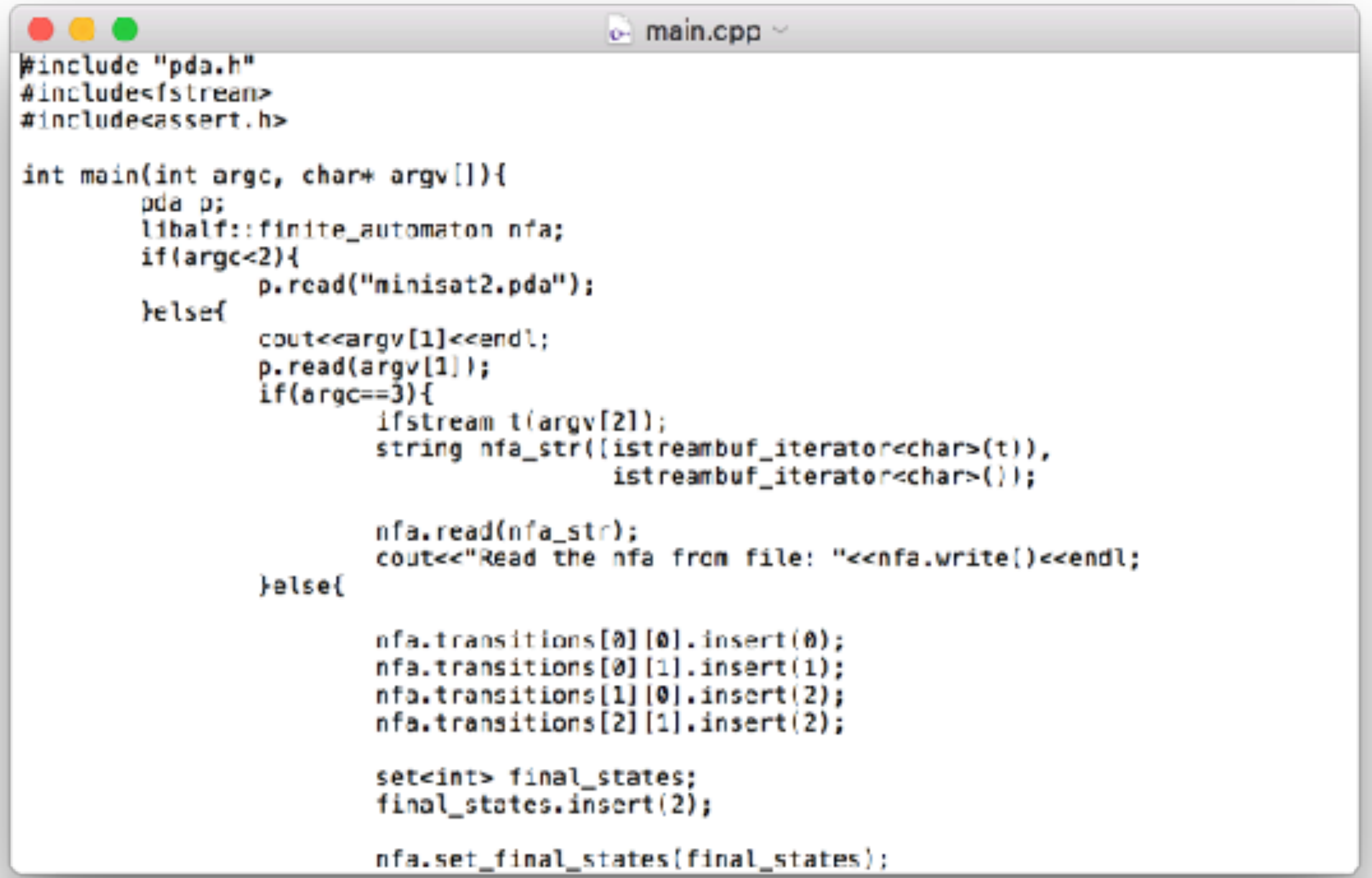
Eclipse (version Oxygen)

Ming-Hsien Tsai
Academia Sinica

SDM 2017

Writing Code With…

Text Editors

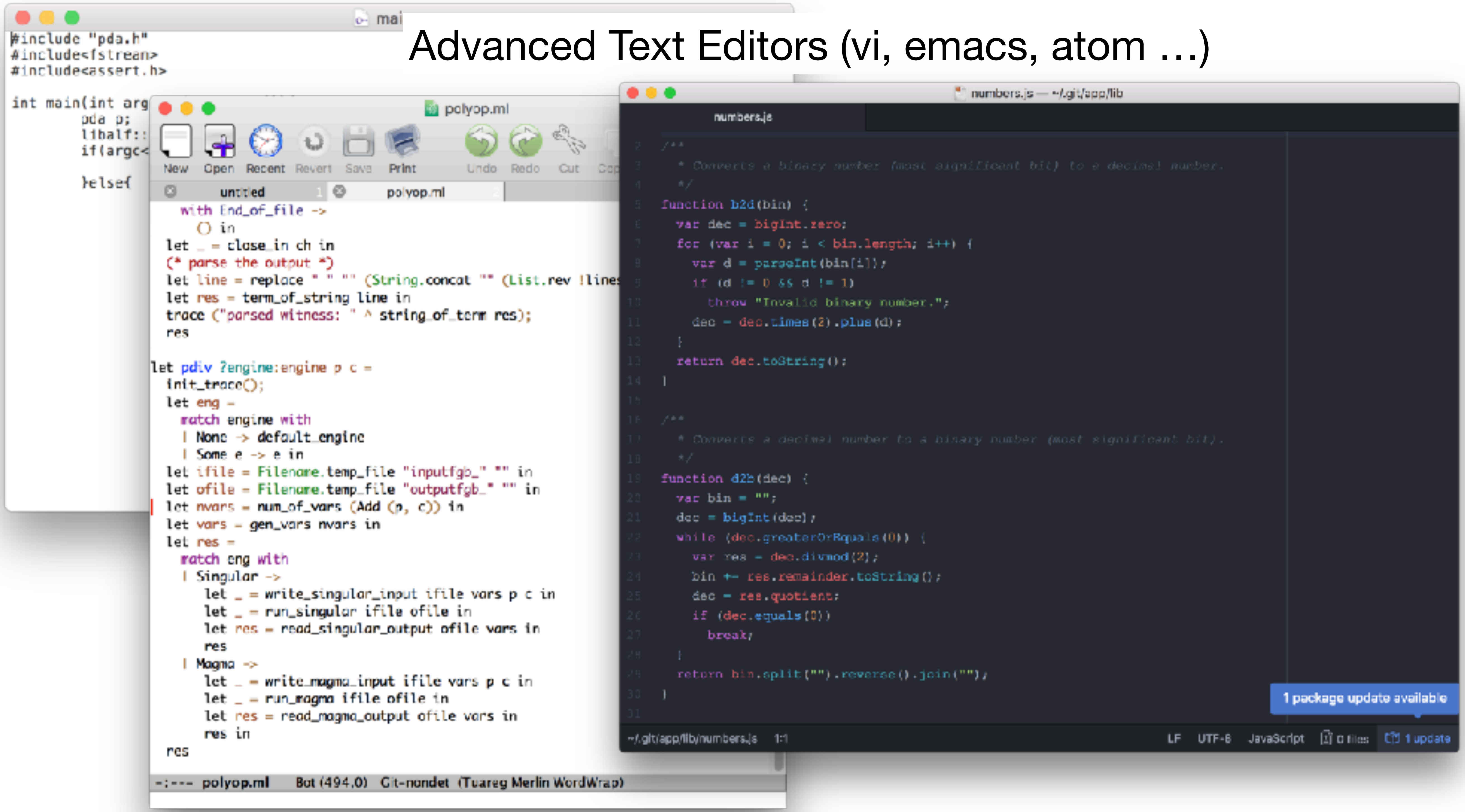


```cpp
#include "pda.h"
#include<fstream>
#include<assert.h>

int main(int argc, char* argv[]){
        pda p;
        libalf::finite_automaton nfa;
        if(argc<2){
                p.read("minisat2.pda");
        }else{
                cout<<argv[1]<<endl;
                p.read(argv[1]);
                if(argc==3){
                        ifstream t(argv[2]);
                        string nfa_str((istreambuf_iterator<char>(t)),
                                        istreambuf_iterator<char>());

                        nfa.read(nfa_str);
                        cout<<"Read the nfa from file: "<<nfa.write()<<endl;
                }else{

                        nfa.transitions[0][0].insert(0);
                        nfa.transitions[0][1].insert(1);
                        nfa.transitions[1][0].insert(2);
                        nfa.transitions[2][1].insert(2);

                        set<int> final_states;
                        final_states.insert(2);

                        nfa.set_final_states(final_states);
```

Writing Code With…

Text Editors

Advanced Text Editors (vi, emacs, atom …)



```
#include "pda.h"
#include<fstream>
#include<assert.h>

int main(int arg
        pda p;
        libalf::
        if(argc<

        }else{
```

```
    with End_of_file ->
      () in
  let _ = close_in ch in
  (* parse the output *)
  let line = replace " " "" (String.concat "" (List.rev !lines
  let res = term_of_string line in
  trace ("parsed witness: " ^ string_of_term res);
  res

let pdiv ?engine:engine p c =
  init_trace();
  let eng =
    match engine with
    | None -> default_engine
    | Some e -> e in
  let ifile = Filename.temp_file "inputfgb_" "" in
  let ofile = Filename.temp_file "outputfgb_" "" in
  let nvars = num_of_vars (Add (p, c)) in
  let vars = gen_vars nvars in
  let res =
    match eng with
    | Singular ->
      let _ = write_singular_input ifile vars p c in
      let _ = run_singular ifile ofile in
      let res = read_singular_output ofile vars in
      res
    | Magma ->
      let _ = write_magma_input ifile vars p c in
      let _ = run_magma ifile ofile in
      let res = read_magma_output ofile vars in
      res in
  res
-:---  polyop.ml    Bot (494,0)   Git-nondet  (Tuareg Merlin WordWrap)
```

```
/**
  * Converts a binary number (most significant bit) to a decimal number.
  */
function b2d(bin) {
  var dec = bigInt.zero;
  for (var i = 0; i < bin.length; i++) {
    var d = parseInt(bin[i]);
    if (d != 0 && d != 1)
      throw "Invalid binary number.";
    dec = dec.times(2).plus(d);
  }
  return dec.toString();
}

/**
  * Converts a decimal number to a binary number (most significant bit).
  */
function d2b(dec) {
  var bin = "";
  dec = bigInt(dec);
  while (dec.greaterOrEquals(0)) {
    var res = dec.divmod(2);
    bin += res.remainder.toString();
    dec = res.quotient;
    if (dec.equals(0))
      break;
  }
  return bin.split("").reverse().join("");
}
```

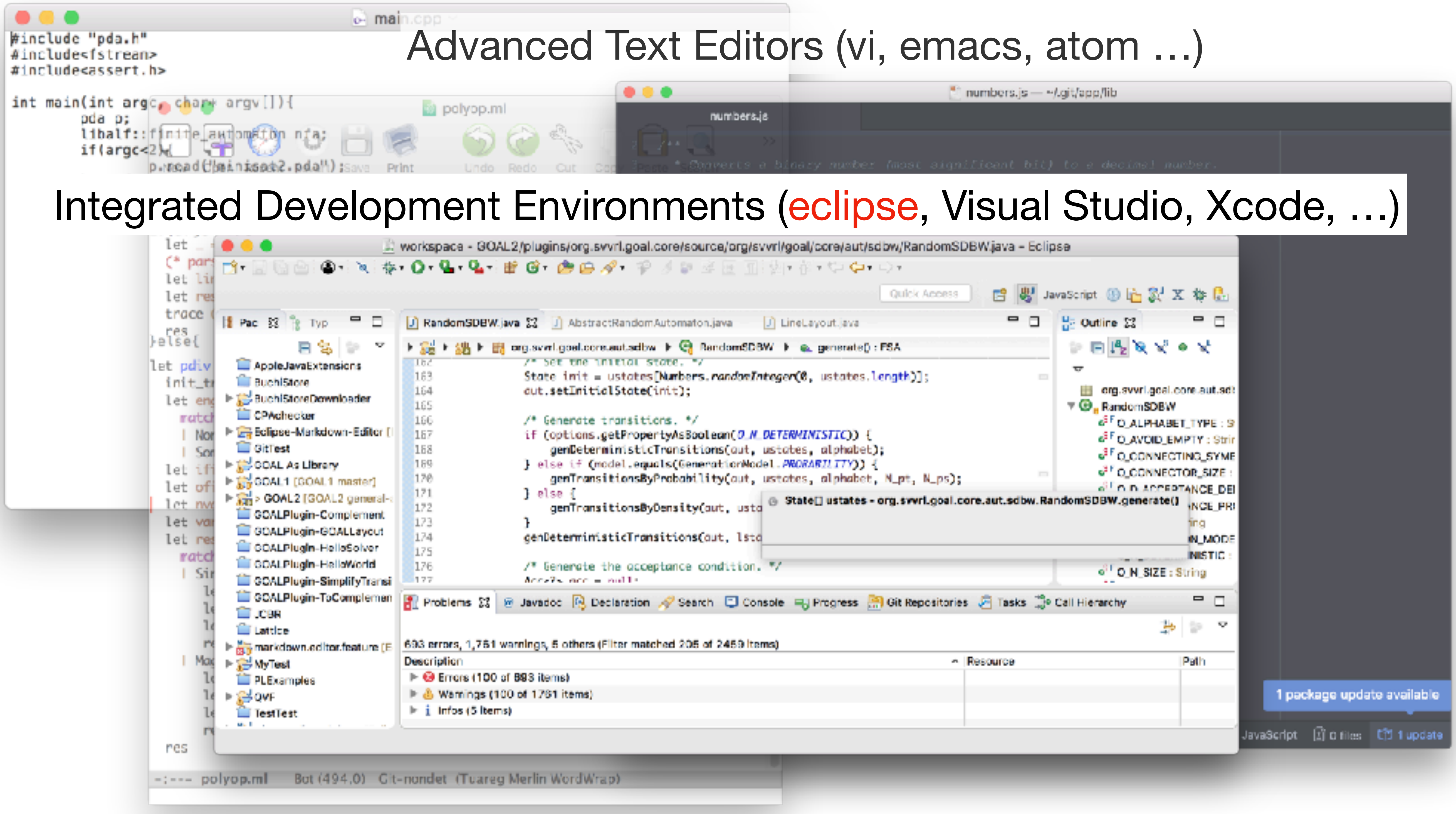
```
~/.git/app/lib/numbers.js   1:1        LF   UTF-8   JavaScript
```

Writing Code With…

Text Editors

Advanced Text Editors (vi, emacs, atom …)

Integrated Development Environments (eclipse, Visual Studio, Xcode, …)



```
#include "pda.h"
#include<fstream>
#include<assert.h>

int main(int argc, char* argv[]){
        pda p;
        libalf::finite_automaton nfa;
        if(argc<2){
```

```
/* Set the initial state. */
State init = ustates[Numbers.randomInteger(0, ustates.length)];
out.setInitialState(init);

/* Generate transitions. */
if (options.getPropertyAsBoolean(O_N_DETERMINISTIC)) {
    genDeterministicTransitions(out, ustates, alphabet);
} else if (model.equals(GenerationModel.PROBABILITY)) {
    genTransitionsByProbability(out, ustates, alphabet, N_pt, N_ps);
} else {
    genTransitionsByDensity(out, usta
}
genDeterministicTransitions(out, lsta

/* Generate the acceptance condition. */
```

State[] ustates - org.svvrl.goal.core.aut.sdbw.RandomSDBW.generate()

693 errors, 1,751 warnings, 5 others (Filter matched 205 of 2459 items)

Description	Resource	Path
Errors (100 of 693 items)		
Warnings (100 of 1751 items)		
Infos (5 items)		

main.cpp
polyop.ml
numbers.js — ~/.git/app/lib
workspace - GOAL2/plugins/org.svvrl.goal.core/source/org/svvrl/goal/core/aut/sdbw/RandomSDBW.java - Eclipse
RandomSDBW.java
AbstractRandomAutomaton.java
LineLayout.java
Outline
Problems
Javadoc
Declaration
Search
Console
Progress
Git Repositories
Tasks
Call Hierarchy
1 package update available

Writing Code With…

images from http://www.graphicsbuzz.com/graphics/foundation-construction-graphics-ec9868.html and http://www.freeiconspng.com/img/30650

Integrated Development Environment (IDE)

- A software application that provides comprehensive facilities to computer programmers for software development (Wikipedia)

- source code editor
- build automation tools
- debugger
- code completion
- code refactoring
- simulator
- task / bug tracking
- drag-and-drop graphic user interface creation

Using an IDE

- Advantages
  - Coding efficiency
  - Project management
- Disadvantages
  - Learning curve
  - Lag

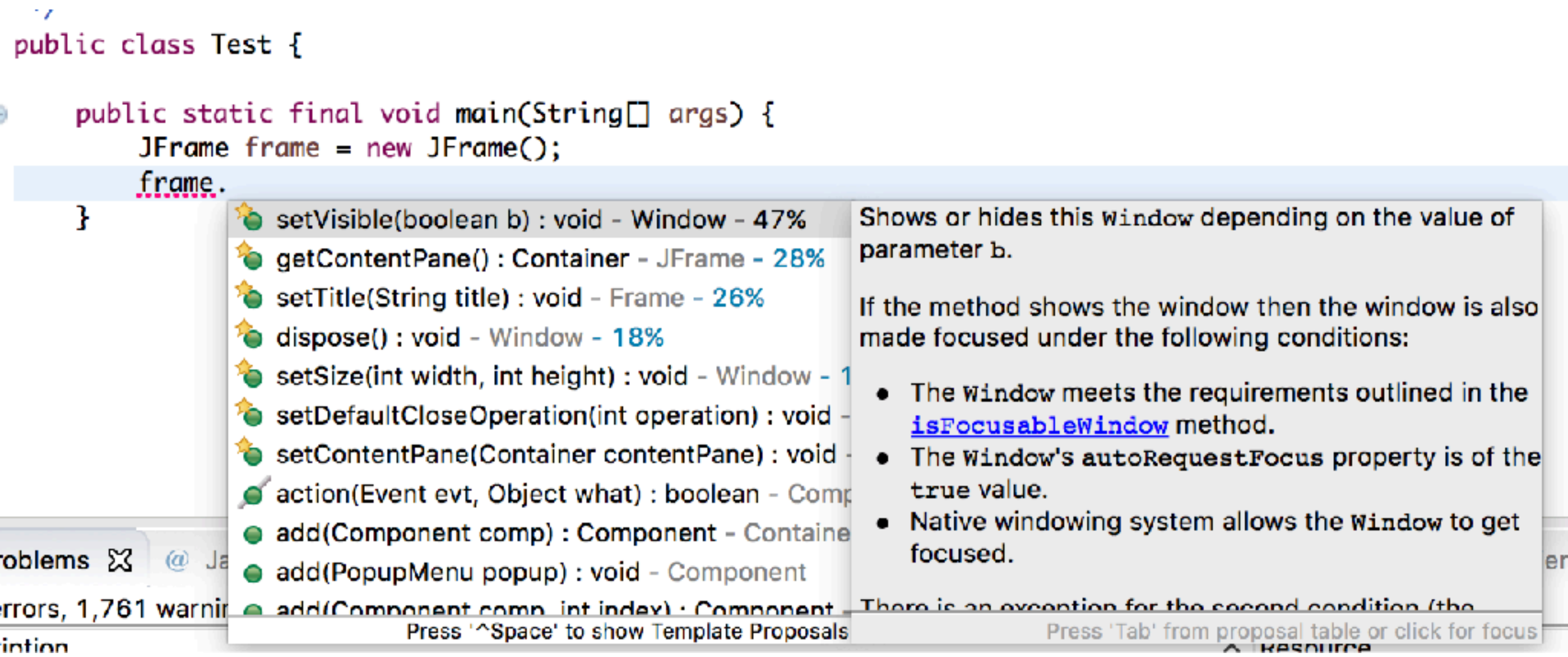
Without/With IDE

obj.??? (what methods are available?)

