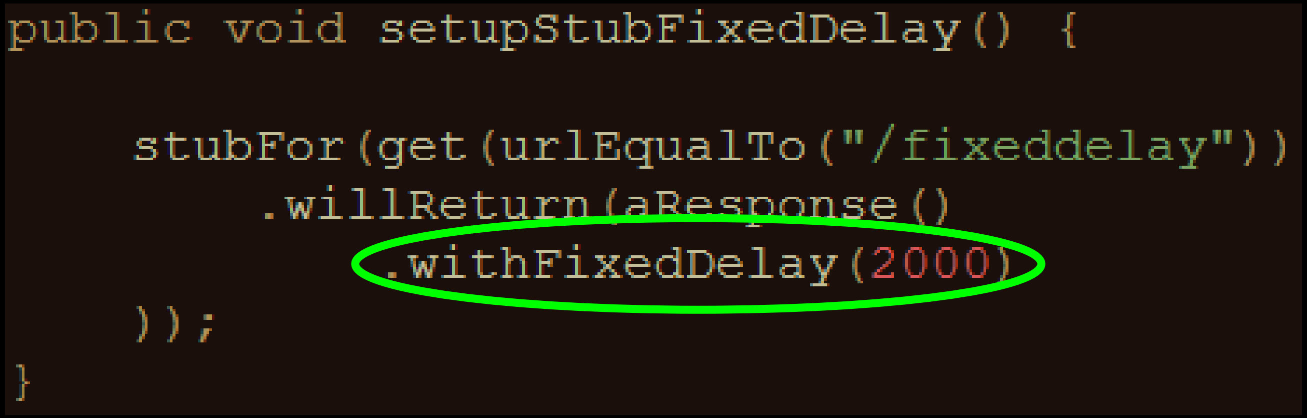


```
public void setupStubReturningErrorCode() {

    stubFor(get(urlEqualTo("/errorcode"))
        .willReturn(aResponse()
            .withStatus(500)
    ));
}
```

_Some often used HTTP status codes:

Client error	**Server error**
403 (Forbidden)	500 (Internal server error)
404 (Not found)	503 (Service unavailable)

Example: timeout (Java)

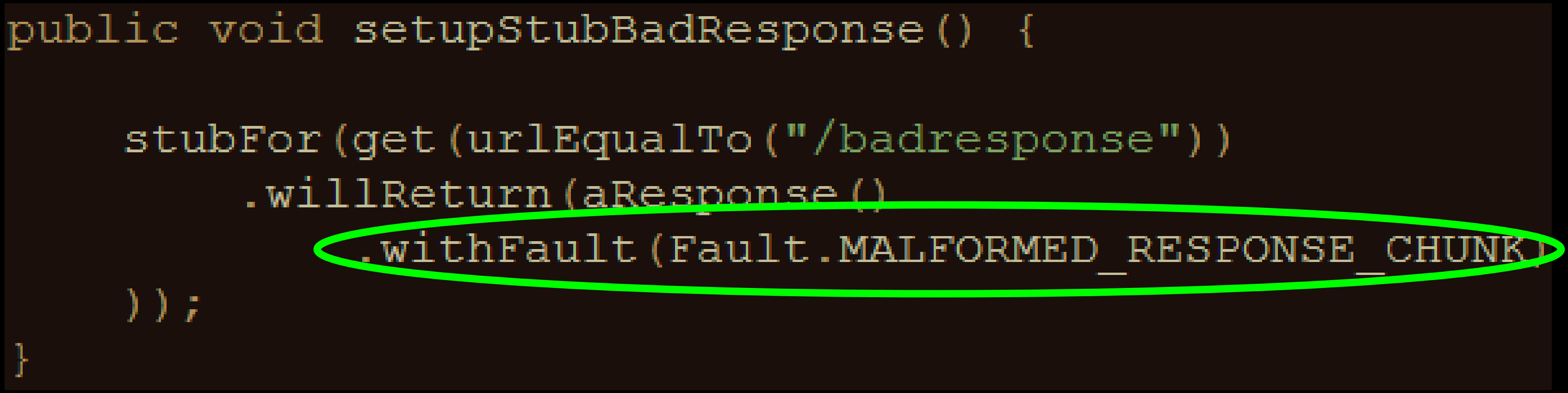


```
public void setupStubFixedDelay() {

    stubFor(get(urlEqualTo("/fixeddelay"))
        .willReturn(aResponse()
            .withFixedDelay(2000)
    ));
}
```

_Random delay can also be used
   _Uniform, lognormal, chunked dribble distribution options

_Can be configured on a per-stub basis as well as globally

Example: bad responses (Java)



```
public void setupStubBadResponse() {

    stubFor(get(urlEqualTo("/badresponse"))
        .willReturn(aResponse()
            .withFault(Fault.MALFORMED_RESPONSE_CHUNK)
    ));
}
```

_HTTP status code 200, but garbage in response body

_Other options:

  _RANDOM_DATA_THEN_CLOSE (as above, without HTTP 200)

  _EMPTY_RESPONSE (does what it says on the tin)

  _CONNECTION_RESET_BY_PEER (close connection, no response)

Now it’s your turn!

_exercises > WireMockExercises2Test.java

_Practice fault simulation and different request matching strategies

  _Implement the responses as described in the comments

_Verify your solution by running the tests in the same file

_Answers are in answers > WireMockAnswers2Test.java

_Examples are in examples > WireMockExamples.java

Section 3:

Creating stateful mocks

Statefulness

_Sometimes, you want to simulate stateful behaviour

_Shopping cart (empty / containing items)

_Database (data present / not present)

_Order in which requests arrive is significant

Stateful mocks in WireMock

_Supported through the concept of a Scenario

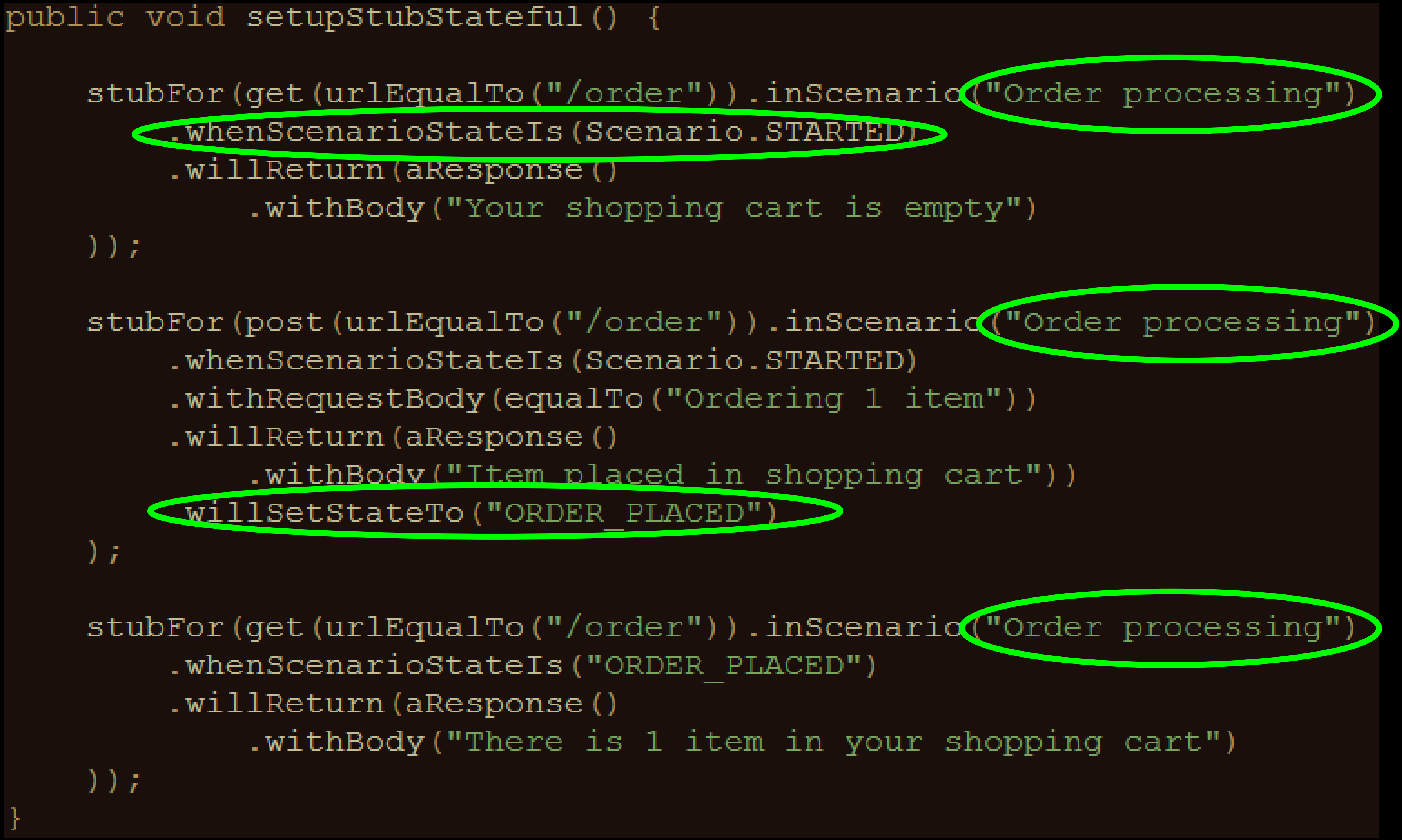
_Essentially a finite state machine (FSM)

  _States and state transitions

_Combination of current state and incoming request determines the response being sent

  _Before now, it was only the incoming request

Stateful mocks: an example (Java)



```
public void setupStubStateful() {

    stubFor(get(urlEqualTo("/order")).inScenario("Order processing")
        .whenScenarioStateIs(Scenario.STARTED)
        .willReturn(aResponse()
            .withBody("Your shopping cart is empty")
    ));

    stubFor(post(urlEqualTo("/order")).inScenario("Order processing")
        .whenScenarioStateIs(Scenario.STARTED)
        .withRequestBody(equalTo("Ordering 1 item"))
        .willReturn(aResponse()
            .withBody("Item placed in shopping cart"))
        .willSetStateTo("ORDER_PLACED")
    );

    stubFor(get(urlEqualTo("/order")).inScenario("Order processing")
        .whenScenarioStateIs("ORDER_PLACED")
        .willReturn(aResponse()
            .withBody("There is 1 item in your shopping cart")
    ));
}
```

Responses are grouped by scenario name

Response depends on both the incoming request as well as the current state

The initial state should always be Scenario.STARTED

Incoming requests can trigger state transitions

State names other than Scenario.STARTED are yours to define

Now it's your turn!

_exercises > WireMockExercises3Test.java

_Create a stateful mock that exerts the described behaviour

  _Implement the responses as described in the comments

_Verify your solution by running the tests in the same file

_Answers are in answers > WireMockAnswers3Test.java

_Examples are in examples > WireMockExamples.java

Section 4:

Response templating

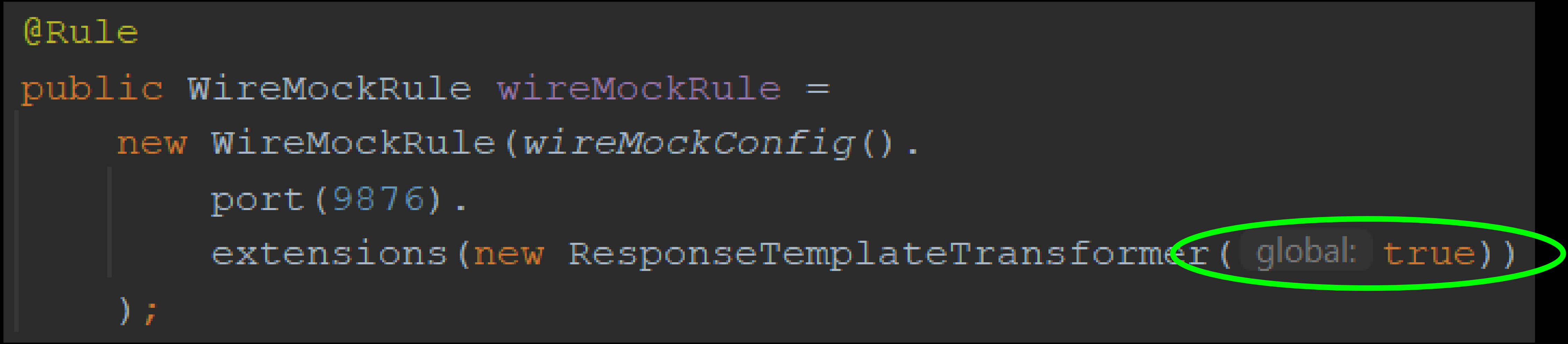
Response templating

_Often, you want to reuse elements from the request in the response
  _Request ID header
  _Unique body elements (client ID, etc.)
  _Cookie values

