Аспектно - ориентированное программирование

Лекция №3

Антонов В.В.

Основные принципы ООП.

- ***1. Инкапсуляция - это объединение в единое целое данных и алгоритмов обработки этих данных***. В рамках ООП данные называются ***полями объекта (свойствами)***, а алгоритмы - ***объектными методами*** или просто ***методами***.
- ***2. Наследование - есть свойство объектов порождать своих потомков***. Объект-потомок автоматически наследует от родителя все поля и методы, может дополнять объекты новыми полями и заменять (перекрывать) методы родителя или дополнять их.
- ***3. Полиморфизм - это свойство родственных объектов (т.е. объектов, имеющих одного общего родителя) решать схожие по смыслу проблемы разными способами***. В рамках ООП поведенческие свойства объекта определяются набором входящих в него методов. Изменяя алгоритм того или иного метода в потомках объекта, программист может придавать этим потомкам отсутствующие у родителя специфические свойства. Для изменения метода необходимо ***перекрыть его в потомке***, то есть ***объявить в потомке одноименный метод и реализовать в нем нужные действия***.

Плагины для Eclipse

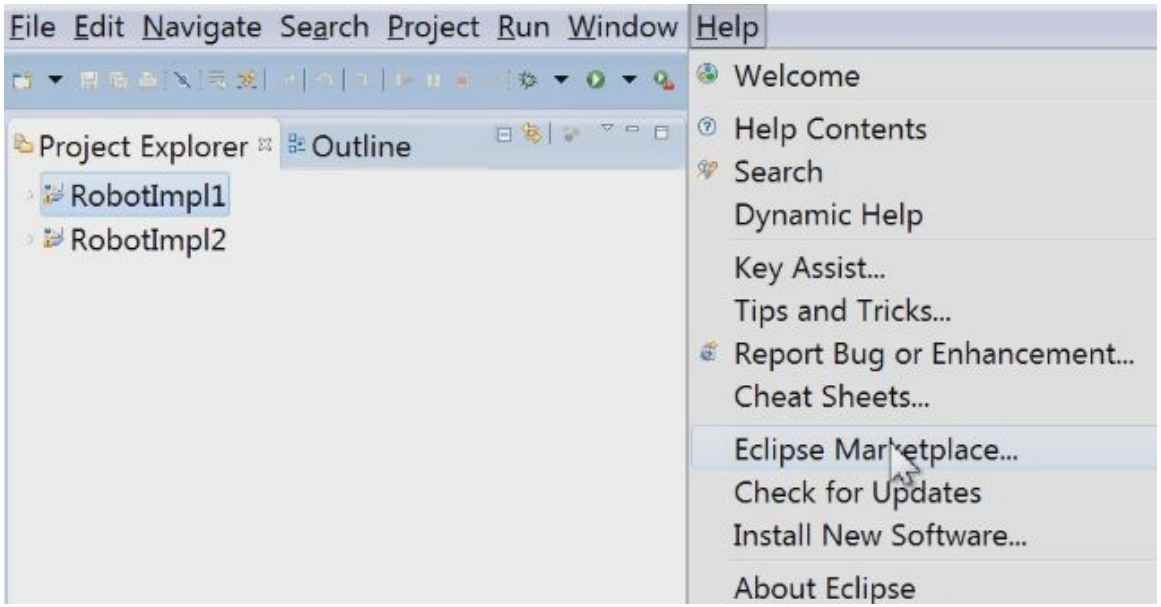
- Обзор Eclipse Marketplace
- Различия Spring IDE и SpringSource Tool Suite
- Установка и настройка дополнительных плагинов
- Настройка форматирования кода, LineWrapping
- Настройка SaveActions в eclipse
- Анализаторы кода, кодировка

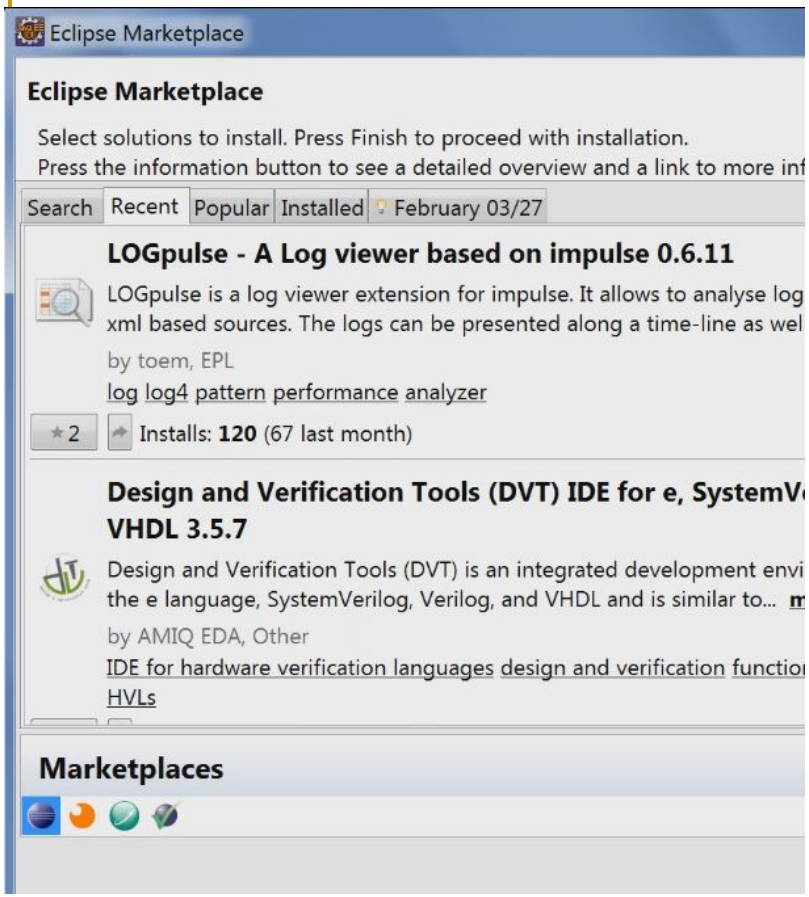
Eclipse Marketplace

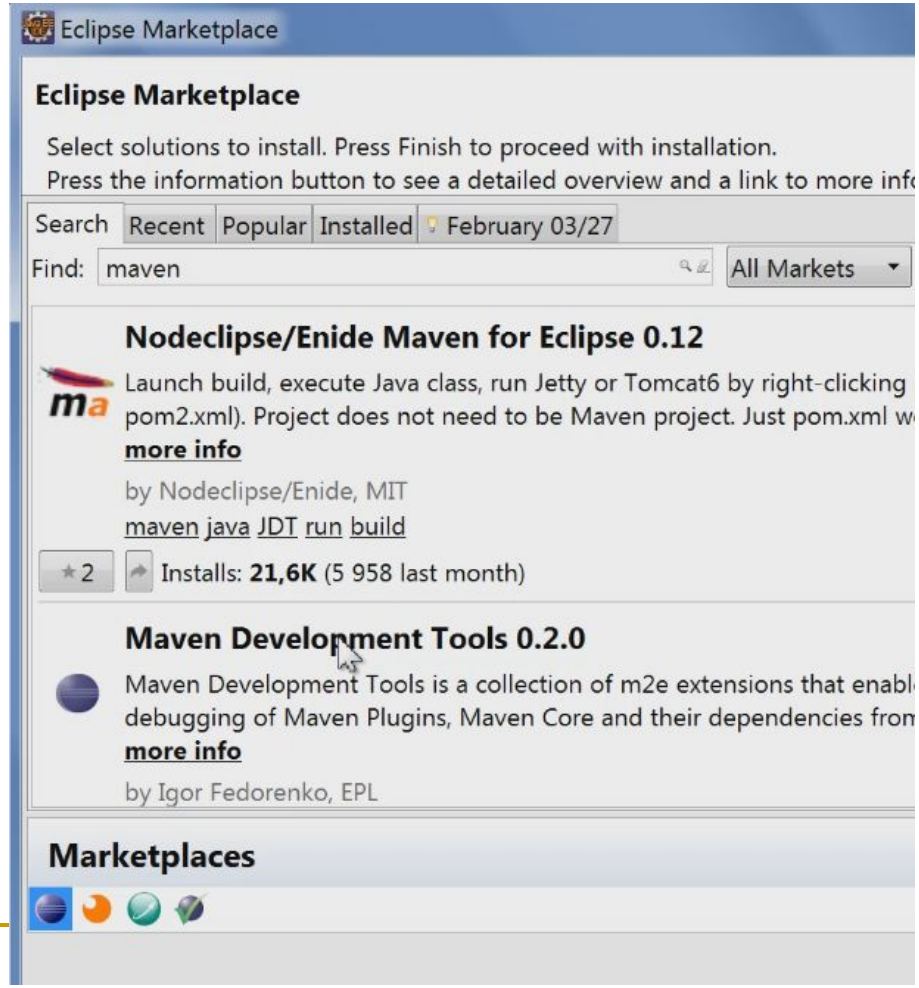
- Eclipse Marketplace - Более удобный вариант поиска и установки дополнений eclipse

Два способа установки

- **Spring IDE** – набор основных плагинов
- **Spring Tool Suite** – полный пакет (включает также сам eclipse и все плагины Spring IDE)




Eclipse Marketplace
Eclipse Marketplace
Select solutions to install. Press Finish to proceed with installation.
Press the information button to see a detailed overview and a link to more inf
Search
Recent
Popular
Installed
February 03/27
LOGpulse - A Log viewer based on impulse 0.6.11
LOGpulse is a log viewer extension for impulse. It allows to analyse log
xml based sources. The logs can be presented along a time-line as wel
by toem, EPL
log log4 pattern performance analyzer
2
Installs: 120 (67 last month)
Design and Verification Tools (DVT) IDE for e, SystemV
VHDL 3.5.7
Design and Verification Tools (DVT) is an integrated development envi
the e language, SystemVerilog, Verilog, and VHDL and is similar to...
by AMIQ EDA, Other
IDE for hardware verification languages design and verification functio
HVLs
Marketplaces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Search
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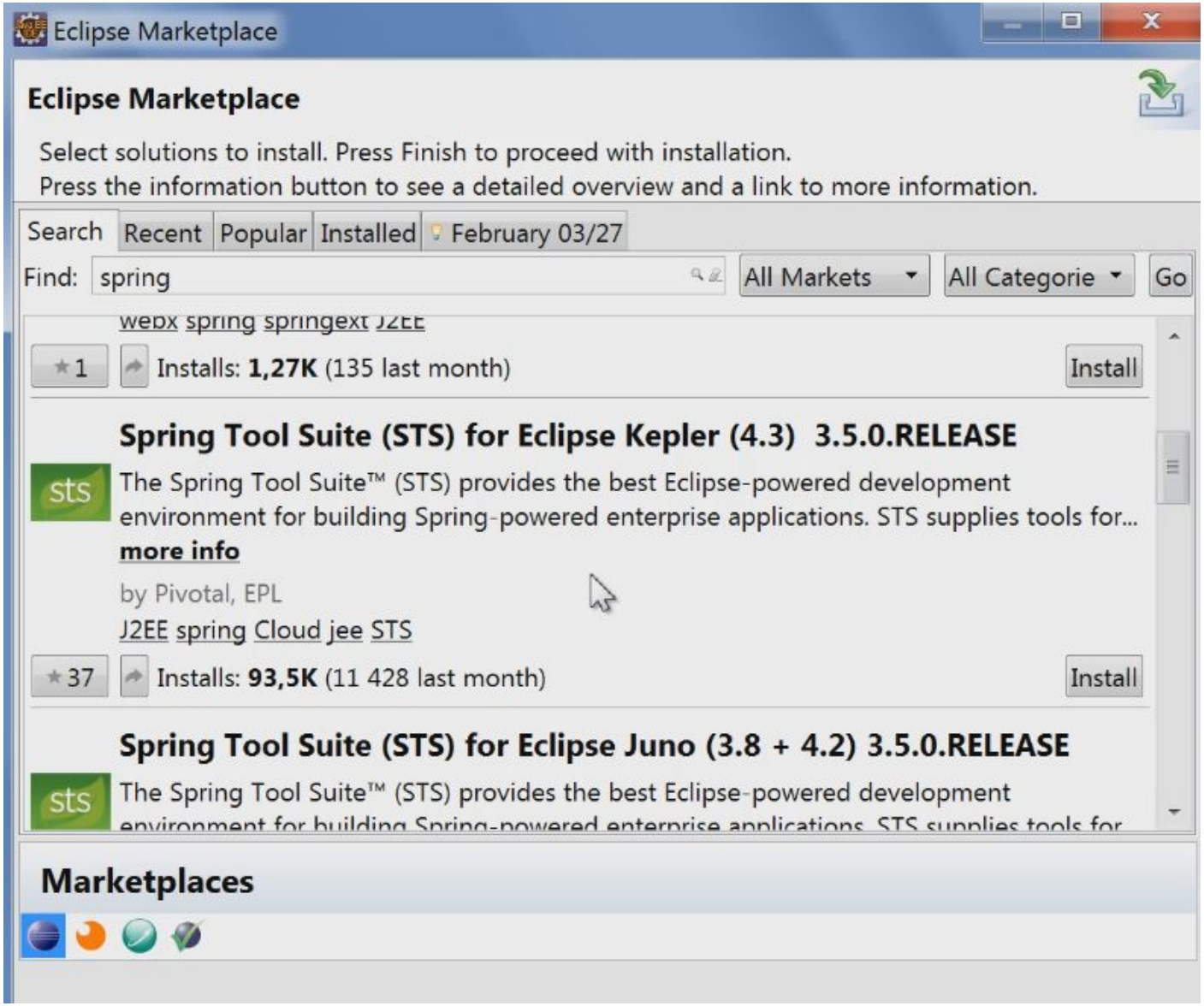
Find:
maven
All Markets
Nodeclipse/Enide Maven for Eclipse 0.12
Launch build, execute Java class, run Jetty or Tomcat6 by right-clicking
pom2.xml). Project does not need to be Maven project. Just pom.xml w
more info
by Nodeclipse/Enide, MIT
maven java JDT run build
2
Installs: 21,6K (5 958 last month)
Maven Development Tools 0.2.0
Maven Development Tools is a collection of m2e extensions that enabl
debugging of Maven Plugins, Maven Core and their dependencies from
more info
by Igor Fedorenko, EPL
Marketplaces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Select solutions to install. Press Finish to proceed with installation.
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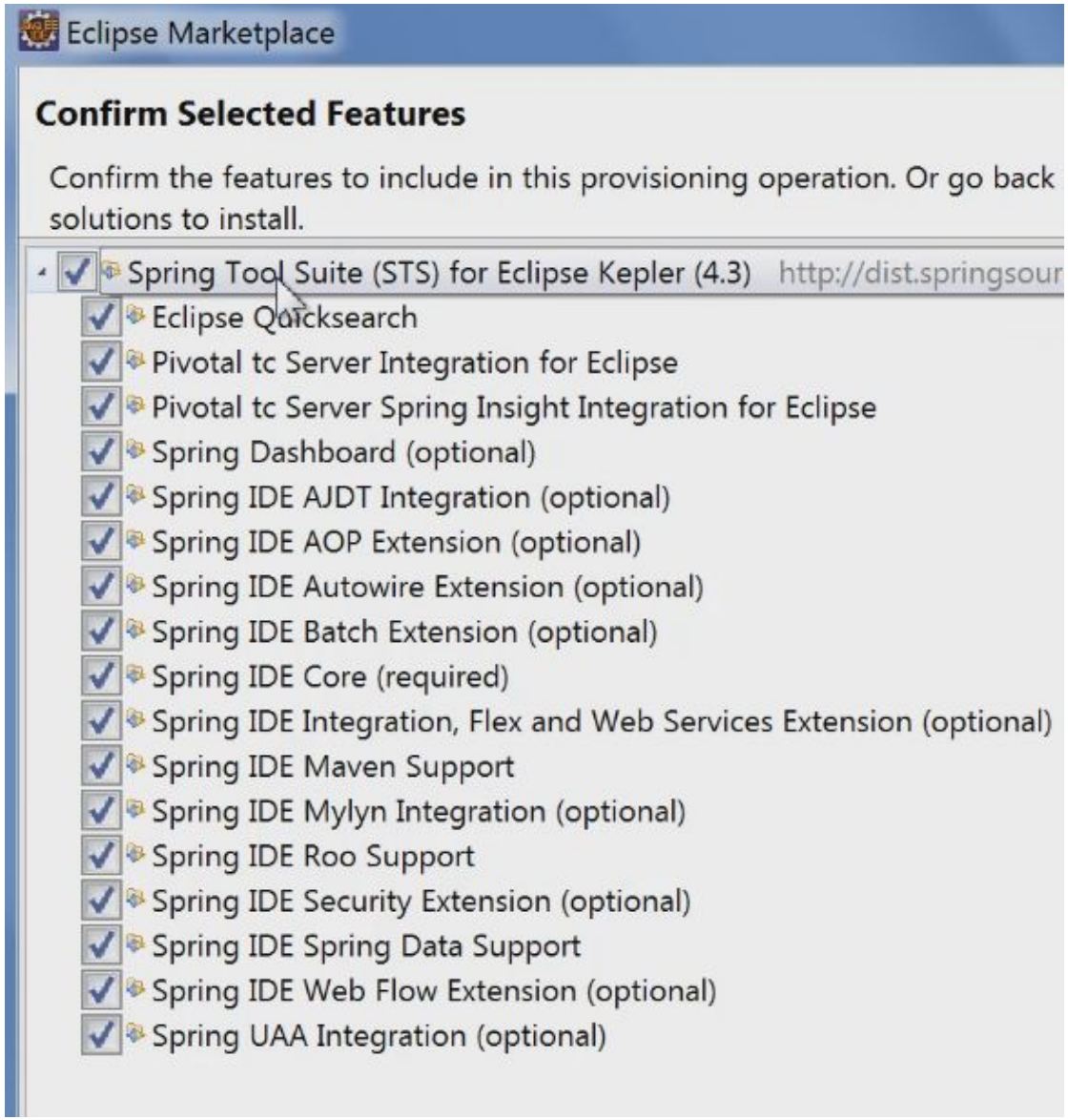
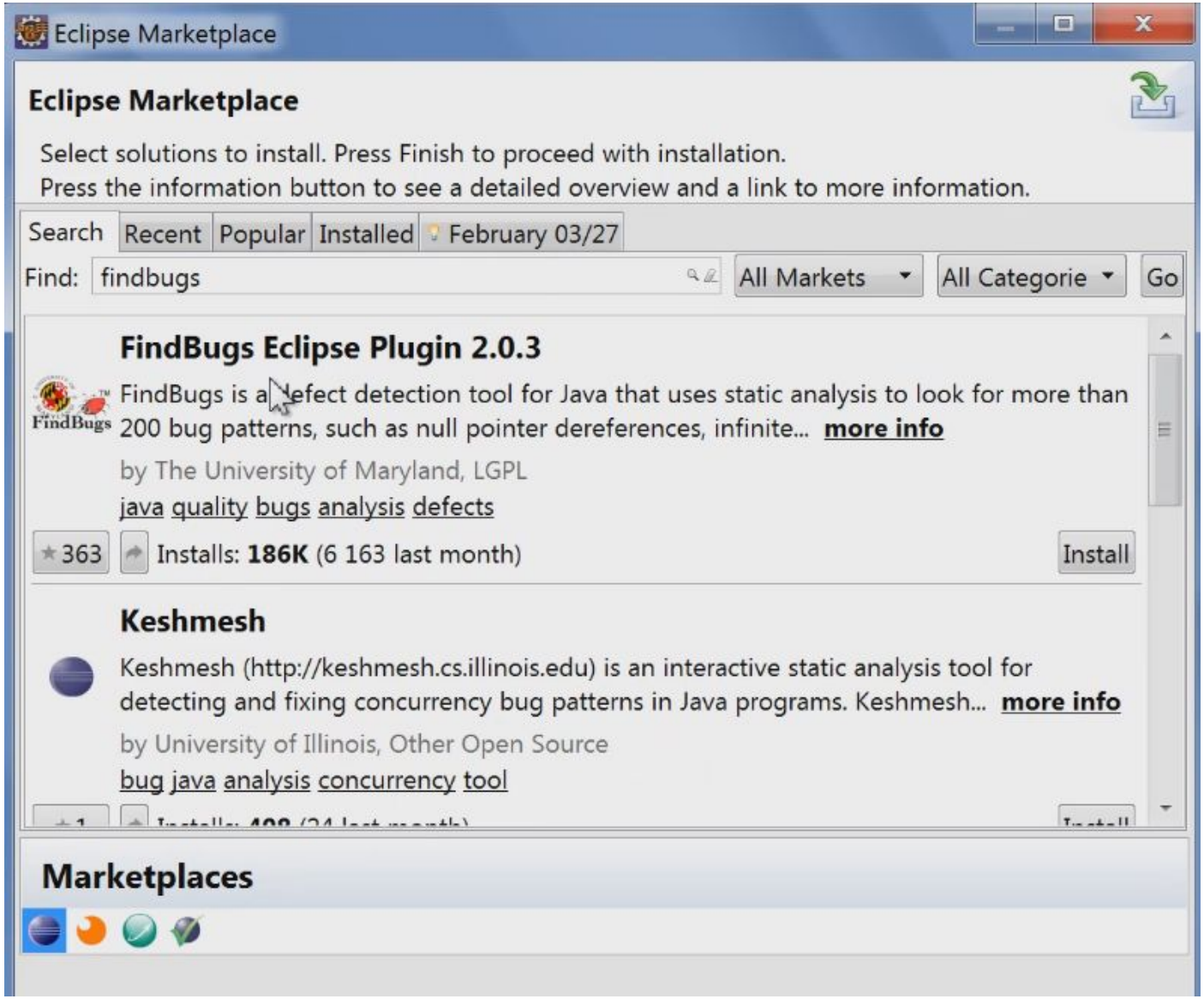
Search
Recent
Popular
Installed
February 03/27
Find:
spring
All Markets
All Categorie
Go
webx spring springext J2EE
1
Installs: 1,27K (135 last month)
Install
Spring Tool Suite (STS) for Eclipse Kepler (4.3) 3.5.0.RELEASE
sts
The Spring Tool Suite™ (STS) provides the best Eclipse-powered development environment for building Spring-powered enterprise applications. STS supplies tools for...
more info
by Pivotal, EPL
J2EE spring Cloud jee STS
37
Installs: 93,5K (11 428 last month)
Install
Spring Tool Suite (STS) for Eclipse Juno (3.8 + 4.2) 3.5.0.RELEASE
sts
The Spring Tool Suite™ (STS) provides the best Eclipse-powered development
Marketplaces