Without/With IDE

obj.???

(what methods are available?)



```
public class Test {

    public static final void main(String[] args) {
        JFrame frame = new JFrame();
        frame.
    }
```

setVisible(boolean b) : void - Window - 47%
getContentPane() : Container - JFrame - 28%
setTitle(String title) : void - Frame - 26%
dispose() : void - Window - 18%
setSize(int width, int height) : void - Window - 1
setDefaultCloseOperation(int operation) : void -
setContentPane(Container contentPane) : void -
action(Event evt, Object what) : boolean - Comp
add(Component comp) : Component - Containe
add(PopupMenu popup) : void - Component
add(Component comp, int index) : Component

Press '^Space' to show Template Proposals

Shows or hides this `Window` depending on the value of parameter `b`.

If the method shows the window then the window is also made focused under the following conditions:

- The `Window` meets the requirements outlined in the `isFocusableWindow` method.
- The `Window's` `autoRequestFocus` property is of the `true` value.
- Native windowing system allows the `Window` to get focused.

There is an exception for the second condition (the

Press 'Tab' from proposal table or click for focus

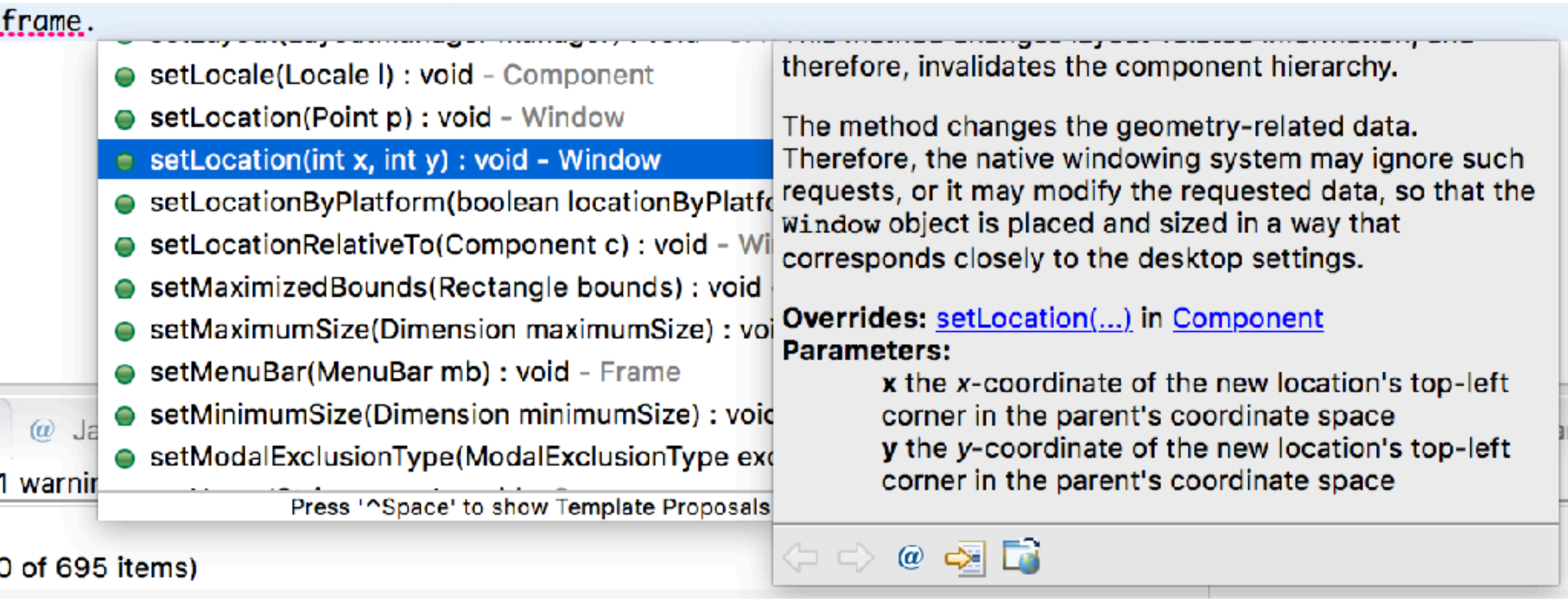
Without/With IDE

obj.func(???)

(what arguments are needed?)

Without/With IDE

obj.func(???) (what arguments are needed?)



```
frame.
● setLocale(Locale l) : void - Component
● setLocation(Point p) : void - Window
● setLocation(int x, int y) : void - Window
● setLocationByPlatform(boolean locationByPlatfo
● setLocationRelativeTo(Component c) : void - Wi
● setMaximizedBounds(Rectangle bounds) : void
● setMaximumSize(Dimension maximumSize) : voi
● setMenuBar(MenuBar mb) : void - Frame
● setMinimumSize(Dimension minimumSize) : voic
● setModalExclusionType(ModalExclusionType exc
Press '^Space' to show Template Proposals
```

therefore, invalidates the component hierarchy.

The method changes the geometry-related data. Therefore, the native windowing system may ignore such requests, or it may modify the requested data, so that the `Window` object is placed and sized in a way that corresponds closely to the desktop settings.

Overrides: setLocation(...) in Component
Parameters:
    x the *x*-coordinate of the new location's top-left corner in the parent's coordinate space
    y the *y*-coordinate of the new location's top-left corner in the parent's coordinate space

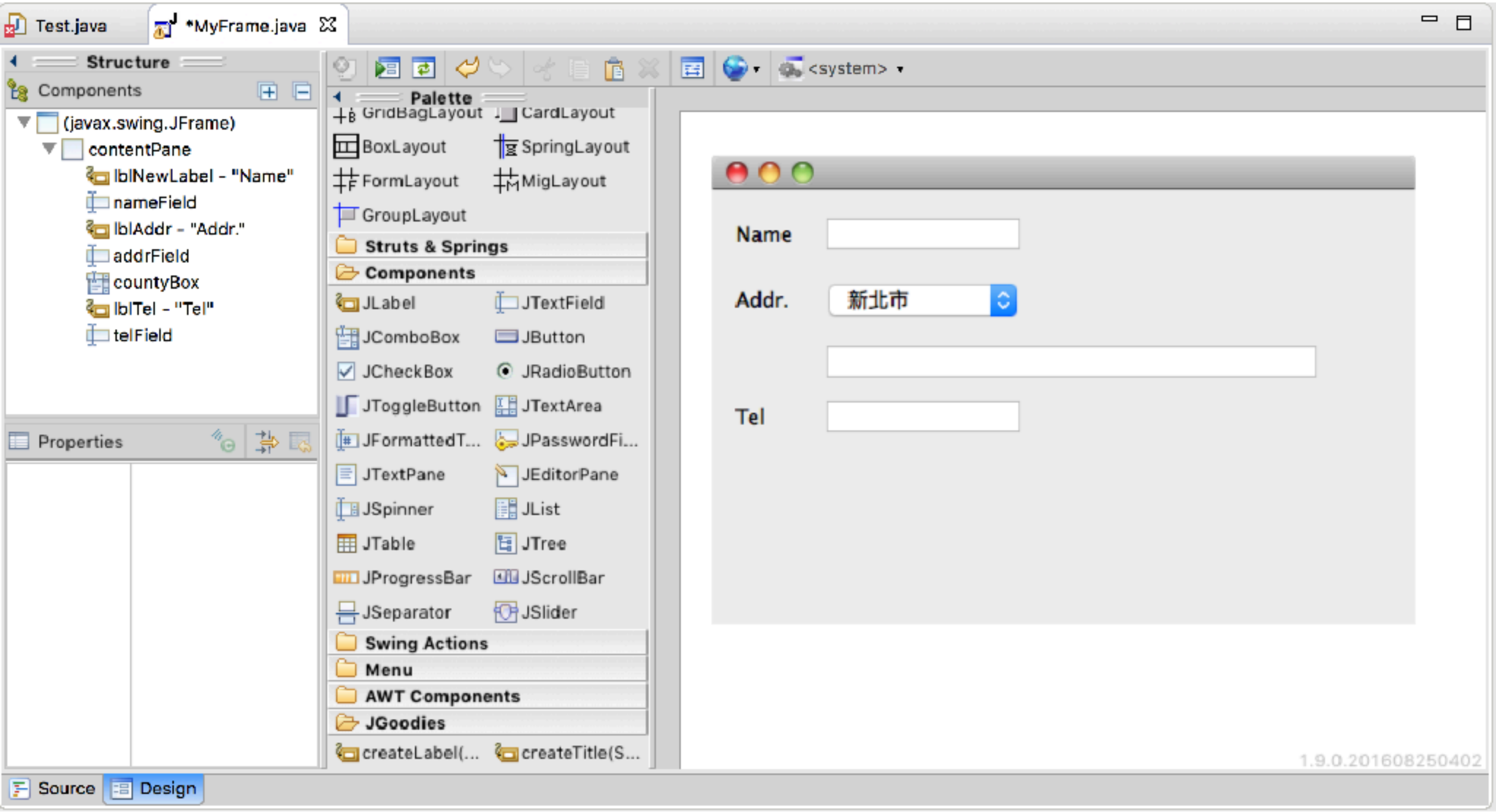
1 warnir
0 of 695 items)

Without/With IDE

```
add(comp1, BorderLayout.NORTH);
add(comp2, BorderLayout.CENTER);
cs.weightx = 1;
comp2.add(comp3, cs);
cs.weightx = 2;
comp2.add(comp4, cs);
```

(build graphical user interface)

Without/With IDE



Eclipse

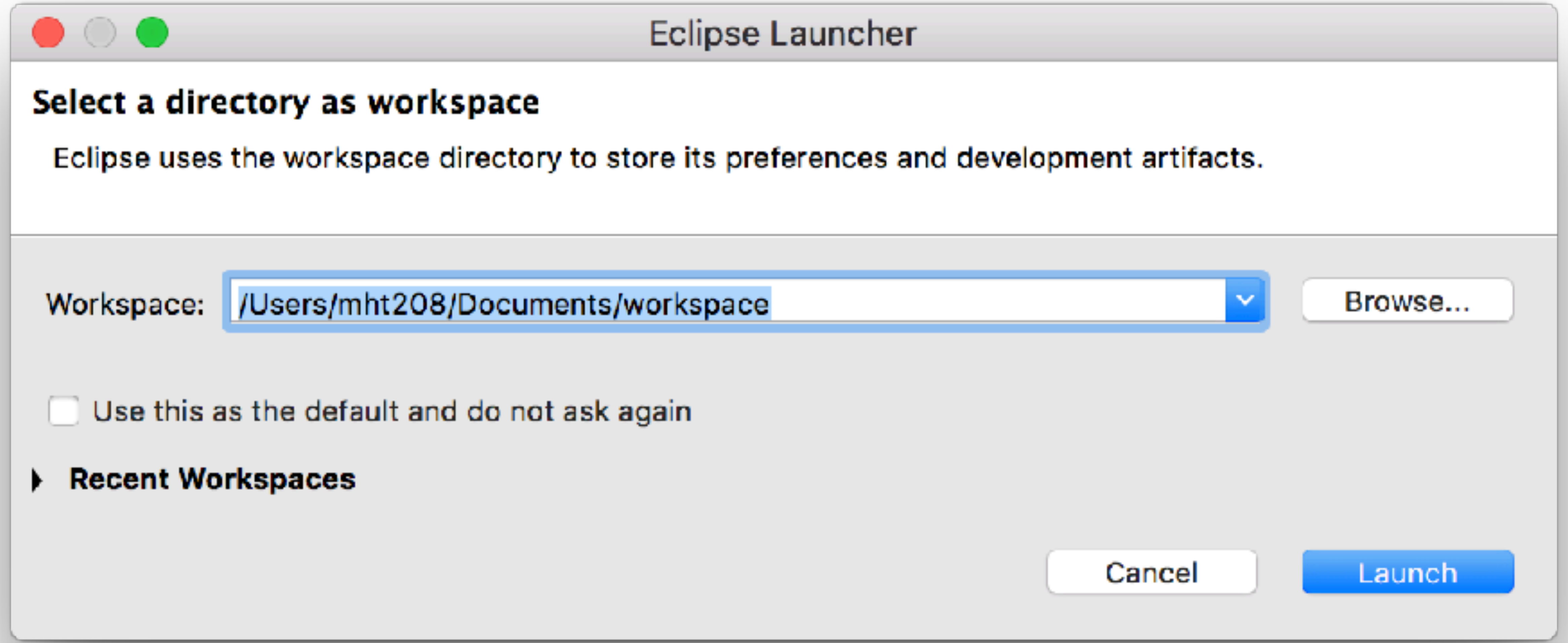
- http://www.eclipse.org
- Integrated development environment (IDE)
    - Java, C/C++, PHP, …
- Extensible with plugins (http://marketplace.eclipse.org)
    - WindowBuilder, EGit, Eclipse UML Generators, …
- Free

Eclipse History

Version Name	Date	Platform Version
N/A	21 June 2004	3.0
N/A	28 June 2005	3.1
Callisto	30 June 2006	3.2
Europa	29 June 2007	3.3
Ganymede	25 June 2008	3.4
Galileo	24 June 2009	3.5
Helios	23 June 2010	3.6
Indigo	22 June 2011	3.7
Juno	27 June 2012	3.8 and 4.2
Kepler	26 June 2013	4.3
Luna	25 June 2014	4.4
Mars	24 June 2015	4.5
Neon	22 June 2016	4.6
Oxygen	28 June 2017	4.7
Photon	2018	4.8

First Start

- Workspace
  - Where your projects are stored
  - Multiple workspaces are allowed



Select a directory as workspace

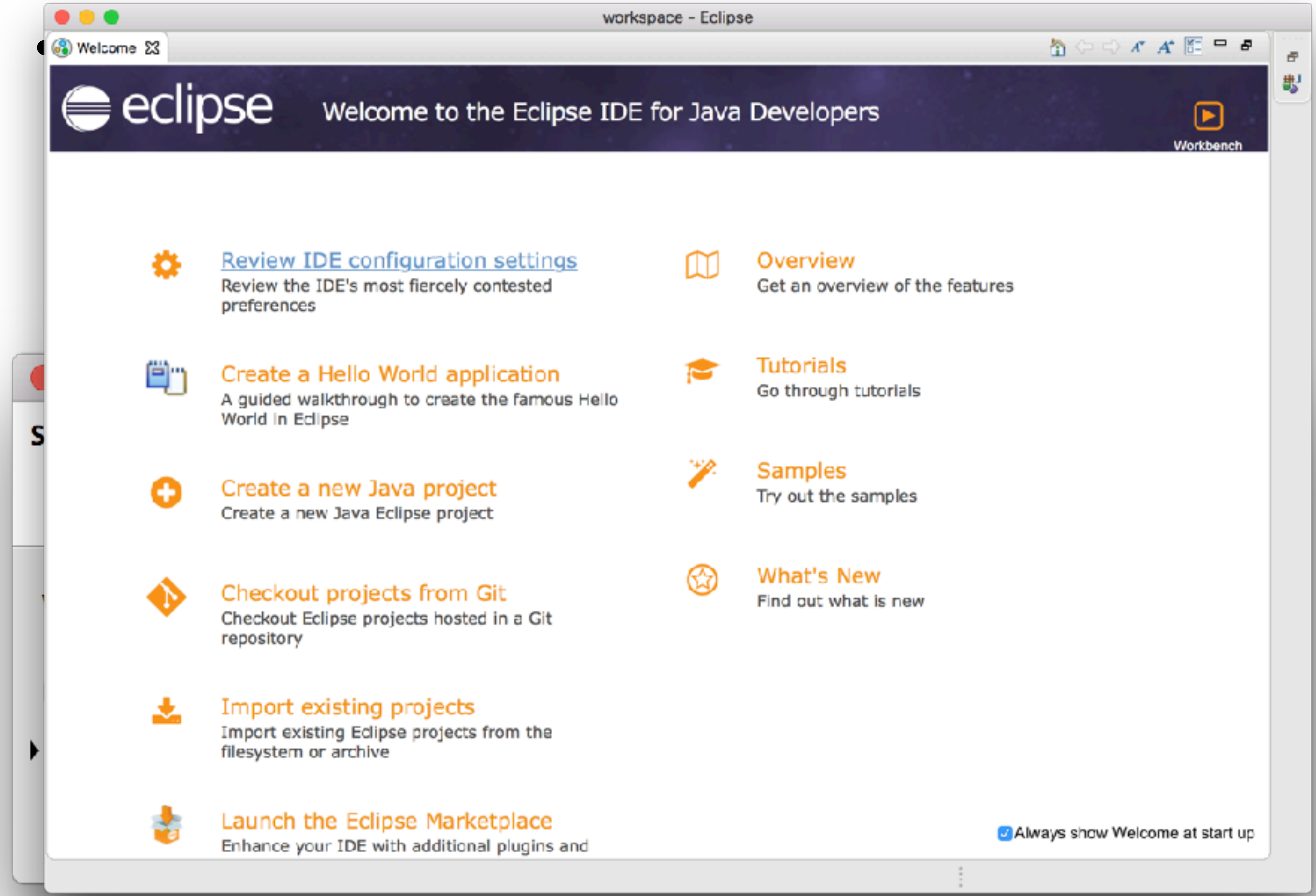
Eclipse uses the workspace directory to store its preferences and development artifacts.

