10th International IT-seminar

Madrid – Spain

Create your own WEB server

from scratch

```
var http = require("http");
http.createServer(function (request, response) {
      response.writeHead(200, {
         'Content-Type': 'text/plain'
      });
      response.write('Simple Simple Fun')
      response.end();
}).listen(5002);
```

Web services

- Classic (SOAP)
- Data protocol
  - SOAP
- Transport protocol
  - Not specified
  - Usually HTTP

- Restful
- Data protocol
  - Not specified
  - Usually JSON
  - or XML
- Transport protocol
  - HTTP

Representational State Transfer

- Homepages for machines?
- Another way to make remote procedure calls?
- Semireligious paradigm?

Architectural constraints

If a service violates any of the required constraints, it cannot be considered RESTful

- Client–server
- Stateless
- Cacheable
- Layered system
- Code on demand (optional)
- **Uniform interface**

HTTP Request

```
GET /index.html HTTP/1.1
Host: localhost:4711
Connection: keep-alive
Accept: text/html,application/xhtml+xml,application/xml…
Upgrade-Insecure-Requests: 1
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_11_3) …
Accept-Encoding: gzip, deflate, sdch
Accept-Language: en-US,en;q=0.8,da;q=0.6
```

HTTP Response

```
HTTP/1.1 200 OK
Content-Type: text/html; charset=utf-8
Content-Length: 156

<!DOCTYPE html>
<html>
  <head>
    <title>Welcome</title>
    <meta charset="UTF-8">
  </head>
  <body>
    <div>Hello Fine World!</div>
  </body>
</html>
```

HTTP POST Request

```
POST /person HTTP/1.1
Host: localhost:4711
Connection: keep-alive
Content-Length: 50
Cache-Control: no-cache
Content-Type: application/json...

{
    "id": 8,
    "name": "Jens",
    "age": 25
}
```

HTTP Error Response

```
HTTP/1.1 404 Not Found
Content-Type: text/plain; charset=utf-8
Content-Length: 0
```

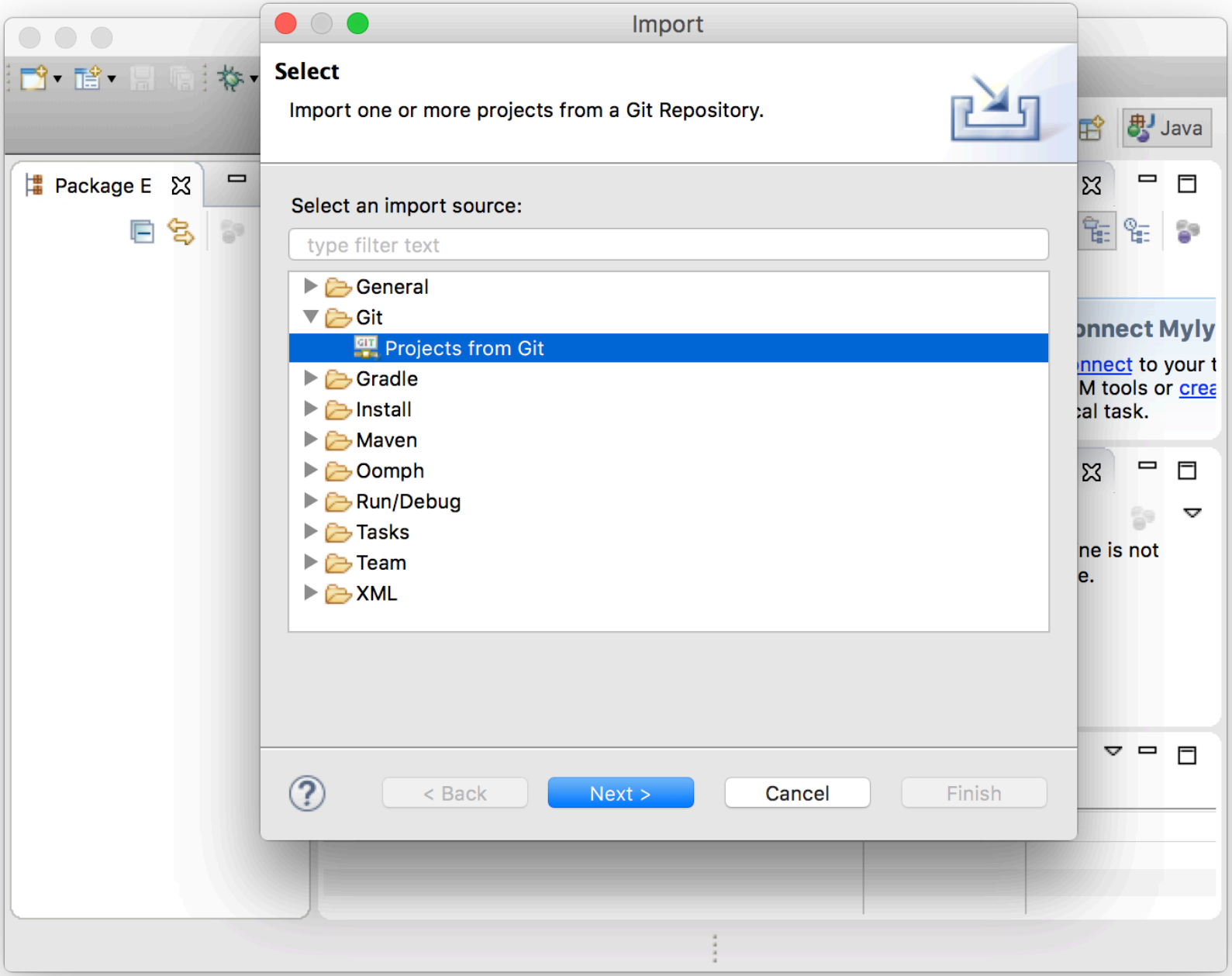
HTTP Methods

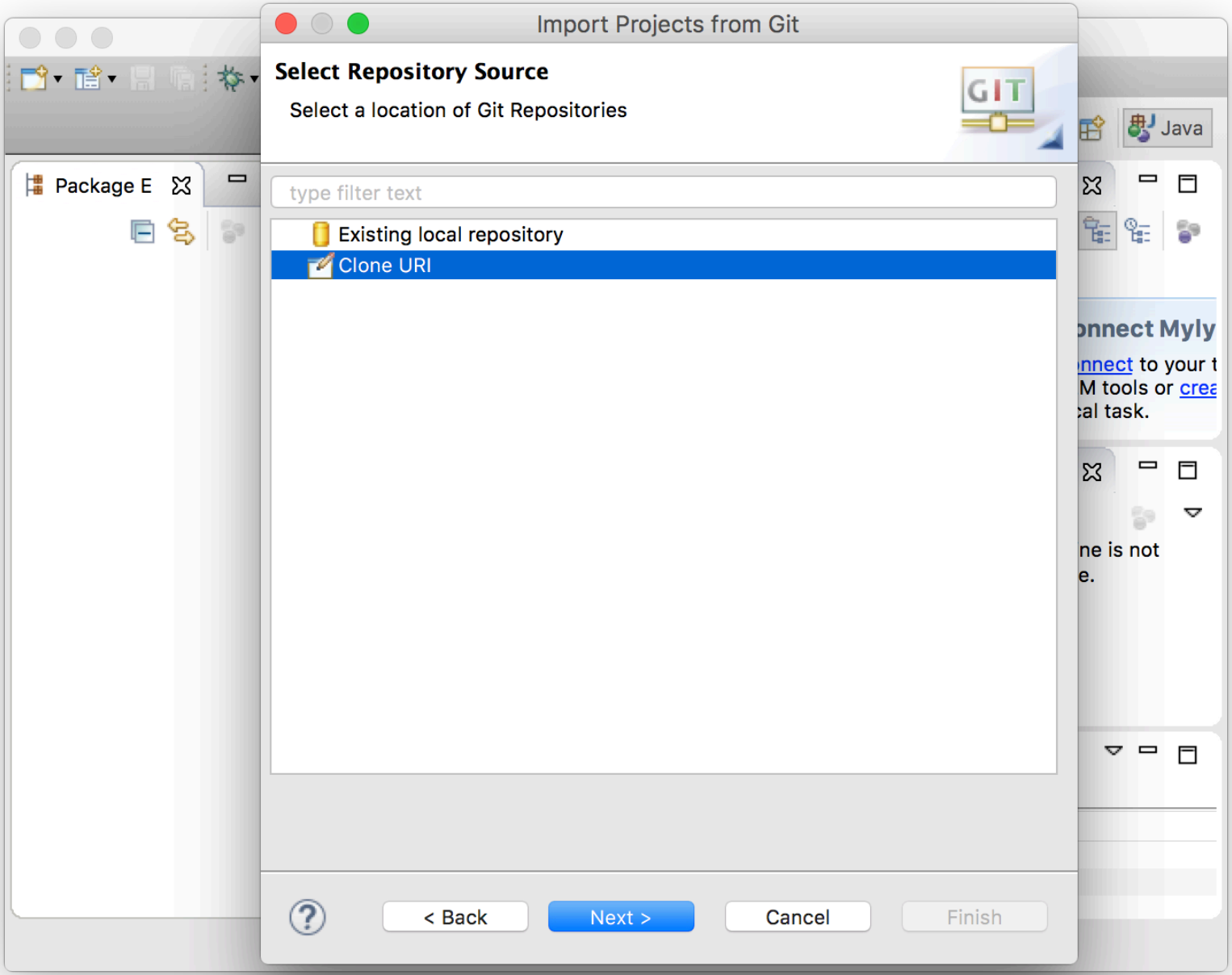
- GET
  - select
- POST
  - update or insert
- DELETE
  - delete
- and many more