Eclipse Marketplace
Confirm Selected Features
Confirm the features to include in this provisioning operation. Or go back
solutions to install.
Spring Tool Suite (STS) for Eclipse Kepler (4.3) http://dist.springsour
Eclipse Quicksearch
Pivotal tc Server Integration for Eclipse
Pivotal tc Server Spring Insight Integration for Eclipse
Spring Dashboard (optional)
Spring IDE AJDT Integration (optional)
Spring IDE AOP Extension (optional)
Spring IDE Autowire Extension (optional)
Spring IDE Batch Extension (optional)
Spring IDE Core (required)
Spring IDE Integration, Flex and Web Services Extension (optional)
Spring IDE Maven Support
Spring IDE Mylyn Integration (optional)
Spring IDE Roo Support
Spring IDE Security Extension (optional)
Spring IDE Spring Data Support
Spring IDE Web Flow Extension (optional)
Spring UAA Integration (optional)

Анализаторы кода

- **FindBugs** http://marketplace.eclipse.org/content/findbugs-eclipse-plugin
- **PMD** http://marketplace.eclipse.org/content/eclipse-pmd
- **Checkstyle Plug-in** https://marketplace.eclipse.org/content/checkstyle-plug

- Не увлекаться!
- Возможно ощущение идеального кода при плохой структуре!
- Можно использовать несколько плагинов одновременно – дополняют друг друга


Eclipse Marketplace
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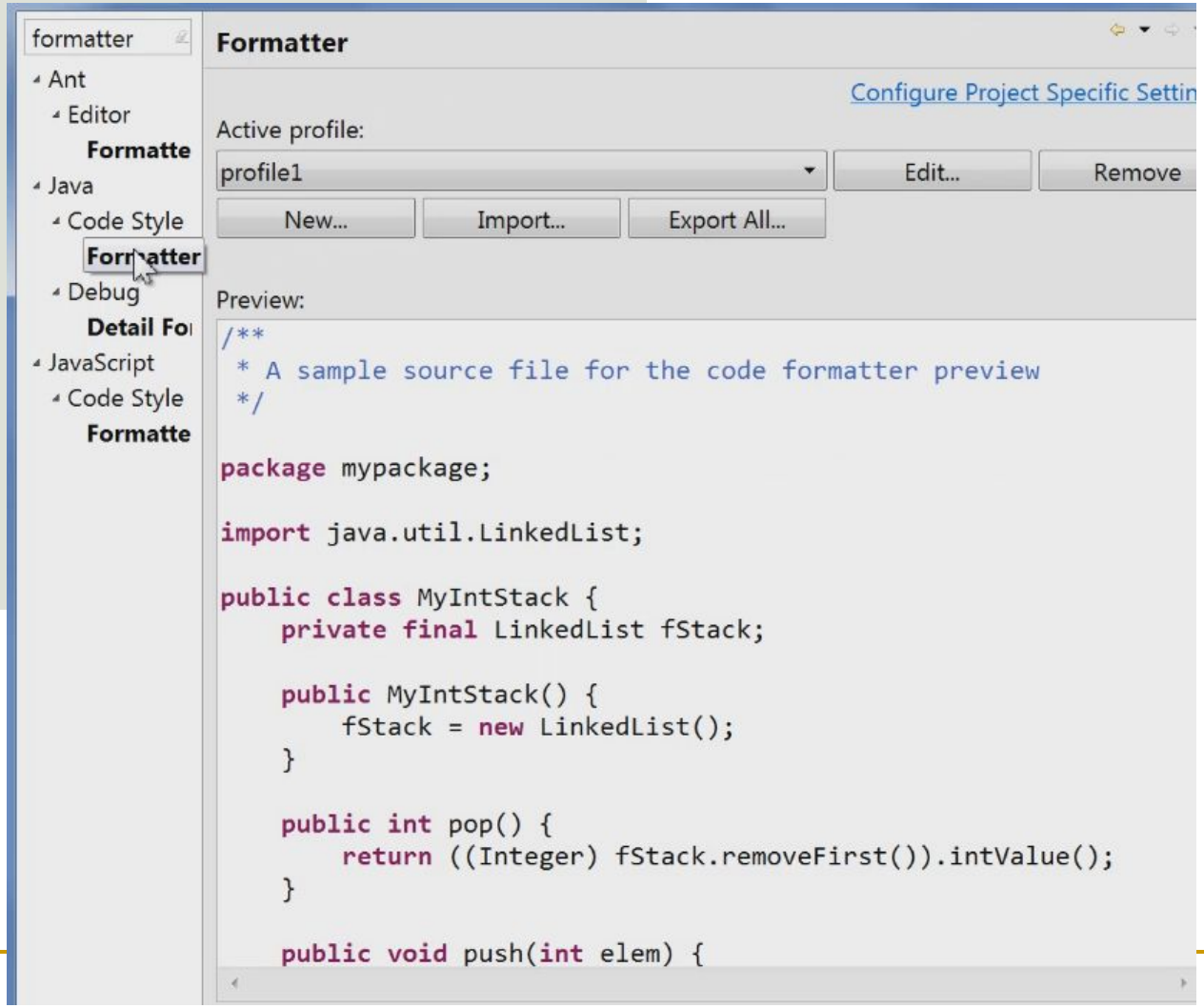
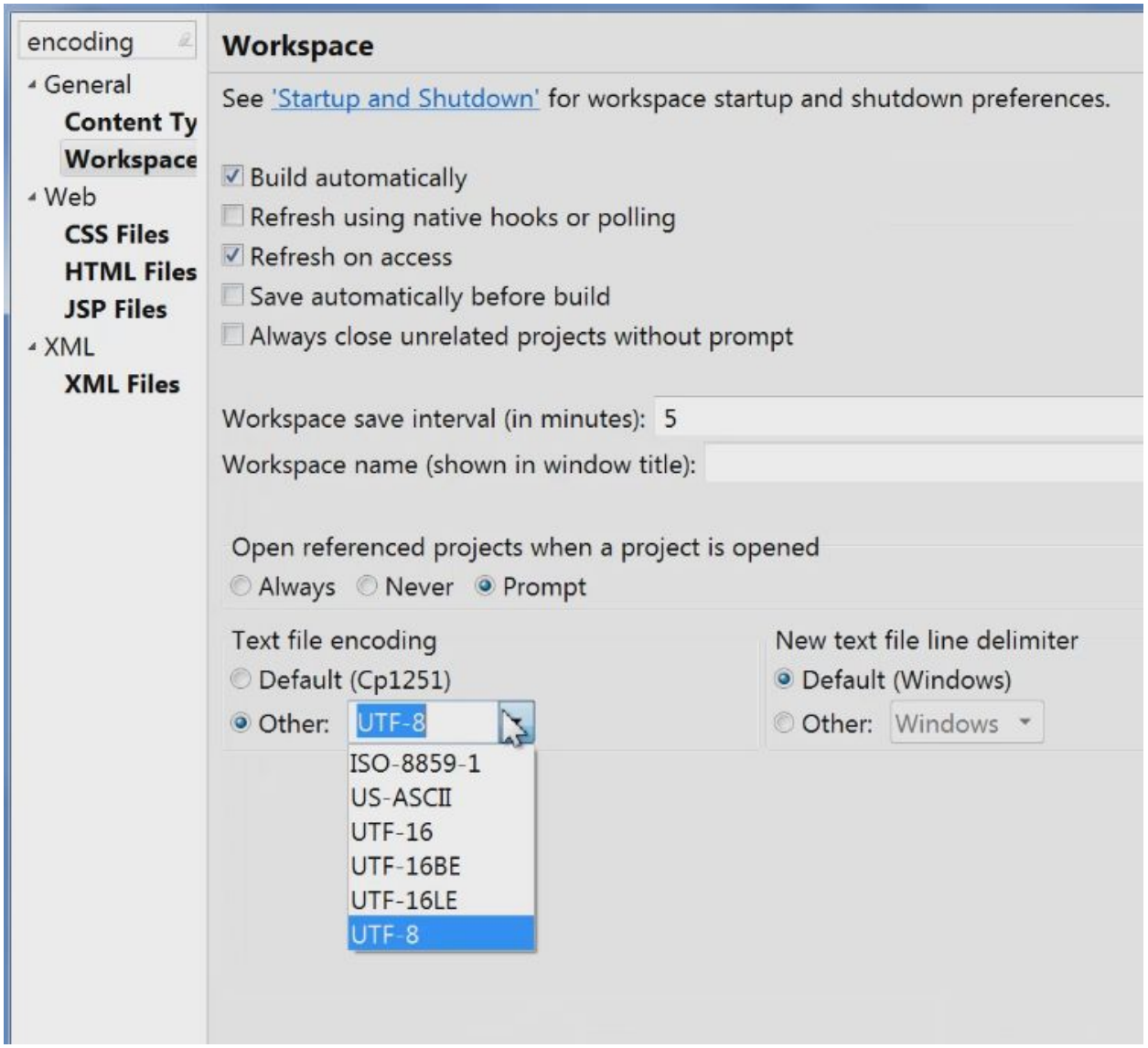
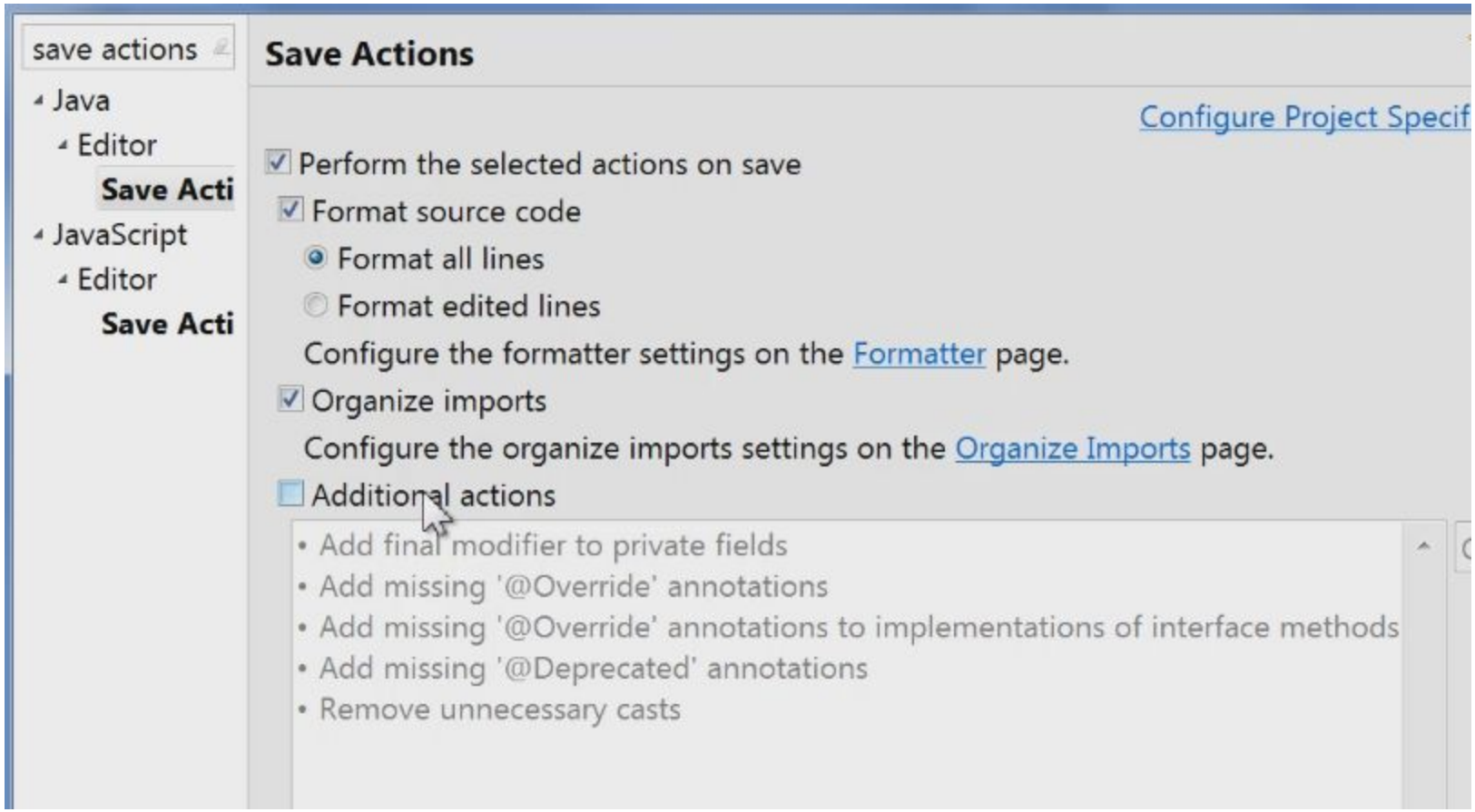
findbugs
All Markets
All Categorie
Go
FindBugs Eclipse Plugin 2.0.3
FindBugs is a defect detection tool for Java that uses static analysis to look for more than 200 bug patterns, such as null pointer dereferences, infinite... more info
by The University of Maryland, LGPL
java quality bugs analysis defects
363
Installs: 186K (6 163 last month)
Install
Keshmesh
Keshmesh (http://keshmesh.cs.illinois.edu) is an interactive static analysis tool for detecting and fixing concurrency bug patterns in Java programs. Keshmesh... more info
by University of Illinois, Other Open Source
bug java analysis concurrency tool
Marketplaces