_WireMock supports this through response templating

Setup response templating (JUnit4)

_In code: through the JUnit @Rule

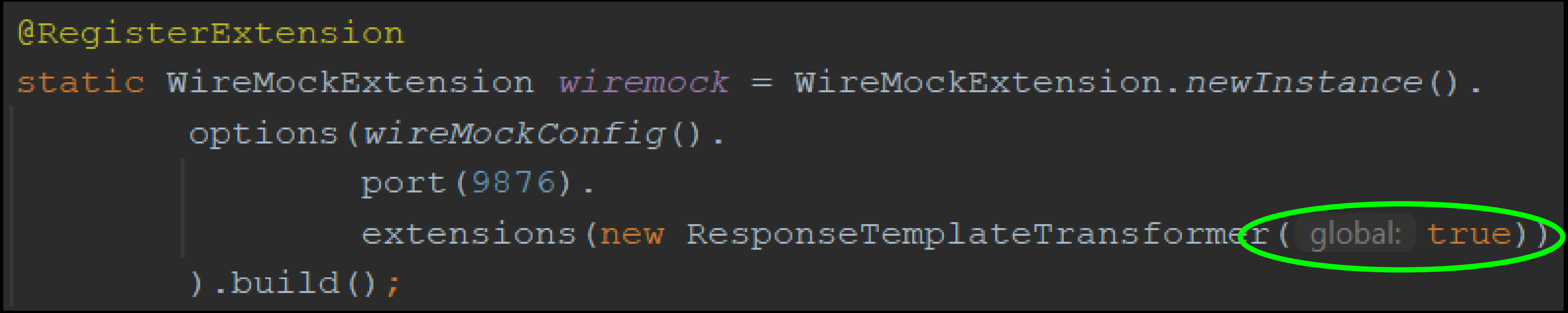


```
@Rule
public WireMockRule wireMockRule =
    new WireMockRule(wireMockConfig().
        port(9876).
        extensions(new ResponseTemplateTransformer( global: true))
    );
```

_Global == false: response templating transformer has to be enabled for individual stubs

Setup response templating (JUnit5)

_In code: through the Junit @RegisterExtension

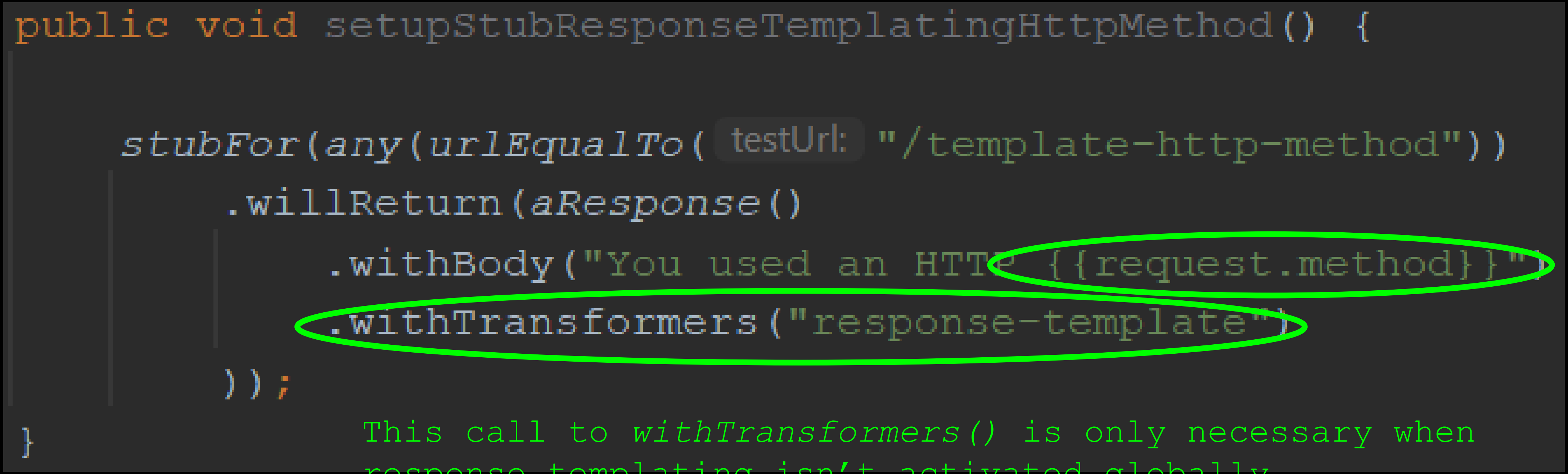


```
@RegisterExtension
static WireMockExtension wiremock = WireMockExtension.newInstance().
        options(wireMockConfig().
                port(9876).
                extensions(new ResponseTemplateTransformer( global: true))
        ).build();
```

_Global == false: response templating transformer has to be enabled for individual stubs

Enable/apply response templating

_ This template reads the HTTP request method (GET/POST/PUT/…) using *{{request.method}}* and returns it as the response body



```
public void setupStubResponseTemplatingHttpMethod() {

    stubFor(any(urlEqualTo( testUrl: "/template-http-method"))
        .willReturn(aResponse()
            .withBody("You used an HTTP {{request.method}}")
            .withTransformers("response-template")
        ));
}
```

This call to *withTransformers()* is only necessary when response templating isn’t activated globally

Request attributes

_Many different request attributes available for use

_request.method	: HTTP method (example)
_request.pathSegments.[<n>]	: nth path segment
_request.scheme	: protocol (e.g. HTTPS)
_…	

_All available attributes listed at

http://wiremock.org/docs/response-templating/

Request attributes (cont’d)

_Extracting and reusing body elements

_In case of a JSON request body:

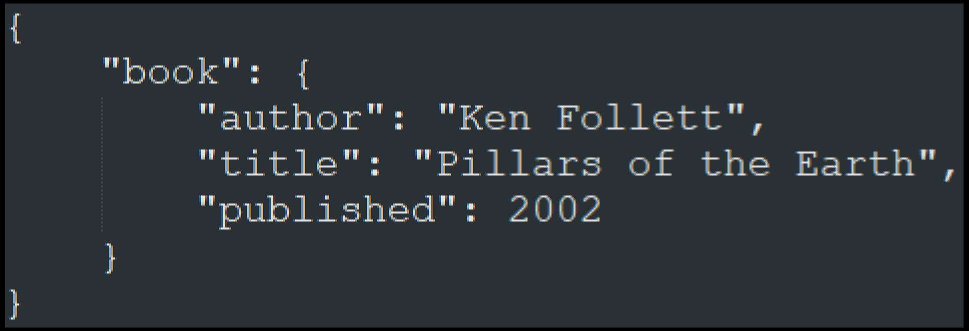
{{jsonPath request.body '$.path.to.element’}}

_In case of an XML request body:

{{xPath request.body ‘/path/to/element/text()’}}

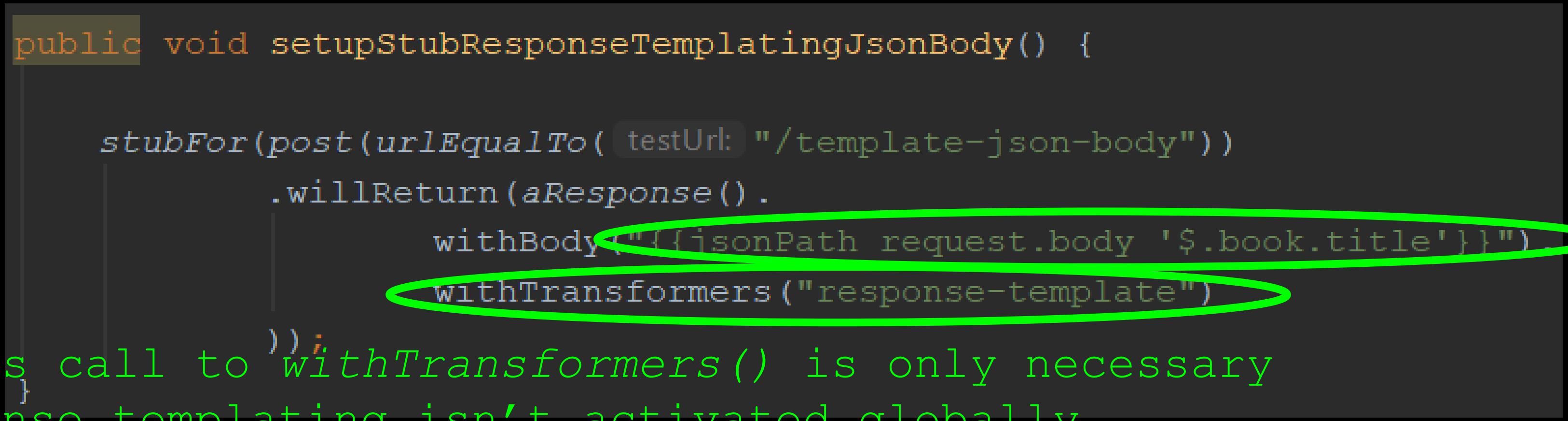
JSON extraction example

- When sent this JSON request body:



```
{
    "book": {
        "author": "Ken Follett",
        "title": "Pillars of the Earth",
        "published": 2002
    }
}
```

- This stub returns a response with body “Pillars of the Earth”:



```
public void setupStubResponseTemplatingJsonBody() {

    stubFor(post(urlEqualTo( testUrl: "/template-json-body"))
            .willReturn(aResponse().
                    withBody("{{jsonPath request.body '$.book.title'}}").
                    withTransformers("response-template")
            ));
}
```

Again, this call to *withTransformers()* is only necessary when response templating isn’t activated globally

Now it's your turn!

- _exercises > WireMockExercises4Test.java
- _Create mocks that use response templating
  - _Implement the responses as described in the comments
- _Verify your solution by running the tests in the same file
- _Answers are in answers > WireMockAnswers4Test.java
- _Examples are in examples > WireMockExamples.java

Section 5:

Extending WireMock

Extending WireMock

_In some cases, the default WireMock feature set might not fit your needs

_WireMock is open to extensions

_Allows you to create even more powerful stubs

_Several options available

Section 5.1:

Filtering incoming requests

Request filtering

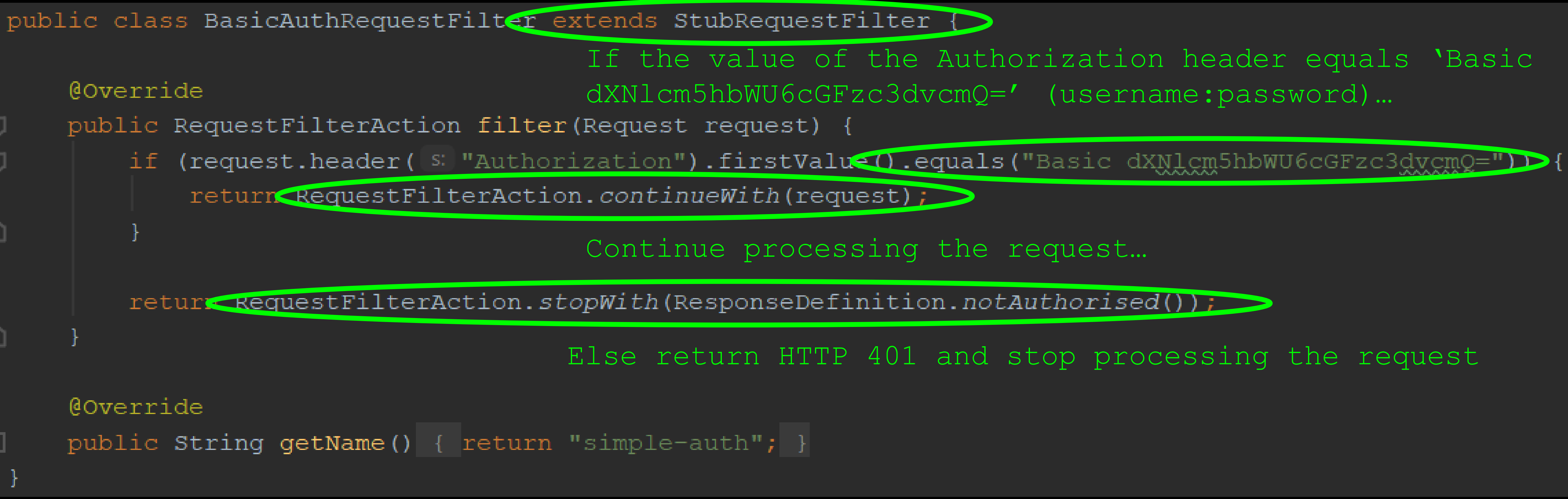
_Modify incoming requests (or halt processing)