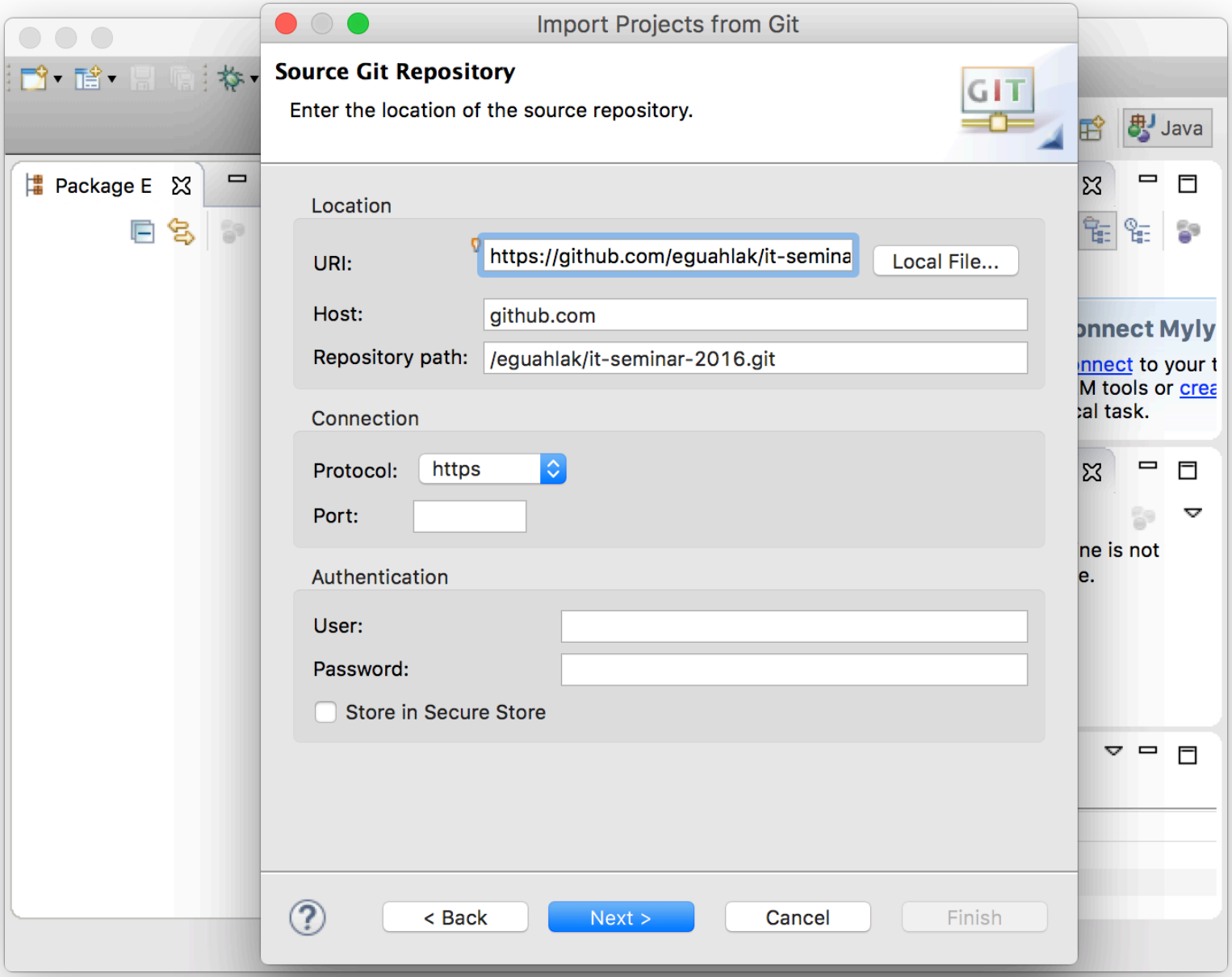
Javascript Simple Object Notation

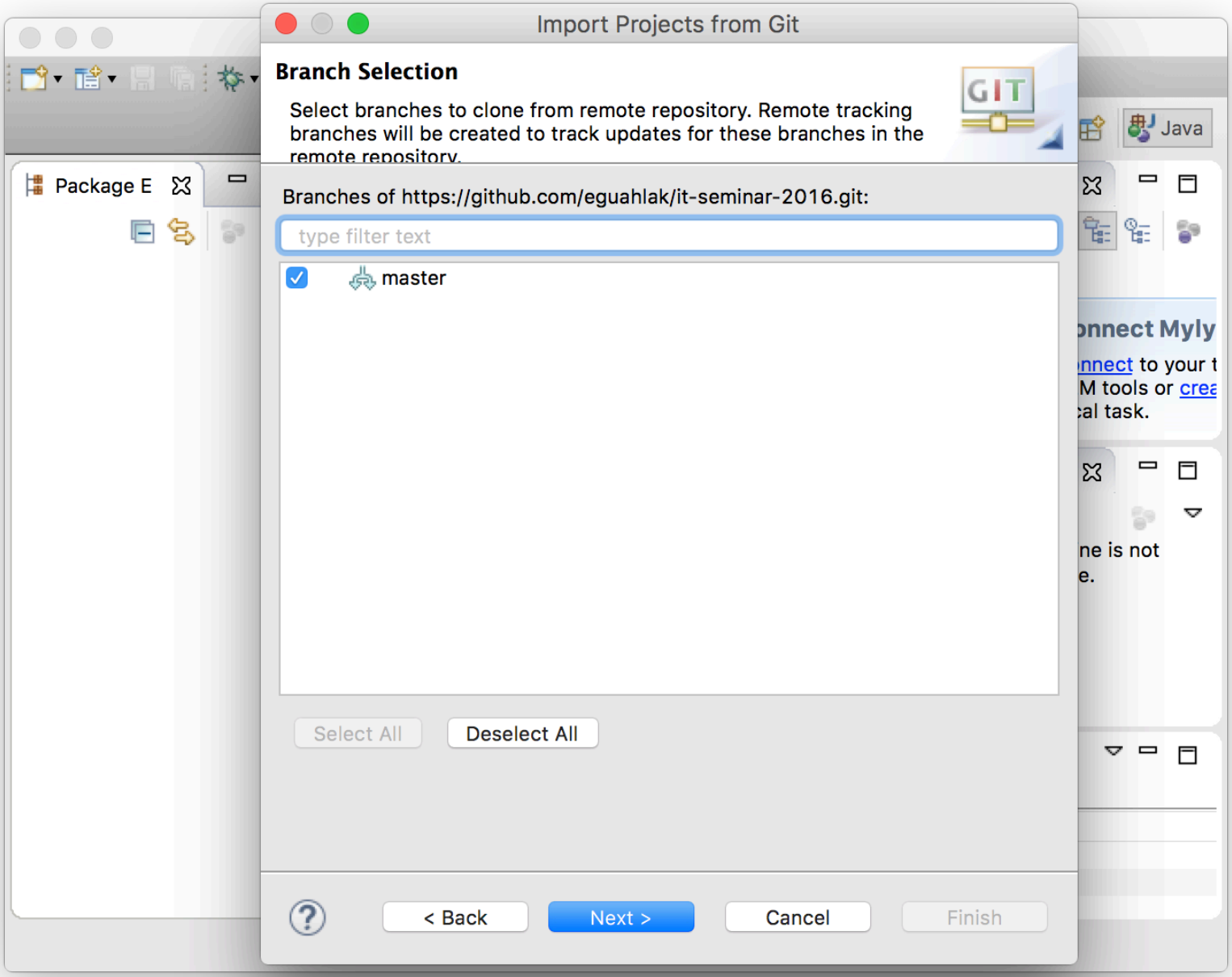
- GSON library
- JSONParser.java
- Strings “In double quotes”
- Numbers `7, 67.5`
- Lists `[ 7, 9, 13 ]`
- Objects `{ “key”: “value”, “anotherKey” : 42 }`
- Any combinatione hereof
- `[{"id":1,"name":"Kurt","age":34},{"id":2,"name":"Sonja","age":25},{"id":3,"name":"Ib","age":67}]`