Форматирование кода

- Настроить максимальную длину LineWrapping




encoding
General
Content Ty
Workspace
Web
CSS Files
HTML Files
JSP Files
XML
XML Files
Workspace
See 'Startup and Shutdown' for workspace startup and shutdown preferences.
Build automatically
Refresh using native hooks or polling
Refresh on access
Save automatically before build
Always close unrelated projects without prompt
Workspace save interval (in minutes): 5
Workspace name (shown in window title):
Open referenced projects when a project is opened
Always
Never
Prompt
Text file encoding
Default (Cp1251)
Other: UTF-8
ISO-8859-1
US-ASCII
UTF-16
UTF-16BE
UTF-16LE
UTF-8
New text file line delimiter
Default (Windows)
Other: Windows


save actions
Java
Editor
Save Acti
JavaScript
Editor
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Save Actions
Configure Project Specif
Perform the selected actions on save
Format source code
Format all lines
Format edited lines
Configure the formatter settings on the Formatter page.
Organize imports
Configure the organize imports settings on the Organize Imports page.
Additional actions
• Add final modifier to private fields
• Add missing '@Override' annotations
• Add missing '@Override' annotations to implementations of interface methods
• Add missing '@Deprecated' annotations
• Remove unnecessary casts

Версии eclipse

- Многие путаются в названиях версий
- http://en.wikipedia.org/wiki/Eclipse_%28software%29#Releases
- Upgrade в пределах одной версии
- Если не используете систему контроля версий
  – время от времени делайте бэкап всего workspace

en.wikipedia.org/wiki/Eclipse_(software)#Releases

Google

ссылки курсы

Version Name	Date	Platform version	Projects
N/A	21 June 2004	3.0[14]	
N/A	28 June 2005	3.1	
Callisto	30 June 2006	3.2	Callisto projects[15]
Europa	29 June 2007	3.3	Europa projects[16]
Ganymede	25 June 2008	3.4	Ganymede projects[17]
Galileo	24 June 2009	3.5	Galileo projects[18]
Helios	23 June 2010	3.6	Helios projects[19]
Indigo	22 June 2011	3.7	Indigo projects[20]
Juno	27 June 2012	3.8 and 4.2[21] [Notes 1]	Juno projects[24]
Kepler	26 June 2013	**4.3**	Kepler projects[25]
Luna	25 June 2014 (planned)	4.4	Luna projects[26]
Mars	24 June 2015 (planned)	4.5	Mars projects[27]

Пример на eclipse

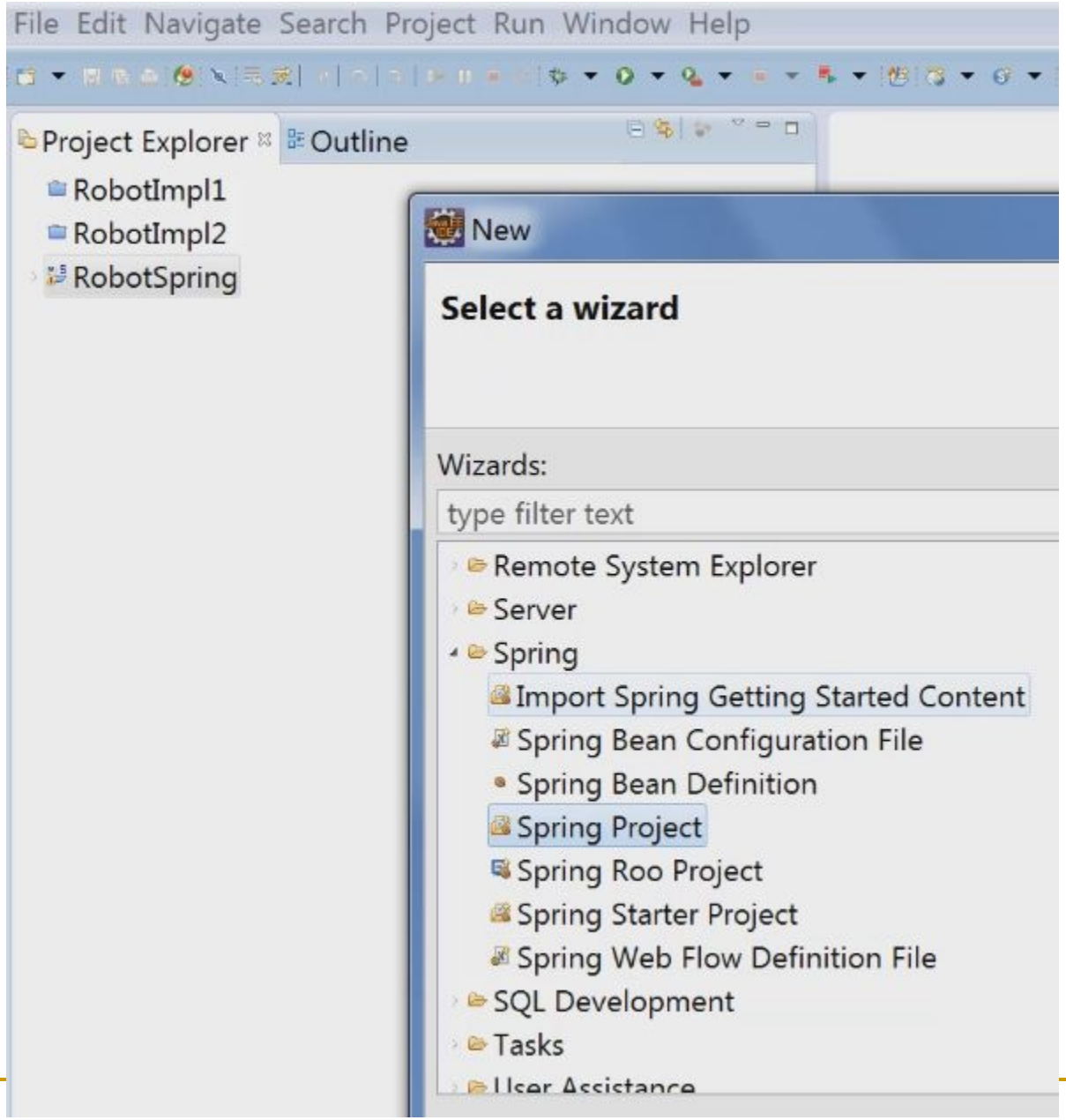
- Перевод проектов на Spring
- Настройка контейнера
- Связывание объектов
- Конфигурации XML

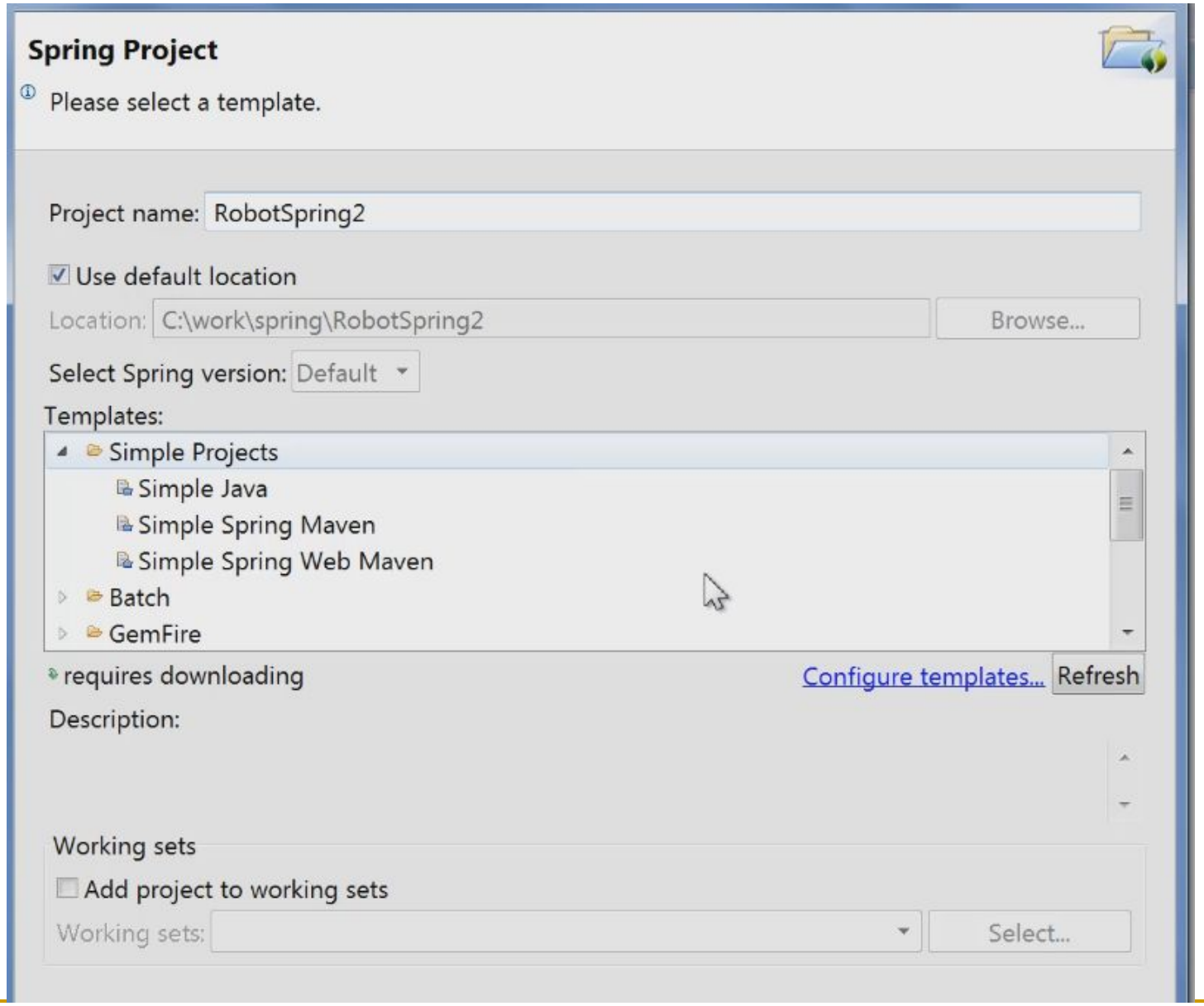
Понятия

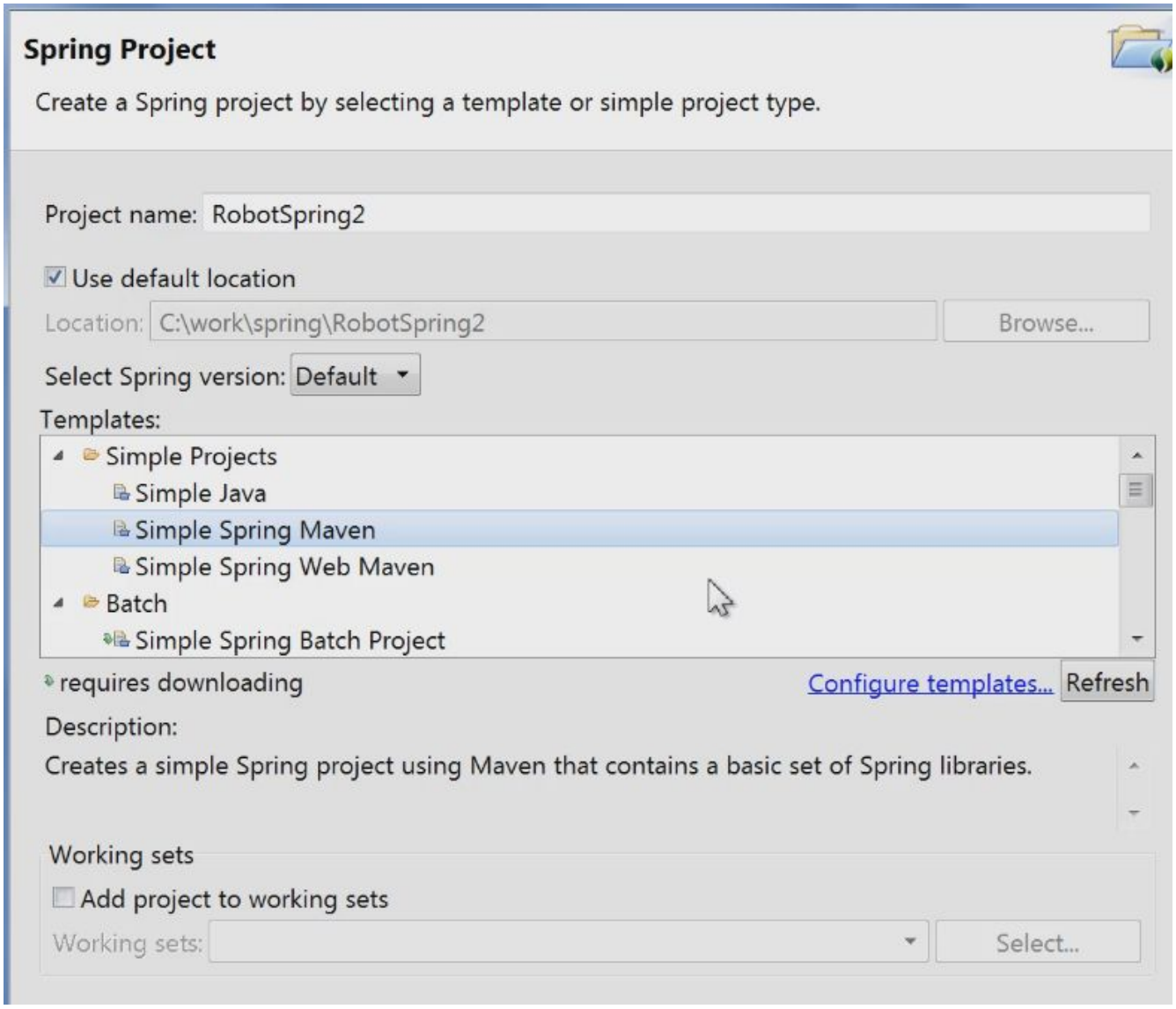
- 3 главных понятия:
  - **Inversion of Control** – паттерн для передачи контроля контейнеру. За создание конкретных объектов ответственны не сами объекты, а IoC контейнер.
  - **Dependency Injection -** внедрение объекта в другой объект
  - **IoC контейнер**
- Понятие «контейнер» применяется также в веб программировании, EJB и пр.
- Без настройки IoC контейнера приложения Spring работать не будут
- Компонент – то, с чем работает контейнер