_This has a variety of use cases:

- _Checking authentication details
- _Request header injection
- _URL rewriting

_Created by extending the *StubRequestFilter* class

Request filtering - build



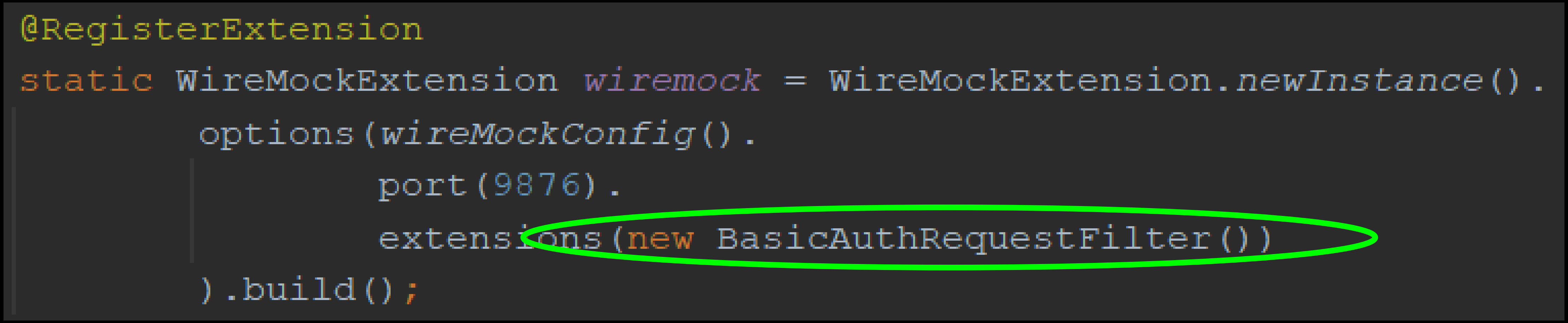
```java
public class BasicAuthRequestFilter extends StubRequestFilter {

    @Override
    public RequestFilterAction filter(Request request) {
        if (request.header( s: "Authorization").firstValue().equals("Basic dXNlcm5hbWU6cGFzc3dvcmQ=")) {
            return RequestFilterAction.continueWith(request);
        }

        return RequestFilterAction.stopWith(ResponseDefinition.notAuthorised());
    }

    @Override
    public String getName() { return "simple-auth"; }
}
```

If the value of the Authorization header equals 'Basic dXNlcm5hbWU6cGFzc3dvcmQ=' (username:password)…

Continue processing the request…

Else return HTTP 401 and stop processing the request

Request filtering - use



```
@RegisterExtension
static WireMockExtension wiremock = WireMockExtension.newInstance().
        options(wireMockConfig().
                port(9876).
                extensions(new BasicAuthRequestFilter())
        ).build();
```

An extension can be registered using:
- its class name (*"com.example.BasicAuthRequestFilter"*)
- the class (*BasicAuthRequestFilter.class*)
- an instance (*new BasicAuthRequestFilter()*)

Now it's your turn!

_exercises > extensions > HttpDeleteFilter.java

_Implement a custom request filter that filters out HTTP DELETE calls and processes all other HTTP verbs normally

_Verify your solution by running the tests in exercises > WireMockExercises5dot1Test.java

_Answers are in answers > extensions > HttpDeleteFilter.java

_Examples are in examples > extensions > BasicAuthRequestFilter.java

Section 5.2:

Building a custom request matcher

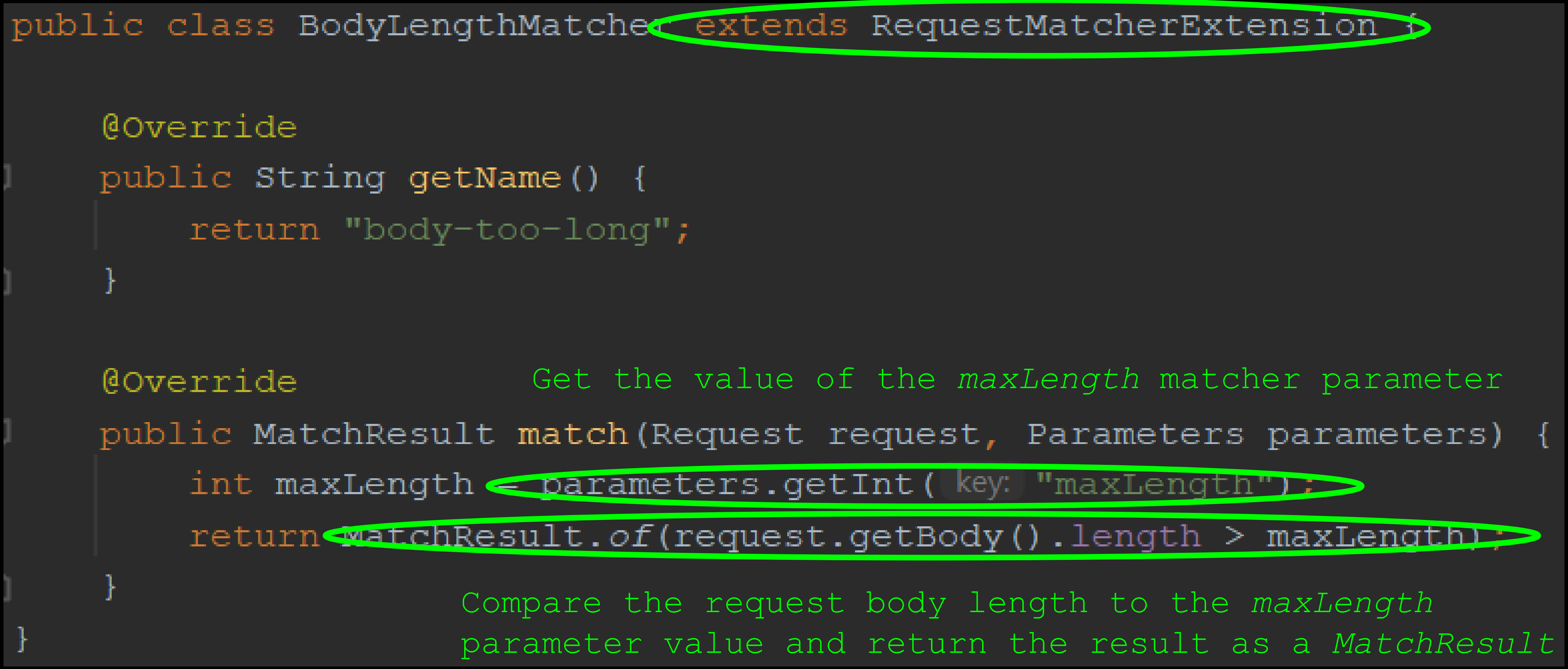
Custom request matchers

_Add custom request matching logic to WireMock

_Can be combined with existing standard matchers

_Done by extending RequestMatcherExtension class

Custom request matcher - build

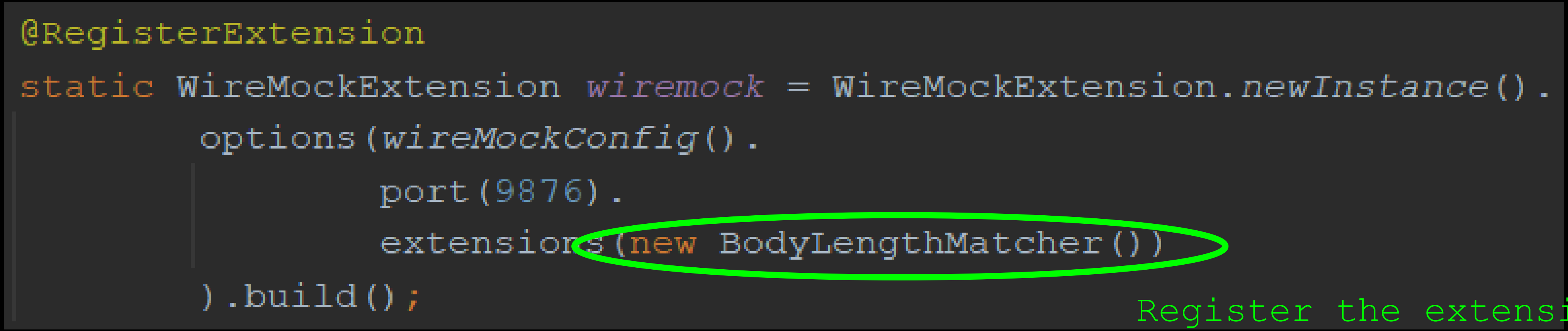


```
public class BodyLengthMatcher extends RequestMatcherExtension {

    @Override
    public String getName() {
        return "body-too-long";
    }

    @Override
    public MatchResult match(Request request, Parameters parameters) {
        int maxLength = parameters.getInt( key: "maxLength");
        return MatchResult.of(request.getBody().length > maxLength);
    }
}
```

Get the value of the *maxLength* matcher parameter

Compare the request body length to the *maxLength* parameter value and return the result as a *MatchResult*

Custom request matcher – use

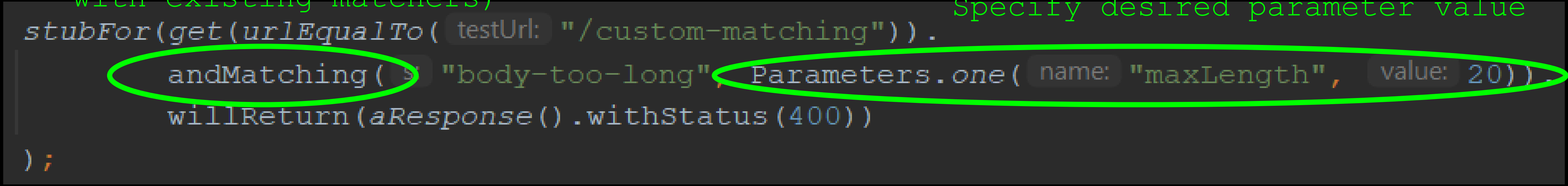


```
@RegisterExtension
static WireMockExtension wiremock = WireMockExtension.newInstance().
        options(wireMockConfig().
                port(9876).
                extensions(new BodyLengthMatcher())
        ).build();
```

Register the extension

Use custom matcher in a stub definition using its name (can be combined with existing matchers)

Specify desired parameter value



```
stubFor(get(urlEqualTo( testUrl: "/custom-matching")).
        andMatching( s: "body-too-long", Parameters.one( name: "maxLength", value: 20)).
        willReturn(aResponse().withStatus(400))
);
```

Now it's your turn!