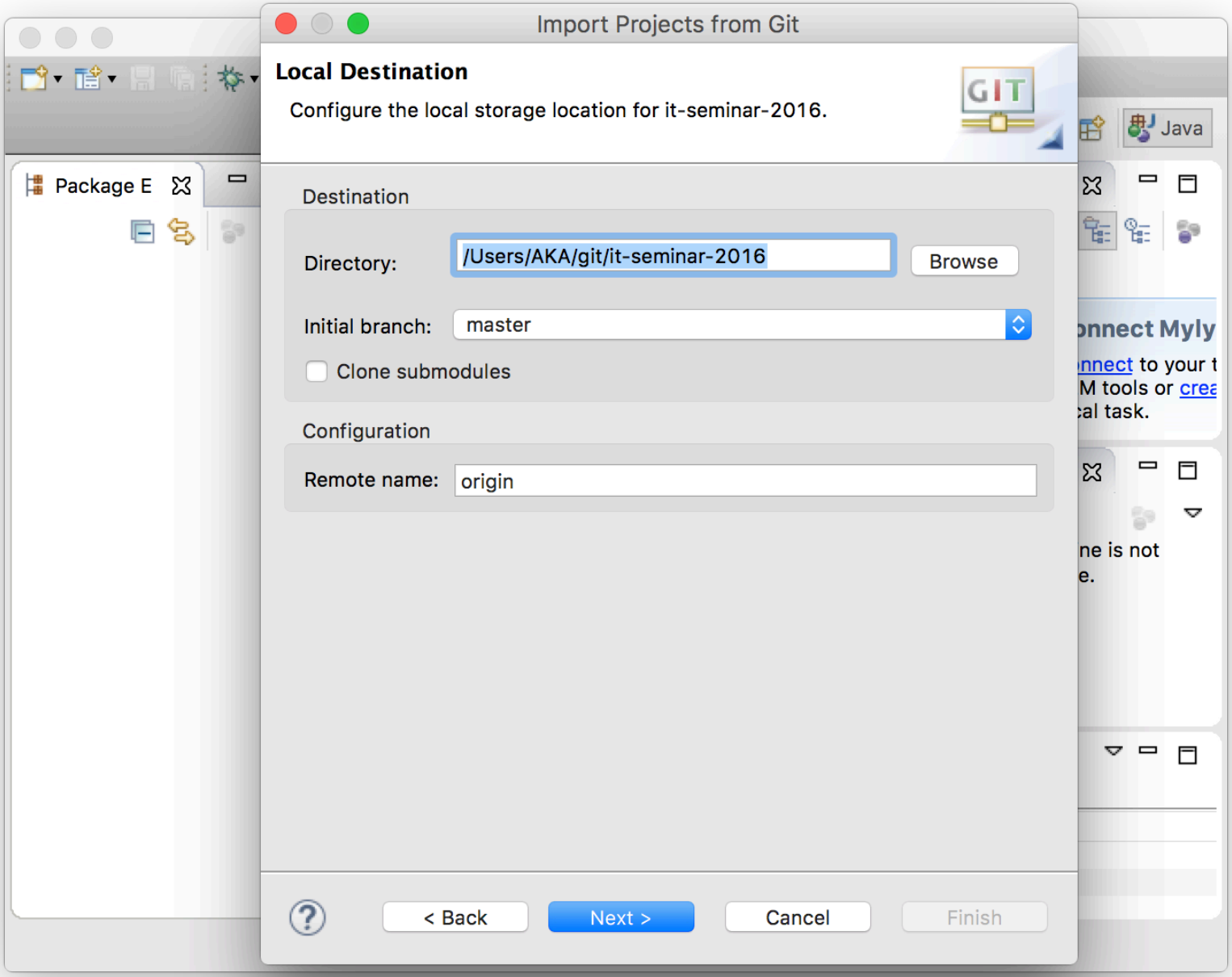
Installing boilerplate code with

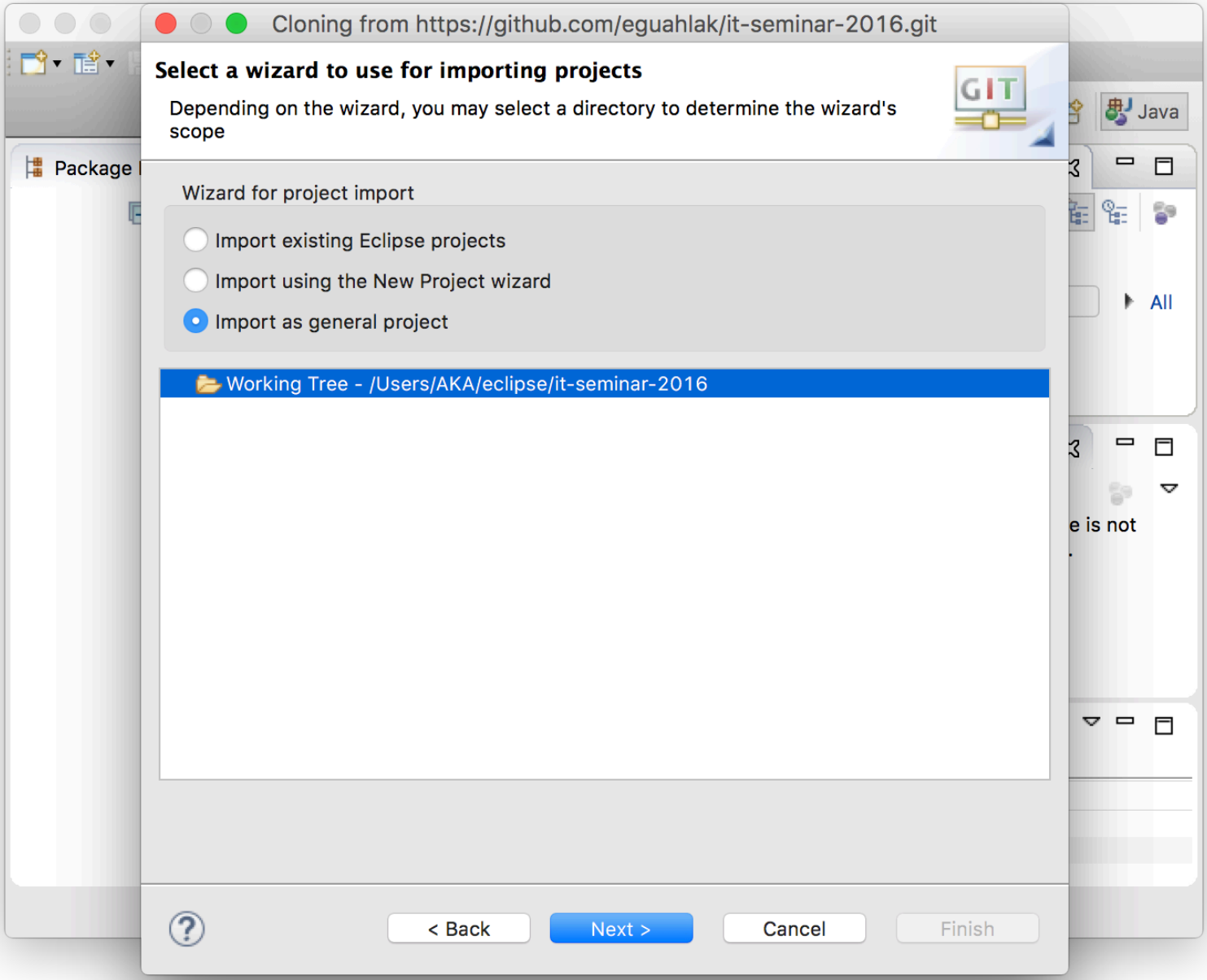

Import
Select
Import one or more projects from a Git Repository.
Select an import source:
type filter text
General
Git
Projects from Git
Gradle
Install
Maven
Oomph
Run/Debug
Tasks
Team
XML
< Back
Next >
Cancel
Finish
Package E
Java