Workspace: /Users/mht208/Documents/workspace

☐ Use this as the default and do not ask again

Recent Workspaces

First Start



workspace - Eclipse

Welcome to the Eclipse IDE for Java Developers

Review IDE configuration settings
Review the IDE's most fiercely contested preferences

Create a Hello World application
A guided walkthrough to create the famous Hello World in Eclipse

Create a new Java project
Create a new Java Eclipse project

Checkout projects from Git
Checkout Eclipse projects hosted in a Git repository

Import existing projects
Import existing Eclipse projects from the filesystem or archive

Launch the Eclipse Marketplace
Enhance your IDE with additional plugins and

Overview
Get an overview of the features

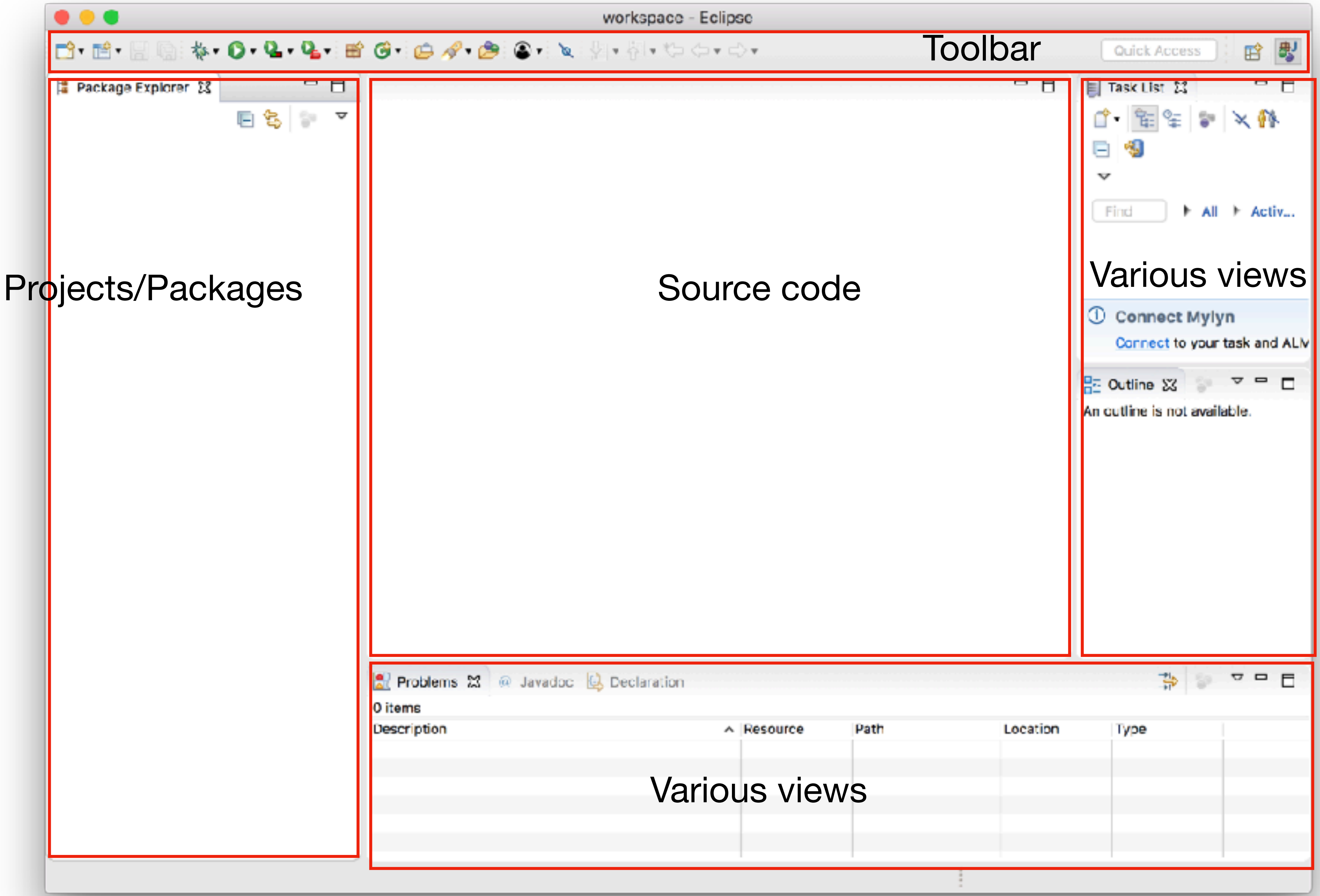
Tutorials
Go through tutorials

Samples
Try out the samples

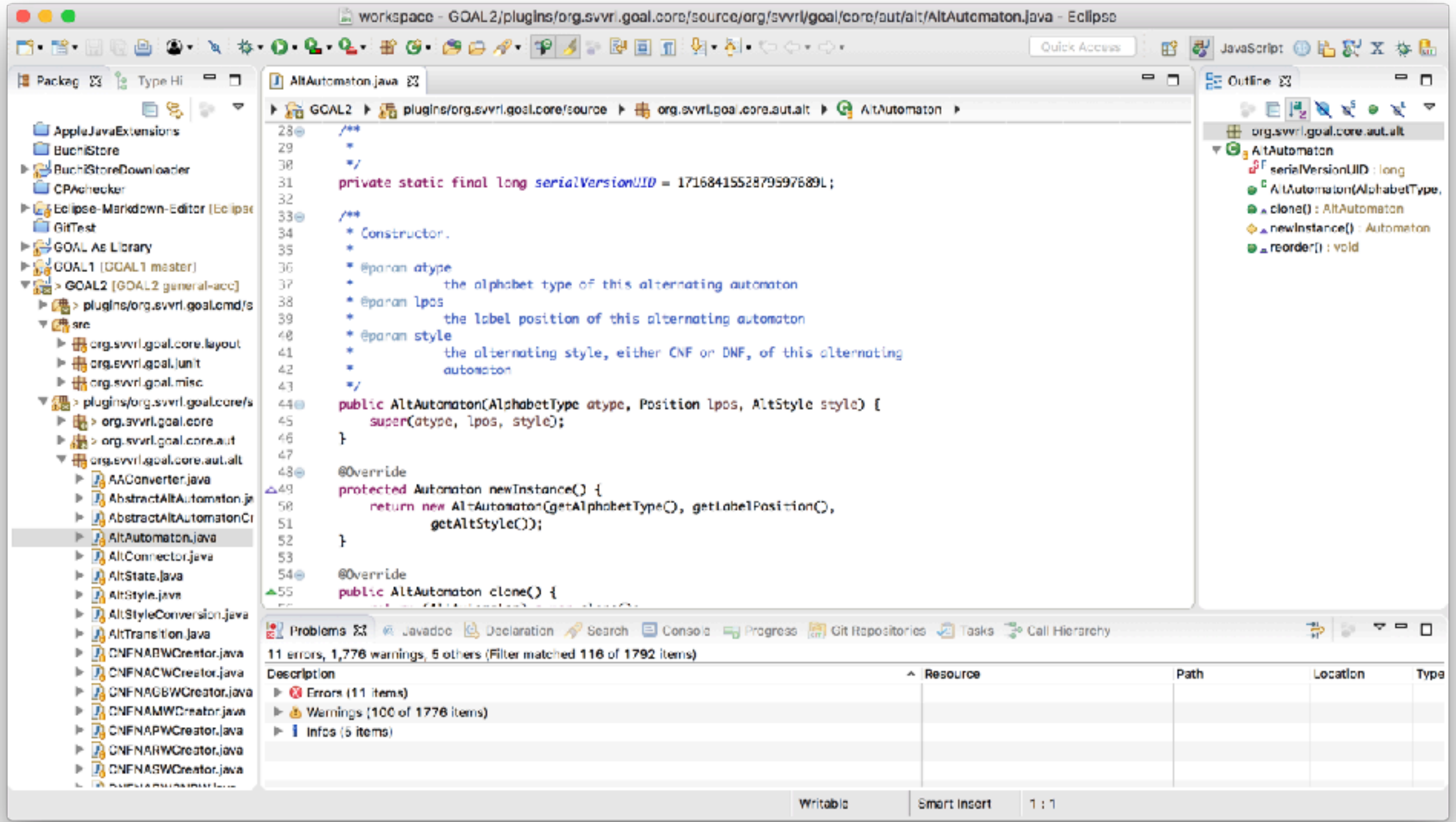
What's New
Find out what is new

☑ Always show Welcome at start up

Perspective



Perspective
Java

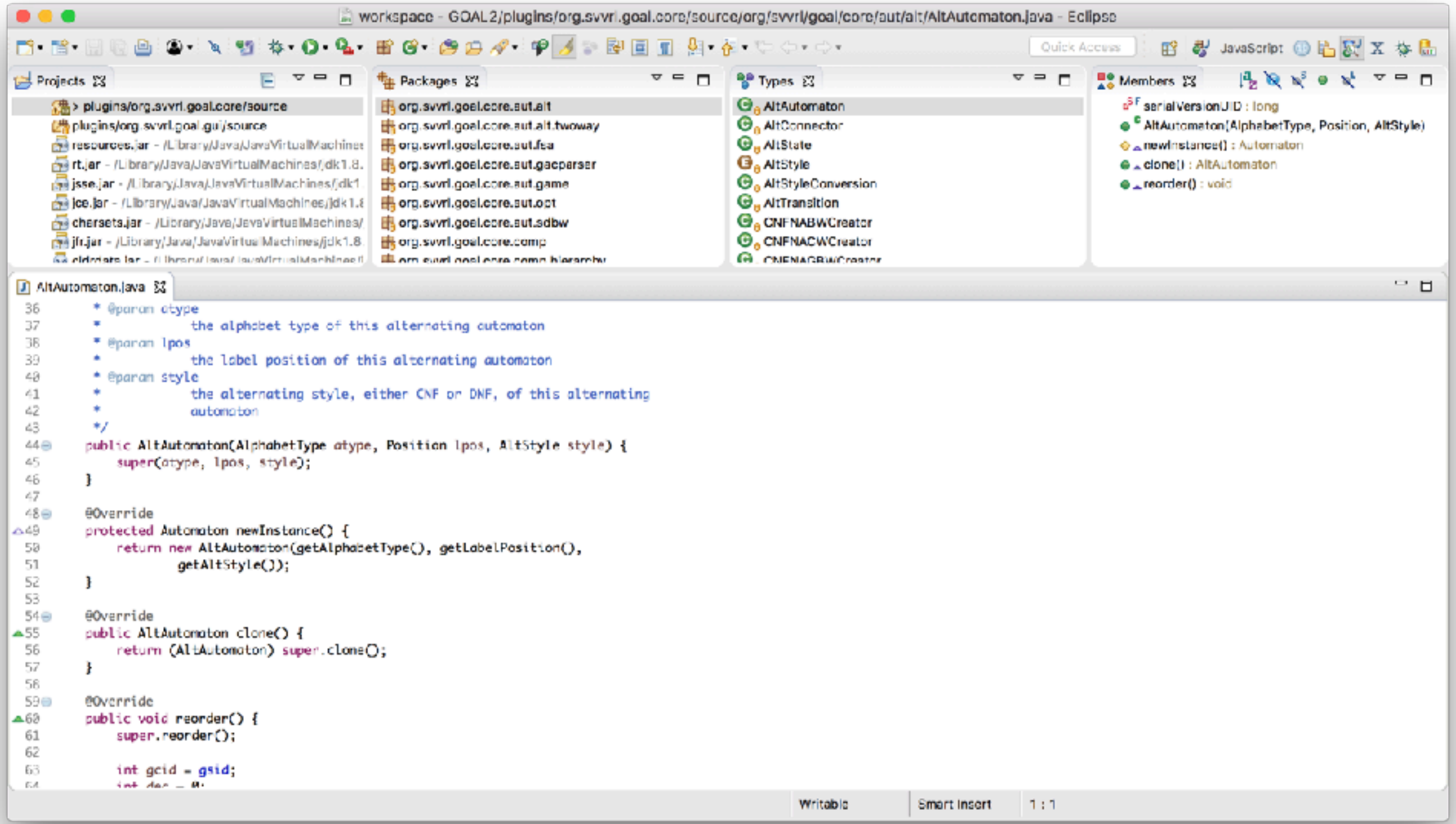


```
    /**
     *
     */
    private static final long serialVersionUID = 1716841552879597689L;

    /**
     * Constructor.
     *
     * @param atype
     *            the alphabet type of this alternating automaton
     * @param lpos
     *            the label position of this alternating automaton
     * @param style
     *            the alternating style, either CNF or DNF, of this alternating
     *            automaton
     */
    public AltAutomaton(AlphabetType atype, Position lpos, AltStyle style) {
        super(atype, lpos, style);
    }

    @Override
    protected Automaton newInstance() {
        return new AltAutomaton(getAlphabetType(), getLabelPosition(),
                getAltStyle());
    }

    @Override
    public AltAutomaton clone() {
```

11 errors, 1,776 warnings, 5 others (Filter matched 116 of 1792 items)

Description	Resource	Path	Location	Type
Errors (11 items)				
Warnings (100 of 1776 items)				
Infos (5 items)				

Perspective
Java Browsing


workspace - GOAL 2/plugins/org.svvrl.goal.core/source/org/svvrl/goal/core/aut/alt/AltAutomaton.java - Eclipse
Quick Access
JavaScript
Projects
Packages
Types
Members
AltAutomaton.java
Writable
Smart Insert
1 : 1

Projects:

```
> plugins/org.svvrl.goal.core/source
plugins/org.svvrl.goal.gui/source
resources.jar - /Library/Java/JavaVirtualMachines
rt.jar - /Library/Java/JavaVirtualMachines/jdk1.8.
jsse.jar - /Library/Java/JavaVirtualMachines/jdk1
jce.jar - /Library/Java/JavaVirtualMachines/jdk1.8
charsets.jar - /Library/Java/JavaVirtualMachines/
jfr.jar - /Library/Java/JavaVirtualMachines/jdk1.8
```

Packages:

```
org.svvrl.goal.core.aut.alt
org.svvrl.goal.core.aut.alt.twoway
org.svvrl.goal.core.aut.fsa
org.svvrl.goal.core.aut.gacparser
org.svvrl.goal.core.aut.game
org.svvrl.goal.core.aut.opt
org.svvrl.goal.core.aut.sdbw
org.svvrl.goal.core.comp
```

Types:

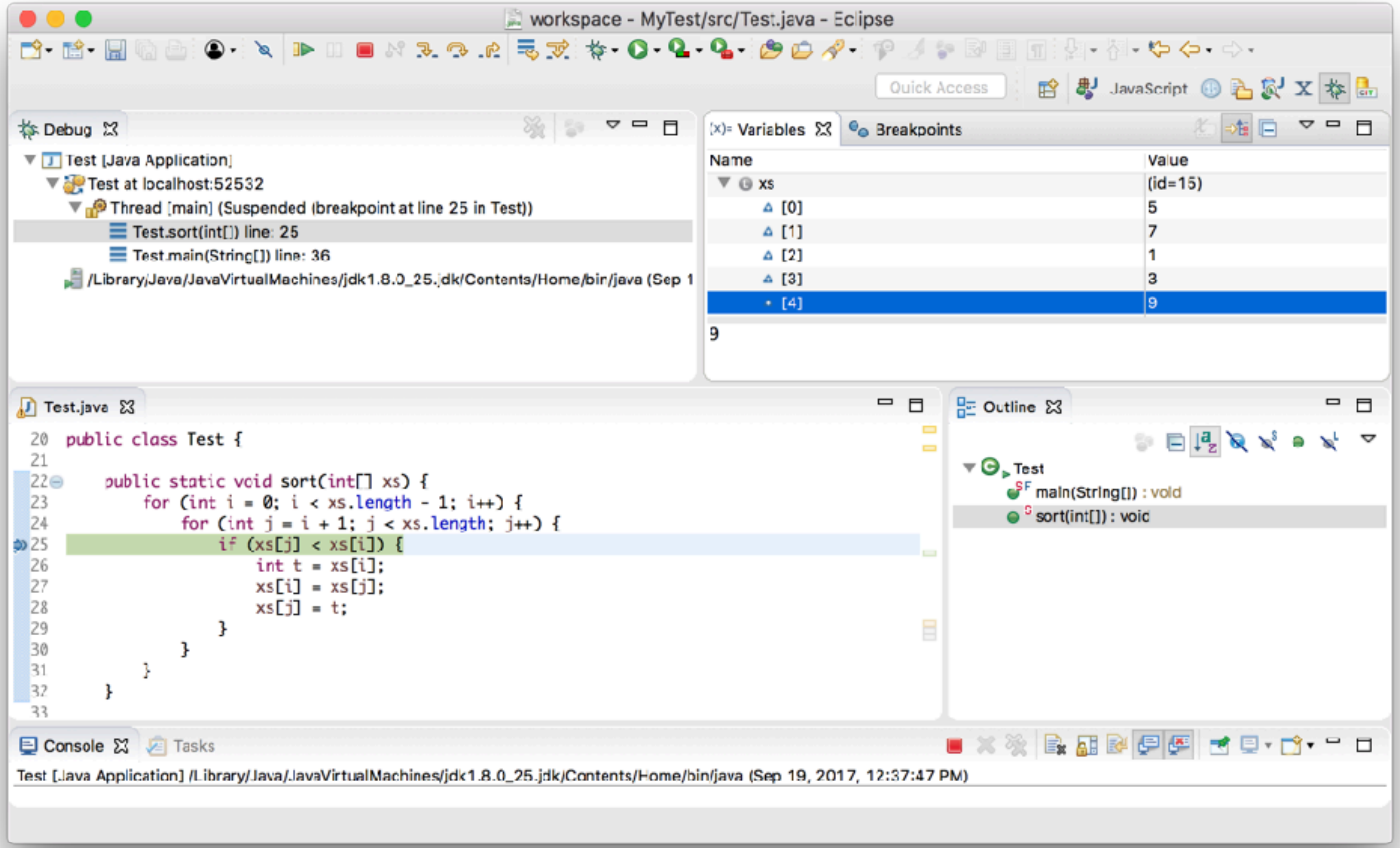
```
AltAutomaton
AltConnector
AltState
AltStyle
AltStyleConversion
AltTransition
CNFNABWCreator
CNFNACWCreator
```