- exercises > extensions > MultipleHttpVerbsMatcher.java
- Implement a custom matcher that reads a list of accepted HTTP verbs and matches the HTTP verb used in the incoming request against it
- Verify your solution by running the tests in exercises > WireMockExercises5dot2Test.java
- Answers are in answers > extensions > MultipleHttpVerbsMatcher.java
- Examples are in examples > extensions > BodyLengthMatcher.java

Section 5.3:

Executing post-serve actions

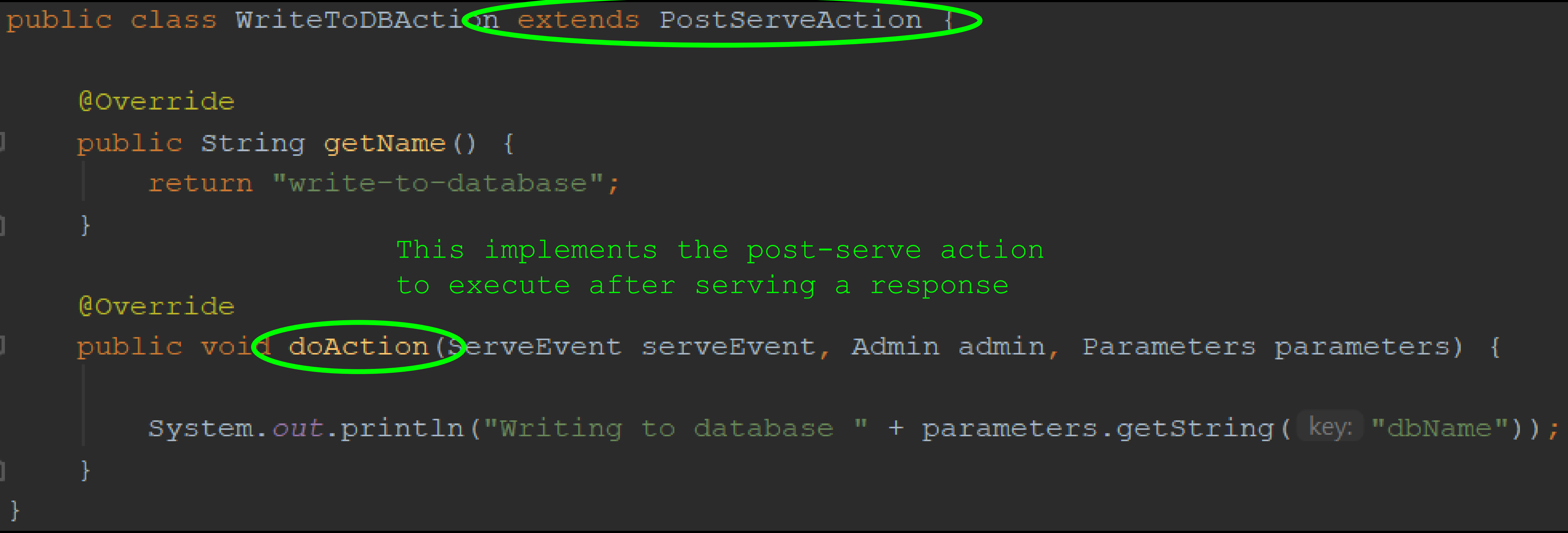
Post-serve actions

_Perform specific actions after serving response

_Logging, writing to database, …

_Done by extending PostServeAction class

Post-serve action - build

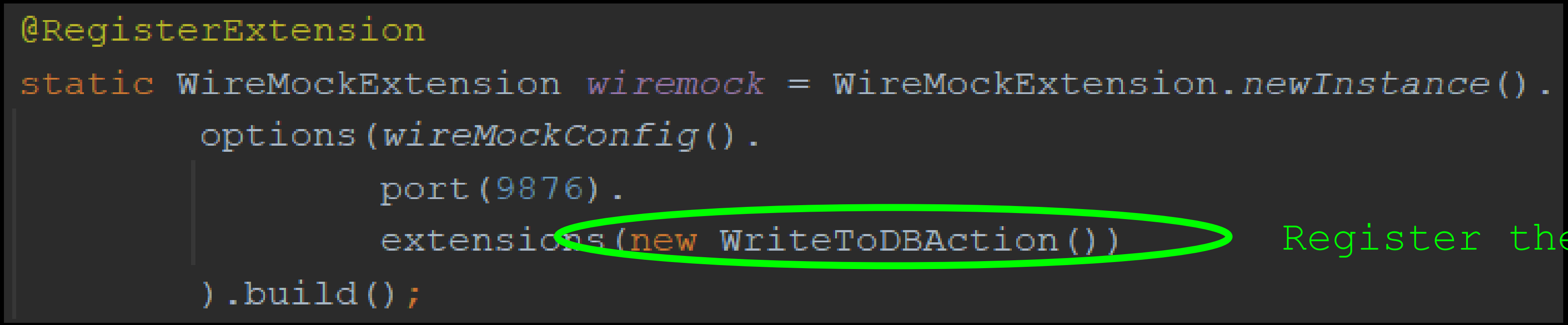


```
public class WriteToDBAction extends PostServeAction {

    @Override
    public String getName() {
        return "write-to-database";
    }

    @Override
    public void doAction(ServeEvent serveEvent, Admin admin, Parameters parameters) {

        System.out.println("Writing to database " + parameters.getString( key: "dbName"));
    }
}
```

This implements the post-serve action to execute after serving a response

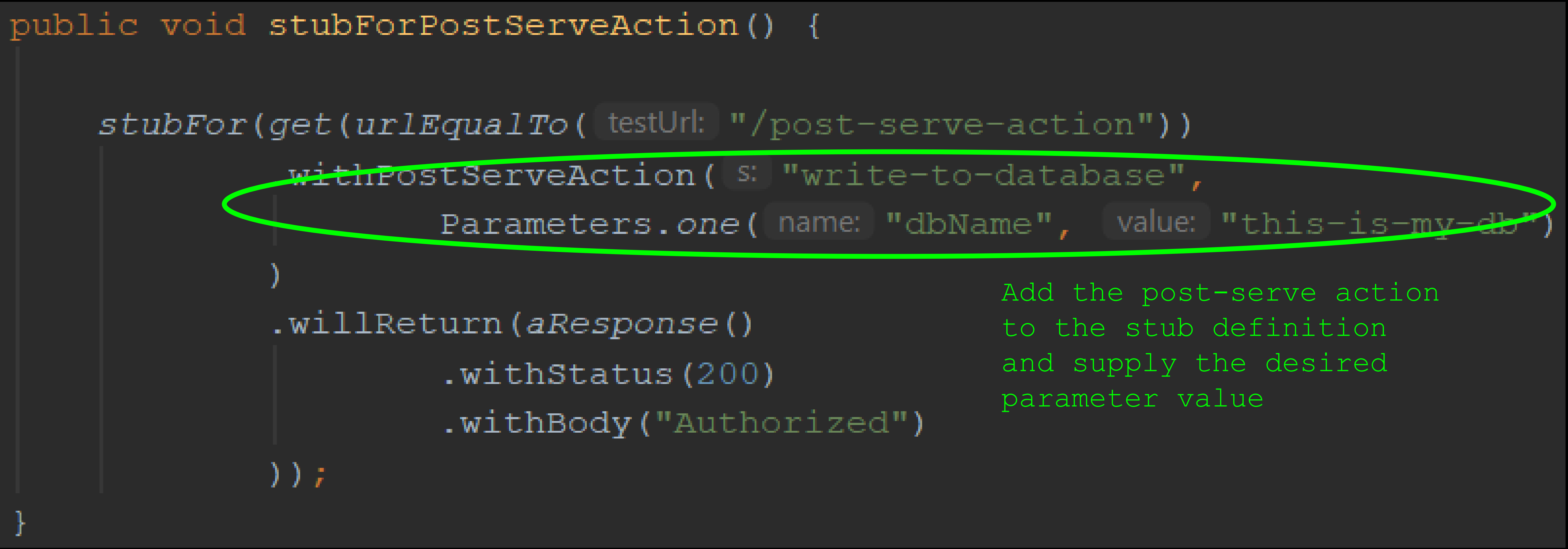
Overriding *doGlobalAction()* automatically performs the action for all responses served by WireMock (no need to configure this on a per-stub basis anymore)

Post-serve action - use



```java
@RegisterExtension
static WireMockExtension wiremock = WireMockExtension.newInstance().
        options(wireMockConfig().
                port(9876).
                extensions(new WriteToDBAction())
        ).build();
```

Register the extension



```java
public void stubForPostServeAction() {

    stubFor(get(urlEqualTo( testUrl: "/post-serve-action"))
            withPostServeAction( s: "write-to-database",
                    Parameters.one( name: "dbName",  value: "this-is-my-db")
            )
            .willReturn(aResponse()
                    .withStatus(200)
                    .withBody("Authorized")
            ));
}
```

Add the post-serve action to the stub definition and supply the desired parameter value

Now it's your turn!

- _exercises > extensions > LogCurrentTimeAction.java
- _Implement a post-serve action that prints a log message containing the current date and time in the requested format to the console
- _Verify your solution by running the tests in exercises > WireMockExercises5dot3Test.java
- _Answers are in answers > extensions > LogCurrentTimeAction.java
- _Examples are in examples > extensions > WriteToDBAction.java

Section 5.4:

Transforming responses

Response transformation

_Create responses in a more dynamic and reusable fashion

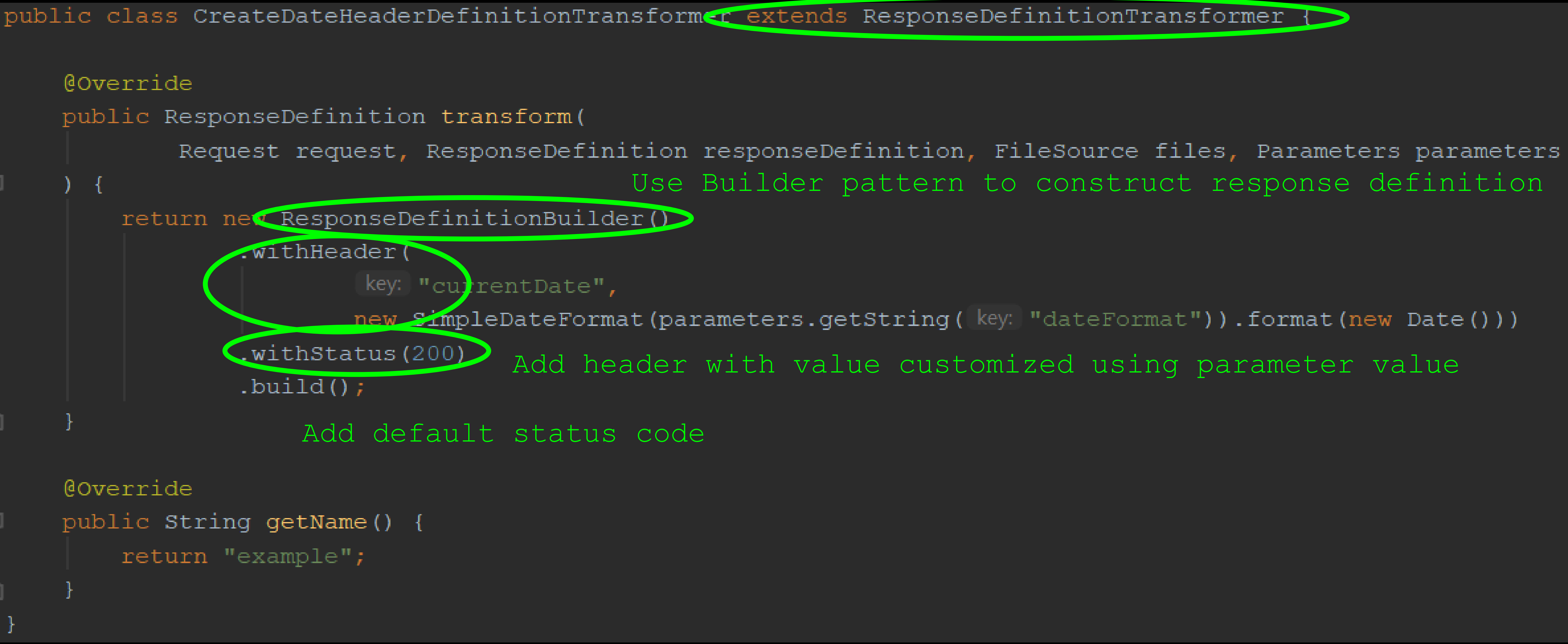
_Two types of use cases

  _Define characteristics of response definition

  _Add specific information to existing response

_Done by extending ResponseDefinitionTransformer and ResponseTransformer class, respectively

Response definition transformer - build



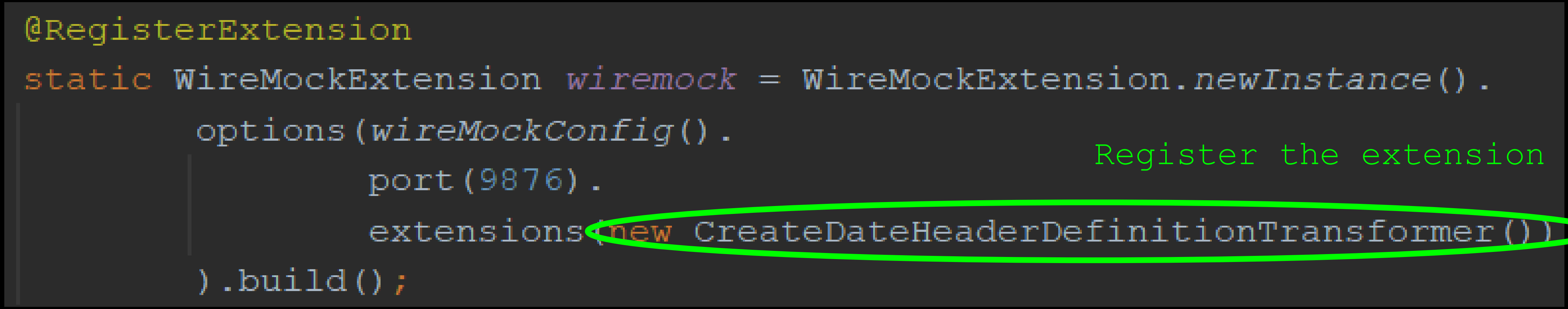
```
public class CreateDateHeaderDefinitionTransformer extends ResponseDefinitionTransformer {

    @Override
    public ResponseDefinition transform(
            Request request, ResponseDefinition responseDefinition, FileSource files, Parameters parameters
    ) {
        return new ResponseDefinitionBuilder()
                .withHeader(
                        key: "currentDate",
                        new SimpleDateFormat(parameters.getString( key: "dateFormat")).format(new Date()))
                .withStatus(200)
                .build();
    }

    @Override
    public String getName() {
        return "example";
    }
}
```