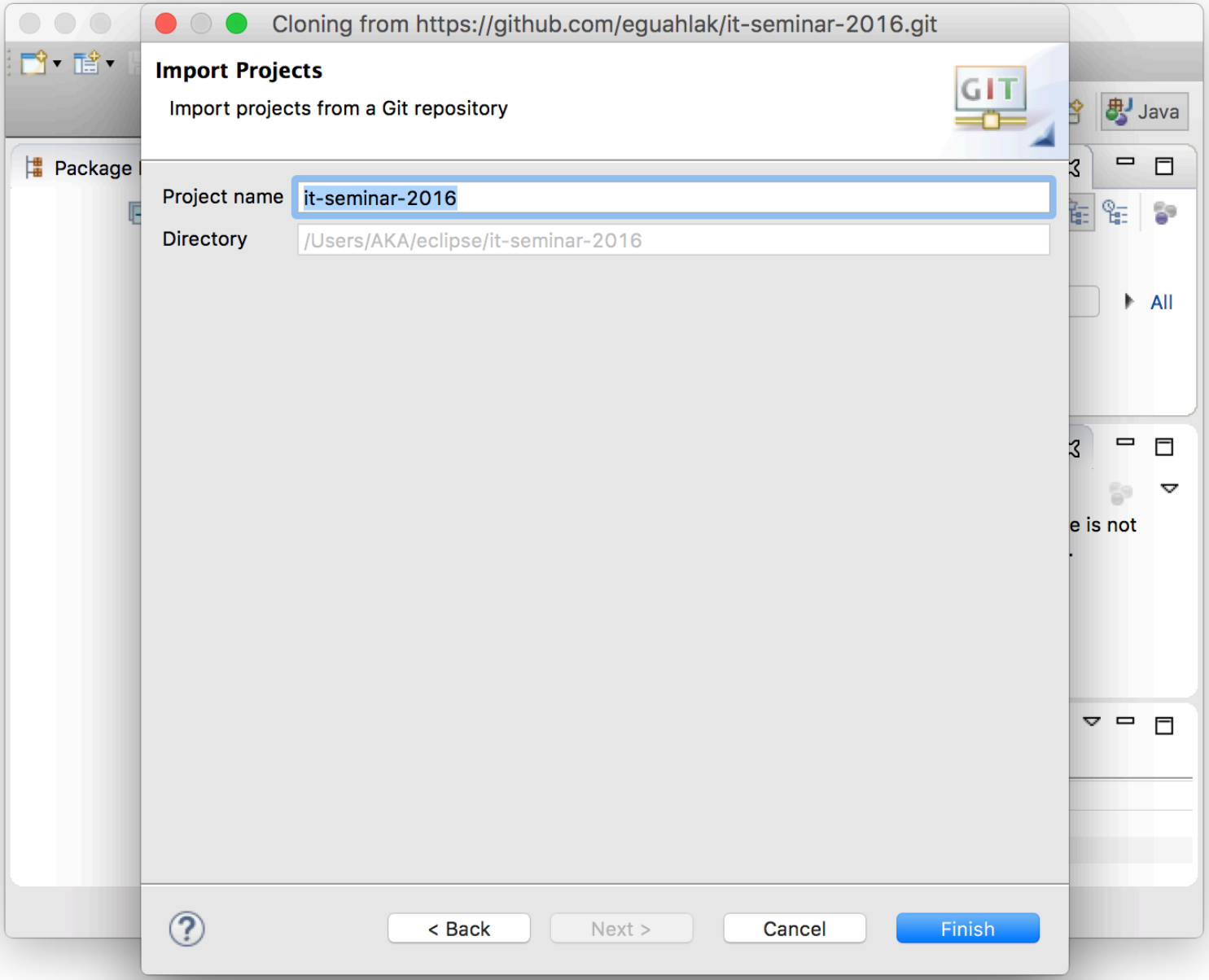

Import Projects from Git
Select Repository Source
Select a location of Git Repositories
GIT
type filter text
Existing local repository
Clone URI
< Back
Next >
Cancel
Finish
Package E
Java

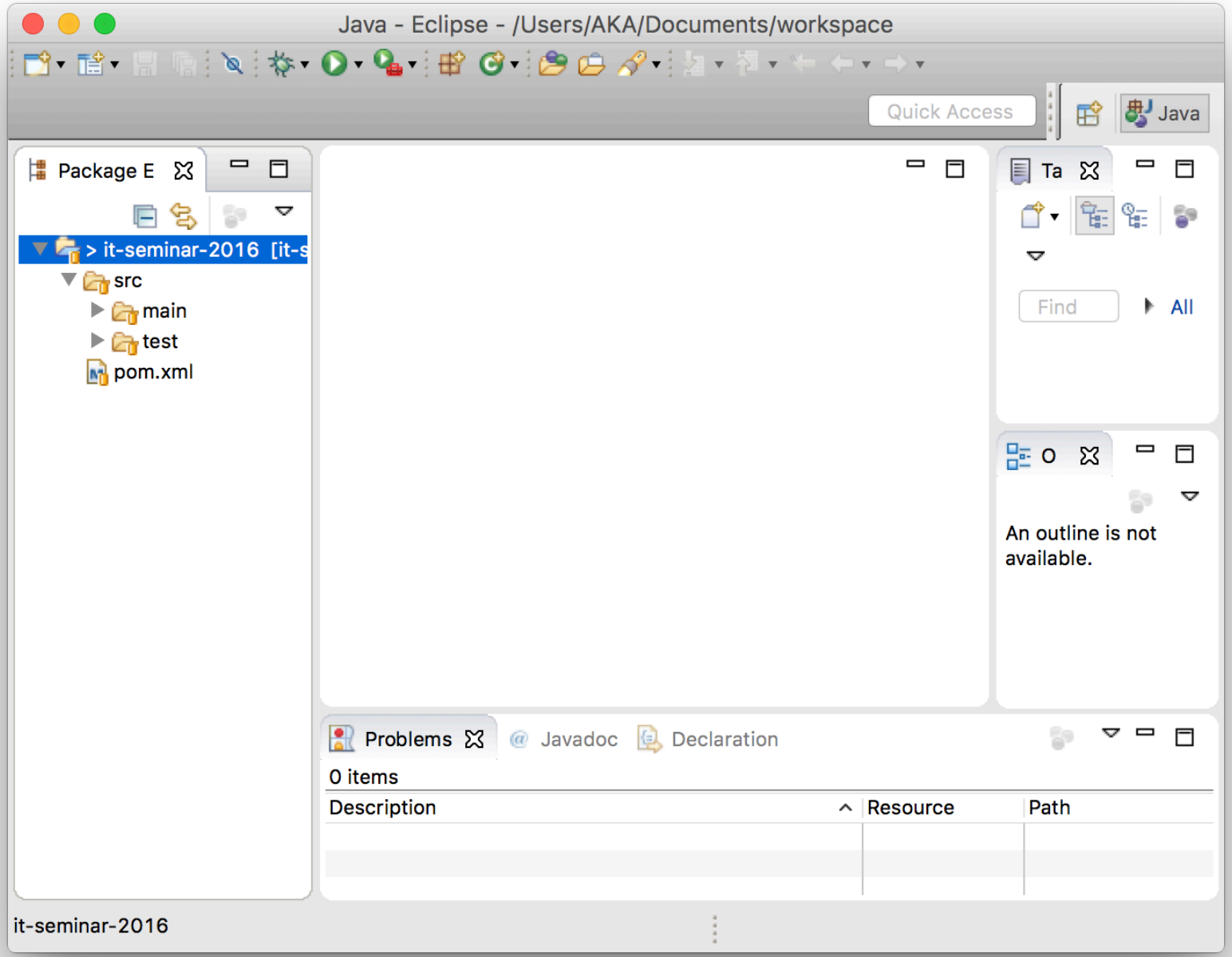

Import Projects from Git
Source Git Repository
Enter the location of the source repository.
GIT
Location
URI:
https://github.com/eguahlak/it-semina
Local File...
Host:
github.com
Repository path:
/eguahlak/it-seminar-2016.git
Connection
Protocol:
https
Port:
Authentication
User:
Password:
Store in Secure Store
< Back
Next >
Cancel
Finish
Package E
Java