Members:

```
serialVersionUID : long
AltAutomaton(AlphabetType, Position, AltStyle)
newInstance() : Automaton
clone() : AltAutomaton
reorder() : void
```

```java
     * @param atype
     *            the alphabet type of this alternating automaton
     * @param lpos
     *            the label position of this alternating automaton
     * @param style
     *            the alternating style, either CNF or DNF, of this alternating
     *            automaton
     */
    public AltAutomaton(AlphabetType atype, Position lpos, AltStyle style) {
        super(atype, lpos, style);
    }

    @Override
    protected Automaton newInstance() {
        return new AltAutomaton(getAlphabetType(), getLabelPosition(),
                getAltStyle());
    }

    @Override
    public AltAutomaton clone() {
        return (AltAutomaton) super.clone();
    }

    @Override
    public void reorder() {
        super.reorder();

        int gcid = gsid;
```

Perspective Debug



```
Test [Java Application]
  Test at localhost:52532
    Thread [main] (Suspended (breakpoint at line 25 in Test))
      Test.sort(int[]) line: 25
      Test.main(String[]) line: 36
  /Library/Java/JavaVirtualMachines/jdk1.8.0_25.jdk/Contents/Home/bin/java (Sep 1
```

Name	Value
xs	(id=15)
[0]	5
[1]	7
[2]	1
[3]	3
[4]	9

9

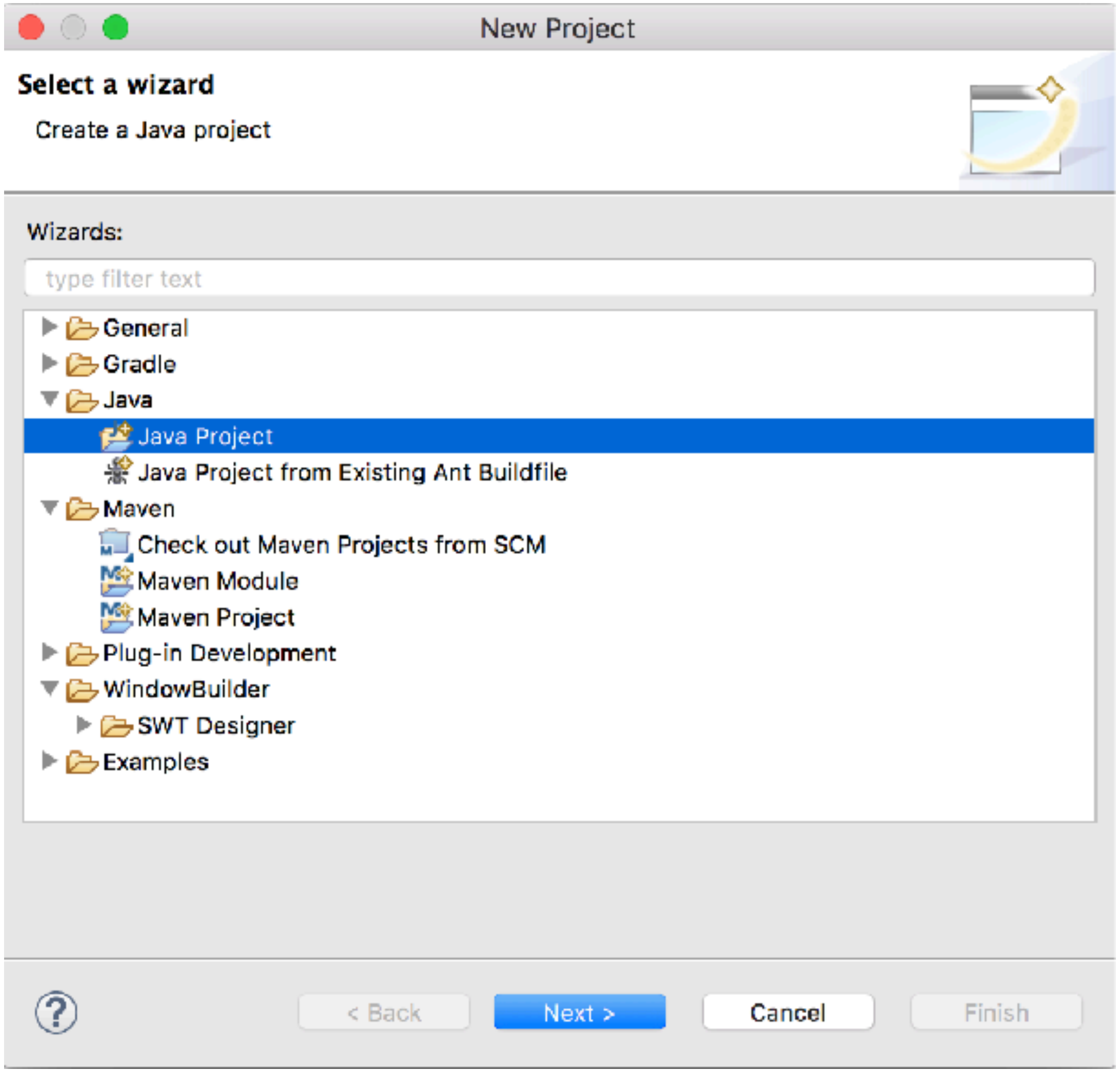
```java
public class Test {

    public static void sort(int[] xs) {
        for (int i = 0; i < xs.length - 1; i++) {
            for (int j = i + 1; j < xs.length; j++) {
                if (xs[j] < xs[i]) {
                    int t = xs[i];
                    xs[i] = xs[j];
                    xs[j] = t;
                }
            }
        }
    }
```

```
Test
  main(String[]) : void
  sort(int[]) : void
```

```
Test [Java Application] /Library/Java/JavaVirtualMachines/jdk1.8.0_25.jdk/Contents/Home/bin/java (Sep 19, 2017, 12:37:47 PM)
```

Creating New Projects

File / New / Project…


New Project

Select a wizard

Create a Java project

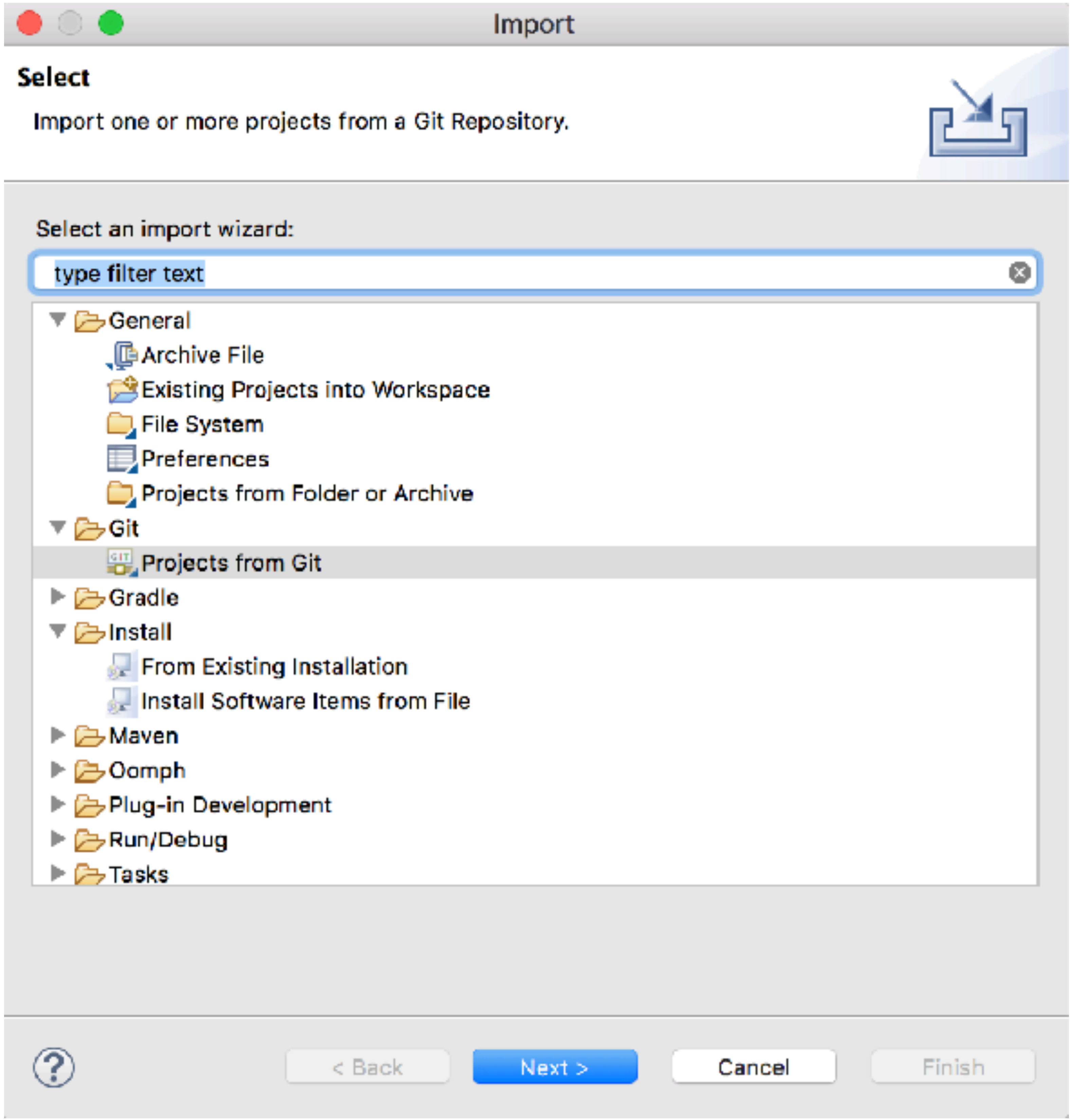
Wizards:

type filter text

- General
- Gradle
- Java
  - Java Project
  - Java Project from Existing Ant Buildfile
- Maven
  - Check out Maven Projects from SCM
  - Maven Module
  - Maven Project
- Plug-in Development
- WindowBuilder
  - SWT Designer
- Examples

Importing Existing Projects

File / Import…



Import

Select

Import one or more projects from a Git Repository.

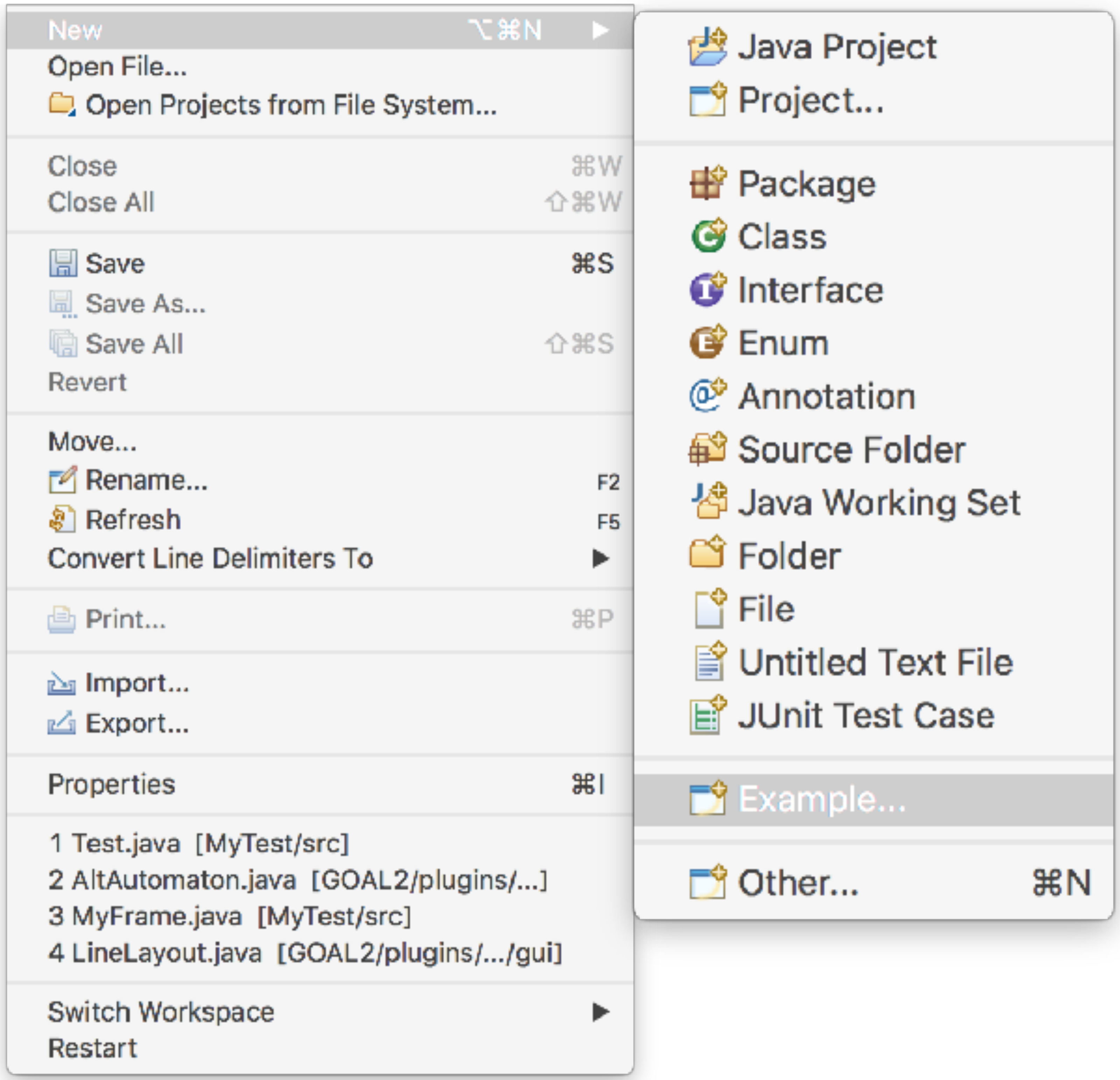
Select an import wizard:

type filter text

- General
  - Archive File
  - Existing Projects into Workspace
  - File System
  - Preferences
  - Projects from Folder or Archive
- Git
  - Projects from Git
- Gradle
- Install
  - From Existing Installation
  - Install Software Items from File
- Maven
- Oomph
- Plug-in Development
- Run/Debug
- Tasks

New Source Files

File / New (⌘N)



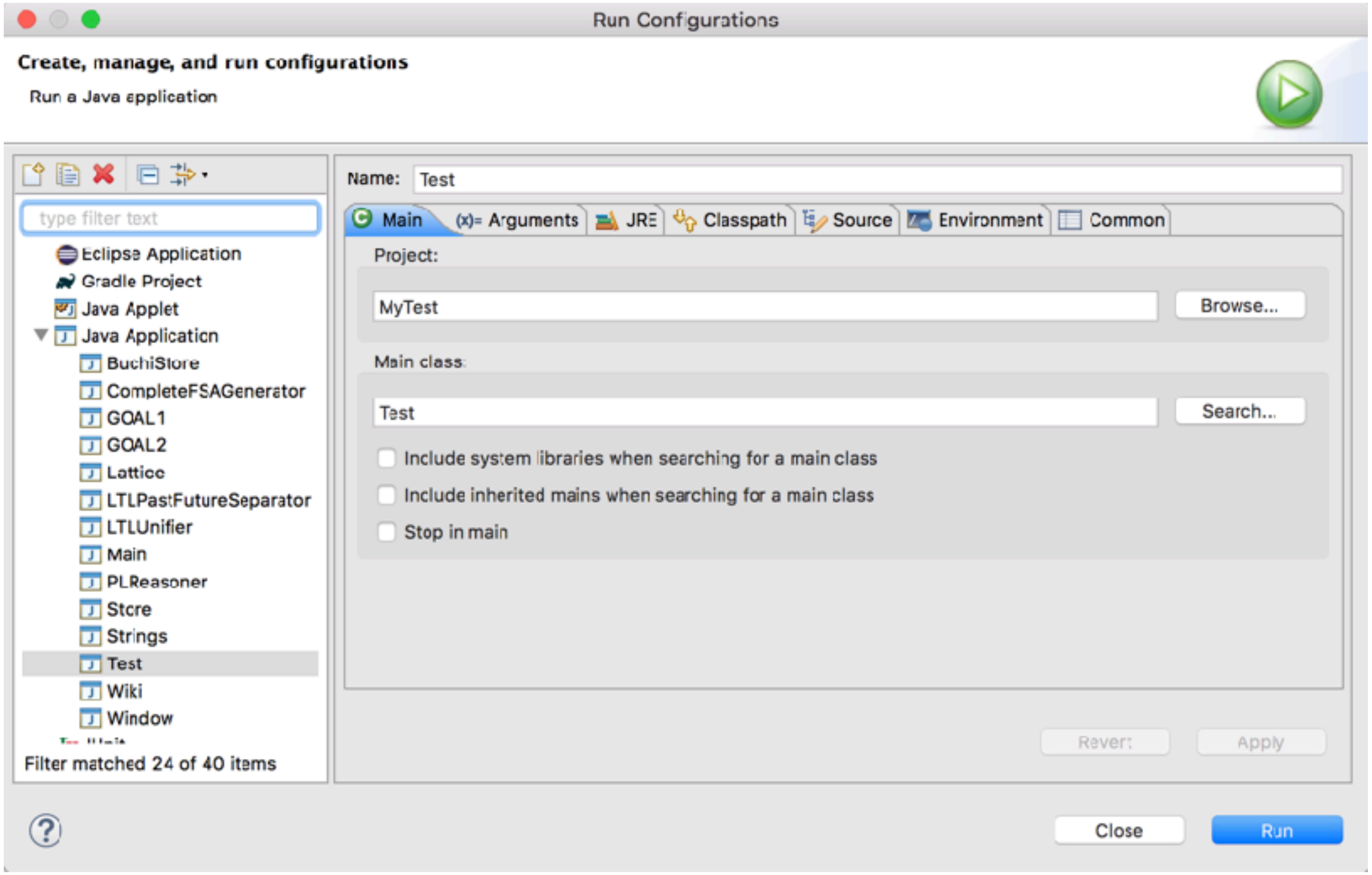
Build Projects

- Java projects can be built automatically
- Build tools:
    - GNU Make
    - Apache Ant (with Ivy)
    - Apache Maven
    - Gradle
    - …