Use Builder pattern to construct response definition

Add header with value customized using parameter value

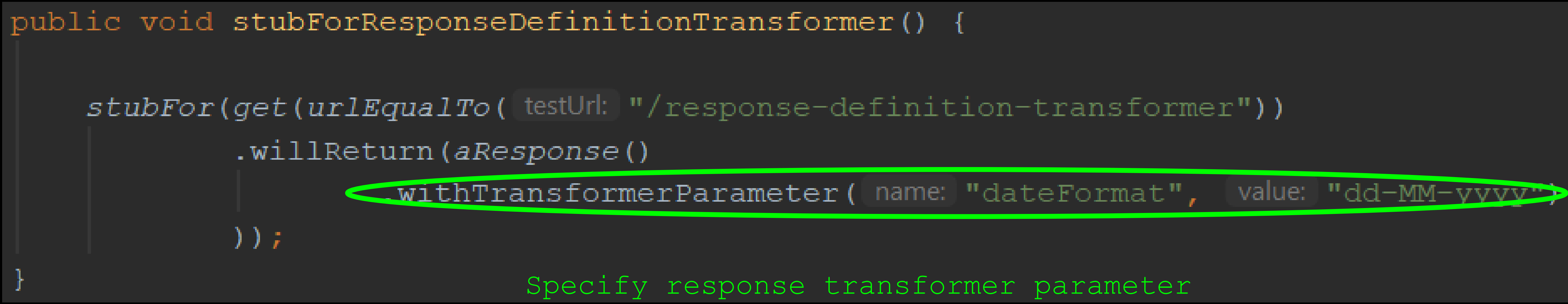
Add default status code

Response definition transformer - use



```
@RegisterExtension
static WireMockExtension wiremock = WireMockExtension.newInstance().
        options(wireMockConfig().
                port(9876).
                extensions(new CreateDateHeaderDefinitionTransformer())
        ).build();
```

Register the extension

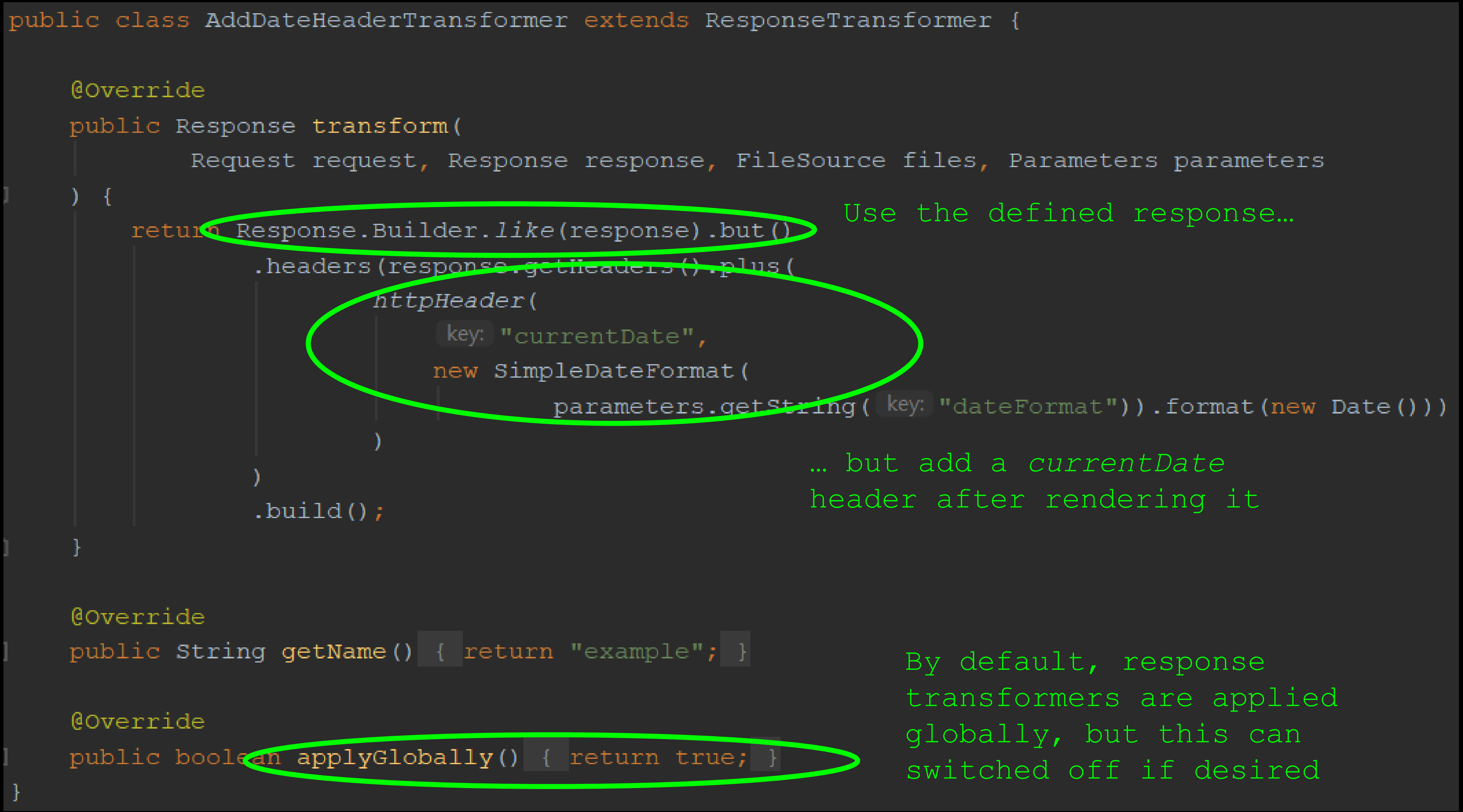


```
public void stubForResponseDefinitionTransformer() {

    stubFor(get(urlEqualTo( testUrl: "/response-definition-transformer"))
            .willReturn(aResponse()
                    .withTransformerParameter( name: "dateFormat",  value: "dd-MM-yyyy")
            ));
}
```

Specify response transformer parameter
value to use for this response

You can transform the rendered Response, too…

Response transformer - build



```
public class AddDateHeaderTransformer extends ResponseTransformer {

    @Override
    public Response transform(
            Request request, Response response, FileSource files, Parameters parameters
    ) {
        return Response.Builder.like(response).but()
                .headers(response.getHeaders().plus(
                        httpHeader(
                                key: "currentDate",
                                new SimpleDateFormat(
                                        parameters.getString( key: "dateFormat")).format(new Date()))
                        )
                )
                .build();
    }

    @Override
    public String getName() { return "example"; }

    @Override
    public boolean applyGlobally() { return true; }
}
```

Use the defined response…

… but add a *currentDate* header after rendering it

By default, response transformers are applied globally, but this can switched off if desired http://wiremock.org/docs/extending-wiremock/

Now it's your turn!

_ exercises > extensions > AddUuidAndHttpMethodHeaderTransformer.java

_ Implement a response definition transformer that adds the requested headers to a response

_ Verify your solution by running the tests in exercises > WireMockExercises5dot4Test.java

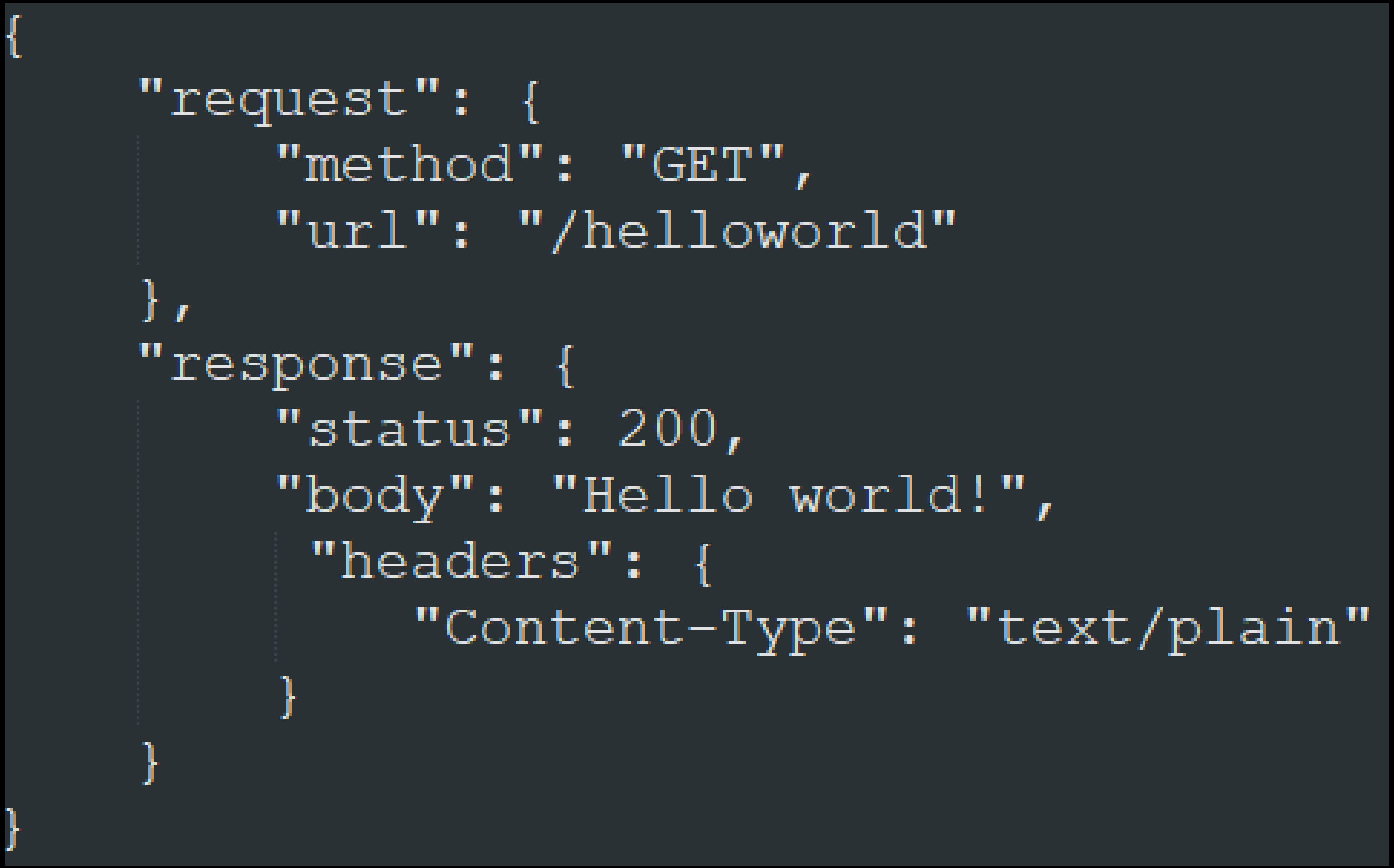
_ Answers are in answers > extensions > AddUuidAndHttpMethodHeaderTransformer.java

_ Examples are in examples > extensions > CreateDateHeaderDefinitionTransformer.java

Appendix A:

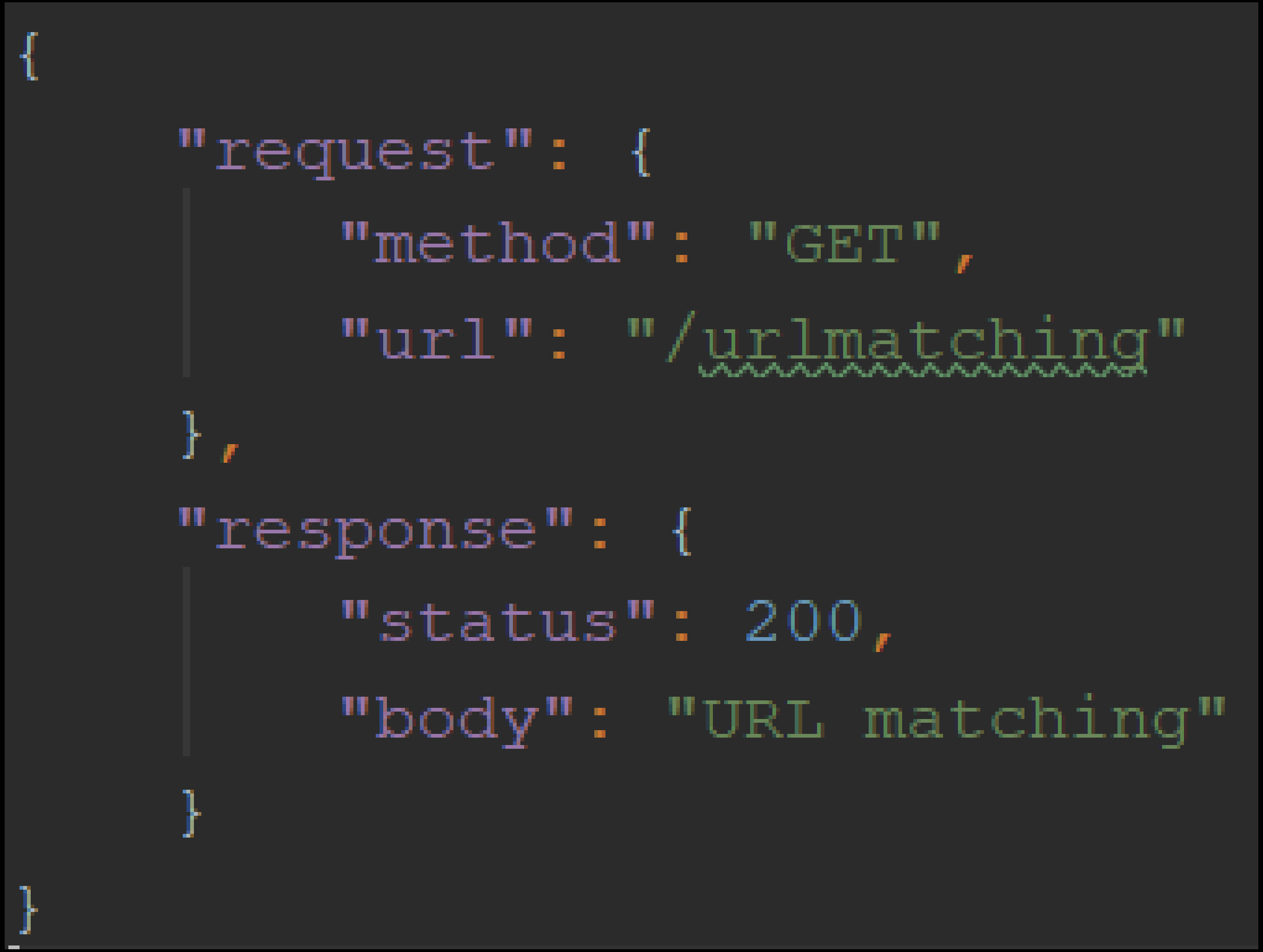
JSON equivalents for the Java examples

Our Hello world! mock



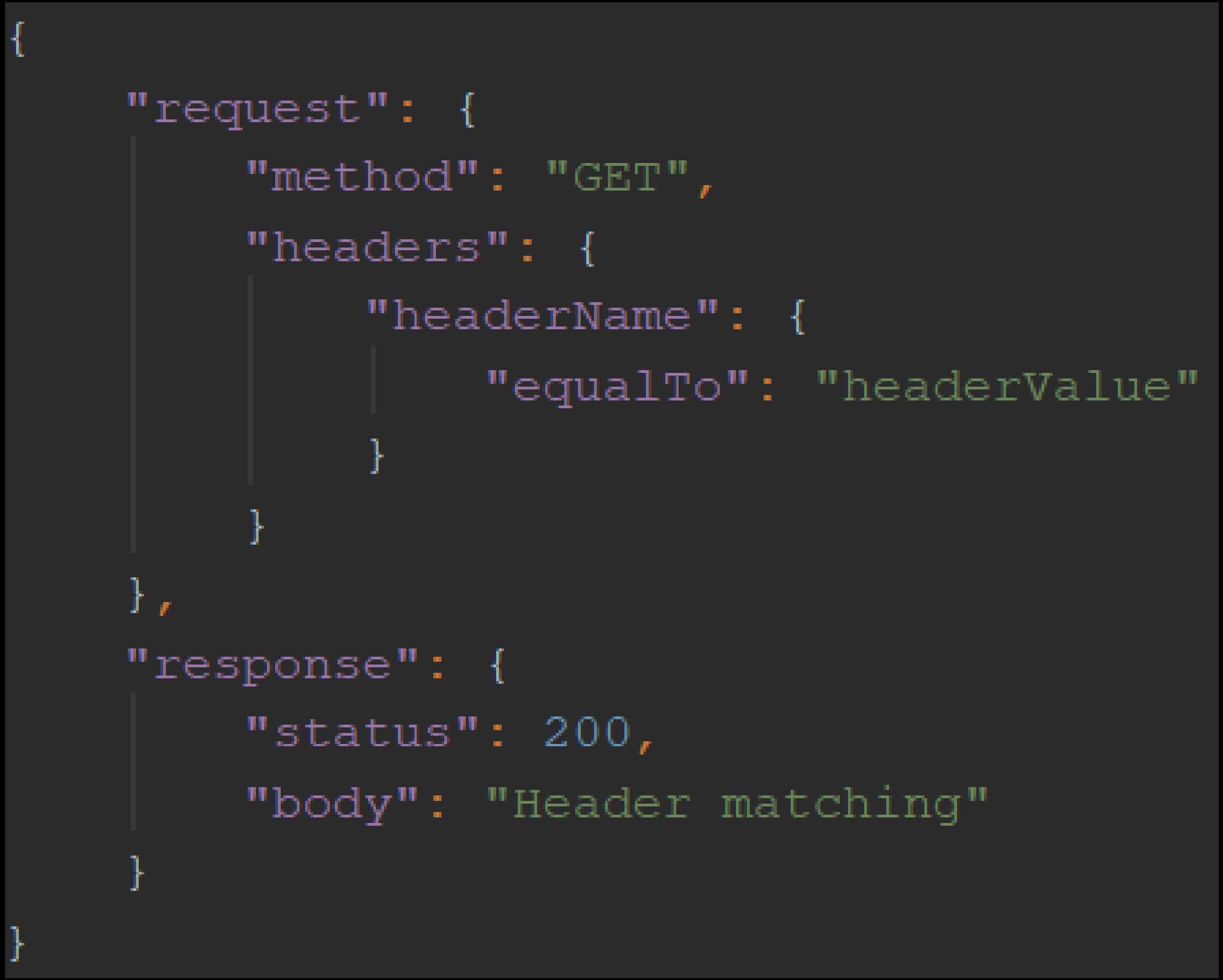
```
{
    "request": {
        "method": "GET",
        "url": "/helloworld"
    },
    "response": {
        "status": 200,
        "body": "Hello world!",
         "headers": {
            "Content-Type": "text/plain"
        }
    }
}
```

URL matching

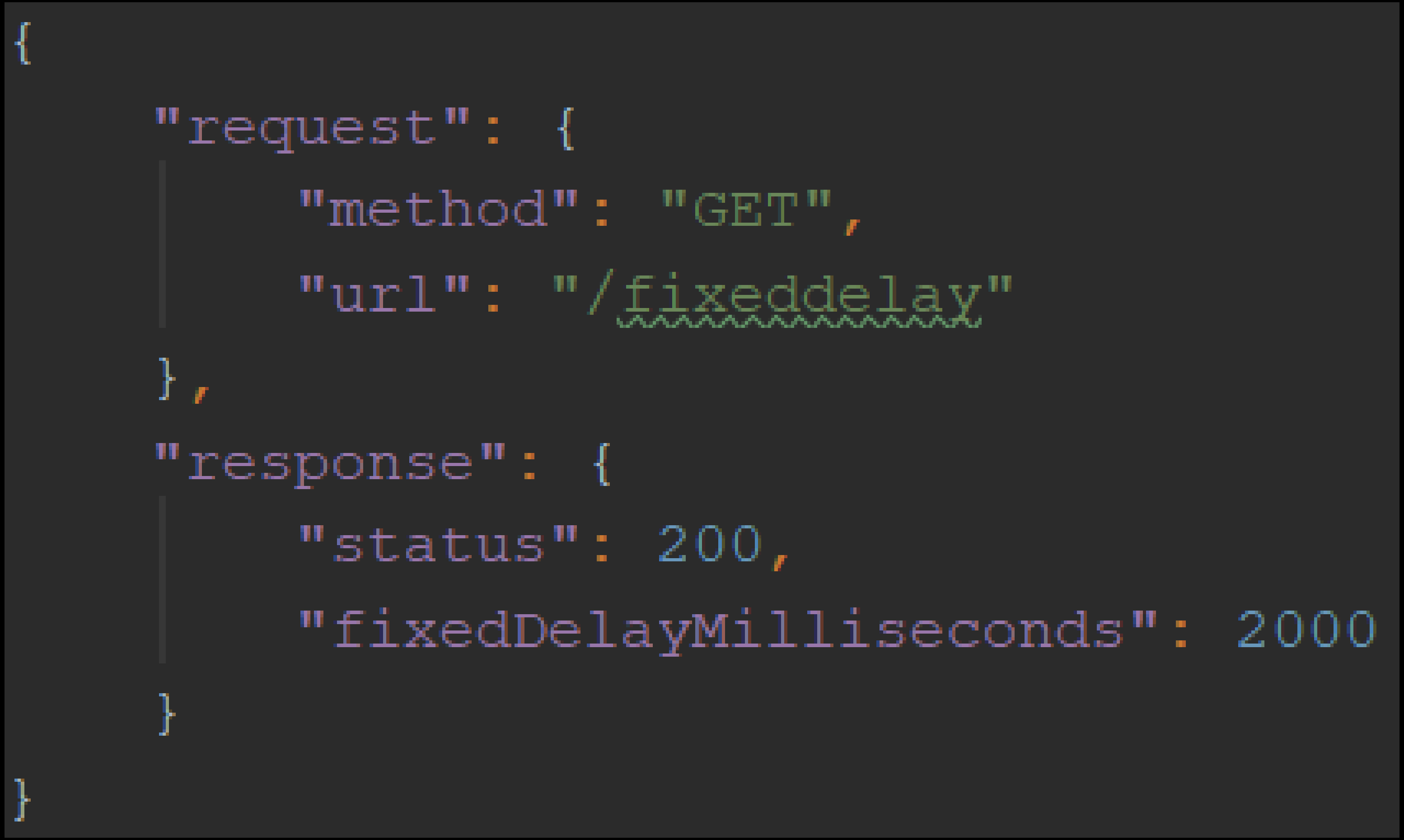


```
{
    "request": {
        "method": "GET",
        "url": "/urlmatching"
    },
    "response": {
        "status": 200,
        "body": "URL matching"
    }
}
```