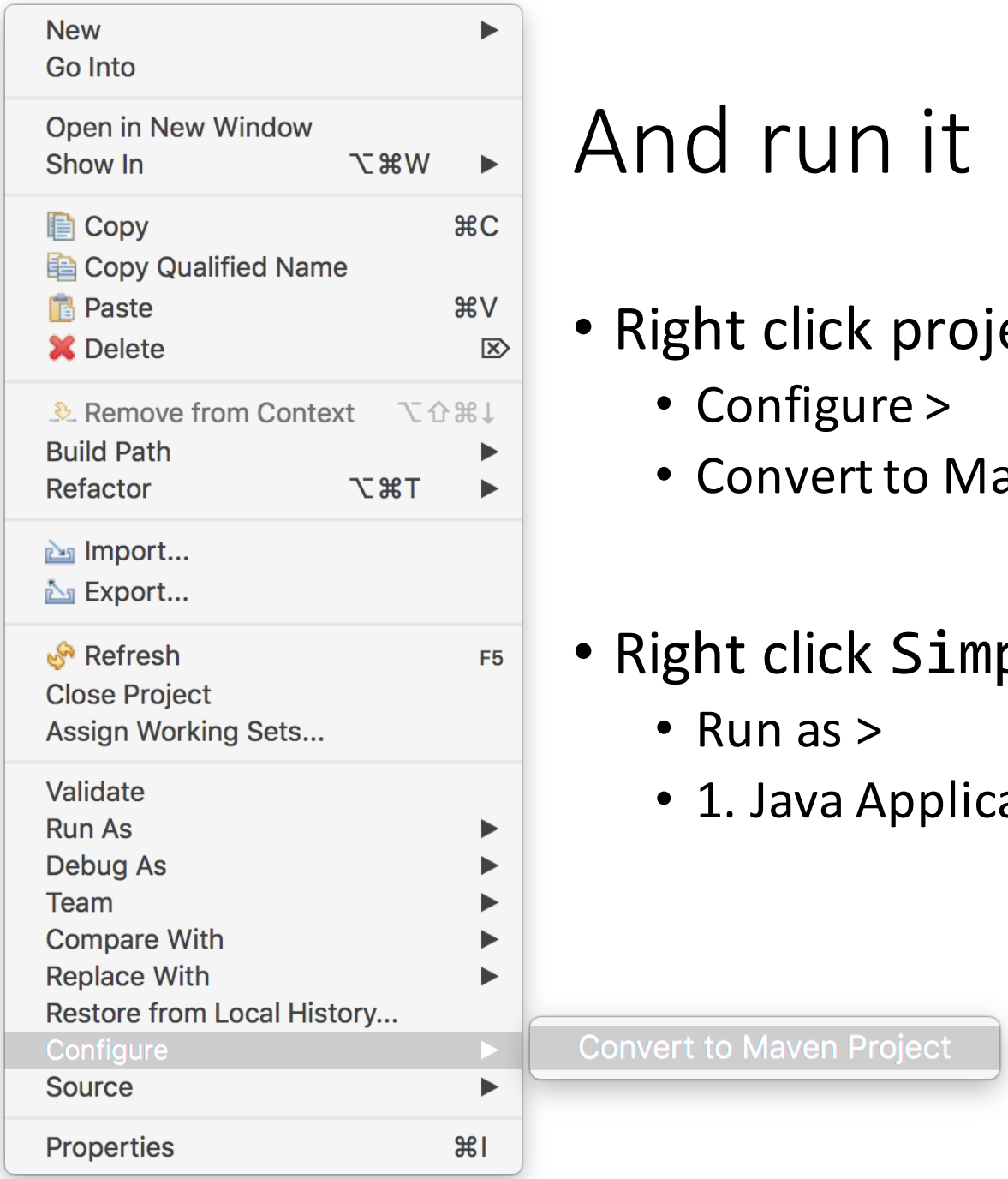

Import Projects from Git
Branch Selection
Select branches to clone from remote repository. Remote tracking branches will be created to track updates for these branches in the remote repository.
GIT
Branches of https://github.com/eguahlak/it-seminar-2016.git:
type filter text
master
Select All
Deselect All
< Back
Next >
Cancel
Finish
Package E
Java


Import Projects from Git
Local Destination
Configure the local storage location for it-seminar-2016.
GIT
Destination
Directory:
/Users/AKA/git/it-seminar-2016
Browse
Initial branch:
master
Clone submodules
Configuration
Remote name:
origin
< Back
Next >
Cancel
Finish
Package E
Java


Cloning from https://github.com/eguahlak/it-seminar-2016.git
Select a wizard to use for importing projects
Depending on the wizard, you may select a directory to determine the wizard's scope
GIT
Wizard for project import
Import existing Eclipse projects
Import using the New Project wizard
Import as general project
Working Tree - /Users/AKA/eclipse/it-seminar-2016
< Back
Next >
Cancel
Finish
Java
All
e is not


Cloning from https://github.com/eguahlak/it-seminar-2016.git
Import Projects
Import projects from a Git repository
GIT
Project name
it-seminar-2016
Directory
/Users/AKA/eclipse/it-seminar-2016
< Back
Next >
Cancel
Finish
Java
Package
All
e is not

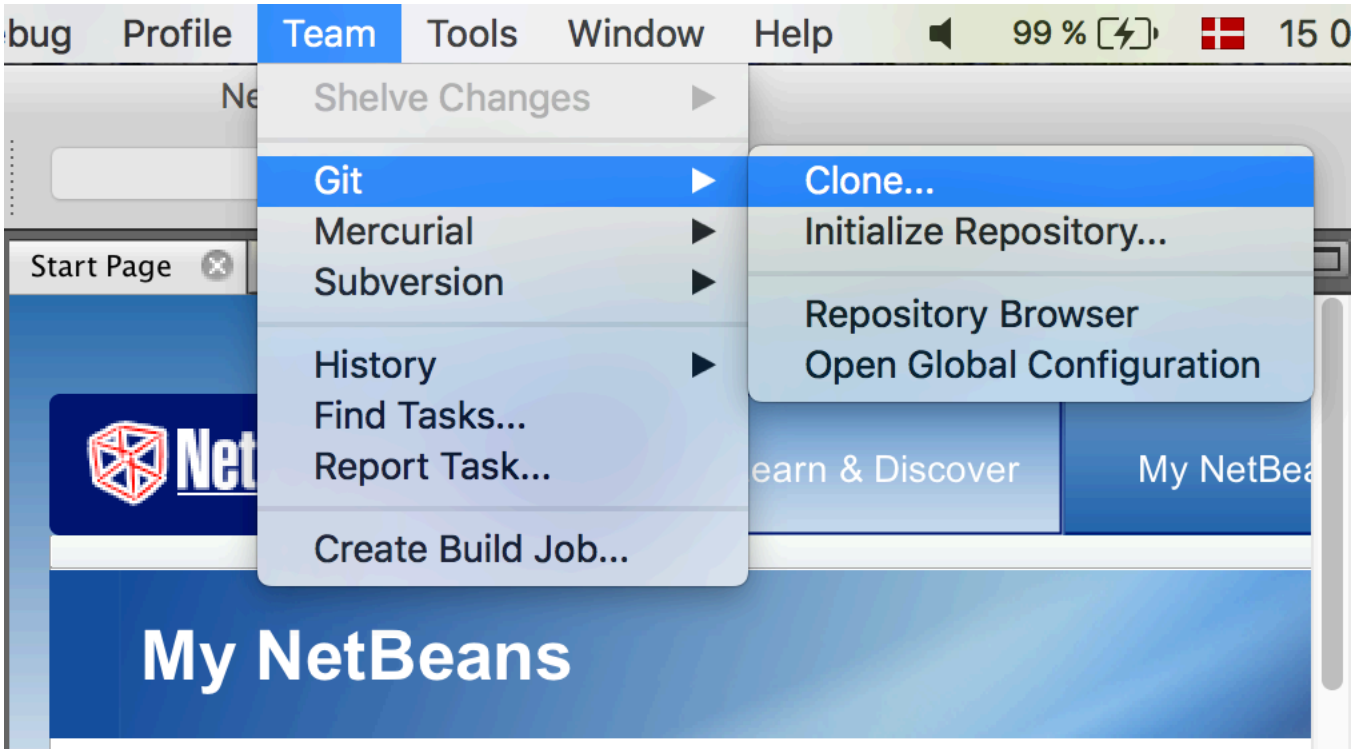

Java - Eclipse - /Users/AKA/Documents/workspace
Quick Access
Java
Package E
> it-seminar-2016 [it-s
src
main
test
pom.xml
Ta
Find
All
O
An outline is not available.
Problems
Javadoc
Declaration
0 items
Description
Resource
Path
it-seminar-2016