Run Projects

Run / Run Configurations…

Run / Run (⇧ ⌘ F11)



Run Configurations

Create, manage, and run configurations

Run a Java application

Name: Test

Project: MyTest

Main class: Test

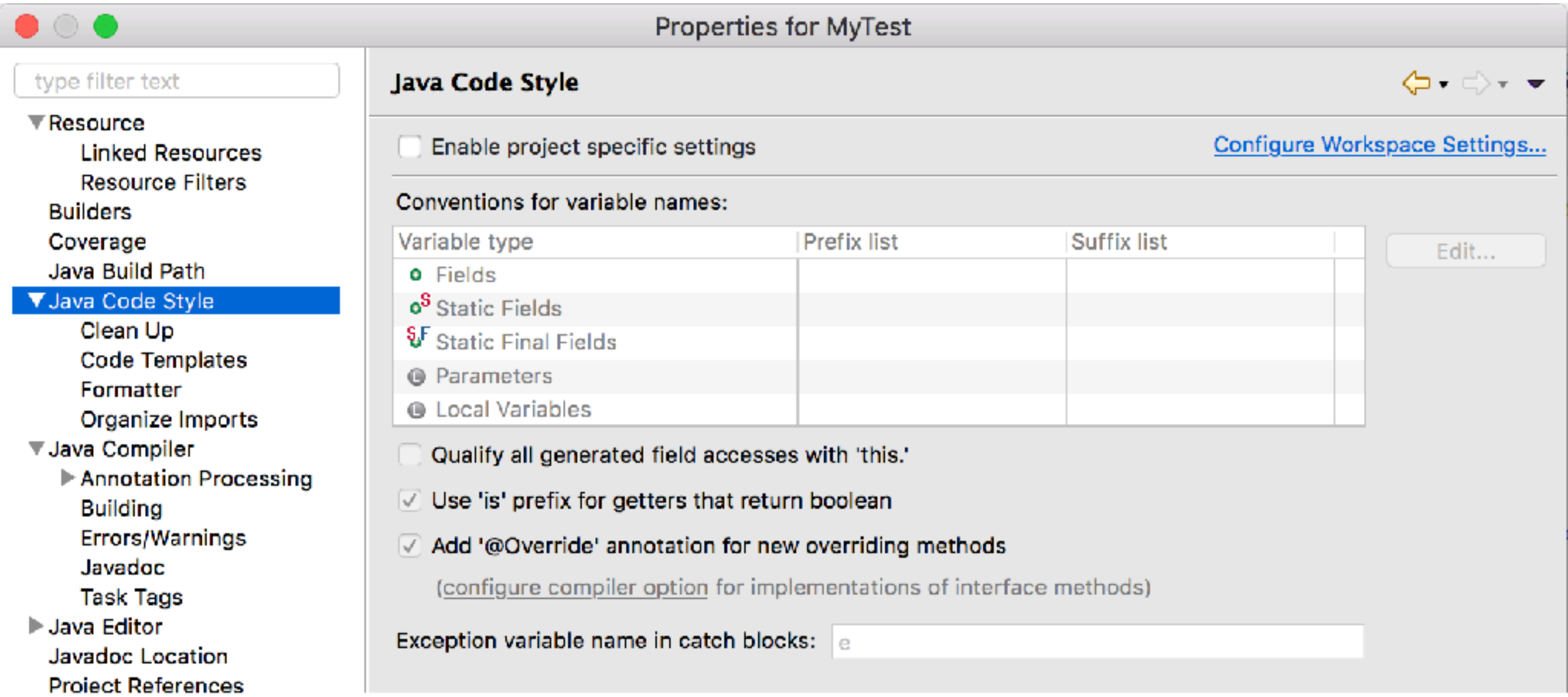
- [ ] Include system libraries when searching for a main class
- [ ] Include inherited mains when searching for a main class
- [ ] Stop in main

Filter matched 24 of 40 items

Project Management

Right click on a project / Properties

Uniform code style and policy



Properties for MyTest

type filter text

- Resource
  - Linked Resources
  - Resource Filters
- Builders
- Coverage
- Java Build Path
- Java Code Style
  - Clean Up
  - Code Templates
  - Formatter
  - Organize Imports
- Java Compiler
  - Annotation Processing
  - Building
  - Errors/Warnings
  - Javadoc
  - Task Tags
- Java Editor
- Javadoc Location
- Project References

Java Code Style

☐ Enable project specific settings — Configure Workspace Settings...

Conventions for variable names:

Variable type	Prefix list	Suffix list
Fields		
Static Fields		
Static Final Fields		
Parameters		
Local Variables		

Edit...

☐ Qualify all generated field accesses with 'this.'

✓ Use 'is' prefix for getters that return boolean

✓ Add '@Override' annotation for new overriding methods

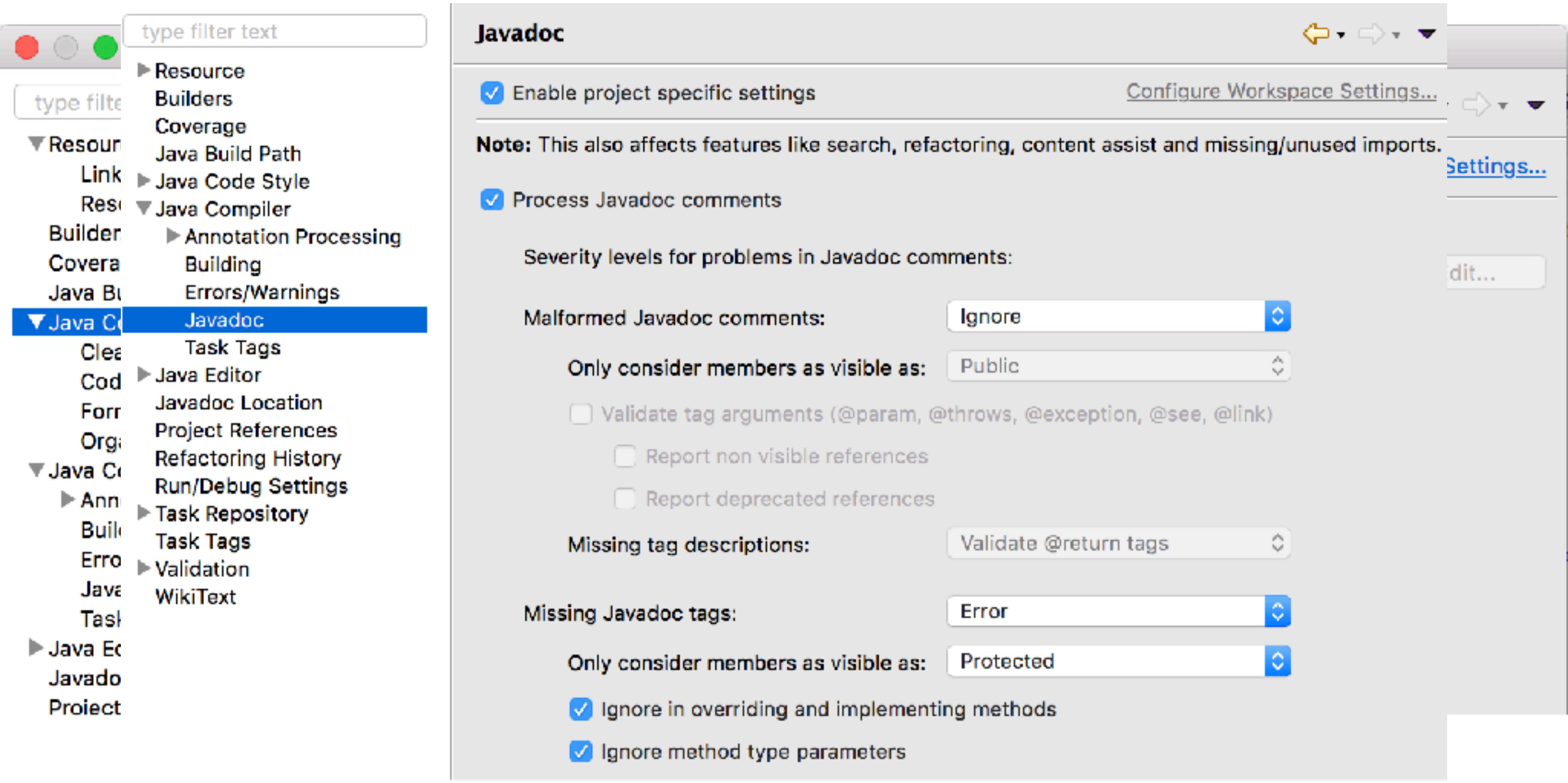
(configure compiler option for implementations of interface methods)

Exception variable name in catch blocks: e

Project Management

Right click on a project / Properties

Uniform code style and policy



☑ Enable project specific settings

Note: This also affects features like search, refactoring, content assist and missing/unused imports.

☑ Process Javadoc comments

Severity levels for problems in Javadoc comments:

Malformed Javadoc comments: Ignore

Only consider members as visible as: Public

☐ Validate tag arguments (@param, @throws, @exception, @see, @link)

☐ Report non visible references

☐ Report deprecated references

Missing tag descriptions: Validate @return tags

Missing Javadoc tags: Error

Only consider members as visible as: Protected

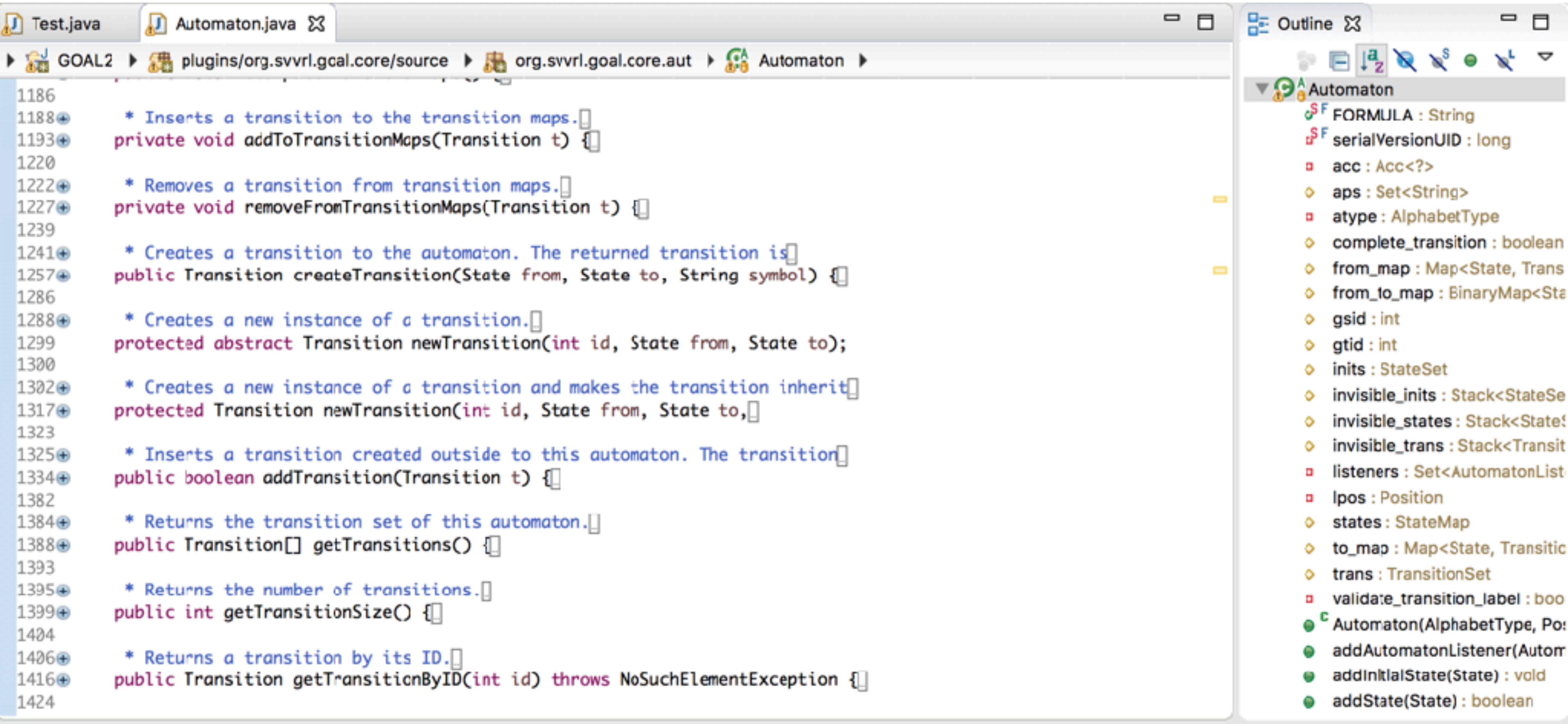
☑ Ignore in overriding and implementing methods

☑ Ignore method type parameters

API Documents

How would you search for available APIs?

In IDE



```
     * Inserts a transition to the transition maps.
    private void addToTransitionMaps(Transition t) {

     * Removes a transition from transition maps.
    private void removeFromTransitionMaps(Transition t) {

     * Creates a transition to the automaton. The returned transition is
    public Transition createTransition(State from, State to, String symbol) {

     * Creates a new instance of a transition.
    protected abstract Transition newTransition(int id, State from, State to);

     * Creates a new instance of a transition and makes the transition inherit
    protected Transition newTransition(int id, State from, State to,

     * Inserts a transition created outside to this automaton. The transition
    public boolean addTransition(Transition t) {

     * Returns the transition set of this automaton.
    public Transition[] getTransitions() {

     * Returns the number of transitions.
    public int getTransitionSize() {

     * Returns a transition by its ID.
    public Transition getTransitionByID(int id) throws NoSuchElementException {
```

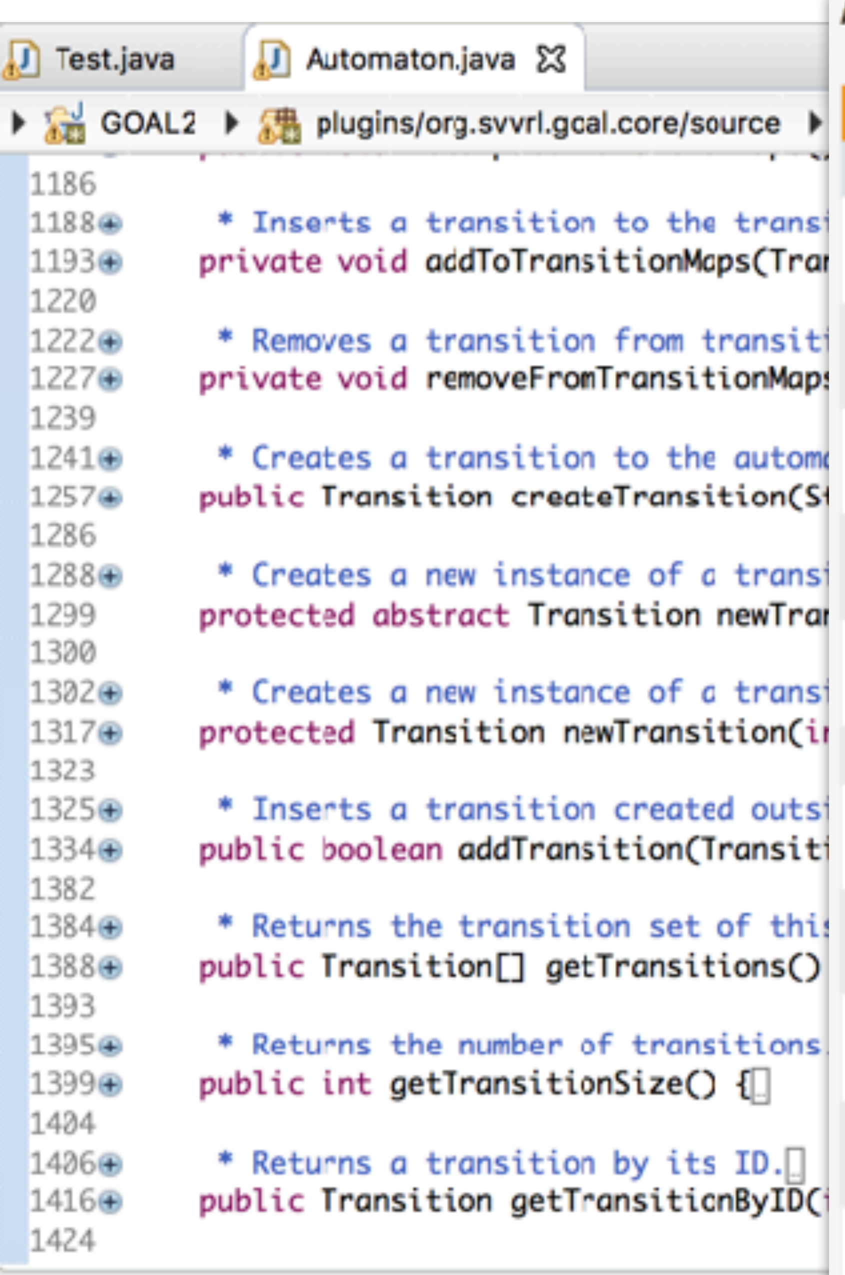
```
Automaton
    FORMULA : String
    serialVersionUID : long
    acc : Acc<?>
    aps : Set<String>
    atype : AlphabetType
    complete_transition : boolean
    from_map : Map<State, Trans
    from_to_map : BinaryMap<Sta
    gsid : int
    gtid : int
    inits : StateSet
    invisible_inits : Stack<StateSe
    invisible_states : Stack<State
    invisible_trans : Stack<Transit
    listeners : Set<AutomatonList
    lpos : Position
    states : StateMap
    to_map : Map<State, Transitic
    trans : TransitionSet
    validate_transition_label : boo
    Automaton(AlphabetType, Po
    addAutomatonListener(Autom
    addInitialState(State) : void
    addState(State) : boolean
```