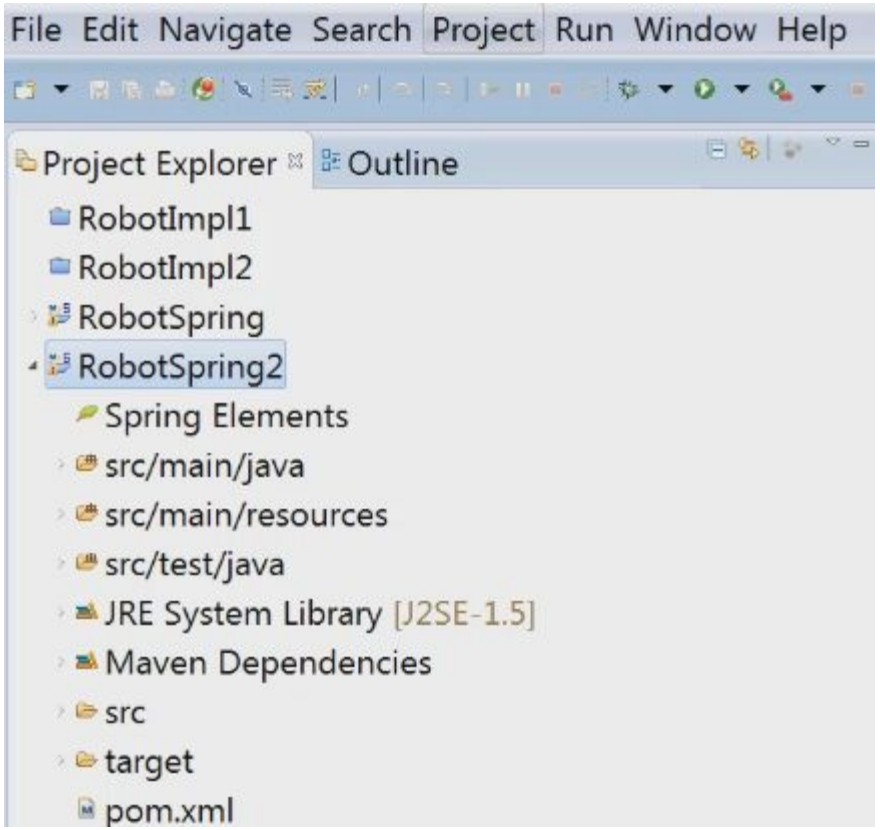
Spring

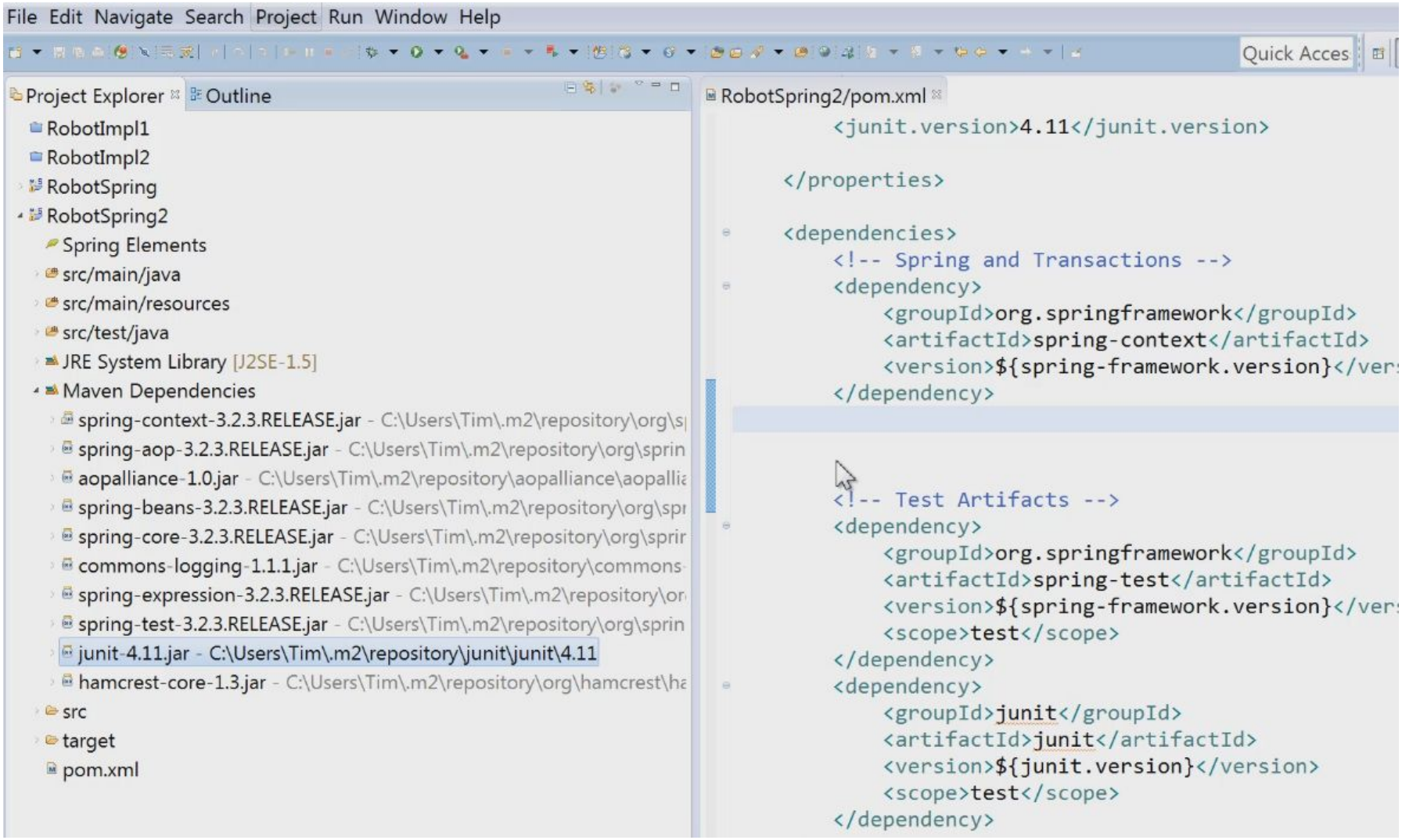
- Конфигурации на основе:
  - XML
  - Аннотаций
- Такой подход используется почти во всех фреймворках


File Edit Navigate Search Project Run Window Help
Project Explorer
Outline
RobotImpl1
RobotImpl2
RobotSpring
New
Select a wizard
Wizards:
type filter text
Remote System Explorer
Server
Spring
Import Spring Getting Started Content
Spring Bean Configuration File
Spring Bean Definition
Spring Project
Spring Roo Project
Spring Starter Project
Spring Web Flow Definition File
SQL Development
Tasks


Spring Project
Please select a template.
Project name: RobotSpring2
Use default location
Location: C:\work\spring\RobotSpring2
Browse...
Select Spring version: Default
Templates:
Simple Projects
Simple Java
Simple Spring Maven
Simple Spring Web Maven
Batch
GemFire
requires downloading
Configure templates...
Refresh
Description:
Working sets
Add project to working sets
Working sets:
Select...


Spring Project
Create a Spring project by selecting a template or simple project type.
Project name: RobotSpring2
Use default location
Location: C:\work\spring\RobotSpring2
Browse...
Select Spring version: Default
Templates:
Simple Projects
Simple Java
Simple Spring Maven
Simple Spring Web Maven
Batch
Simple Spring Batch Project
requires downloading
Configure templates...
Refresh
Description:
Creates a simple Spring project using Maven that contains a basic set of Spring libraries.
Working sets
Add project to working sets
Working sets:
Select...


File Edit Navigate Search Project Run Window Help
Project Explorer
Outline
RobotImpl1
RobotImpl2
RobotSpring
RobotSpring2
Spring Elements
src/main/java
src/main/resources
src/test/java
JRE System Library [J2SE-1.5]
Maven Dependencies
src
target
pom.xml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RobotImpl2
RobotSpring
RobotSpring2
Spring Elements
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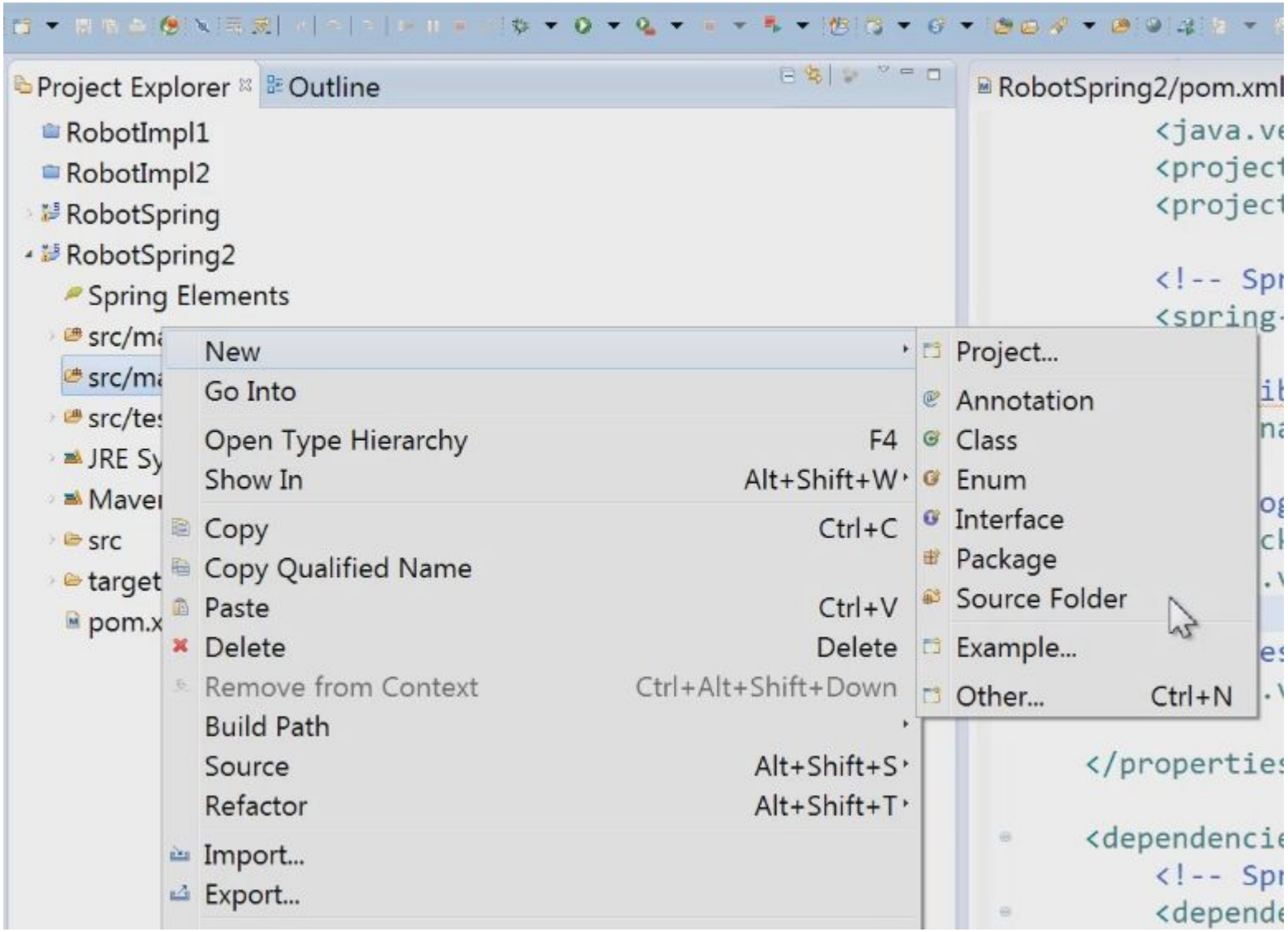
spring-aop-3.2.3.RELEASE.jar - C:\Users\Tim\.m2\repository\org\sprin
aopalliance-1.0.jar - C:\Users\Tim\.m2\repository\aopalliance\aopalli
spring-beans-3.2.3.RELEASE.jar - C:\Users\Tim\.m2\repository\org\spr
spring-core-3.2.3.RELEASE.jar - C:\Users\Tim\.m2\repository\org\sprir
commons-logging-1.1.1.jar - C:\Users\Tim\.m2\repository\commons
spring-expression-3.2.3.RELEASE.jar - C:\Users\Tim\.m2\repository\or
spring-test-3.2.3.RELEASE.jar - C:\Users\Tim\.m2\repository\org\sprin
junit-4.11.jar - C:\Users\Tim\.m2\repository\junit\junit\4.11
hamcrest-core-1.3.jar - C:\Users\Tim\.m2\repository\org\hamcrest\ha
src
target
pom.xml
RobotSpring2/pom.xml
<junit.version>4.11</junit.version>
</properties>
<dependencies>
<!-- Spring and Transactions -->
<dependency>
<groupId>org.springframework</groupId>
<artifactId>spring-context</artifactId>
<version>${spring-framework.version}</ver
</dependency>
<!-- Test Artifacts -->
<dependency>
<groupId>org.springframework</groupId>
<artifactId>spring-test</artifactId>
<version>${spring-framework.version}</ver
<scope>test</scope>
</dependency>
<dependency>
<groupId>junit</groupId>
<artifactId>junit</artifactId>
<version>${junit.version}</version>
<scope>test</scope>
</dependency>