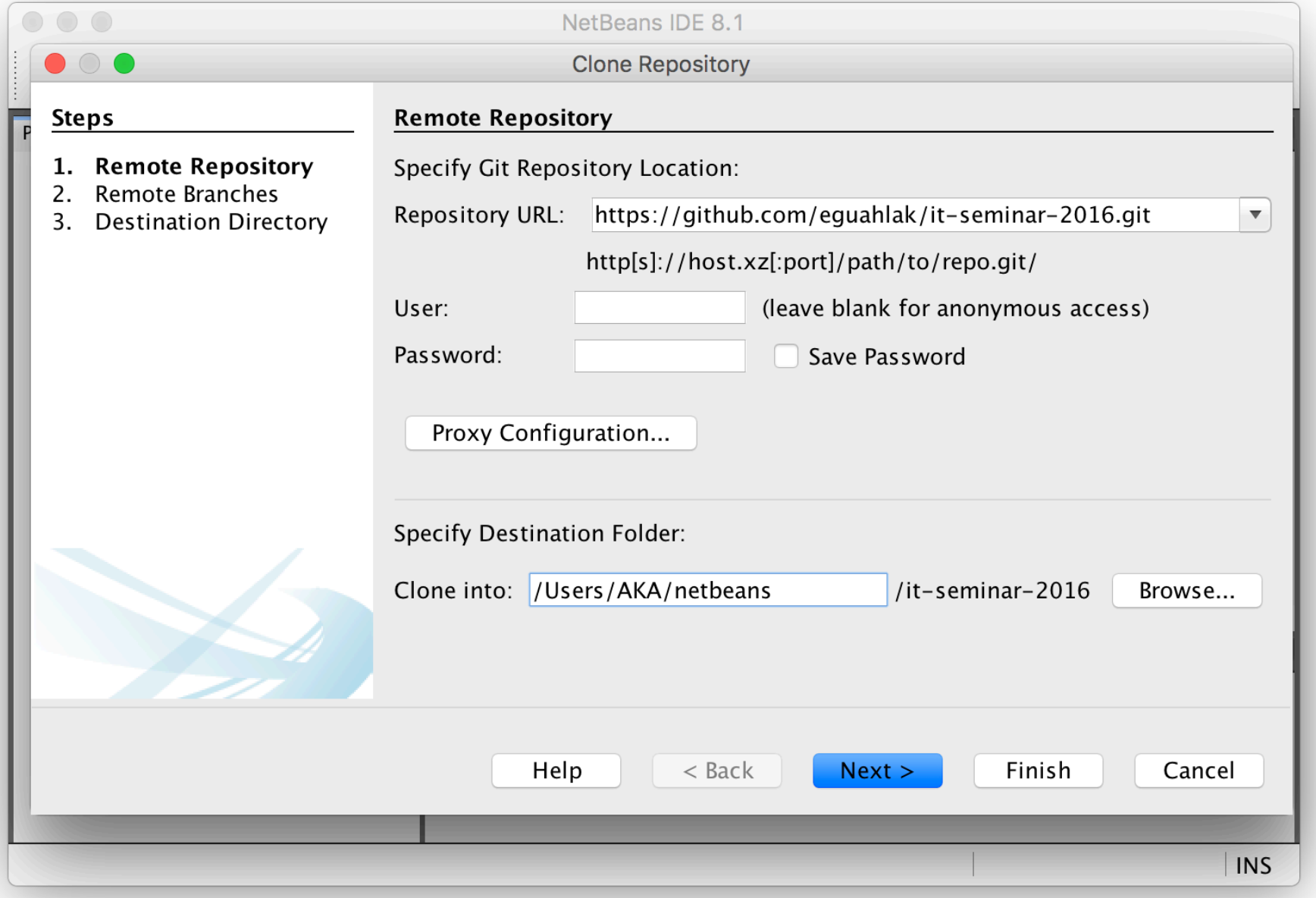


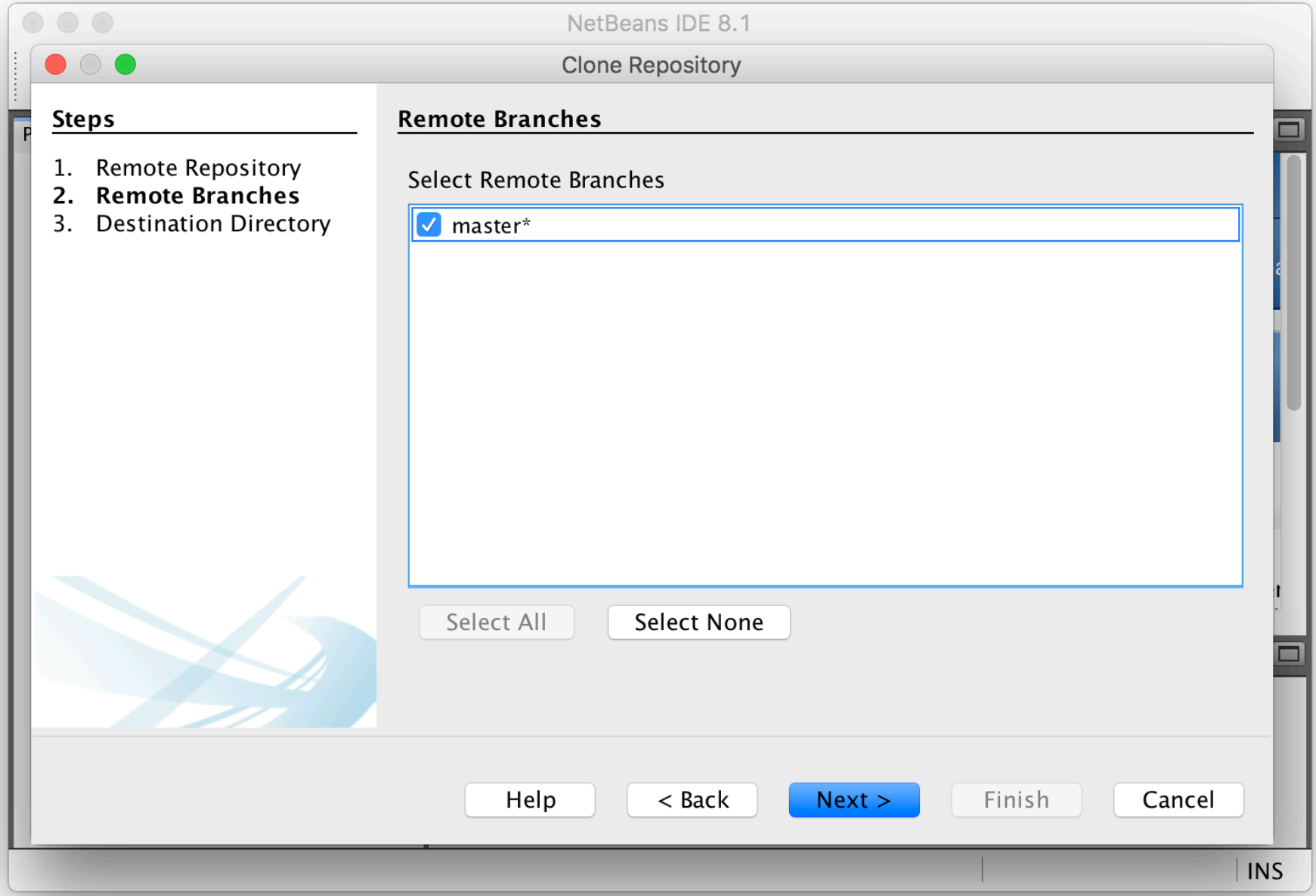
And run it

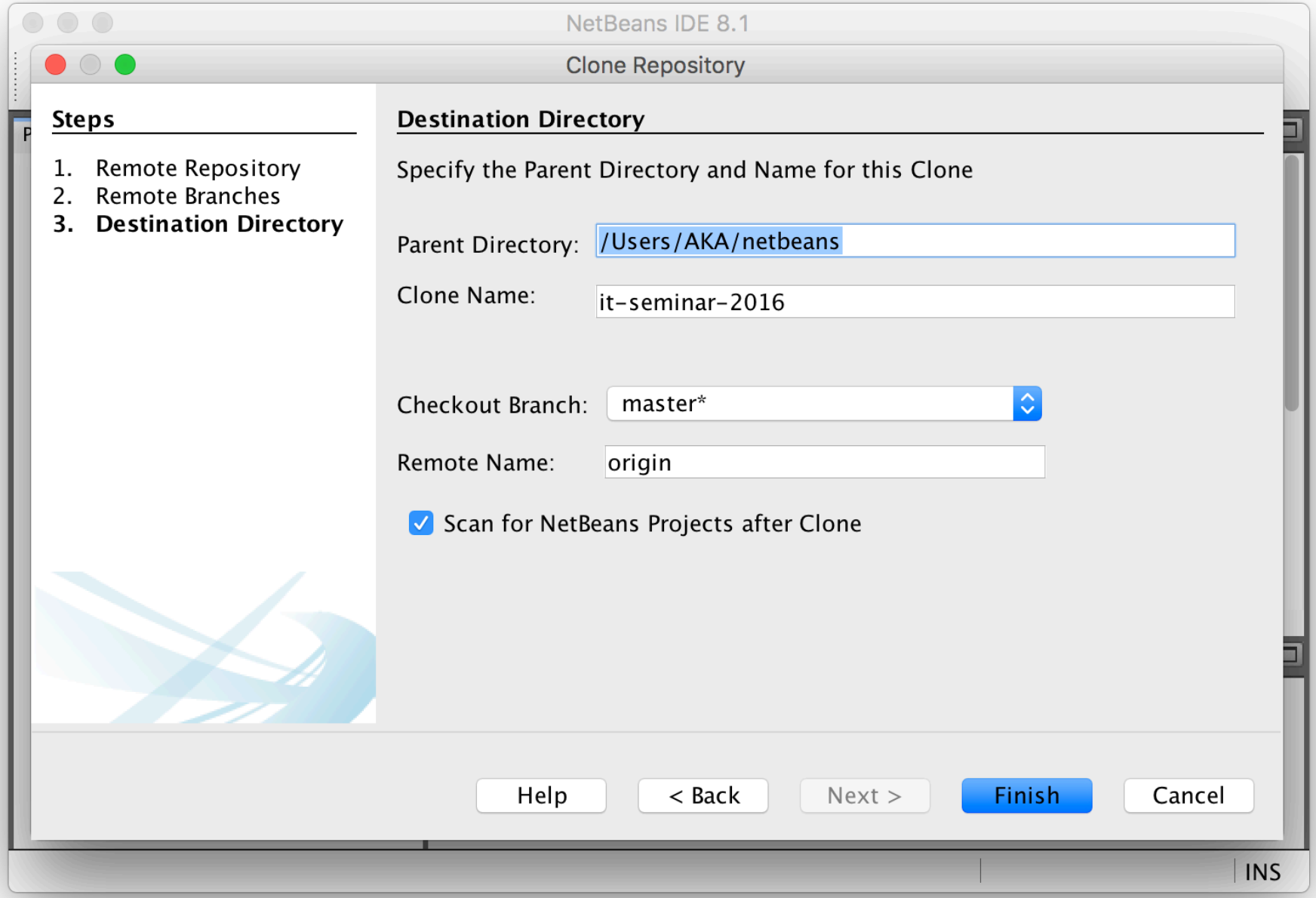
- Right click project
  - Configure >
  - Convert to Maven Project
- Right click `SimpleServer.java`
  - Run as >
  - 1. Java Application