API Documents

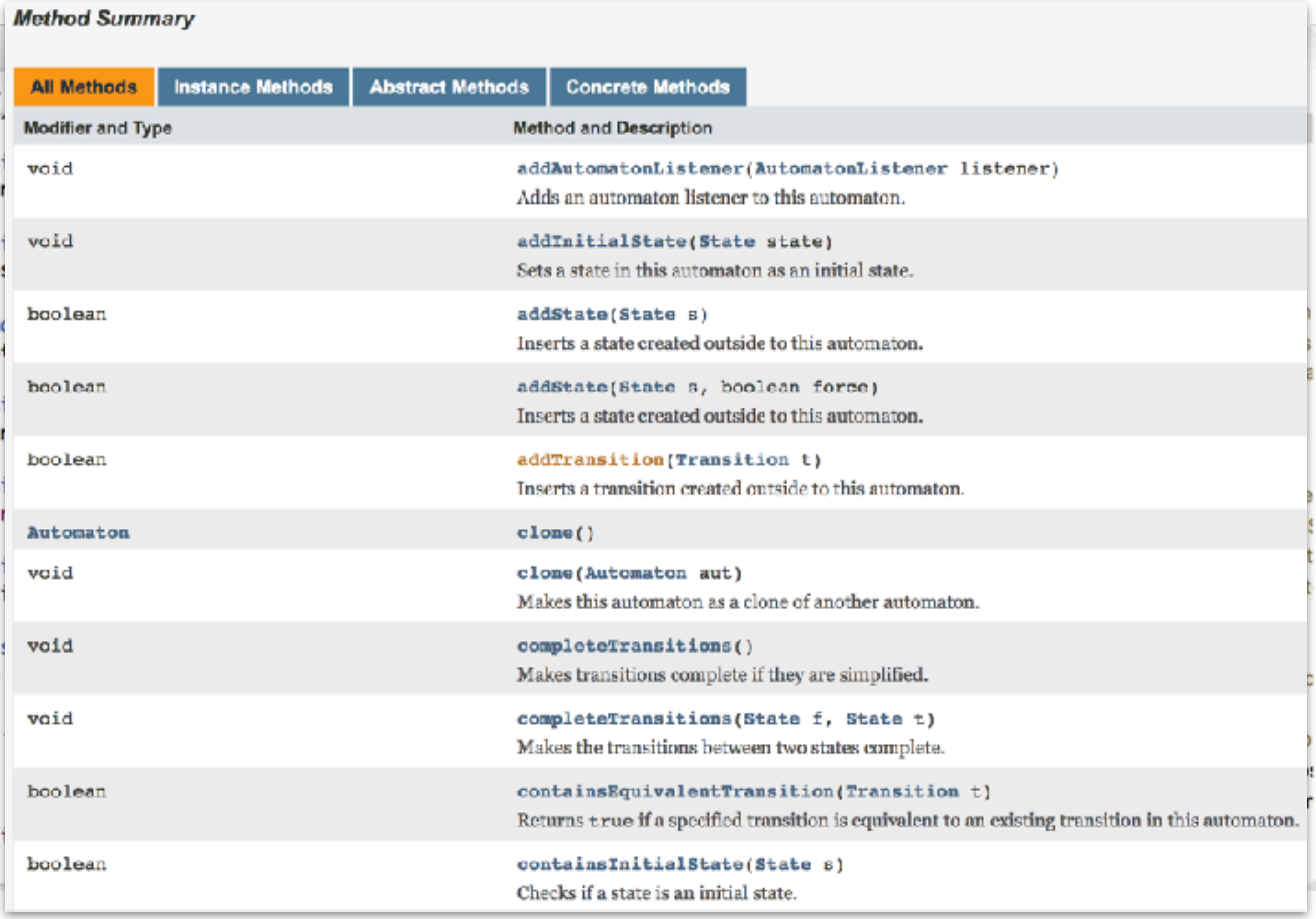
How would you search for available APIs?

In IDE

In browser



```
     * Inserts a transition to the transi
    private void addToTransitionMaps(Tran

     * Removes a transition from transiti
    private void removeFromTransitionMaps

     * Creates a transition to the autom
    public Transition createTransition(S

     * Creates a new instance of a trans
    protected abstract Transition newTran

     * Creates a new instance of a trans
    protected Transition newTransition(i

     * Inserts a transition created outs
    public boolean addTransition(Transit

     * Returns the transition set of thi
    public Transition[] getTransitions()

     * Returns the number of transitions
    public int getTransitionSize() {

     * Returns a transition by its ID.
    public Transition getTransitionByID(
```

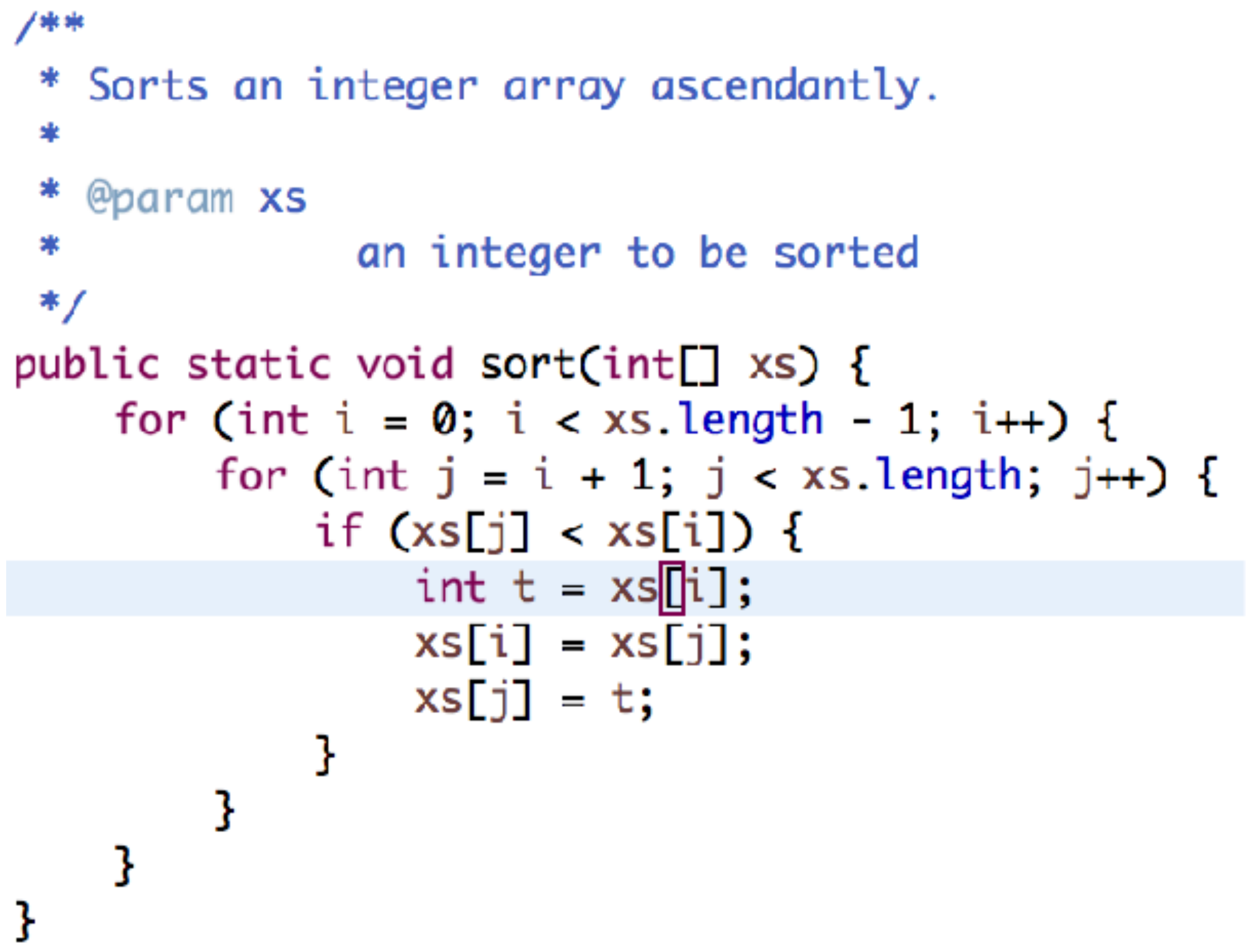


Method Summary

Modifier and Type	Method and Description
void	`addAutomatonListener(AutomatonListener listener)` Adds an automaton listener to this automaton.
void	`addInitialState(State state)` Sets a state in this automaton as an initial state.
boolean	`addState(State s)` Inserts a state created outside to this automaton.
boolean	`addState(State s, boolean force)` Inserts a state created outside to this automaton.
boolean	`addTransition(Transition t)` Inserts a transition created outside to this automaton.
Automaton	`clone()`
void	`clone(Automaton aut)` Makes this automaton as a clone of another automaton.
void	`completeTransitions()` Makes transitions complete if they are simplified.
void	`completeTransitions(State f, State t)` Makes the transitions between two states complete.
boolean	`containsEquivalentTransition(Transition t)` Returns `true` if a specified transition is equivalent to an existing transition in this automaton.
boolean	`containsInitialState(State s)` Checks if a state is an initial state.

Javadoc

⌥⌘J /**↵

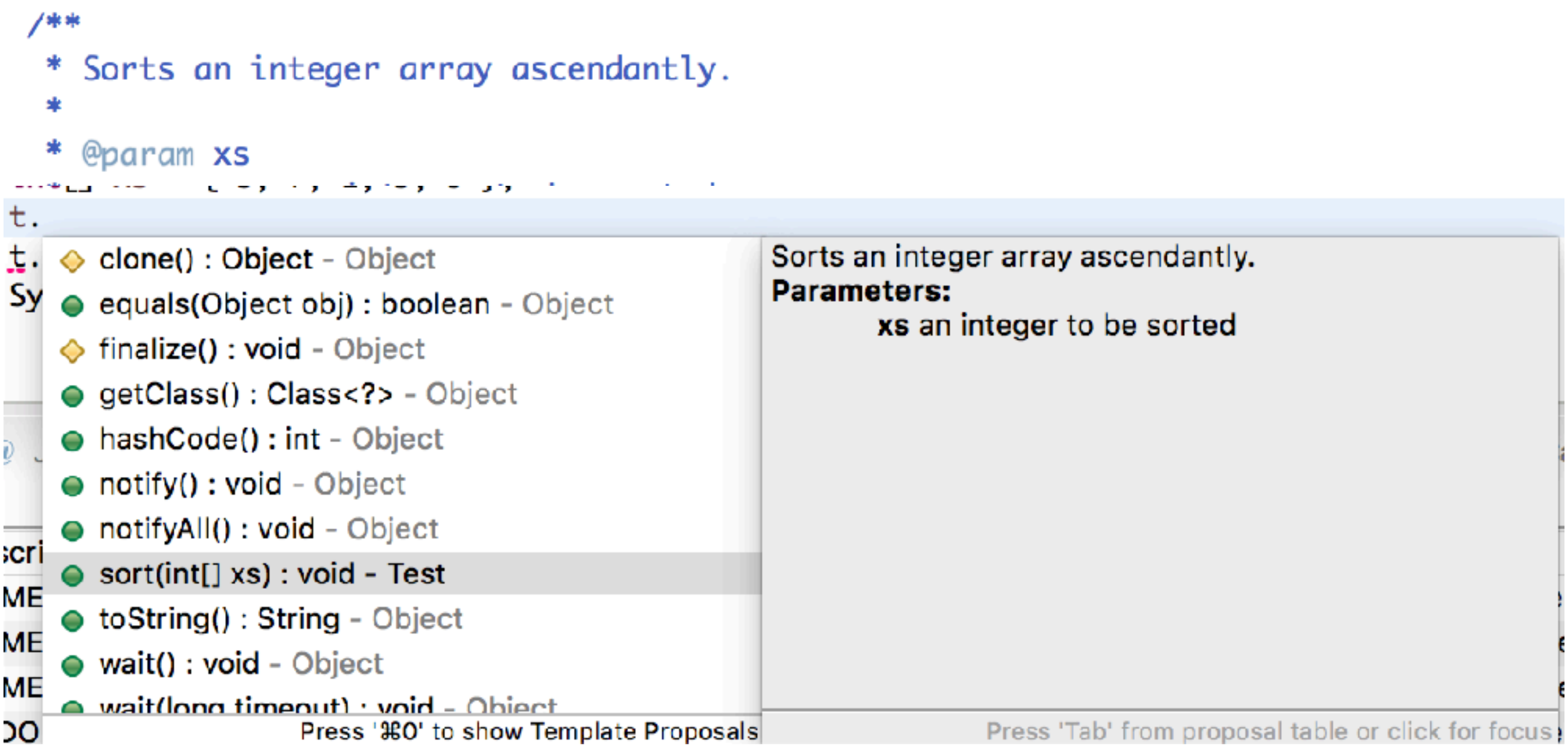


```
/**
 * Sorts an integer array ascendantly.
 *
 * @param xs
 *            an integer to be sorted
 */
public static void sort(int[] xs) {
    for (int i = 0; i < xs.length - 1; i++) {
        for (int j = i + 1; j < xs.length; j++) {
            if (xs[j] < xs[i]) {
                int t = xs[i];
                xs[i] = xs[j];
                xs[j] = t;
            }
        }
    }
}
```

File / Export… / Java / Javadoc

Javadoc

⌥⌘J   /**↵



```
/**
 * Sorts an integer array ascendantly.
 *
 * @param xs
```

```
t.
```

clone() : Object - Object	Sorts an integer array ascendantly.
equals(Object obj) : boolean - Object	**Parameters:**
finalize() : void - Object	**xs** an integer to be sorted
getClass() : Class<?> - Object	
hashCode() : int - Object	
notify() : void - Object	
notifyAll() : void - Object	
sort(int[] xs) : void - Test	
toString() : String - Object	
wait() : void - Object	
wait(long timeout) : void - Object	
Press '⌘0' to show Template Proposals	Press 'Tab' from proposal table or click for focus

File / Export… / Java / Javadoc

Javadoc Tags

- @author <NAME>
- @version <VERSION>
- @param <VARIABLE> <DESCRIPTION>
- @return <DESCRIPTION>
- @deprecated <DESCRIPTION>
- @since <VERSION>
- @throws <EXCEPTION> <DESCRIPTION>
- @exception <EXCEPTION> <DESCRIPTION>
- @see <CLASSPATH>
- …

http://www.oracle.com/technetwork/java/javase/documentation/index-137868.html

Documentation Generators

- Oxygen
  - C, Objective-C, C#, PHP, Java, Python, IDL (Corba, Microsoft, and UNO/OpenOffice flavors), Fortran, VHDL, Tcl
- Sphinx
  - Python, C/C++
- ScalaDoc
- ocamldoc

https://en.wikipedia.org/wiki/Comparison_of_documentation_generators

Code Generation

Getters/Setters:
Source / Generate Getters and Setters…

Override/Implement:
Source / Overwrite/Implement Methods…

…

Code Generation

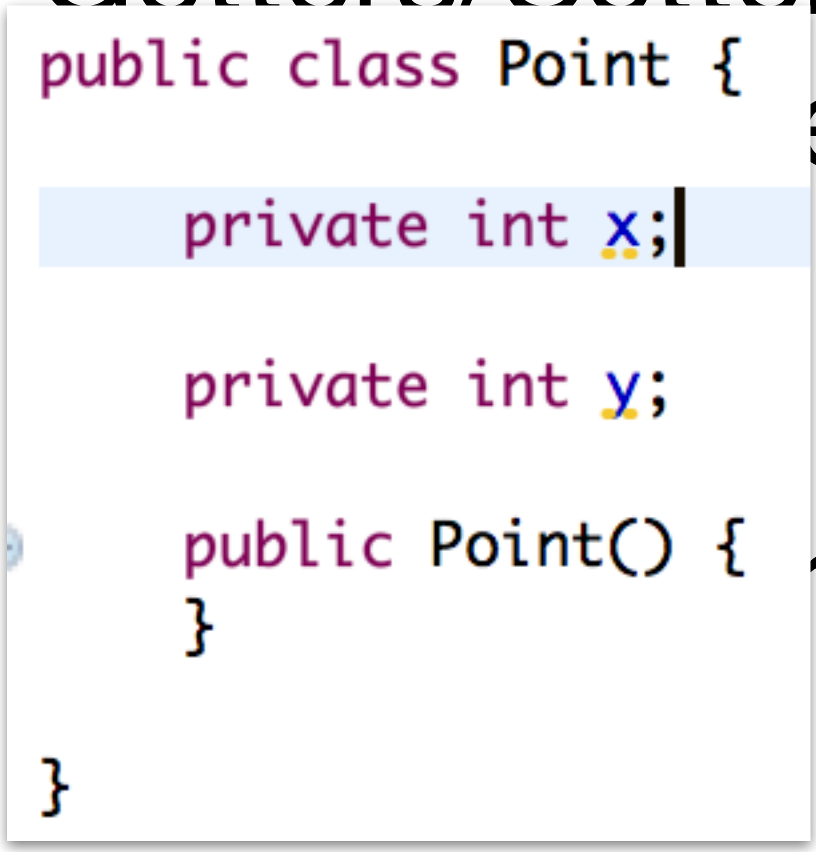
Getters/Setters:

erate Getters and Setters…

ement:

rwrite/Implement Methods…

…



```
public class Point {

    private int x;

    private int y;

    public Point() {
    }

}
```