Project Explorer
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RobotImpl1
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Spring Elements
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Remove from Context Ctrl+Alt+Shift+Down
Build Path
Source Alt+Shift+S
Refactor Alt+Shift+T
Import...
Export...
Project...
Annotation
Class
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Interface
Package
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Example...
Other... Ctrl+N
RobotSpring2/pom.xml
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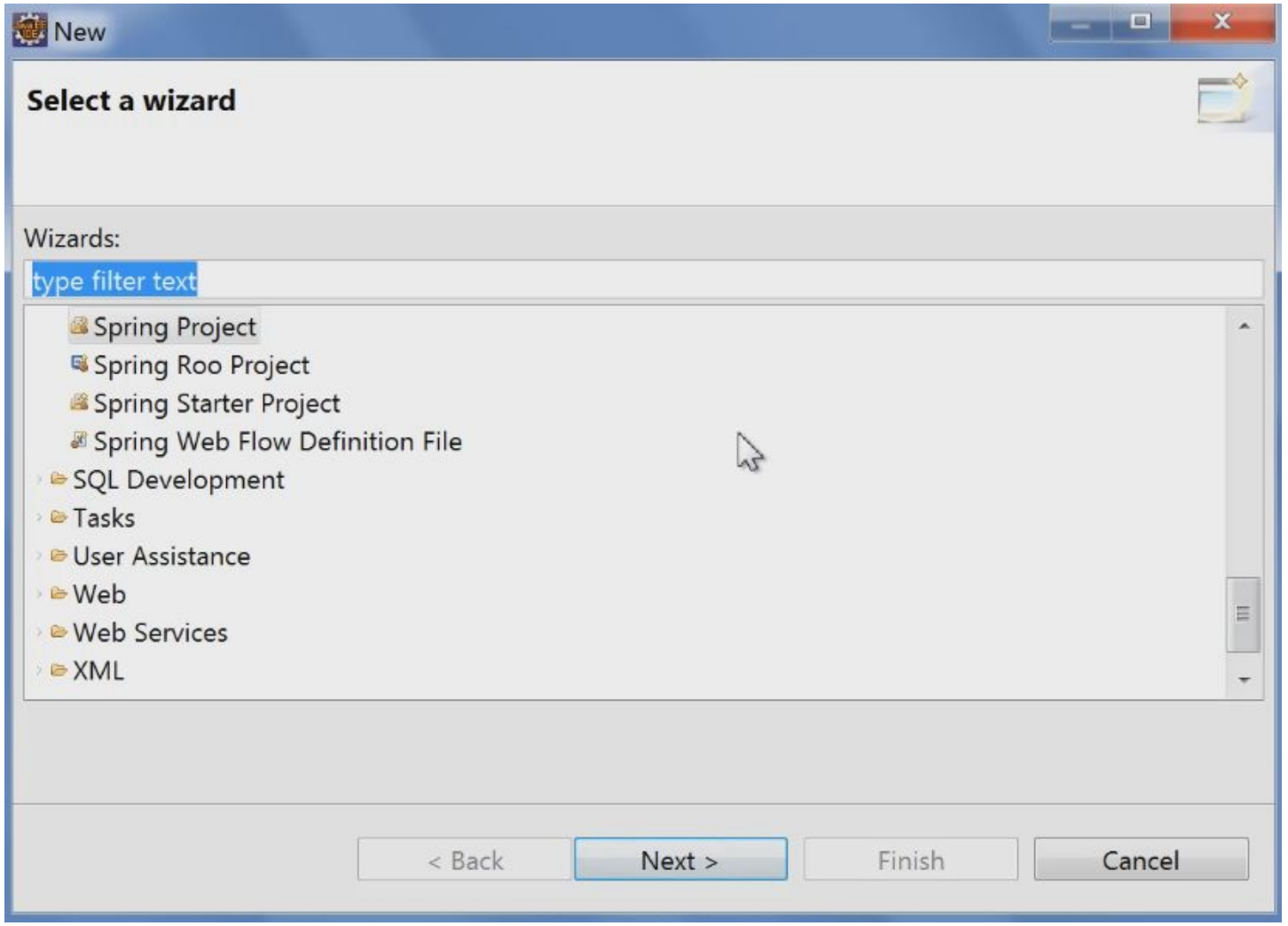
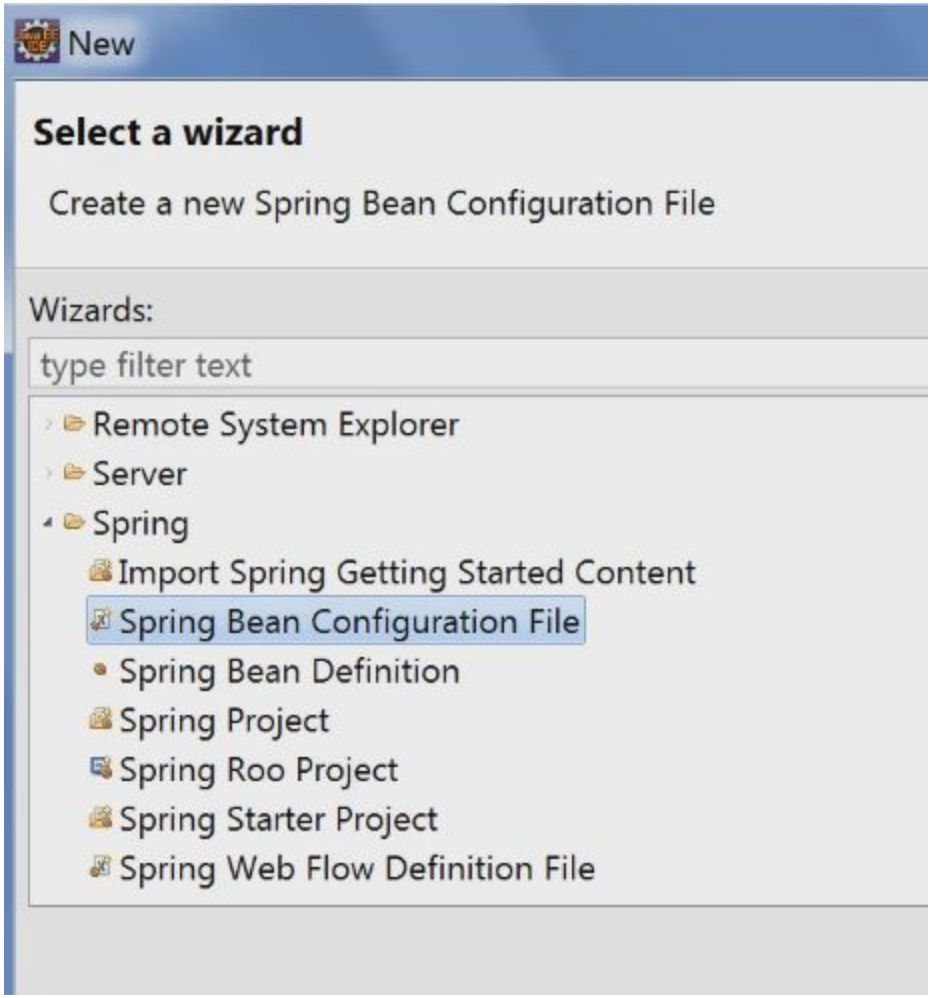
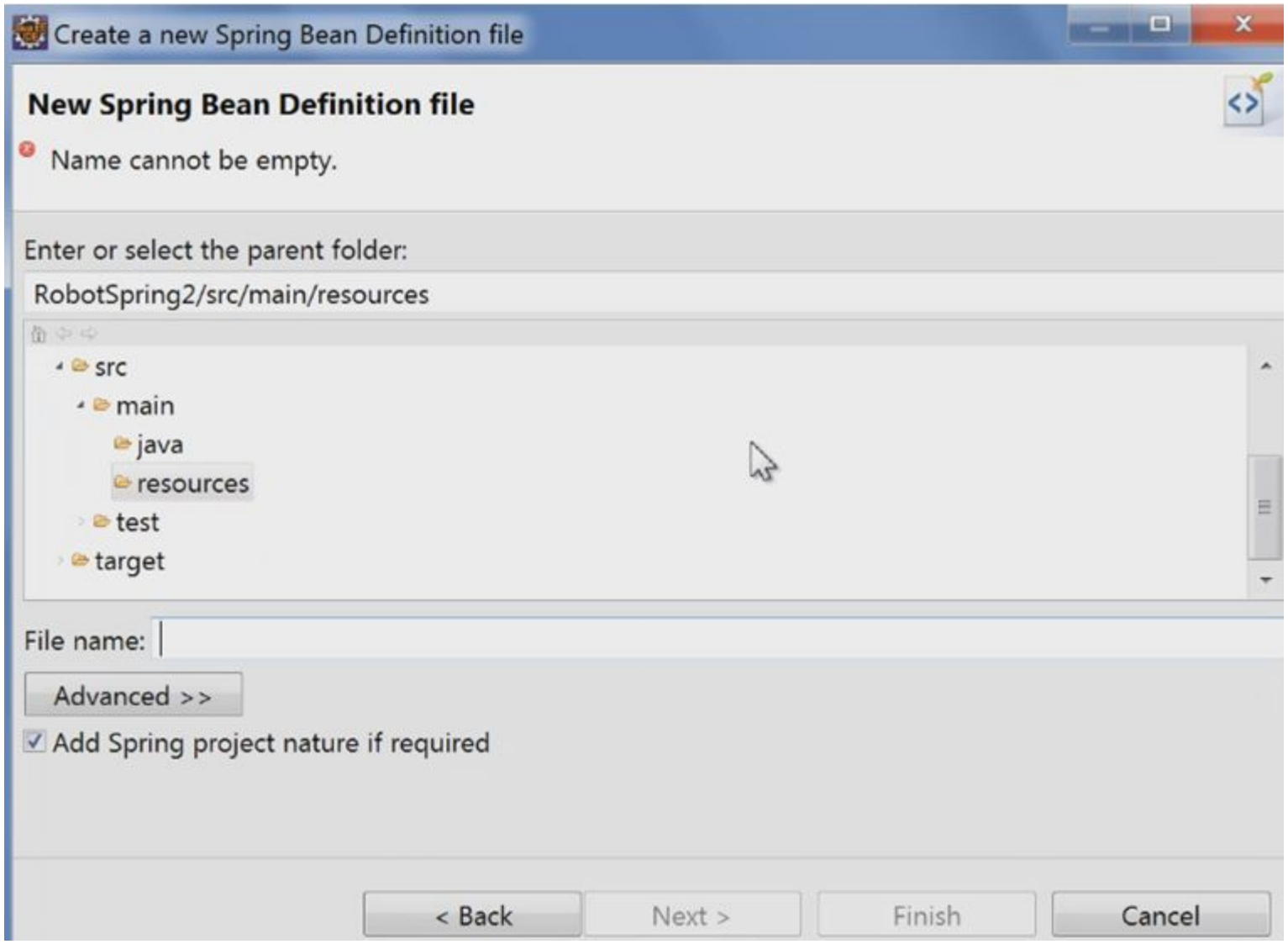
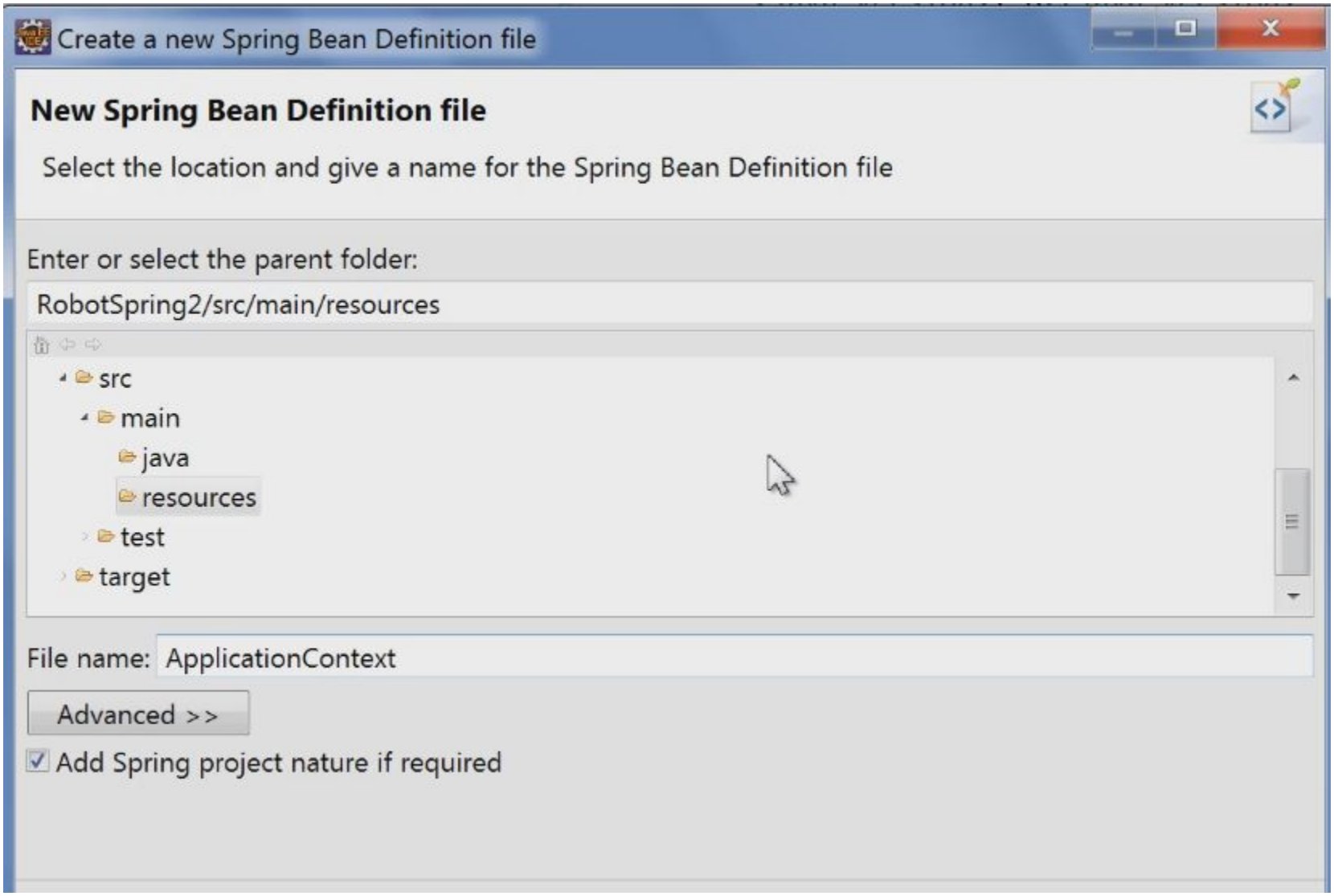
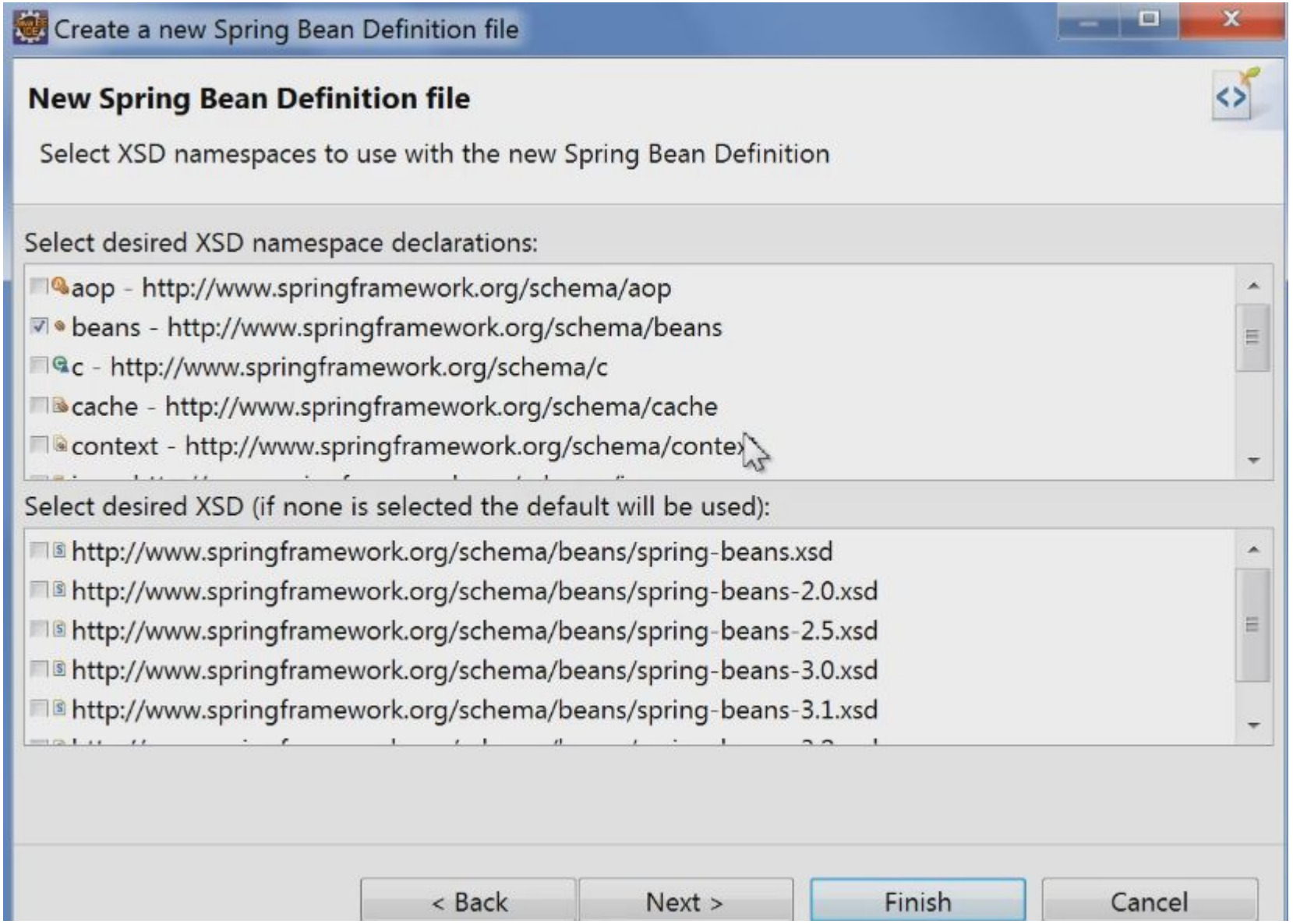
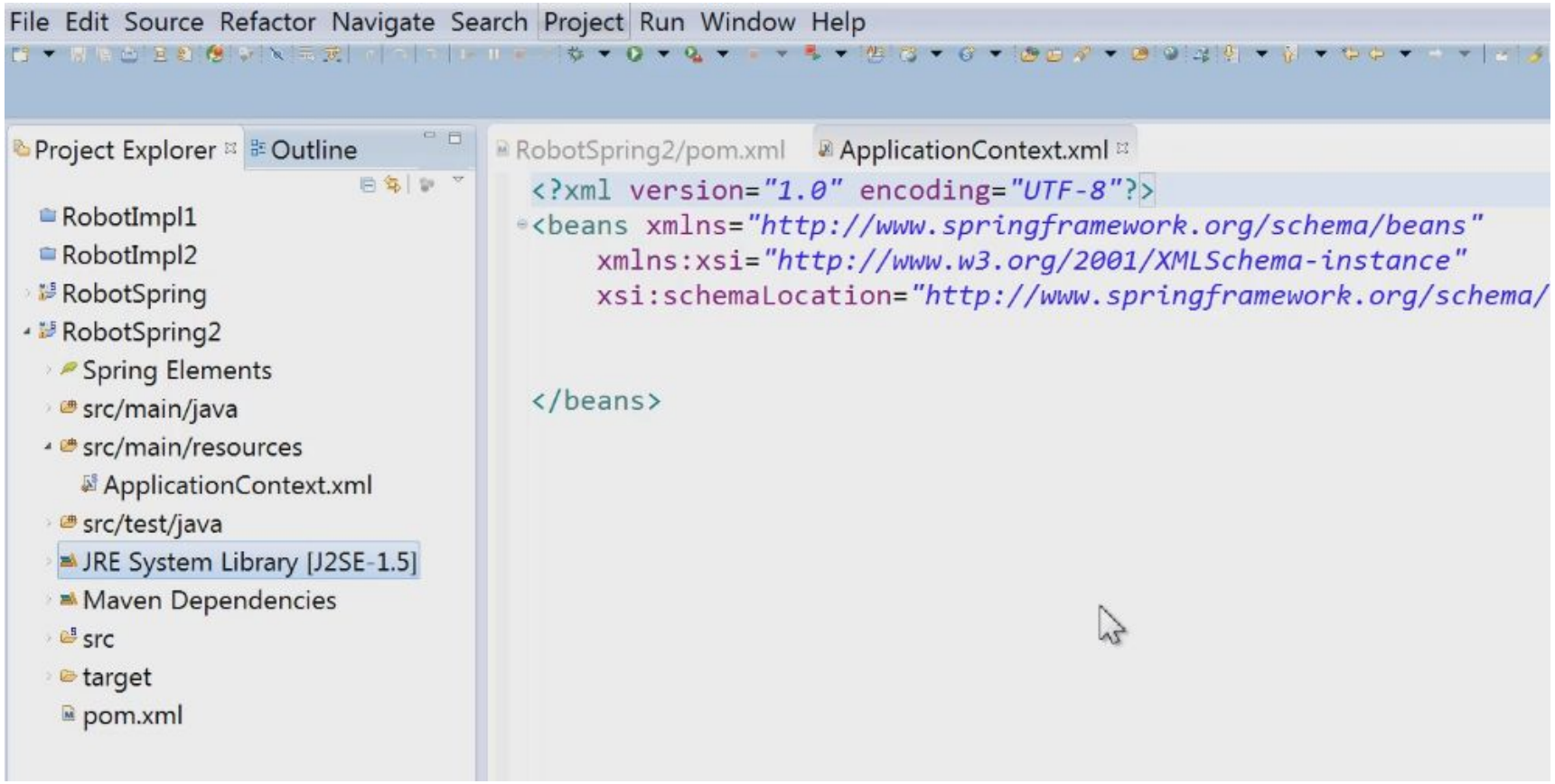

New
Select a wizard
Wizards:
type filter text
Spring Project
Spring Roo Project
Spring Starter Project
Spring Web Flow Definition File
SQL Development
Tasks
User Assistance
Web
Web Services
XML
< Back
Next >
Finish
Cancel


New
Select a wizard
Create a new Spring Bean Configuration File
Wizards:
type filter text
Remote System Explorer
Server
Spring
Import Spring Getting Started Content
Spring Bean Configuration File
Spring Bean Definition
Spring Project
Spring Roo Project
Spring Starter Project
Spring Web Flow Definition File


Create a new Spring Bean Definition file
New Spring Bean Definition file
Name cannot be empty.
Enter or select the parent folder:
RobotSpring2/src/main/resources
src
main
java
resources
test
target
File name:
Advanced >>
Add Spring project nature if required
< Back
Next >
Finish
Cancel


Create a new Spring Bean Definition file
New Spring Bean Definition file
Select the location and give a name for the Spring Bean Definition file
Enter or select the parent folder:
RobotSpring2/src/main/resources
src
main
java
resources
test
target
File name: ApplicationContext
Advanced >>
Add Spring project nature if required


Create a new Spring Bean Definition file
New Spring Bean Definition file
Select XSD namespaces to use with the new Spring Bean Definition
Select desired XSD namespace declarations:
aop - http://www.springframework.org/schema/aop
beans - http://www.springframework.org/schema/beans
c - http://www.springframework.org/schema/c
cache - http://www.springframework.org/schema/cache
context - http://www.springframework.org/schema/conte
Select desired XSD (if none is selected the default will be used):
http://www.springframework.org/schema/beans/spring-beans.xsd
http://www.springframework.org/schema/beans/spring-beans-2.0.xsd
http://www.springframework.org/schema/beans/spring-beans-2.5.xsd
http://www.springframework.org/schema/beans/spring-beans-3.0.xsd
http://www.springframework.org/schema/beans/spring-beans-3.1.xsd
< Back
Next >
Finish
Cancel