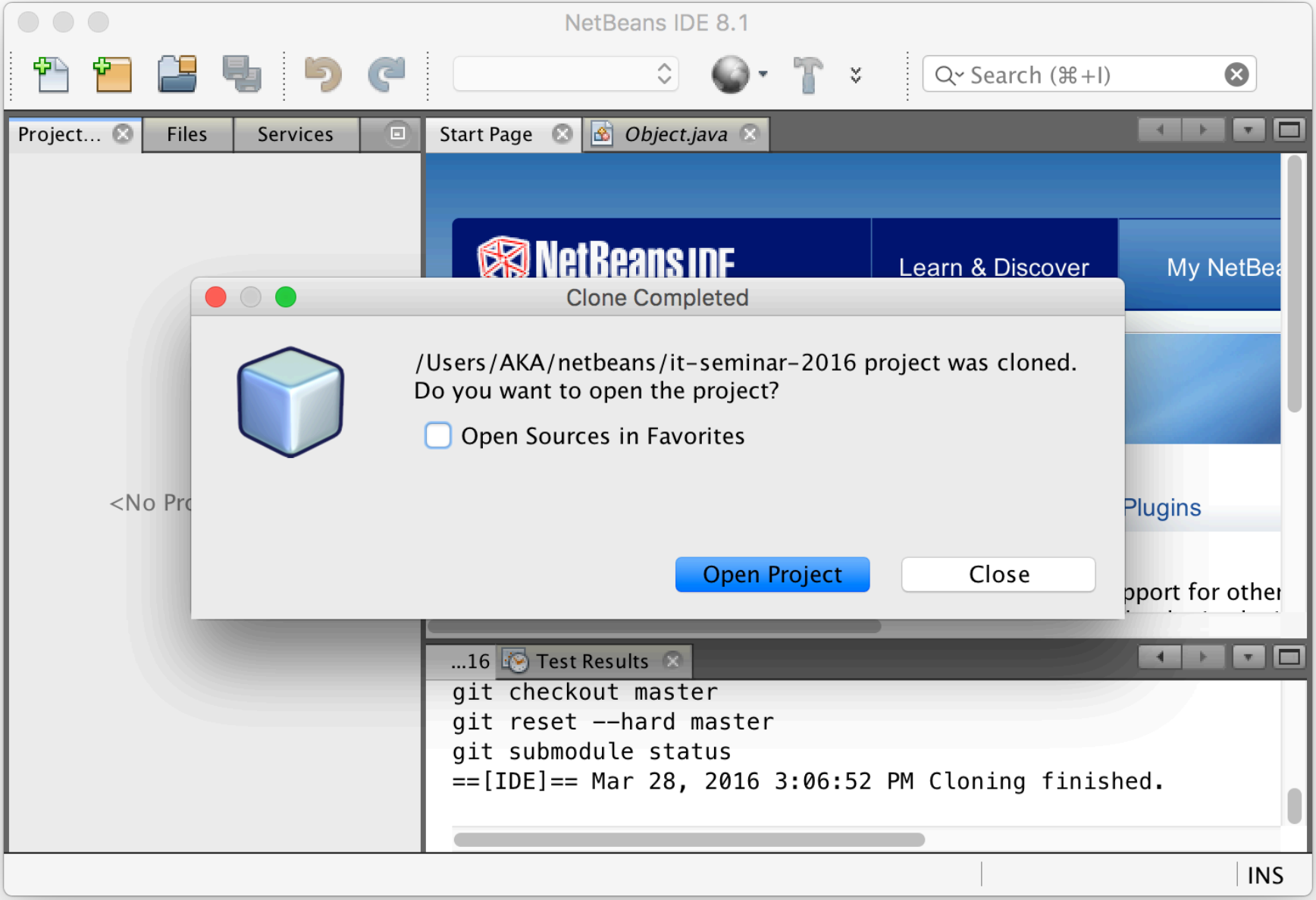
Installing boilerplate code with

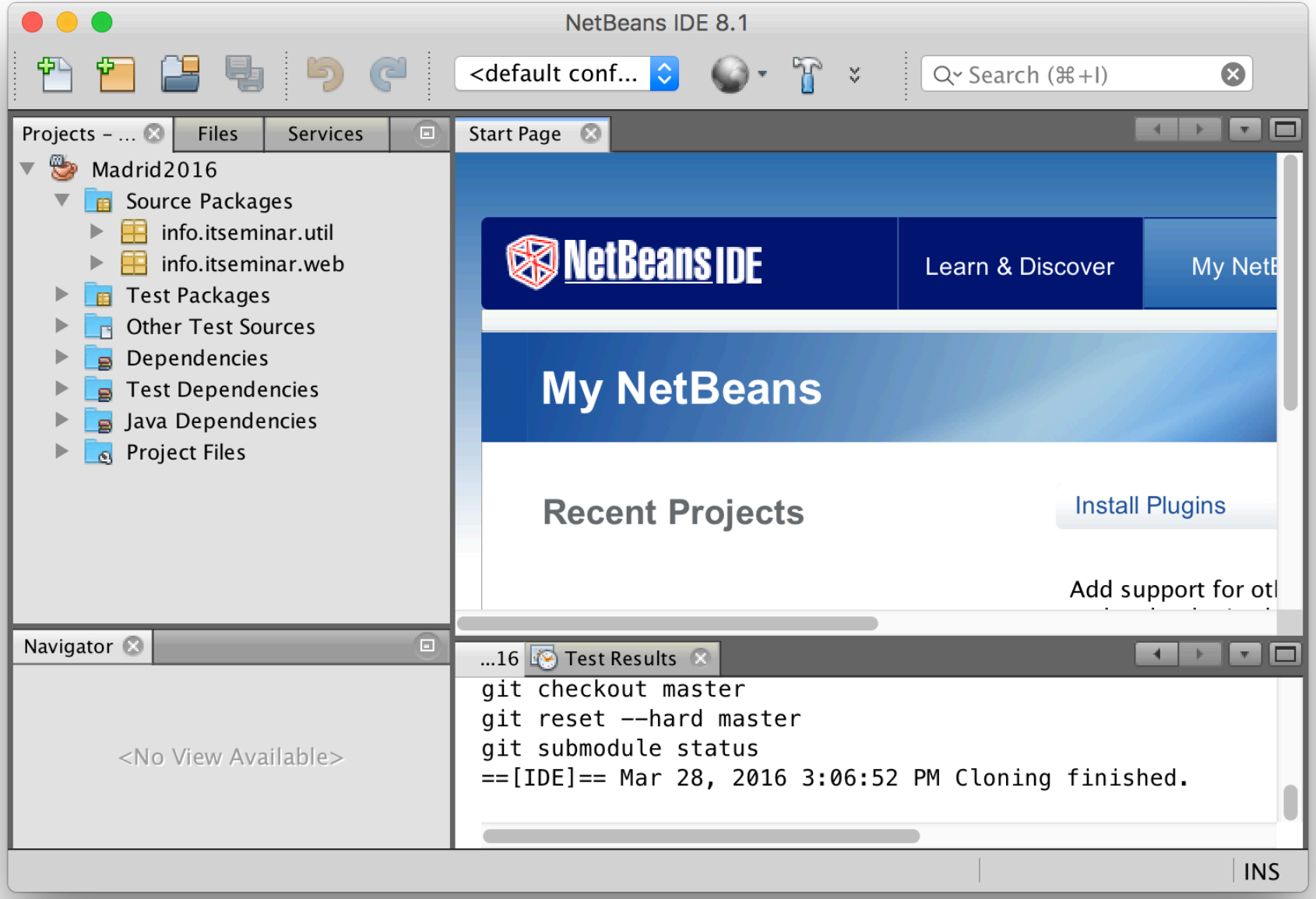

bug
Profile
Team
Tools
Window
Help
99 %
15 0
Shelve Changes
Git
Mercurial
Subversion
History
Find Tasks...
Report Task...
Create Build Job...
Clone...
Initialize Repository...
Repository Browser
Open Global Configuration
Start Page
earn & Discover
My NetBea
My NetBeans


NetBeans IDE 8.1
Clone Repository
Steps
1. Remote Repository
2. Remote Branches
3. Destination Directory
Remote Repository
Specify Git Repository Location:
Repository URL:
https://github.com/eguahlak/it-seminar-2016.git
http[s]://host.xz[:port]/path/to/repo.git/
User:
(leave blank for anonymous access)
Password:
Save Password
Proxy Configuration...
Specify Destination Folder:
Clone into:
/Users/AKA/netbeans
/it-seminar-2016
Browse...
Help
< Back
Next >
Finish
Cancel
INS