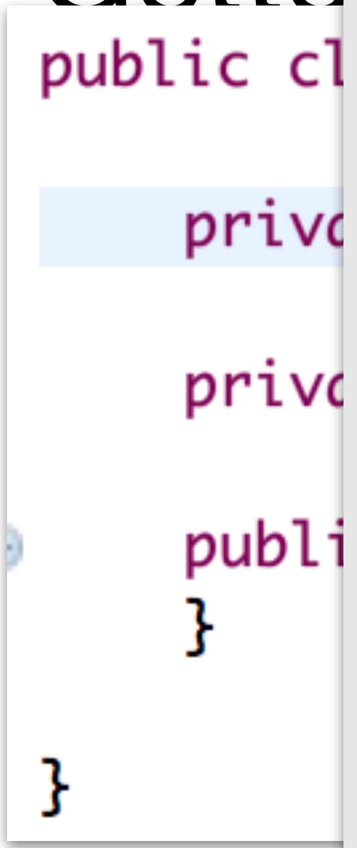
Code Generation

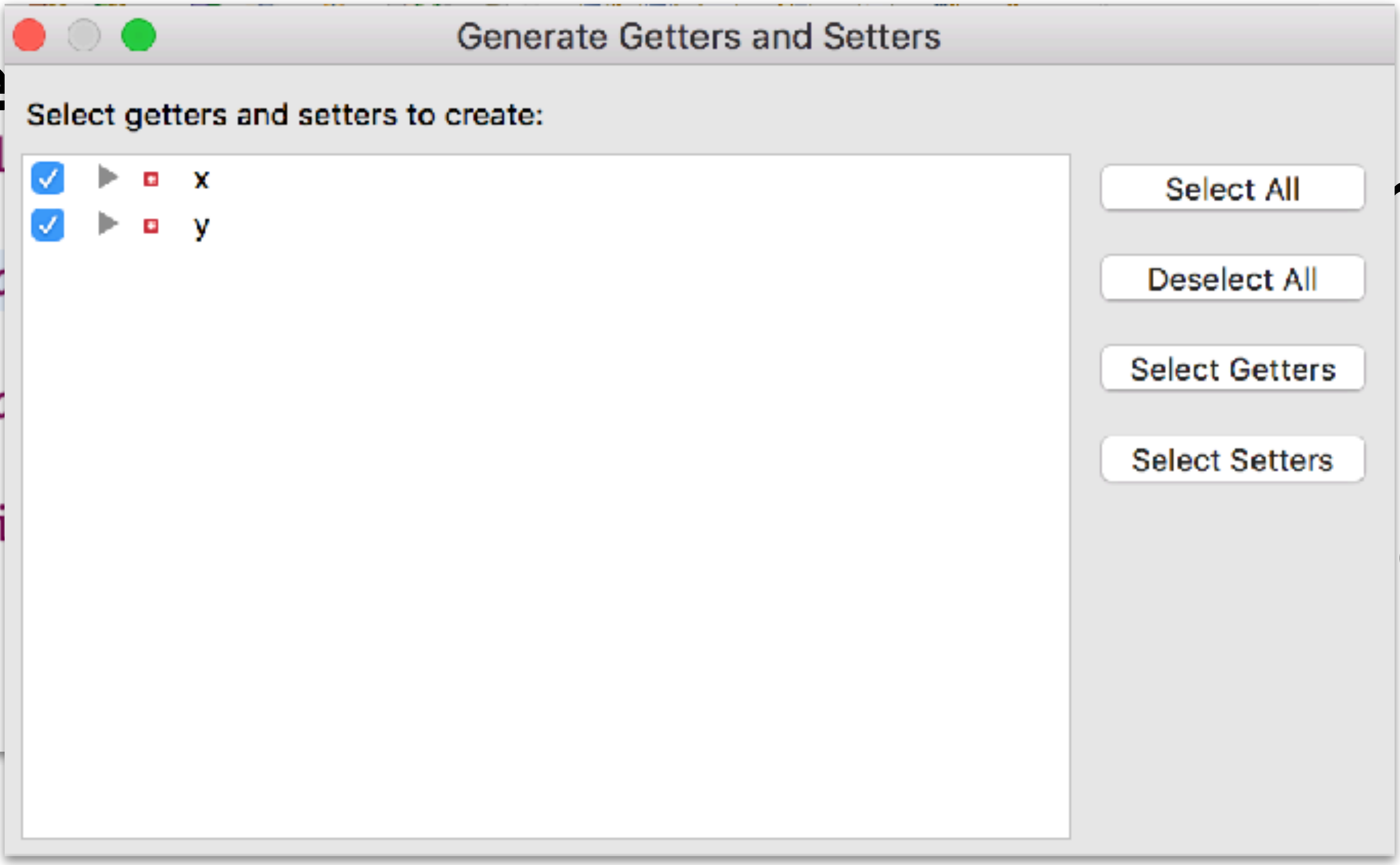
Gette

rs...

ds...

...


```
public cl

    privc

    privc

    publi
    }

}
```

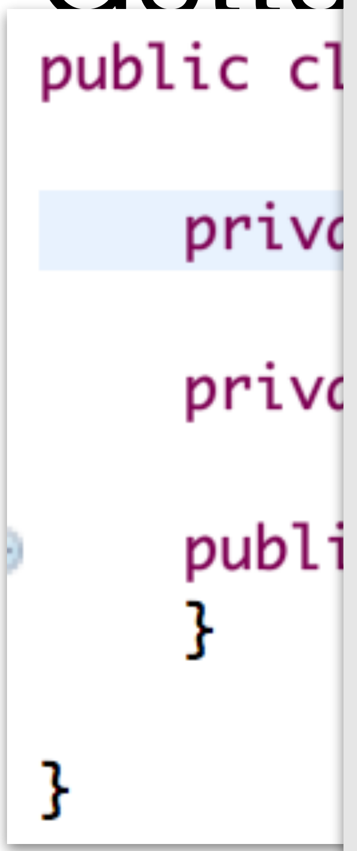

Generate Getters and Setters

Select getters and setters to create:

- [✓] x
- [✓] y

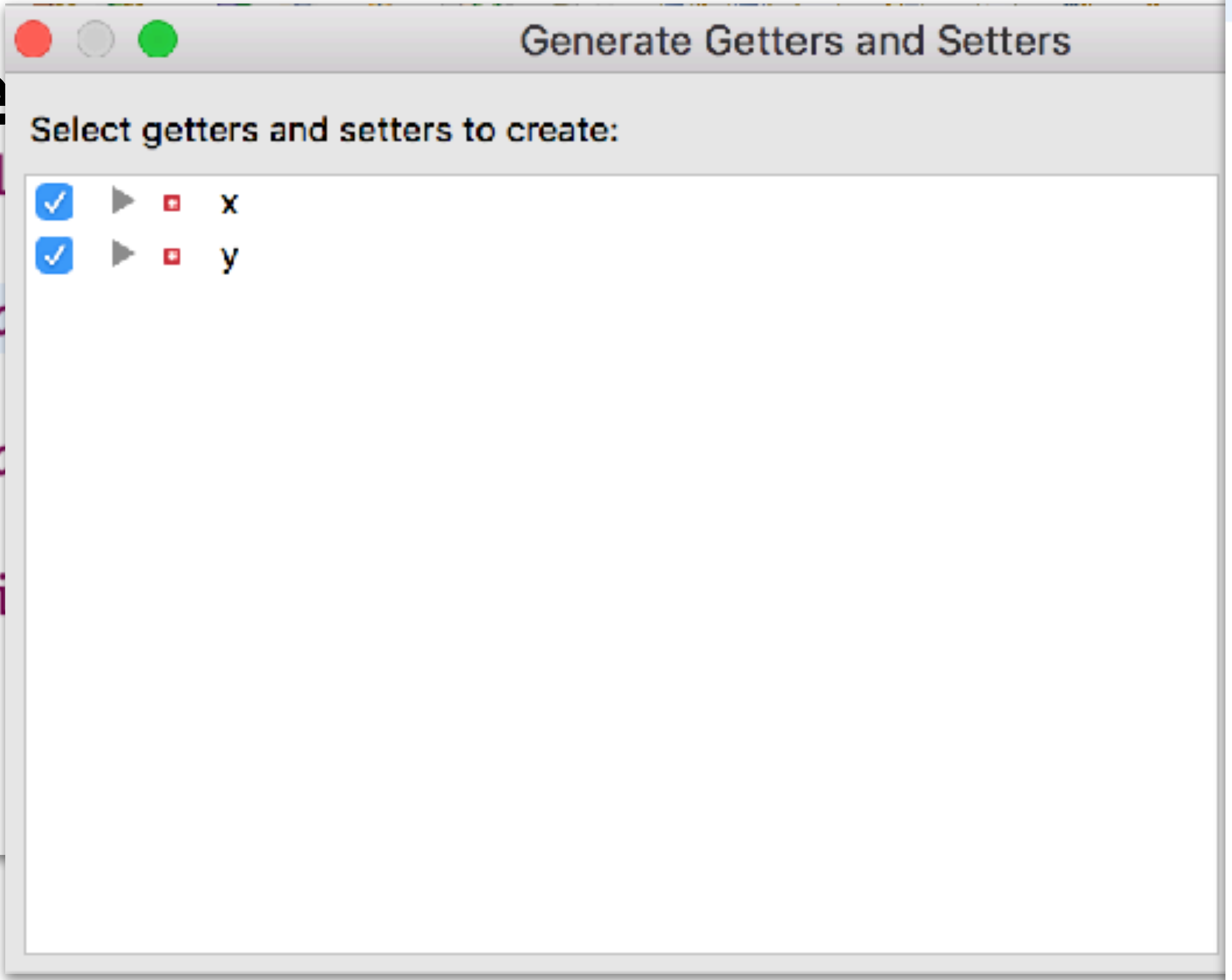
Code Generation

Gette



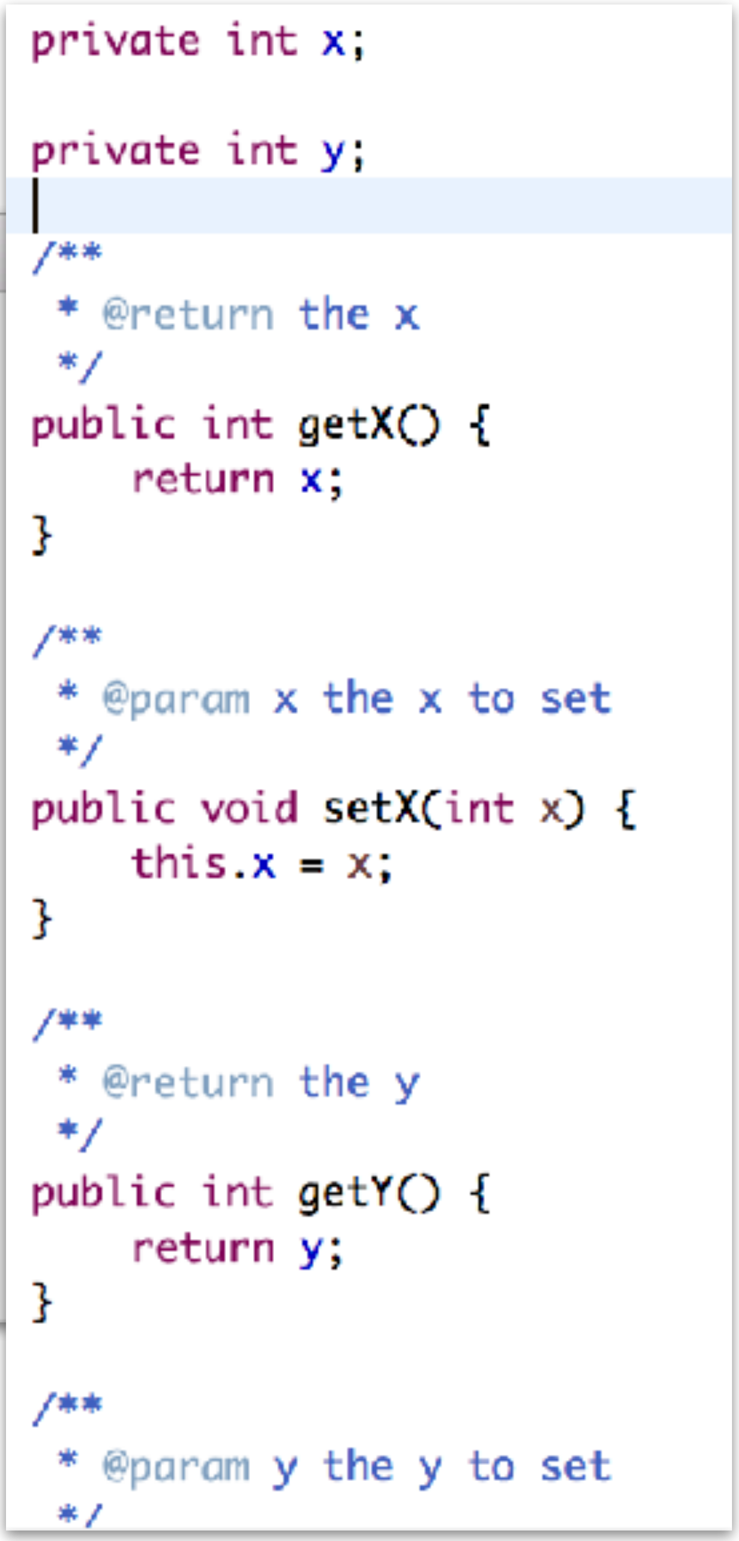
```
public cl

    priva

    priva

    publi
    }

}
```

...



Select getters and setters to create:

- ✓ x
- ✓ y



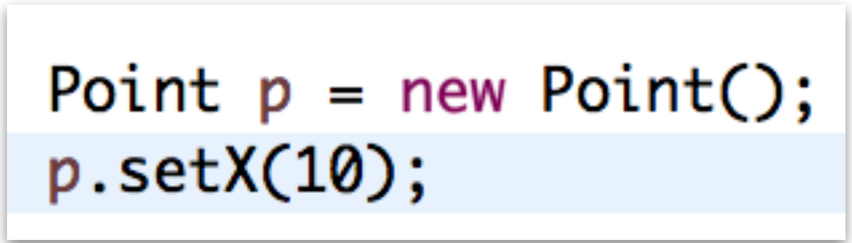
```
private int x;

private int y;

/**
 * @return the x
 */
public int getX() {
    return x;
}

/**
 * @param x the x to set
 */
public void setX(int x) {
    this.x = x;
}

/**
 * @return the y
 */
public int getY() {
    return y;
}

/**
 * @param y the y to set
 */
```

Navigation

- Navigate / Open Declaration (F3)
- Navigate / Open Type Hierarchy (F4)
- Navigate / Open Call Hierarchy (^⌥H)

Navigation

- Navigate / Open Declaration (F3)

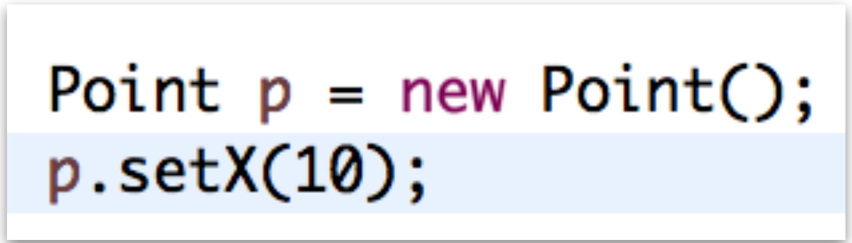


```
Point p = new Point();
p.setX(10);
```

- Navigate / Open Type Hierarchy (F4)
- Navigate / Open Call Hierarchy (^⌥H)

Navigation

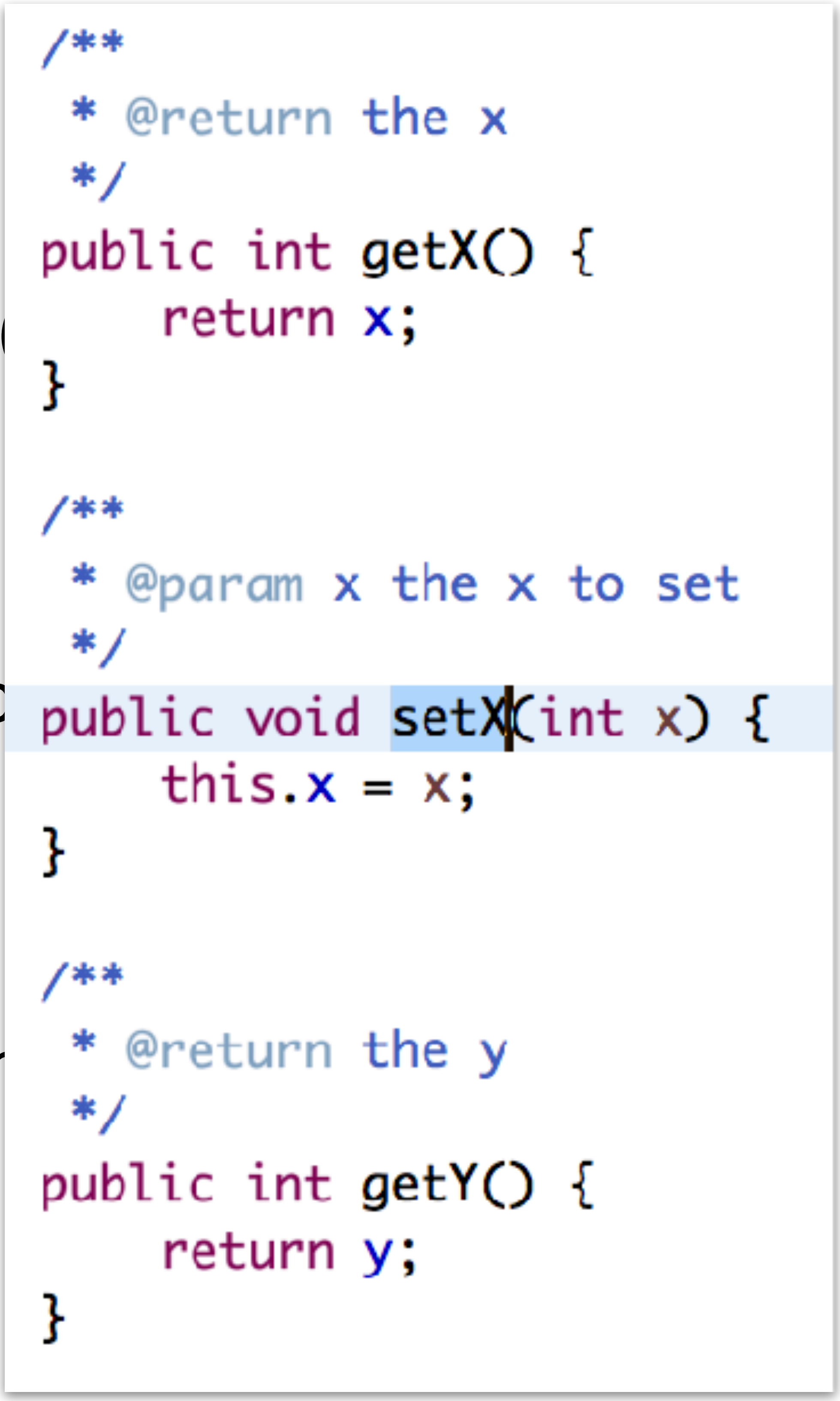
- Navigate / Open Declaration (



```
Point p = new Point();
p.setX(10);
```