File Edit Source Refactor Navigate Search Project Run Window Help
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RobotImpl1
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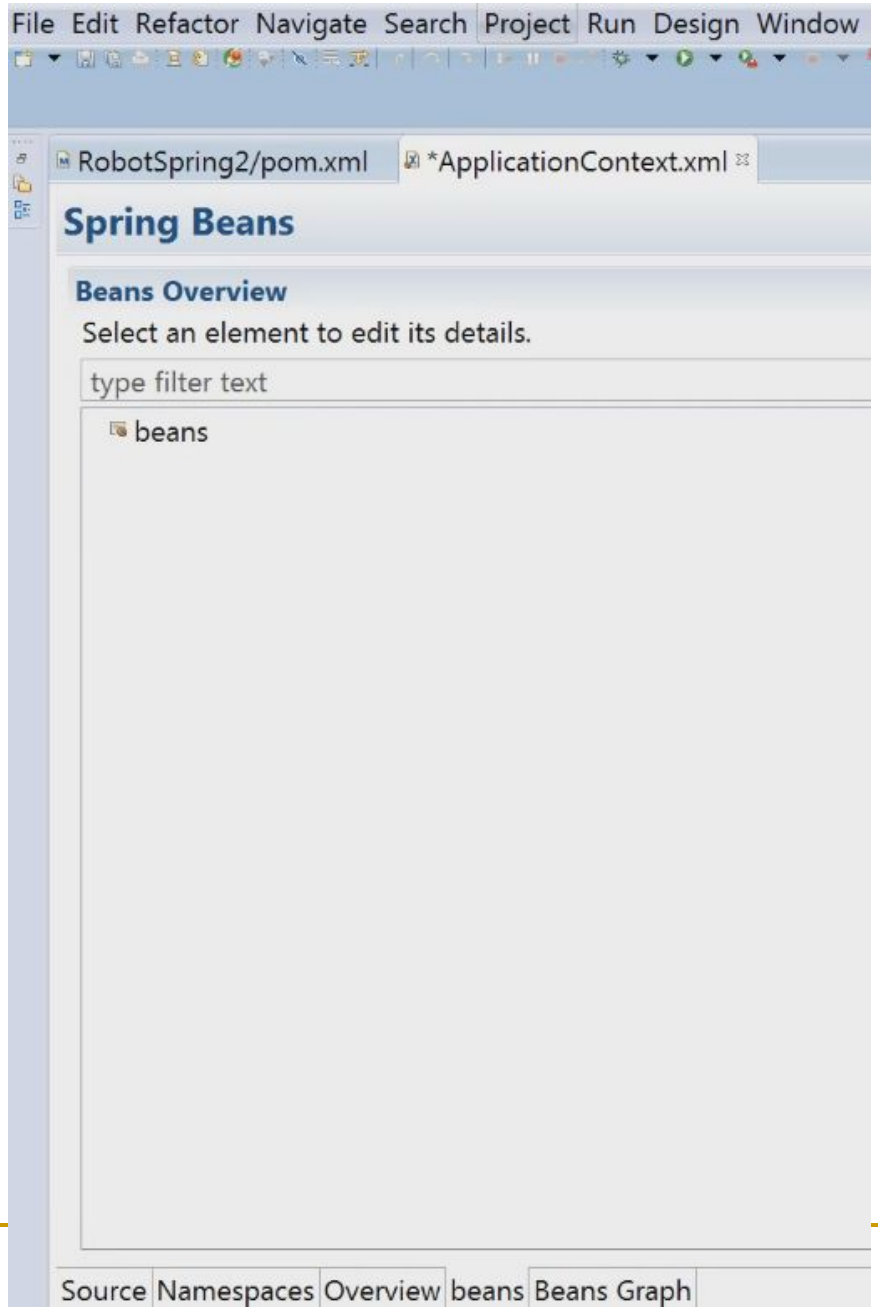
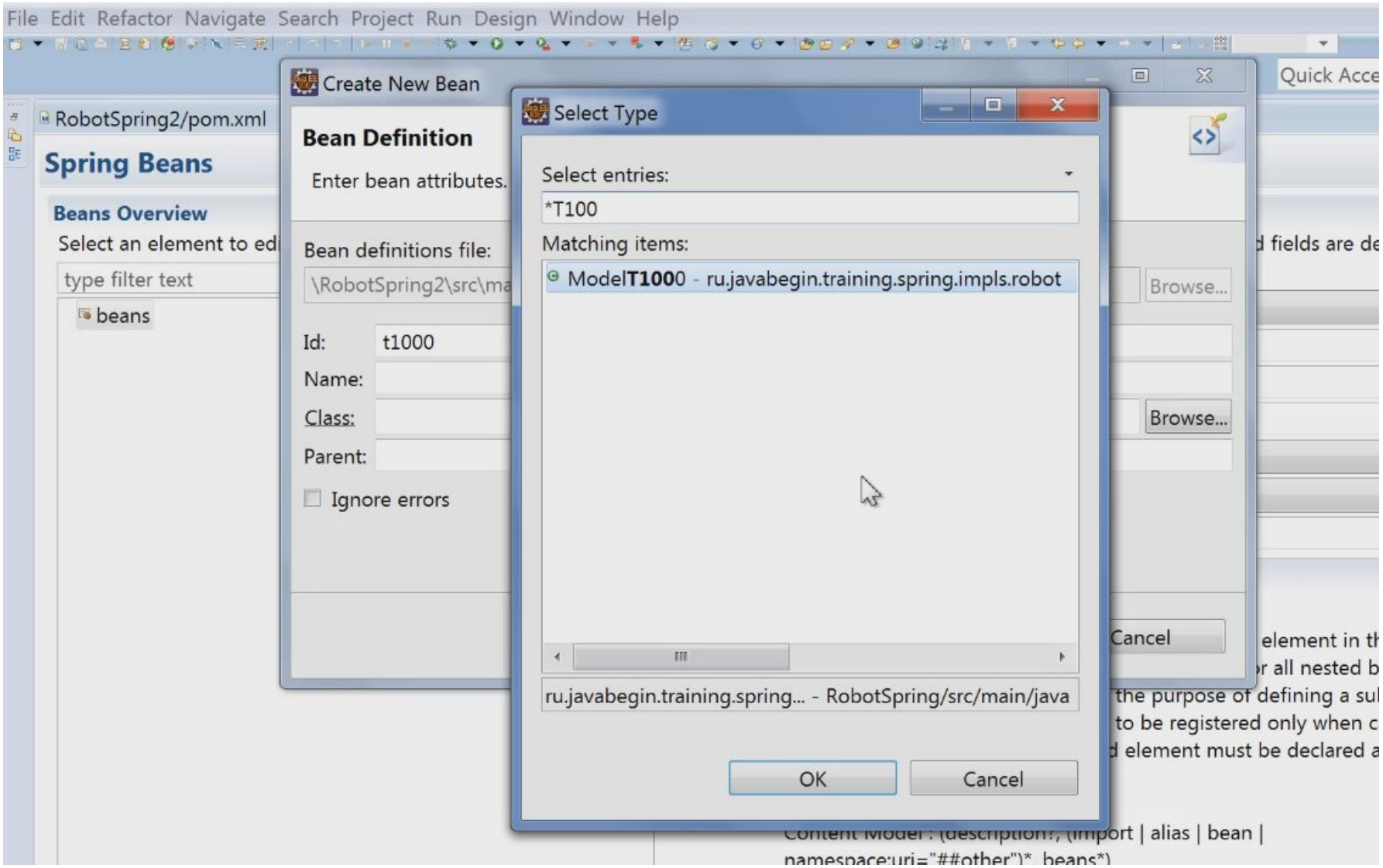
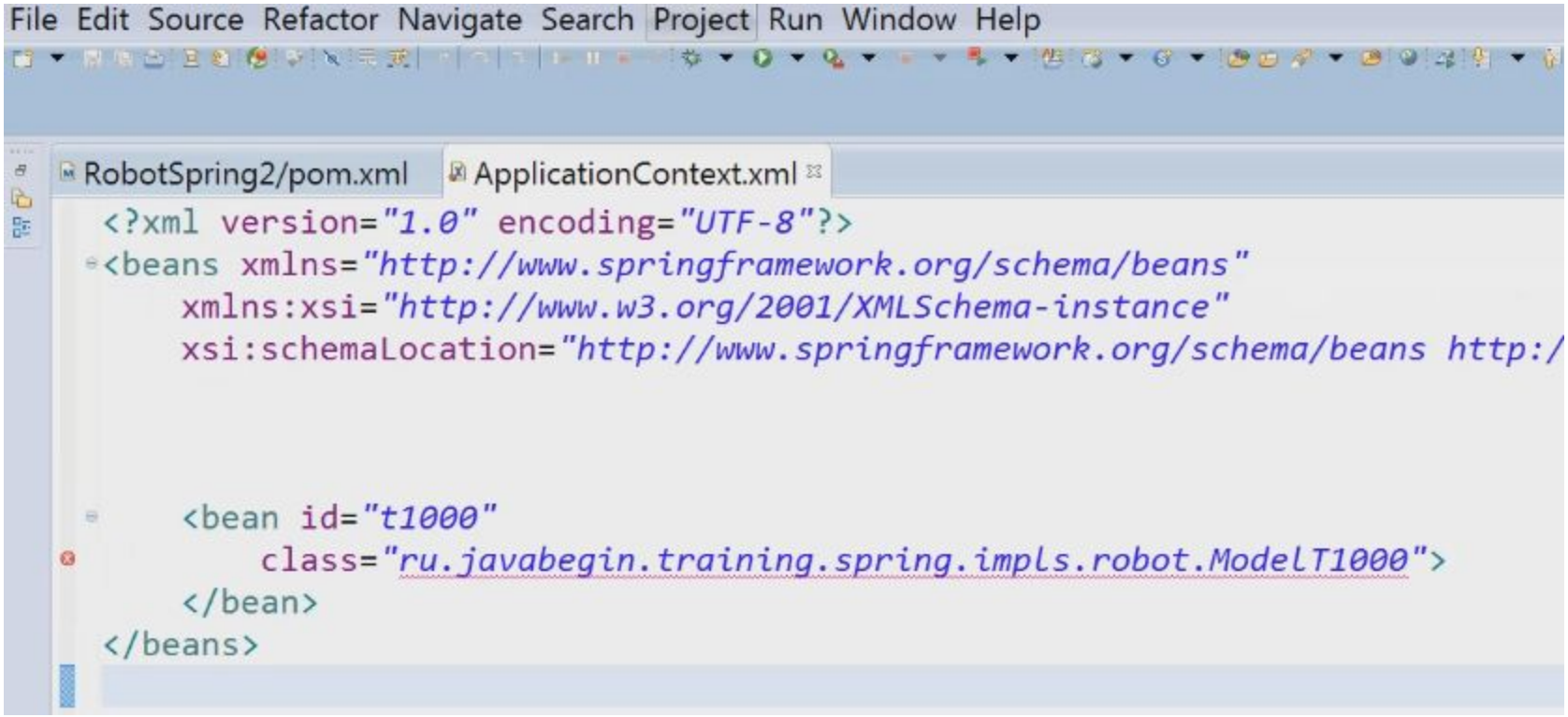
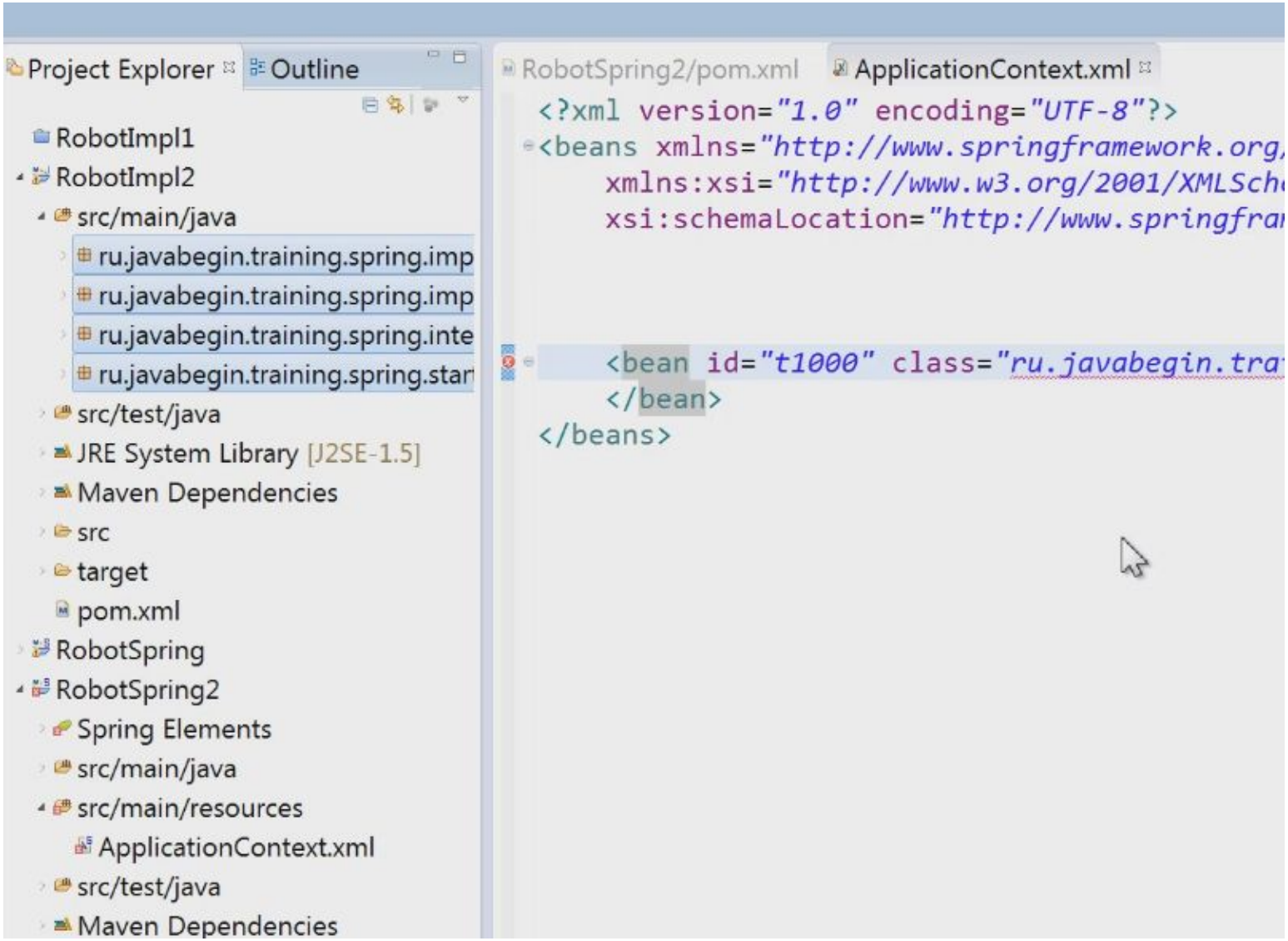
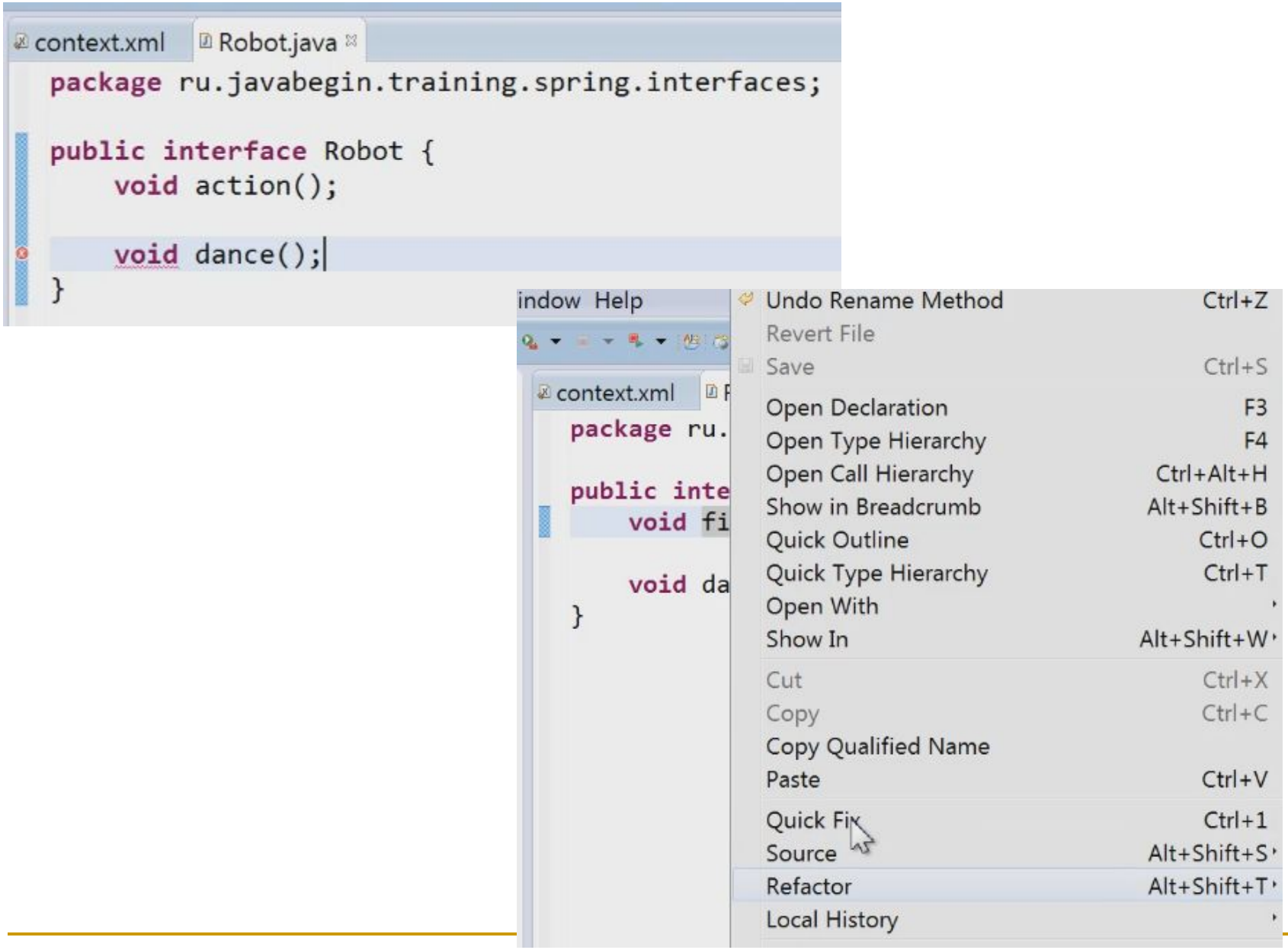
RobotSpring2
Spring Elements
src/main/java
src/main/resources
ApplicationContext.xml
src/test/java
JRE System Library [J2SE-1.5]
Maven Dependencies
src
target
pom.xml
RobotSpring2/pom.xml
ApplicationContext.xml
<?xml version="1.0" encoding="UTF-8"?>
<beans xmlns="http://www.springframework.org/schema/beans"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.springframework.org/schema/
</beans>