Request header matching

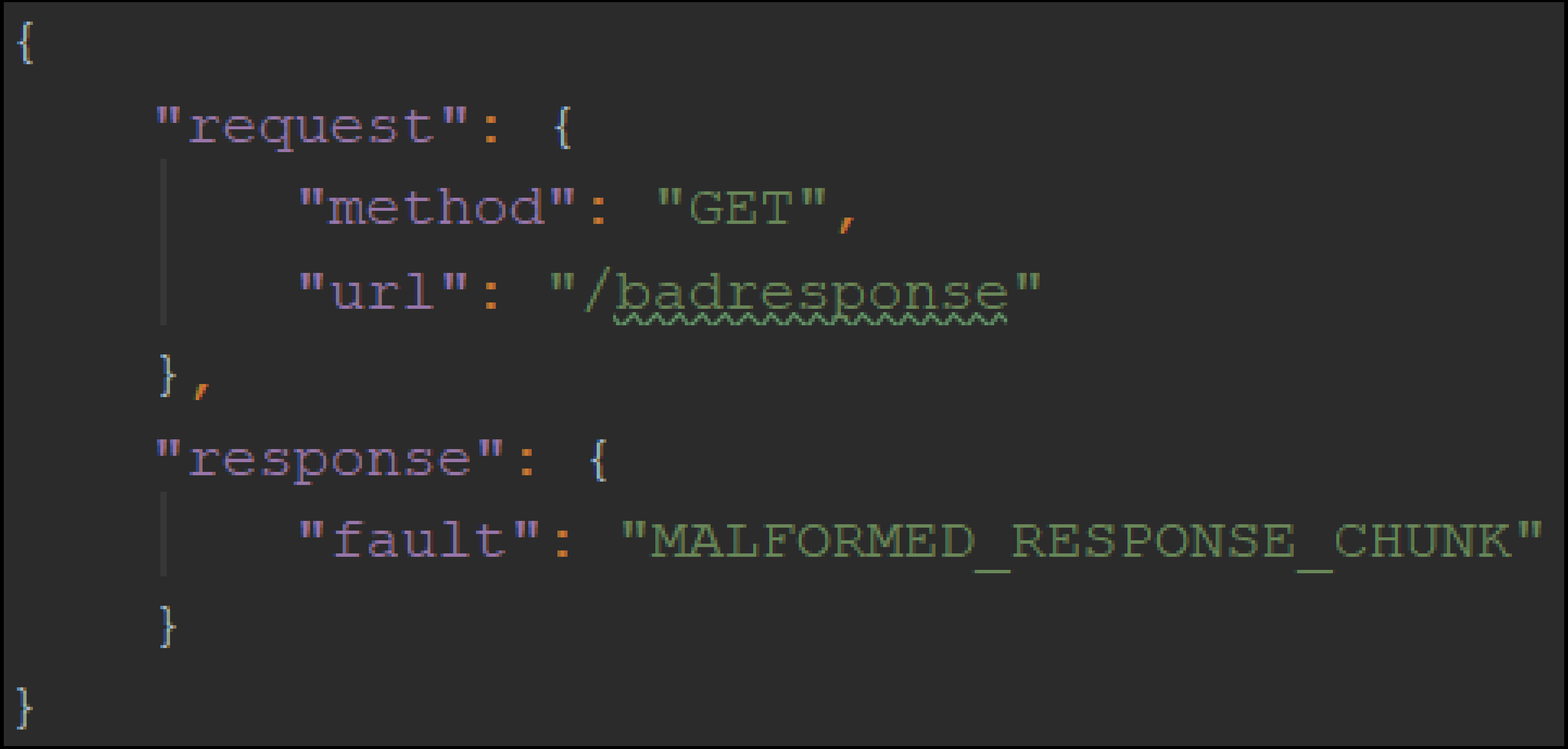

```
{
    "request": {
        "method": "GET",
        "headers": {
            "headerName": {
                "equalTo": "headerValue"
            }
        }
    },
    "response": {
        "status": 200,
        "body": "Header matching"
    }
}
```

Simulating a delay



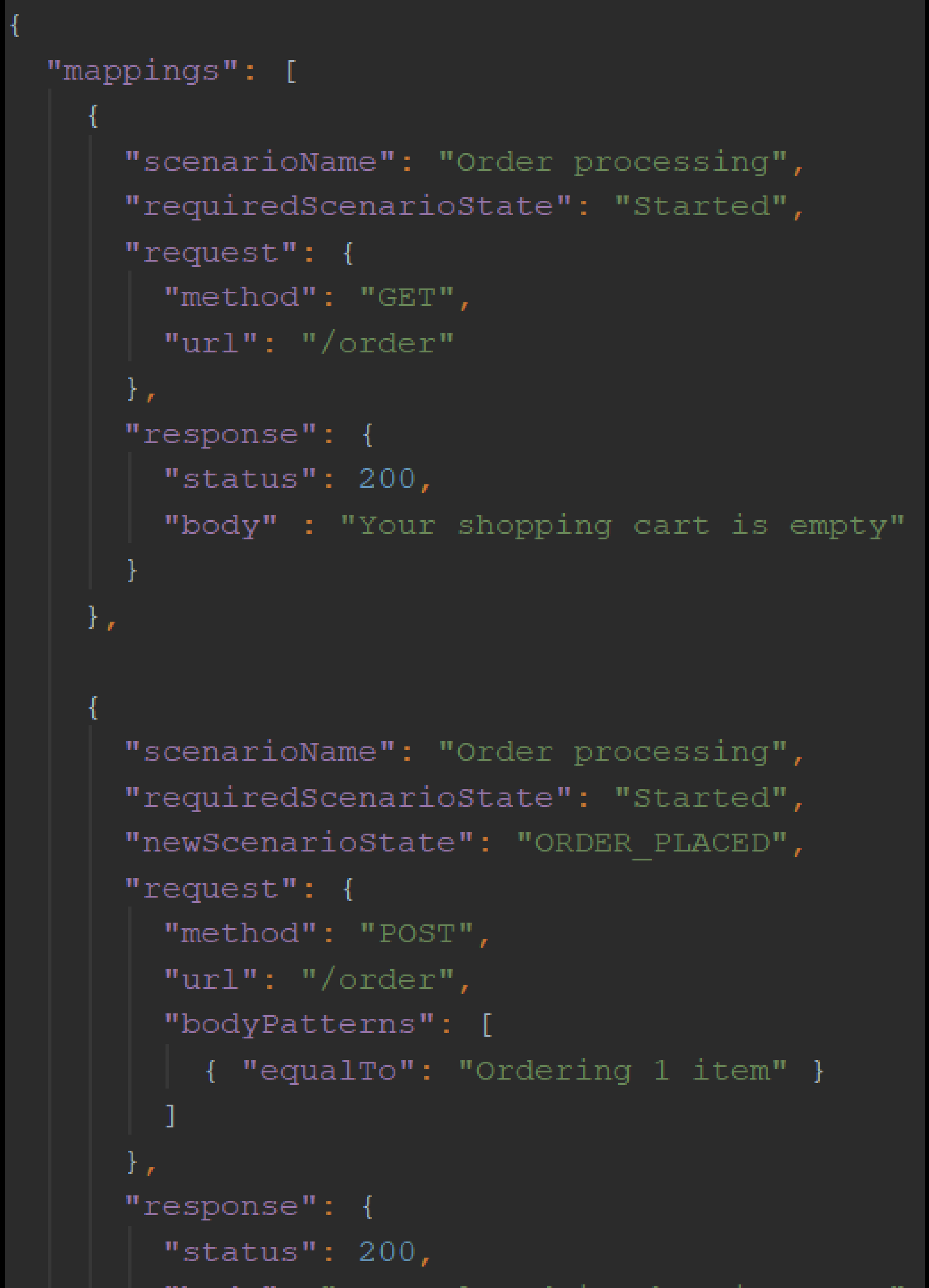
```
{
    "request": {
        "method": "GET",
        "url": "/fixeddelay"
    },
    "response": {
        "status": 200,
        "fixedDelayMilliseconds": 2000
    }
}
```

Returning a fault response

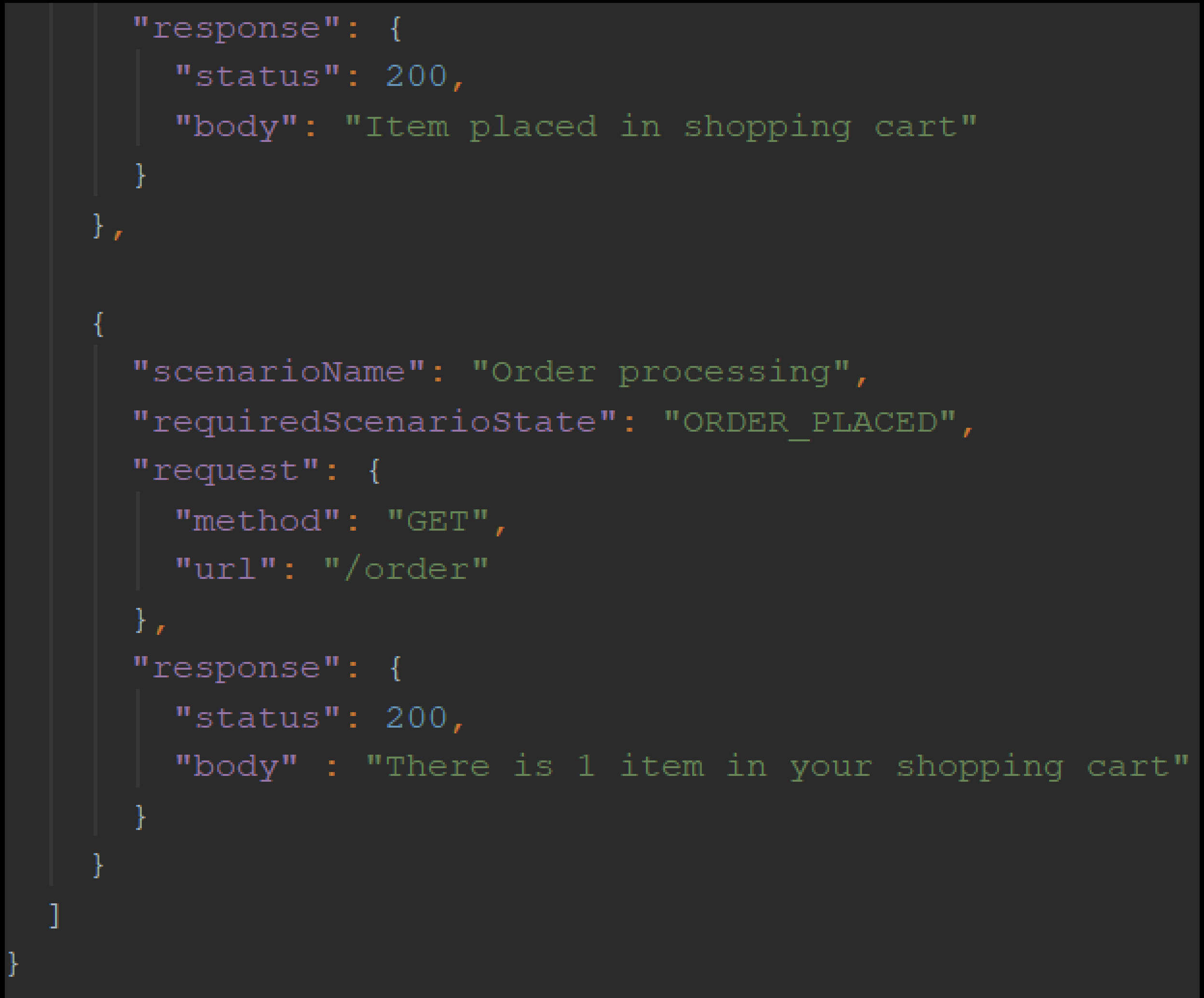


```json
{
    "request": {
        "method": "GET",
        "url": "/badresponse"
    },
    "response": {
        "fault": "MALFORMED_RESPONSE_CHUNK"
    }
}
```

Creating a stateful mock

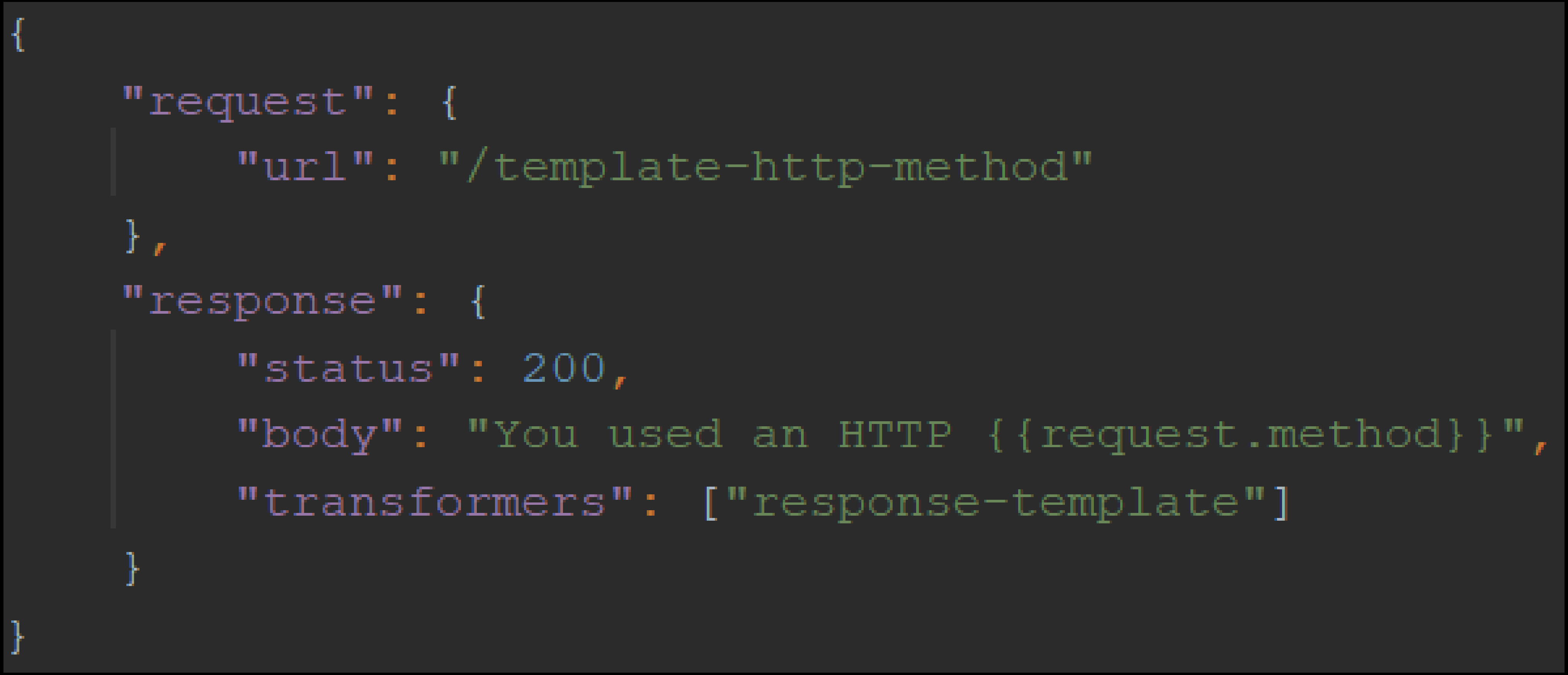


```
{
  "mappings": [
    {
      "scenarioName": "Order processing",
      "requiredScenarioState": "Started",
      "request": {
        "method": "GET",
        "url": "/order"
      },
      "response": {
        "status": 200,
        "body" : "Your shopping cart is empty"
      }
    },

    {
      "scenarioName": "Order processing",
      "requiredScenarioState": "Started",
      "newScenarioState": "ORDER_PLACED",
      "request": {
        "method": "POST",
        "url": "/order",
        "bodyPatterns": [
          { "equalTo": "Ordering 1 item" }
        ]
      },
      "response": {
        "status": 200,
```



```
      "response": {
        "status": 200,
        "body": "Item placed in shopping cart"
      }
    },

    {
      "scenarioName": "Order processing",
      "requiredScenarioState": "ORDER_PLACED",
      "request": {
        "method": "GET",
        "url": "/order"
      },
      "response": {
        "status": 200,
        "body" : "There is 1 item in your shopping cart"
      }
    }
  ]
}
```