NetBeans IDE 8.1
Clone Repository
Steps
1. Remote Repository
2. Remote Branches
3. Destination Directory
Remote Branches
Select Remote Branches
master*
Select All
Select None
Help
< Back
Next >
Finish
Cancel
INS


NetBeans IDE 8.1
Clone Repository
Steps
1. Remote Repository
2. Remote Branches
3. Destination Directory
Destination Directory
Specify the Parent Directory and Name for this Clone
Parent Directory:
/Users/AKA/netbeans
Clone Name:
it-seminar-2016
Checkout Branch:
master*
Remote Name:
origin
Scan for NetBeans Projects after Clone
Help
< Back
Next >
Finish
Cancel
INS


NetBeans IDE 8.1
Search (⌘+I)
Project...
Files
Services
Start Page
Object.java
Learn & Discover
Plugins
Clone Completed
/Users/AKA/netbeans/it-seminar-2016 project was cloned.
Do you want to open the project?
Open Sources in Favorites
Open Project
Close
Test Results
git checkout master
git reset --hard master
git submodule status
==[IDE]== Mar 28, 2016 3:06:52 PM Cloning finished.
INS


NetBeans IDE 8.1
<default conf...
Search (⌘+I)
Projects – ...
Files
Services
Madrid2016
Source Packages
info.itseminar.util
info.itseminar.web
Test Packages
Other Test Sources
Dependencies
Test Dependencies
Java Dependencies
Project Files
Start Page
NetBeans IDE
Learn & Discover
My NetB
My NetBeans
Recent Projects
Install Plugins
Add support for otl
Navigator
<No View Available>
...16
Test Results
git checkout master
git reset --hard master
git submodule status
==[IDE]== Mar 28, 2016 3:06:52 PM Cloning finished.
INS

SimpleServer.java with root

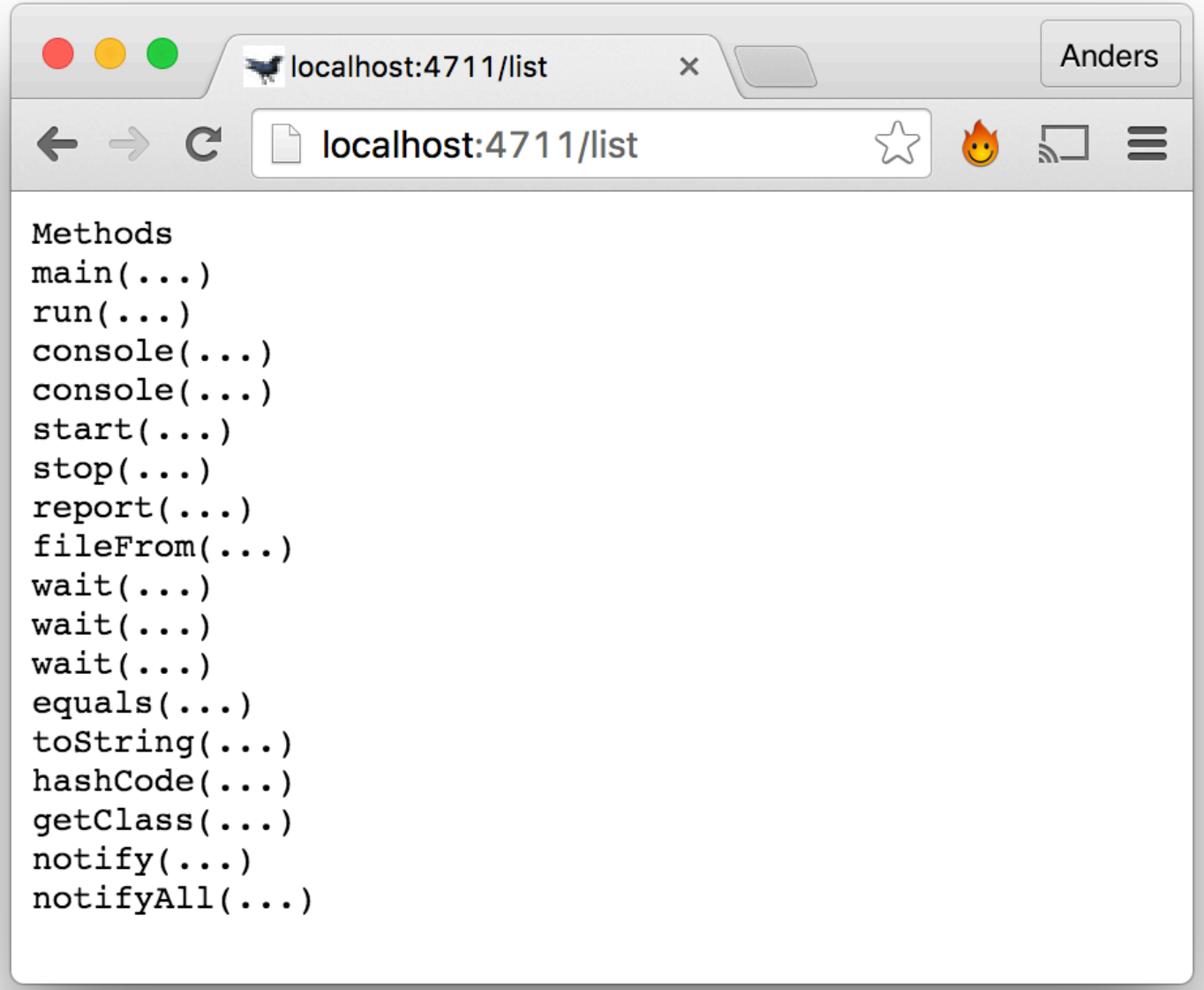
```
public class SimpleServer extends Server {

  public static void main(String... args) {
    new SimpleServer().root("/Users/AKA/Sites").start();
    }

  }
```

HttpService.java

```java
@Override
public void run() {
  try {
    Request request = new HttpRequest(context, in);
    Response response = new HttpResponse(context, out);
    String resource = request.getResource();
    if ("/list".equals(resource)) {
      String text = "Methods";
      for (Method method : context.getClass().getMethods()) {
        text += "\n"+method.getName()+"(...)";
        }
      response.type("txt");
      response.send(text);
      }
    else if (resource.startsWith("/service/")) {
      // Do service call here
      }
    else {
      File file = context.fileFrom(resource);
      response.send(file);
      }
    }
  catch (IOException ex) {
    ex.printStackTrace();
    context.report(ex.getMessage());
    }
```


localhost:4711/list
Anders
localhost:4711/list
Methods
main(...)
run(...)
console(...)
console(...)
start(...)
stop(...)
report(...)
fileFrom(...)
wait(...)
wait(...)
wait(...)
equals(...)
toString(...)
hashCode(...)
getClass(...)
notify(...)
notifyAll(...)

Goal #1

- Change HttpService, so “/list” will return an html page with a table of methods
- Exclude methods from Object and Server class
- Optionally exclude methods defined in the Context interface

Goal #2

- Create methods in your server in the form getXyzHtml() that returns html as a string
- Identify resources ending in ".html"
  - eg: "/welcome.html"
- Ensure that the HTTP method is "GET"
- Check the context (your server) for a corresponding method
  - eg: getWelcomeHtml()
- Call the method if it exists, otherwise show file (default)

Goal #3

- Create a local `int count` field in your server
- Update the field for every call to the server
- Create a getCountHtml() that reflects that count

Goal #4

- Create a method that handles form data using GET
  - eg: getPersonDataHtml(Request request)

```
<form action="personData.html" method="GET">
  ID: <input value="" name="id"/><br/>
  Name: <input value="" name="name"/><br/>
  Age: <input value="" name="age"/><br/>
  <button name="okButton" value="OK">OK</button>
</form>
```

Goal #5

- Create a method that handles form data using POST
  - eg: **post**PersonDataHtml(Request request)

```
<form action="personData.html" method="POST">
  ID: <input value="" name="id"/><br/>
  Name: <input value="" name="name"/><br/>
  Age: <input value="" name="age"/><br/>
  <button name="okButton" value="OK">OK</button>
</form>
```

Goal #6

- Create a REST service that returns all people in your server
- GET /person HTTP/1.1

Goal #7

- Create a REST service that returns the number of people in your server
- GET /person/count HTTP/1.1

Goal #8

- Create a REST service that returns a specific person in your server (i.e.: id = 2)
- GET /person/2 HTTP/1.1

Goal #9

- Create a REST service that updates or inserts a specific person in your server (i.e.: id = 7)
- POST /person HTTP/1.1
- { “id”: 7, “name”: “Kurt”, “age”: 27 }

Goal #9

- Create a REST service that deletes a specific person in your server (i.e.: id = 7)
- DELETE /person/7 HTTP/1.1