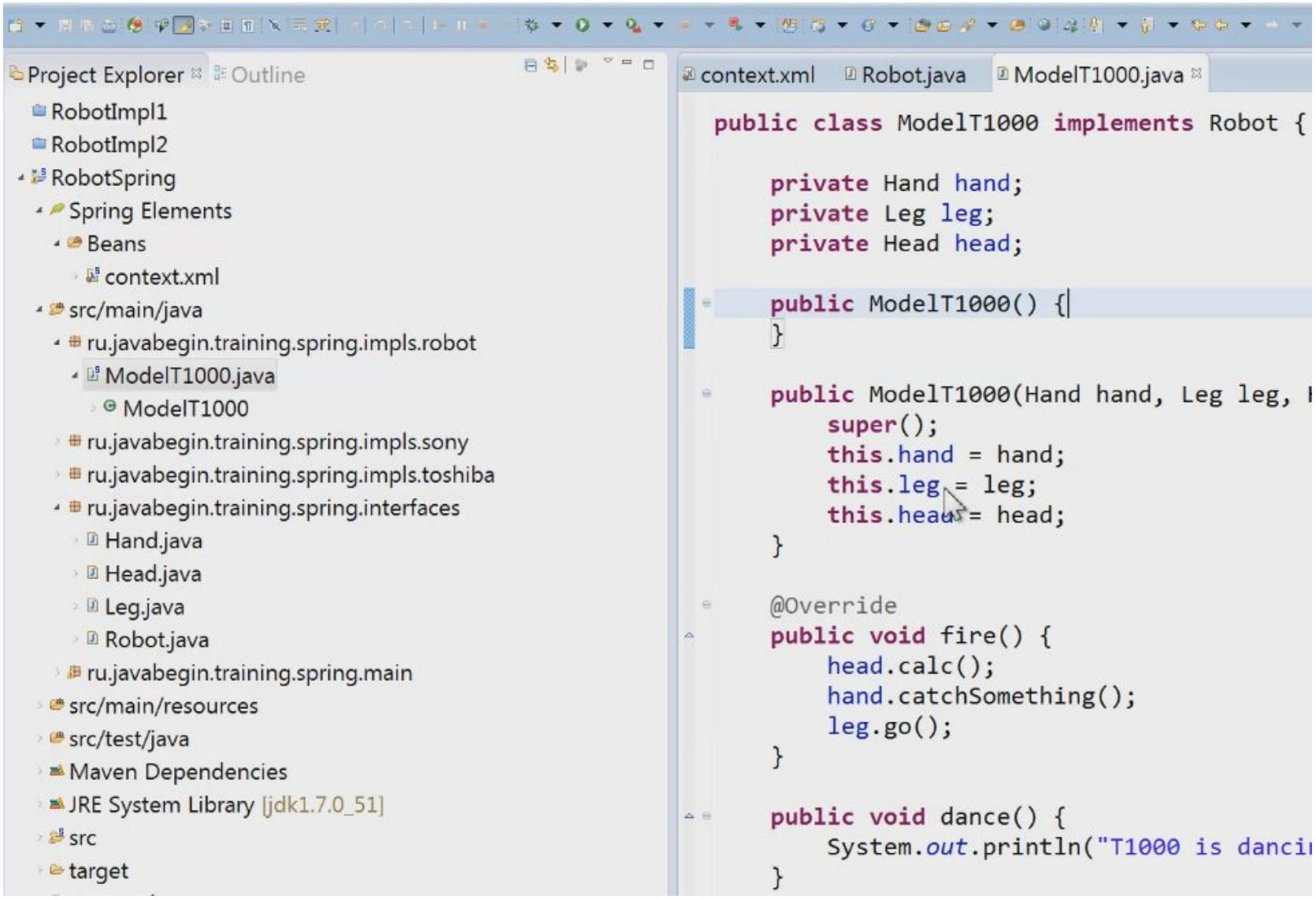

File Edit Refactor Navigate Search Project Run Design Window
RobotSpring2/pom.xml
*ApplicationContext.xml
Spring Beans
Beans Overview
Select an element to edit its details.
type filter text
beans
Source Namespaces Overview beans Beans Graph

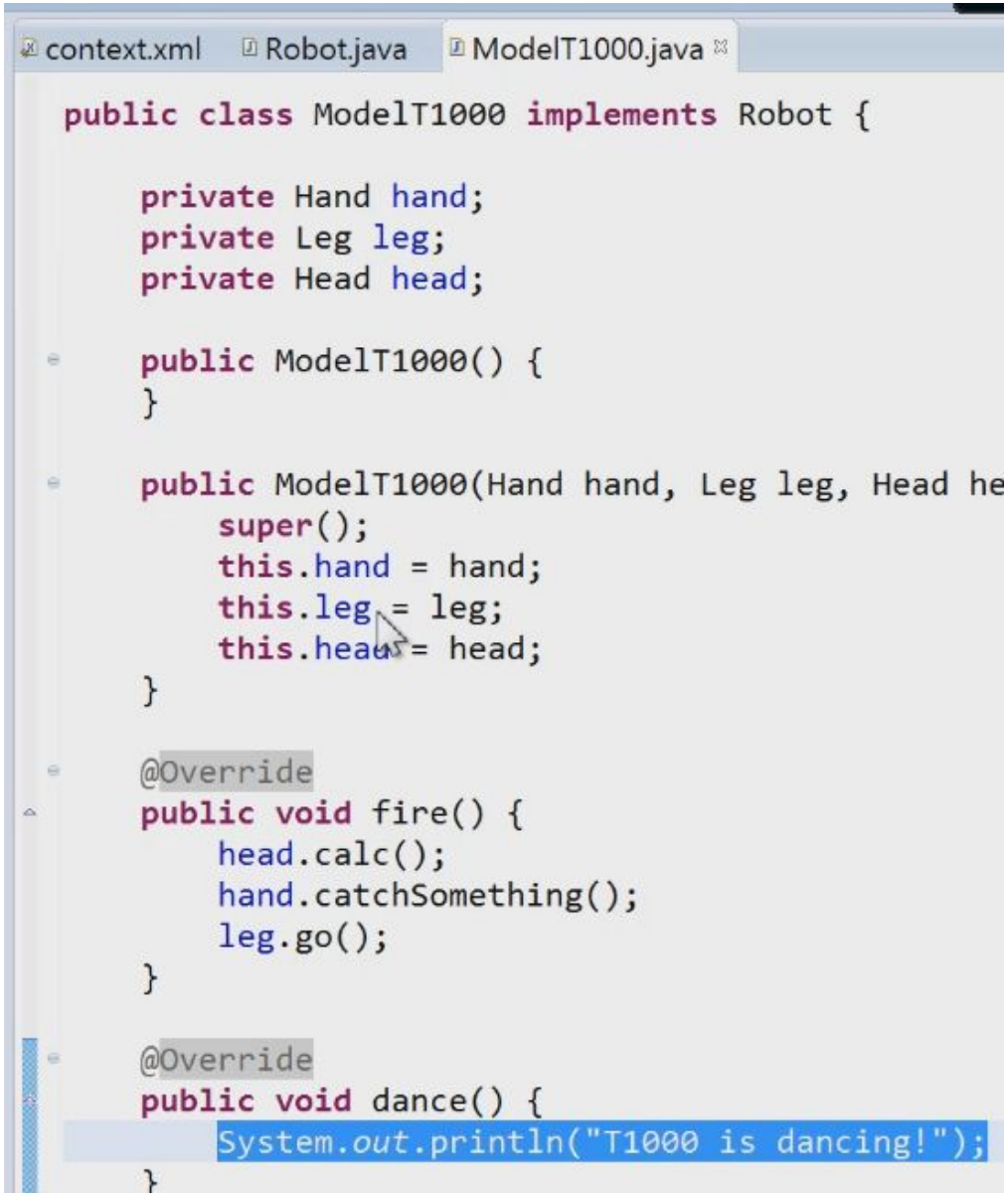

File Edit Refactor Navigate Search Project Run Design Window Help
Create New Bean
Bean Definition
Enter bean attributes.
Bean definitions file:
\RobotSpring2\src\ma
Id: t1000
Name:
Class:
Parent:
Ignore errors
Select Type
Select entries:
*T100
Matching items:
ModelT1000 - ru.javabegin.training.spring.impls.robot
ru.javabegin.training.spring... - RobotSpring/src/main/java
OK
Cancel
RobotSpring2/pom.xml
Spring Beans
Beans Overview
Select an element to ed
type filter text
beans
Browse...
Browse...
Cancel
Quick Acce
d fields are de
element in th
r all nested b
the purpose of defining a sul
to be registered only when c
d element must be declared a
Content Model : (description?, (import | alias | bean |
namespace:uri="##other")*, beans*)

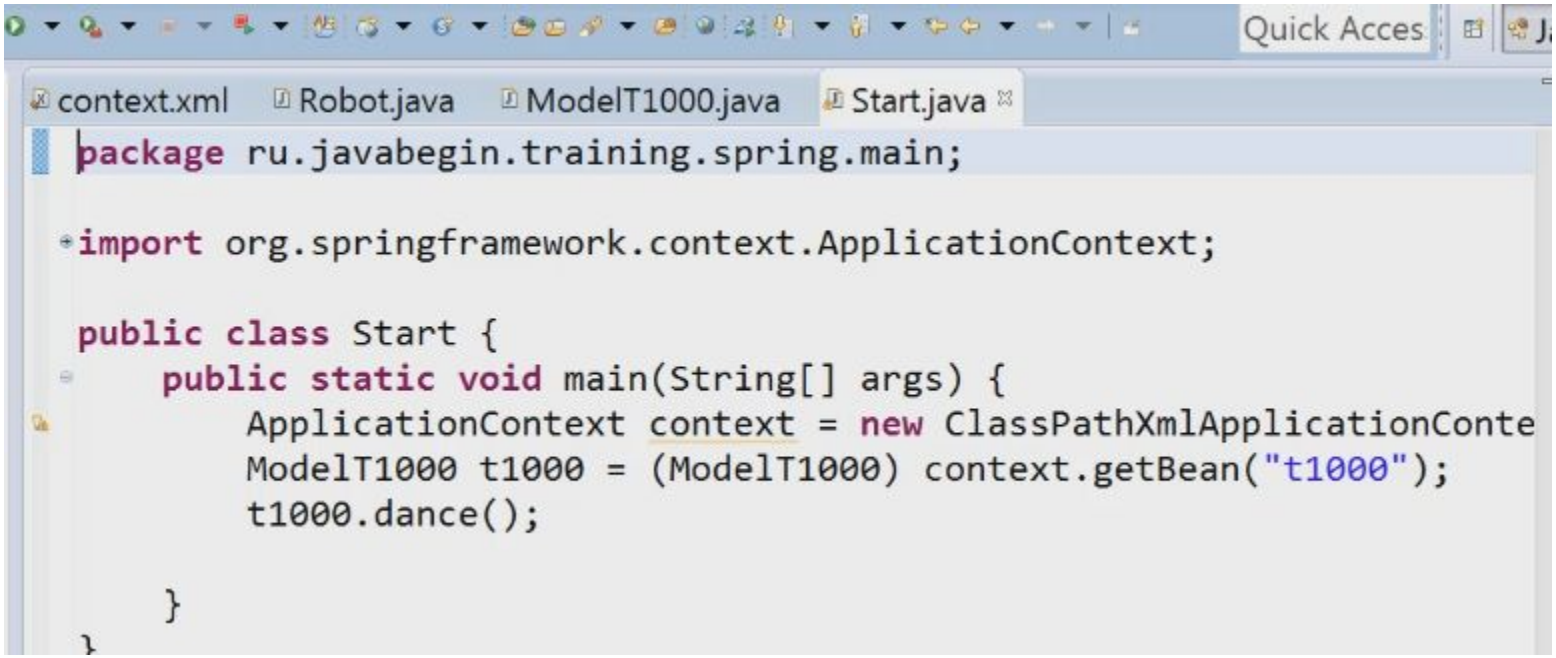

File Edit Source Refactor Navigate Search Project Run Window Help
RobotSpring2/pom.xml
ApplicationContext.xml
<?xml version="1.0" encoding="UTF-8"?>
<beans xmlns="http://www.springframework.org/schema/beans"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.springframework.org/schema/beans http:/
<bean id="t1000"
class="ru.javabegin.training.spring.impls.robot.ModelT1000">
</bean>
</beans>

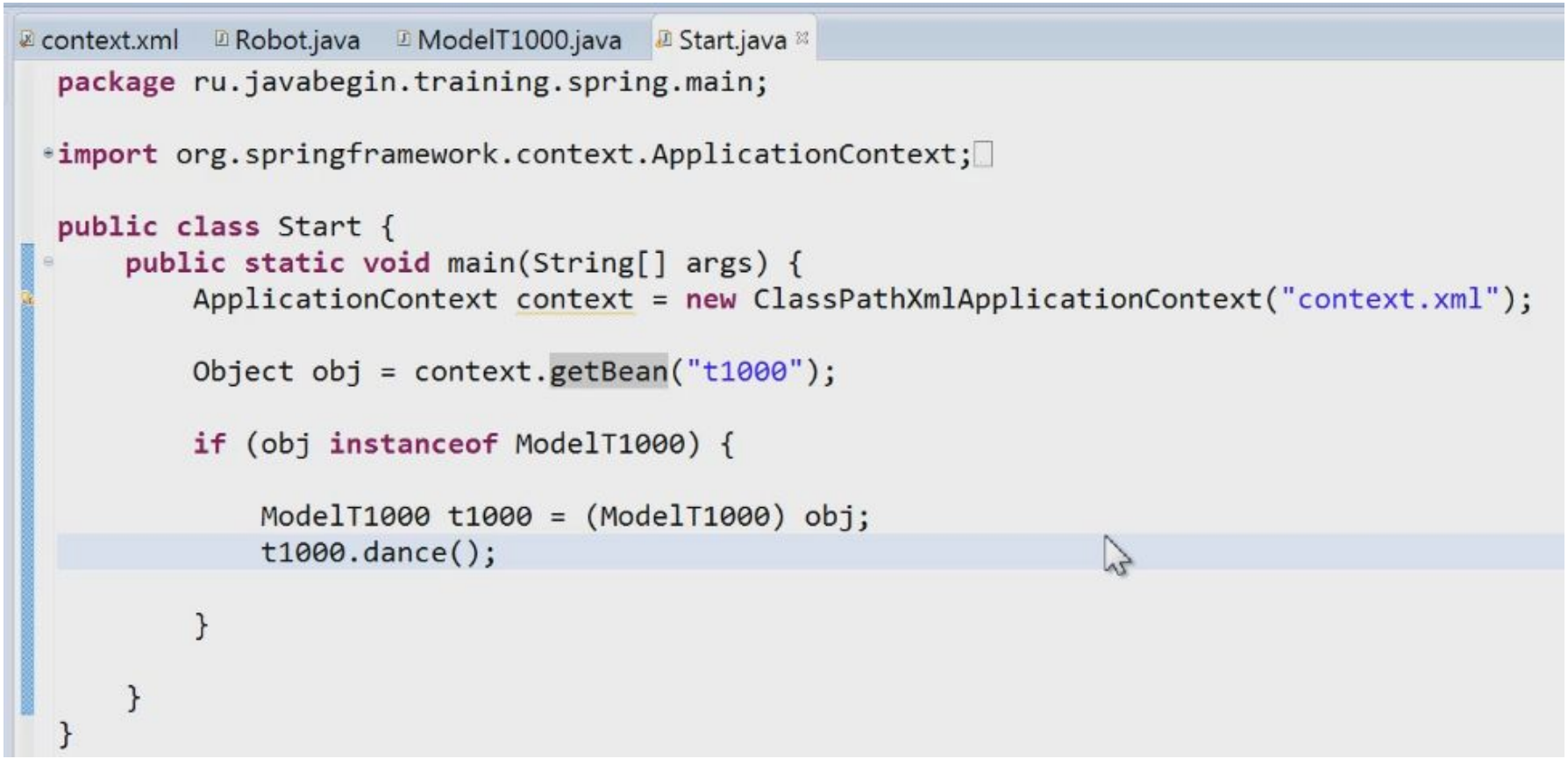

Project Explorer
Outline
RobotImpl1
RobotImpl2
src/main/java
ru.javabegin.training.spring.imp
ru.javabegin.training.spring.imp
ru.javabegin.training.spring.inte
ru.javabegin.training.spring.star
src/test/java
JRE System Library [J2SE-1.5]
Maven Dependencies
src
target
pom.xml
RobotSpring
RobotSpring2
Spring Elements
src/main/java
src/main/resources
ApplicationContext.xml
src/test/java
Maven Dependencies
RobotSpring2/pom.xml
ApplicationContext.xml
<?xml version="1.0" encoding="UTF-8"?>
<beans xmlns="http://www.springframework.org/
xmlns:xsi="http://www.w3.org/2001/XMLSch
xsi:schemaLocation="http://www.springfra
<bean id="t1000" class="ru.javabegin.tra
</bean>
</beans>