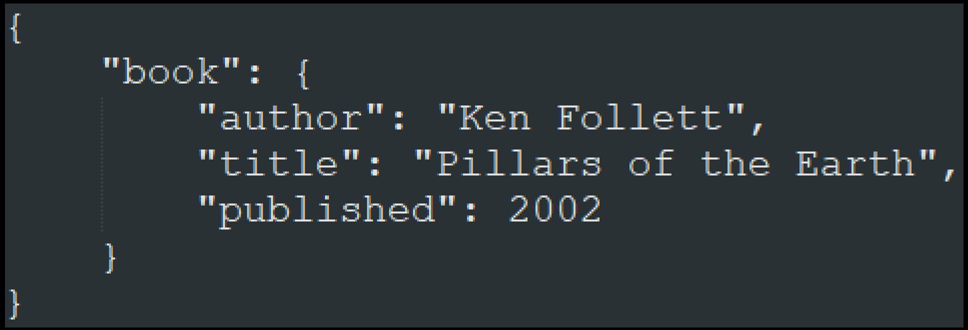
Use response templating



```
{
    "request": {
        "url": "/template-http-method"
    },
    "response": {
        "status": 200,
        "body": "You used an HTTP {{request.method}}",
        "transformers": ["response-template"]
    }
}
```

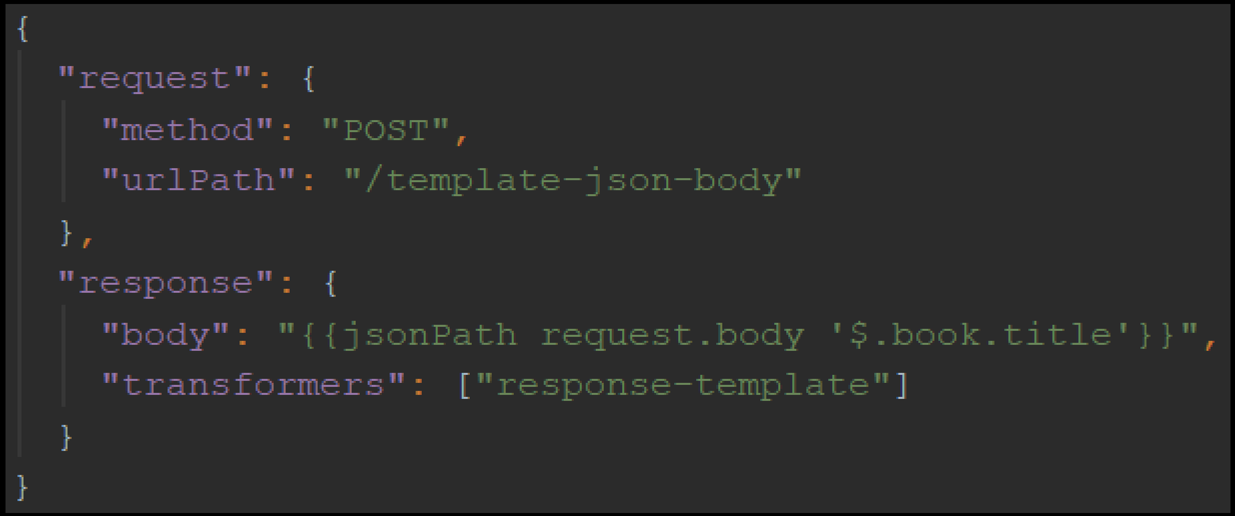
Use response templating

_When sent this JSON request body:



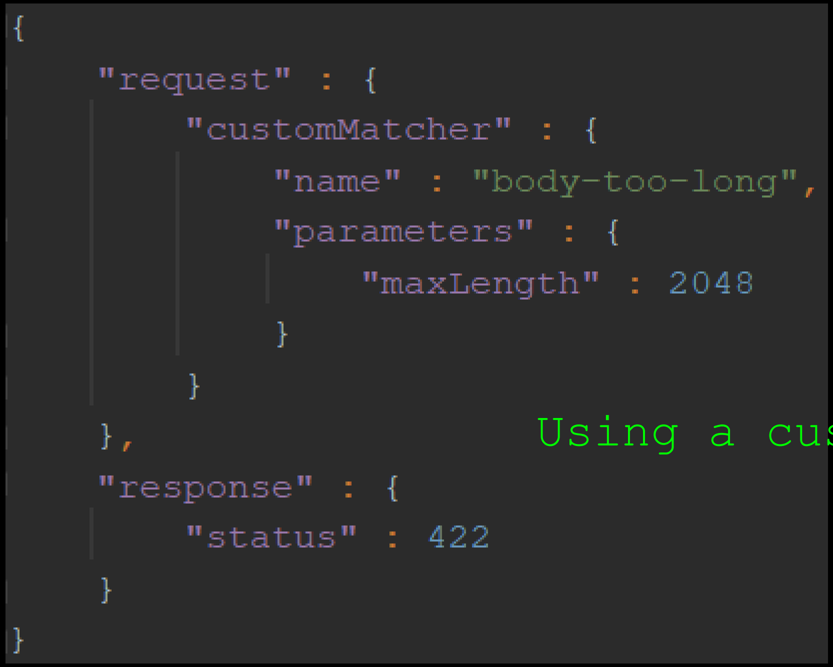
```
{
    "book": {
        "author": "Ken Follett",
        "title": "Pillars of the Earth",
        "published": 2002
    }
}
```

_This stub returns a response with body “Pillars of the Earth”:



```
{
  "request": {
    "method": "POST",
    "urlPath": "/template-json-body"
  },
  "response": {
    "body": "{{jsonPath request.body '$.book.title'}}",
    "transformers": ["response-template"]
  }
}
```

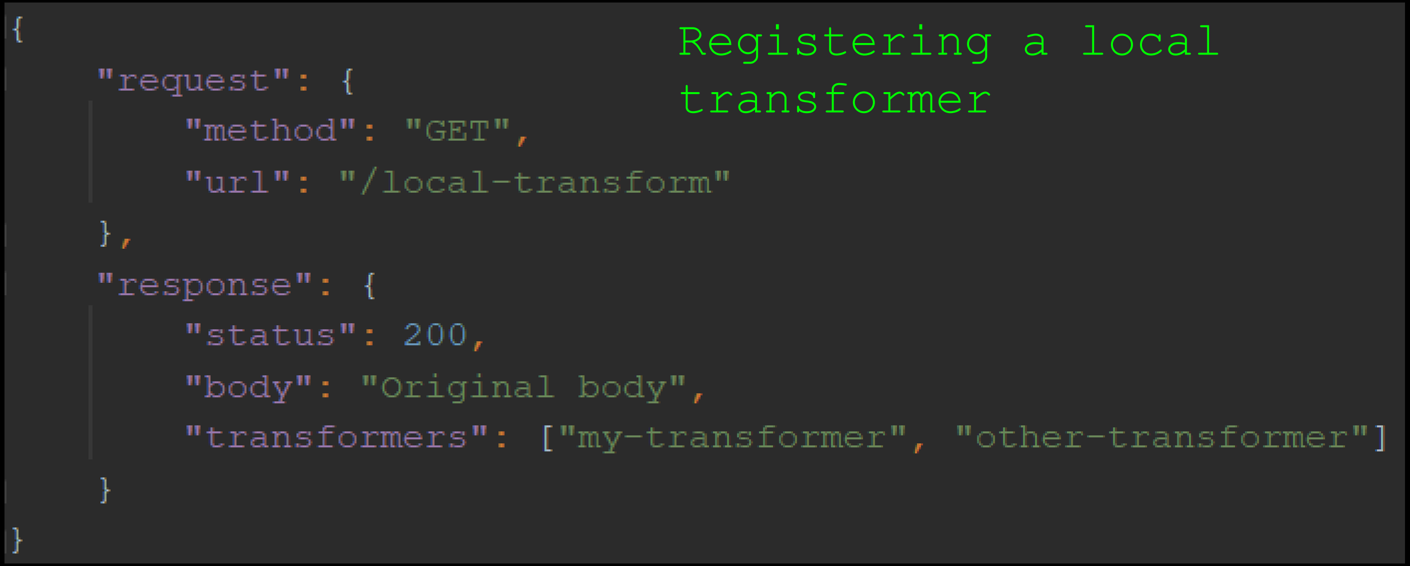
Using WireMock extensions



```
{
    "request" : {
        "customMatcher" : {
            "name" : "body-too-long",
            "parameters" : {
                "maxLength" : 2048
            }
        }
    },
    "response" : {
        "status" : 422
    }
}
```

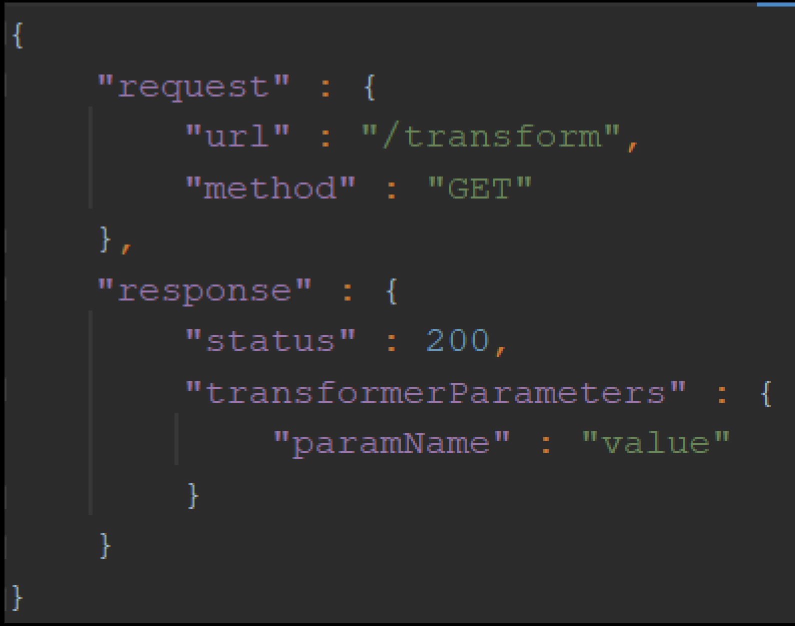
Using a custom matcher

Specifying transformer parameters



```
{
    "request": {
        "method": "GET",
        "url": "/local-transform"
    },
    "response": {
        "status": 200,
        "body": "Original body",
        "transformers": ["my-transformer", "other-transformer"]
    }
}
```

Registering a local transformer



```
{
    "request" : {
        "url" : "/transform",
        "method" : "GET"
    },
    "response" : {
        "status" : 200,
        "transformerParameters" : {
            "paramName" : "value"
        }
    }
}
```

?