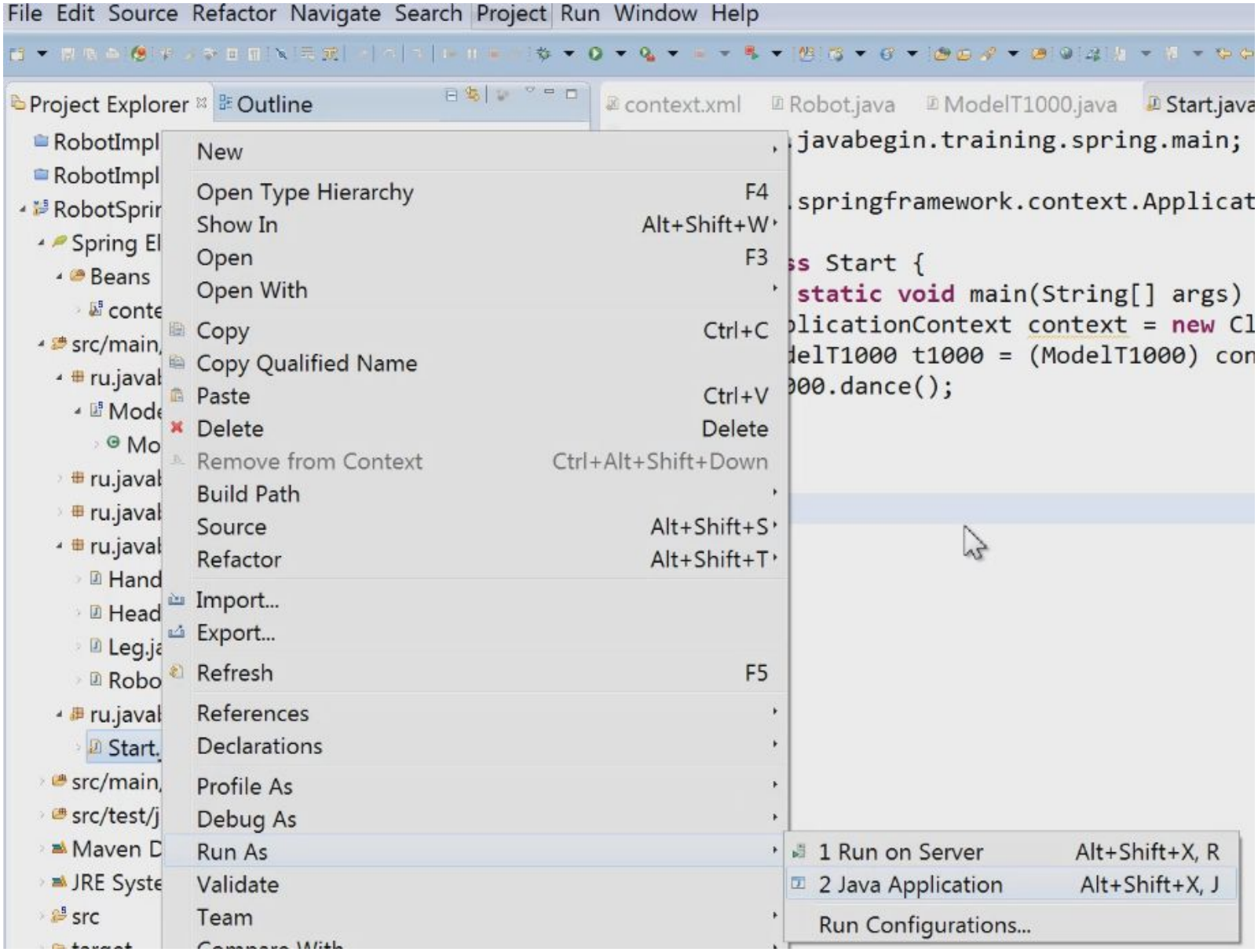

context.xml
Robot.java
package ru.javabegin.training.spring.interfaces;
public interface Robot {
void action();
void dance();
}
indow Help
context.xml
package ru.
public inte
void fi
void da
}
Undo Rename Method Ctrl+Z
Revert File
Save Ctrl+S
Open Declaration F3
Open Type Hierarchy F4
Open Call Hierarchy Ctrl+Alt+H
Show in Breadcrumb Alt+Shift+B
Quick Outline Ctrl+O
Quick Type Hierarchy Ctrl+T
Open With
Show In Alt+Shift+W
Cut Ctrl+X
Copy Ctrl+C
Copy Qualified Name
Paste Ctrl+V
Quick Fix Ctrl+1
Source Alt+Shift+S
Refactor Alt+Shift+T
Local History

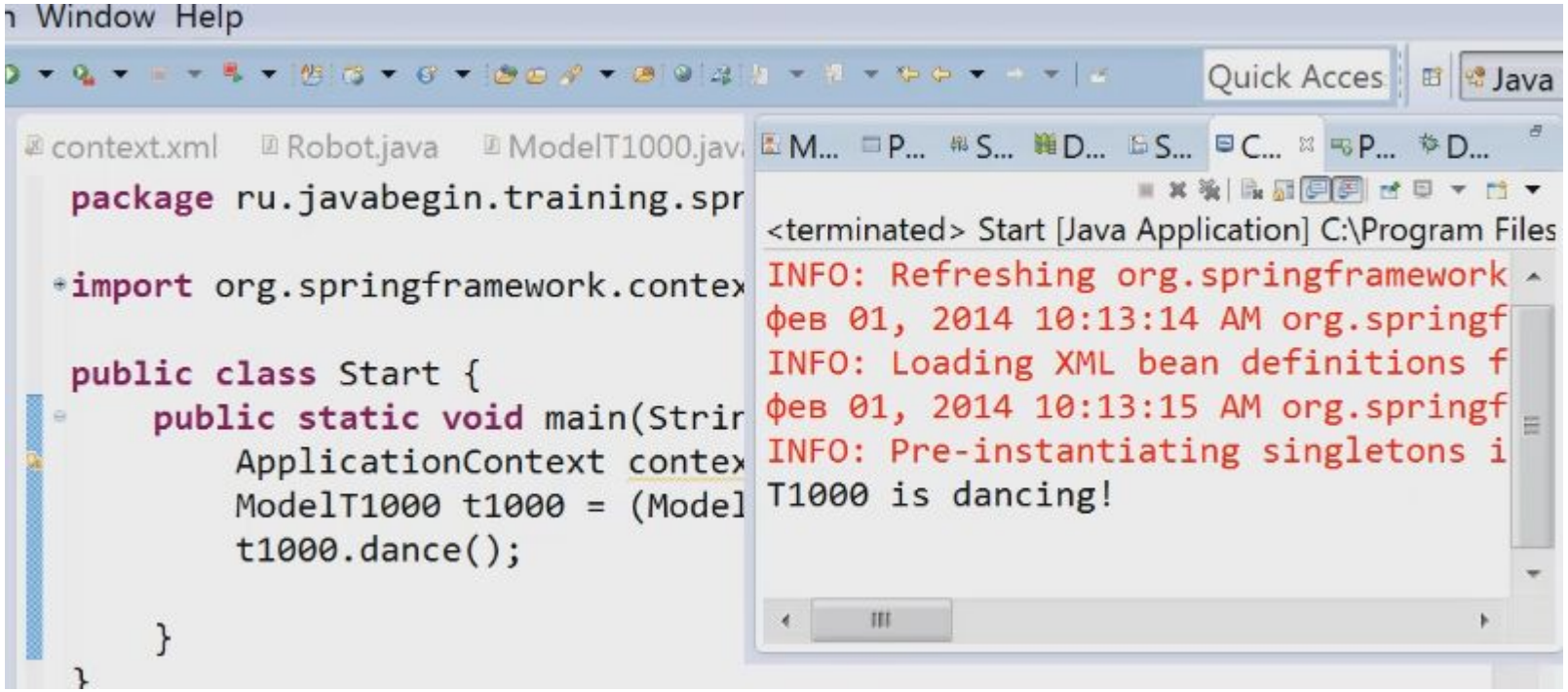

Project Explorer
Outline
RobotImpl1
RobotImpl2
RobotSpring
Spring Elements
Beans
context.xml
src/main/java
ru.javabegin.training.spring.impls.robot
ModelT1000.java
ModelT1000
ru.javabegin.training.spring.impls.sony
ru.javabegin.training.spring.impls.toshiba
ru.javabegin.training.spring.interfaces
Hand.java
Head.java
Leg.java
Robot.java
ru.javabegin.training.spring.main
src/main/resources
src/test/java
Maven Dependencies
JRE System Library [jdk1.7.0_51]
src
target
context.xml
Robot.java
ModelT1000.java
public class ModelT1000 implements Robot {
private Hand hand;
private Leg leg;
private Head head;
public ModelT1000() {
}
public ModelT1000(Hand hand, Leg leg,
super();
this.hand = hand;
this.leg = leg;
this.head = head;
}
@Override
public void fire() {
head.calc();
hand.catchSomething();
leg.go();
}
public void dance() {
System.out.println("T1000 is


context.xml
Robot.java
ModelT1000.java
public class ModelT1000 implements Robot {
private Hand hand;
private Leg leg;
private Head head;
public ModelT1000() {
}
public ModelT1000(Hand hand, Leg leg, Head he
super();
this.hand = hand;
this.leg = leg;
this.head = head;
}
@Override
public void fire() {
head.calc();
hand.catchSomething();
leg.go();
}
@Override
public void dance() {
System.out.println("T1000 is dancing!");
}


Quick Acces
context.xml
Robot.java
ModelT1000.java
Start.java
package ru.javabegin.training.spring.main;
import org.springframework.context.ApplicationContext;
public class Start {
public static void main(String[] args) {
ApplicationContext context = new ClassPathXmlApplicationConte
ModelT1000 t1000 = (ModelT1000) context.getBean("t1000");
t1000.dance();
}
}


context.xml
Robot.java
ModelT1000.java
Start.java
package ru.javabegin.training.spring.main;
import org.springframework.context.ApplicationContext;
public class Start {
public static void main(String[] args) {
ApplicationContext context = new ClassPathXmlApplicationContext("context.xml");
Object obj = context.getBean("t1000");
if (obj instanceof ModelT1000) {
ModelT1000 t1000 = (ModelT1000) obj;
t1000.dance();
}
}
}


File Edit Source Refactor Navigate Search Project Run Window Help
Project Explorer
Outline
context.xml
Robot.java
ModelT1000.java
Start.java
javabegin.training.spring.main;
springframework.context.Applicat
ss Start {
static void main(String[] args)
plicationContext context = new Cl
delT1000 t1000 = (ModelT1000) con
000.dance();
New
Open Type Hierarchy F4
Show In Alt+Shift+W
Open F3
Open With
Copy Ctrl+C
Copy Qualified Name
Paste Ctrl+V
Delete Delete
Remove from Context Ctrl+Alt+Shift+Down
Build Path
Source Alt+Shift+S
Refactor Alt+Shift+T
Import...
Export...
Refresh F5
References
Declarations
Profile As
Debug As
Run As
Validate
Team
1 Run on Server Alt+Shift+X, R
2 Java Application Alt+Shift+X, J
Run Configurations...


Window Help
Quick Acces
Java
context.xml
Robot.java
ModelT1000.jav
package ru.javabegin.training.spr
import org.springframework.contex
public class Start {
public static void main(Strir
ApplicationContext contex
ModelT1000 t1000 = (Model
t1000.dance();
}
}
M...
P...
S...
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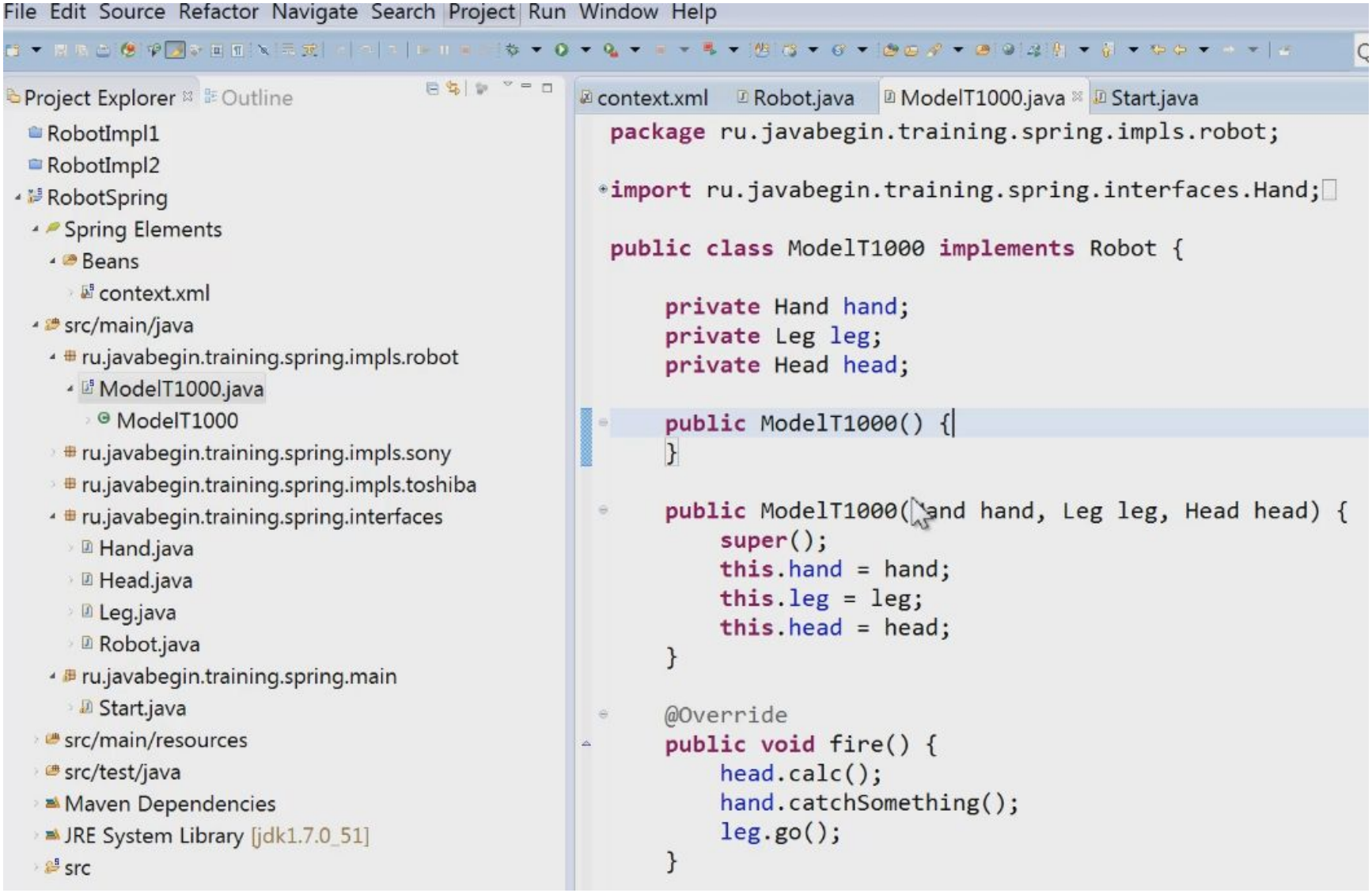
S...
C...
P...
D...
<terminated> Start [Java Application] C:\Program Files
INFO: Refreshing org.springframework
фев 01, 2014 10:13:14 AM org.springf
INFO: Loading XML bean definitions f
фев 01, 2014 10:13:15 AM org.springf
INFO: Pre-instantiating singletons i
T1000 is dancing!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ModelT1000
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ru.javabegin.training.spring.impls.toshiba
ru.javabegin.training.spring.interfaces
Hand.java
Head.java
Leg.java
Robot.java
ru.javabegin.training.spring.main
Start.java
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src/test/java
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JRE System Library [jdk1.7.0_51]
src
context.xml
Robot.java
ModelT1000.java
Start.java
package ru.javabegin.training.spring.impls.robot;
import ru.javabegin.training.spring.interfaces.Hand;
public class ModelT1000 implements Robot {
private Hand hand;
private Leg leg;
private Head head;
public ModelT1000() {
}
public ModelT1000(Hand hand, Leg leg, Head head) {
super();
this.hand = hand;
this.leg = leg;
this.head = head;
}
@Override
public void fire() {
head.calc();
hand.catchSomething();
leg.go();
}

Домашнее задание

- Изучить пример
- Почитать про аннотации http://docs.oracle.com/javase/tutorial/java/annotations/
- Изучить раздел документации Spring
  - http://spring.io/docs (выбрать нужную версию)
  - Скачать PDF версию
- Проверить код с помощью анализаторов
- Научиться создавать проект Spring с помощью Maven