- Navigate / Open Type Hierarc

- Navigate / Open Call Hierarch



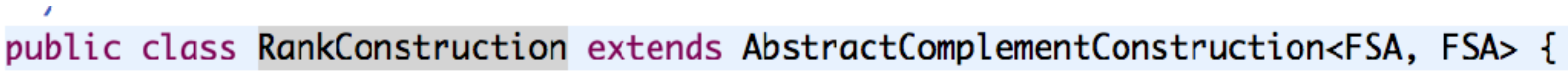
```
/**
 * @return the x
 */
public int getX() {
    return x;
}

/**
 * @param x the x to set
 */
public void setX(int x) {
    this.x = x;
}

/**
 * @return the y
 */
public int getY() {
    return y;
}
```

Search

- Search / References / Workspace (⇧⌘G)

Search

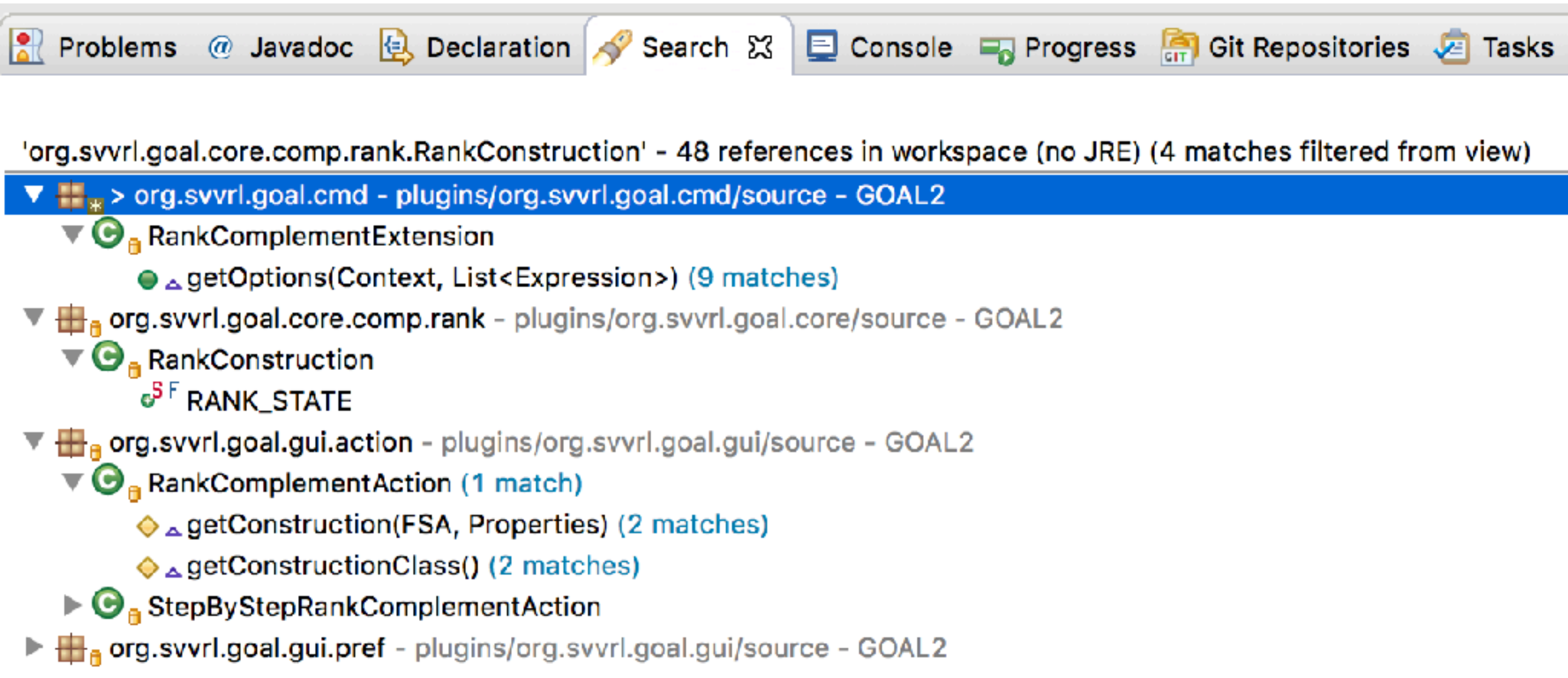
- Search / References / Workspace (⇧⌘G)



```
public class RankConstruction extends AbstractComplementConstruction<FSA, FSA> {
```

Search

- Search / References / Workspace (⇧⌘G)



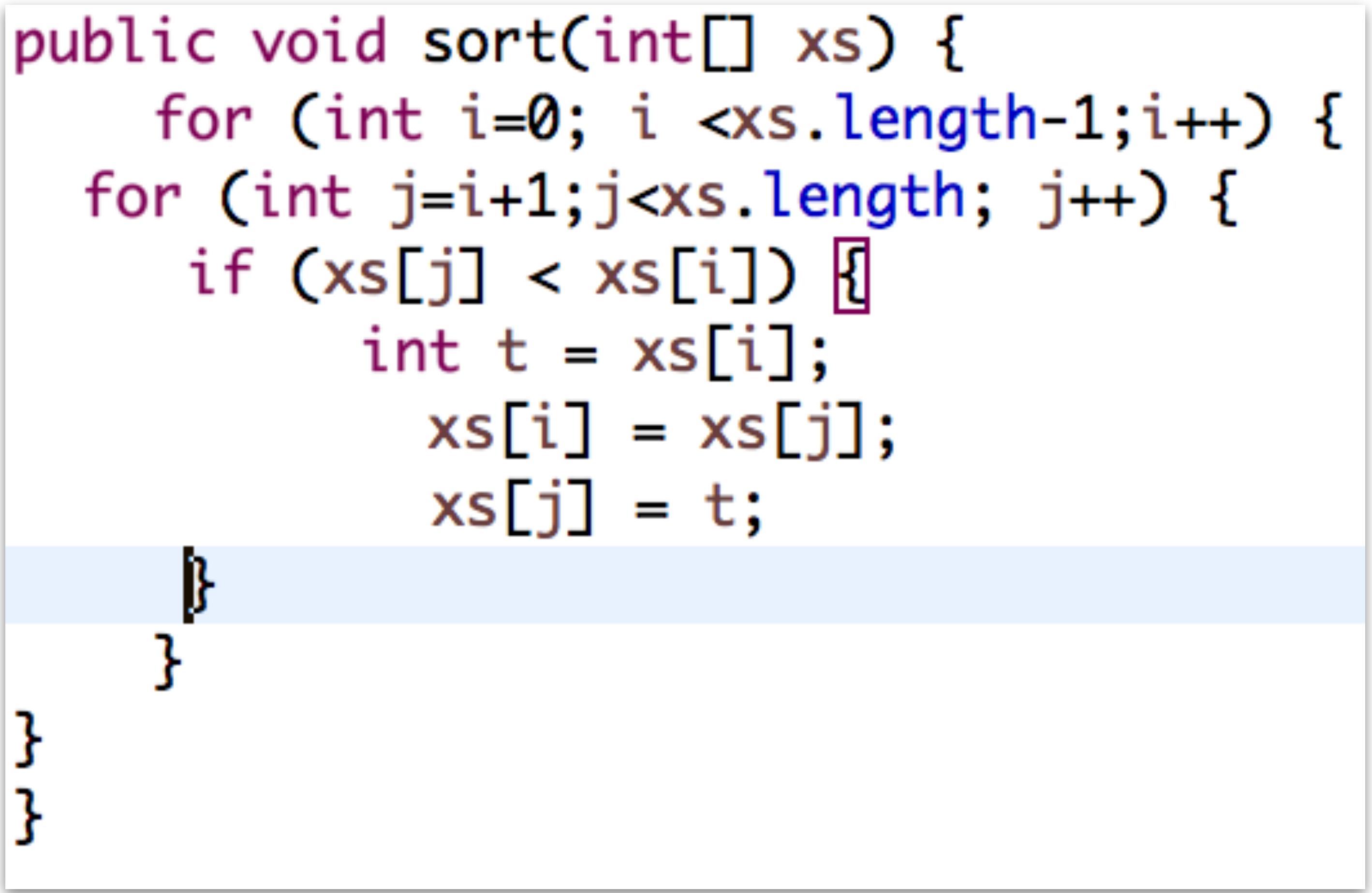
'org.svvrl.goal.core.comp.rank.RankConstruction' - 48 references in workspace (no JRE) (4 matches filtered from view)

```
▼ > org.svvrl.goal.cmd - plugins/org.svvrl.goal.cmd/source - GOAL2
    ▼ RankComplementExtension
        getOptions(Context, List<Expression>) (9 matches)
▼ org.svvrl.goal.core.comp.rank - plugins/org.svvrl.goal.core/source - GOAL2
    ▼ RankConstruction
        RANK_STATE
▼ org.svvrl.goal.gui.action - plugins/org.svvrl.goal.gui/source - GOAL2
    ▼ RankComplementAction (1 match)
        getConstruction(FSA, Properties) (2 matches)
        getConstructionClass() (2 matches)
    ▶ StepByStepRankComplementAction
▶ org.svvrl.goal.gui.pref - plugins/org.svvrl.goal.gui/source - GOAL2
```

Source

- Source / Format (⇧⌘F)
- Source / Organize Imports (⇧⌘O)
- Source / Toggle Comment (⌘/)

Source

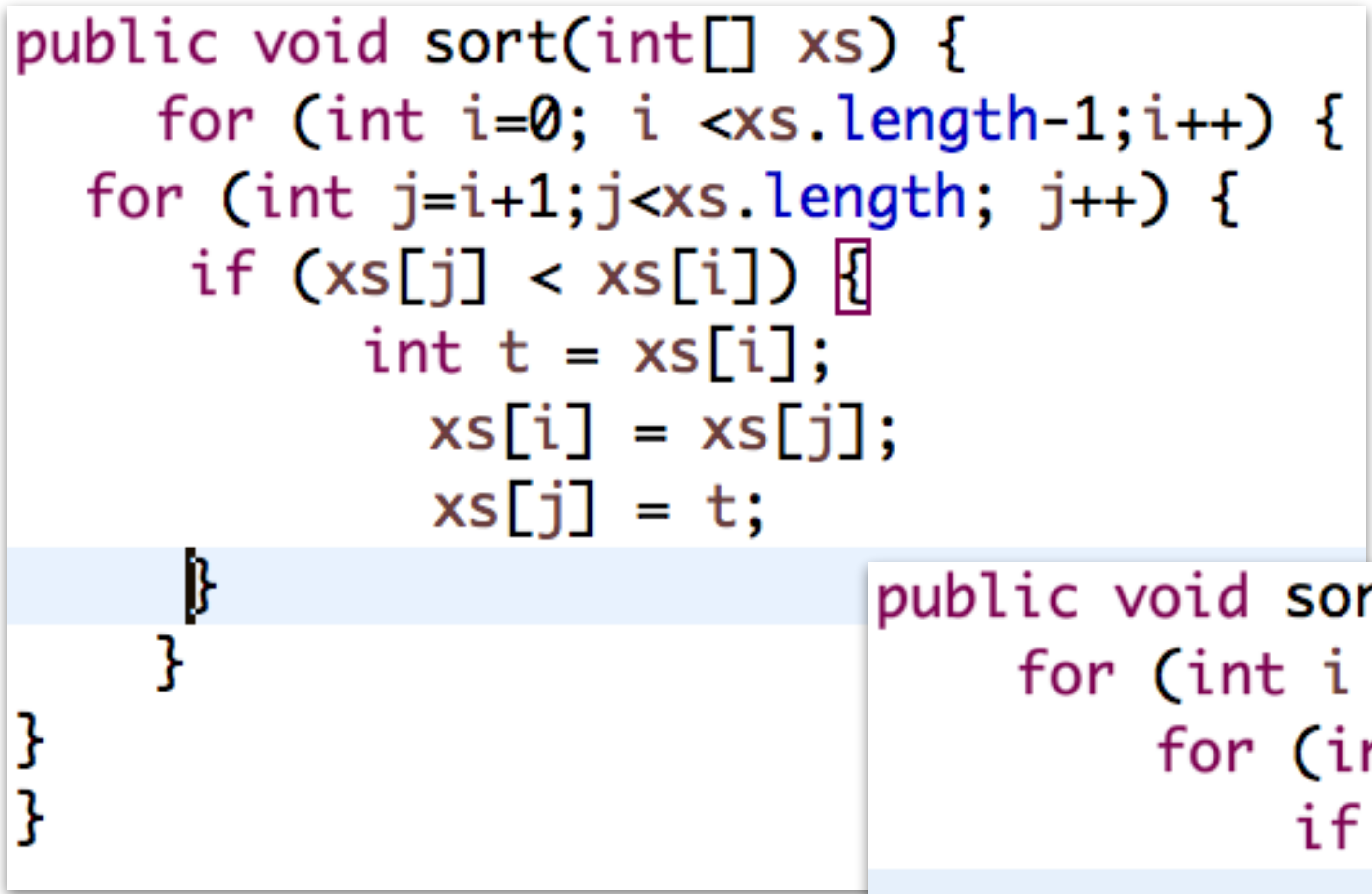


```
public void sort(int[] xs) {
    for (int i=0; i <xs.length-1;i++) {
  for (int j=i+1;j<xs.length; j++) {
     if (xs[j] < xs[i]) {
          int t = xs[i];
            xs[i] = xs[j];
            xs[j] = t;
     }
    }
}
}
```

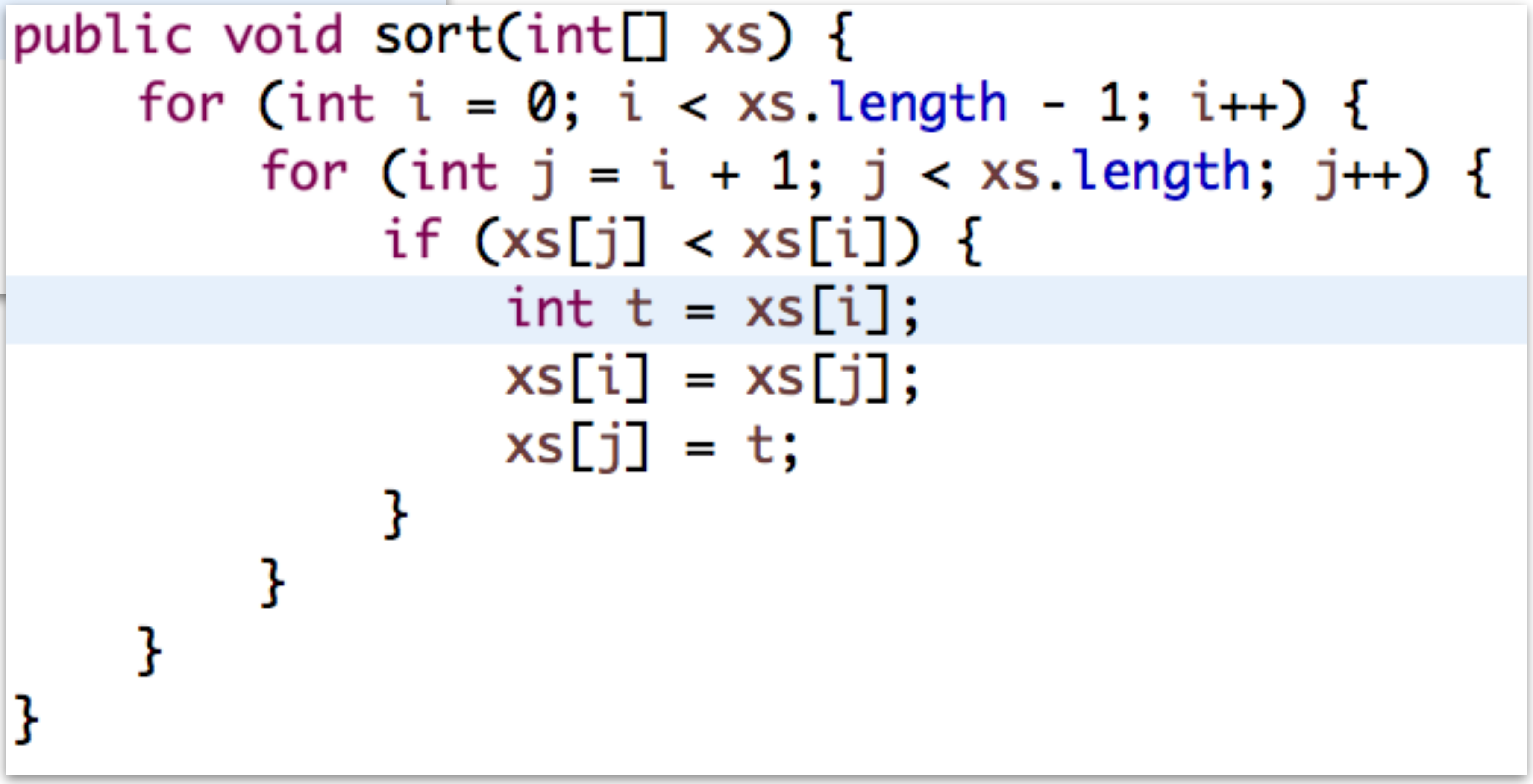
⌘O)

- Source / Toggle Comment (⌘/)

Source



```
public void sort(int[] xs) {
    for (int i=0; i <xs.length-1;i++) {
  for (int j=i+1;j<xs.length; j++) {
      if (xs[j] < xs[i]) {
           int t = xs[i];
             xs[i] = xs[j];
             xs[j] = t;
      }
    }
}
}
```



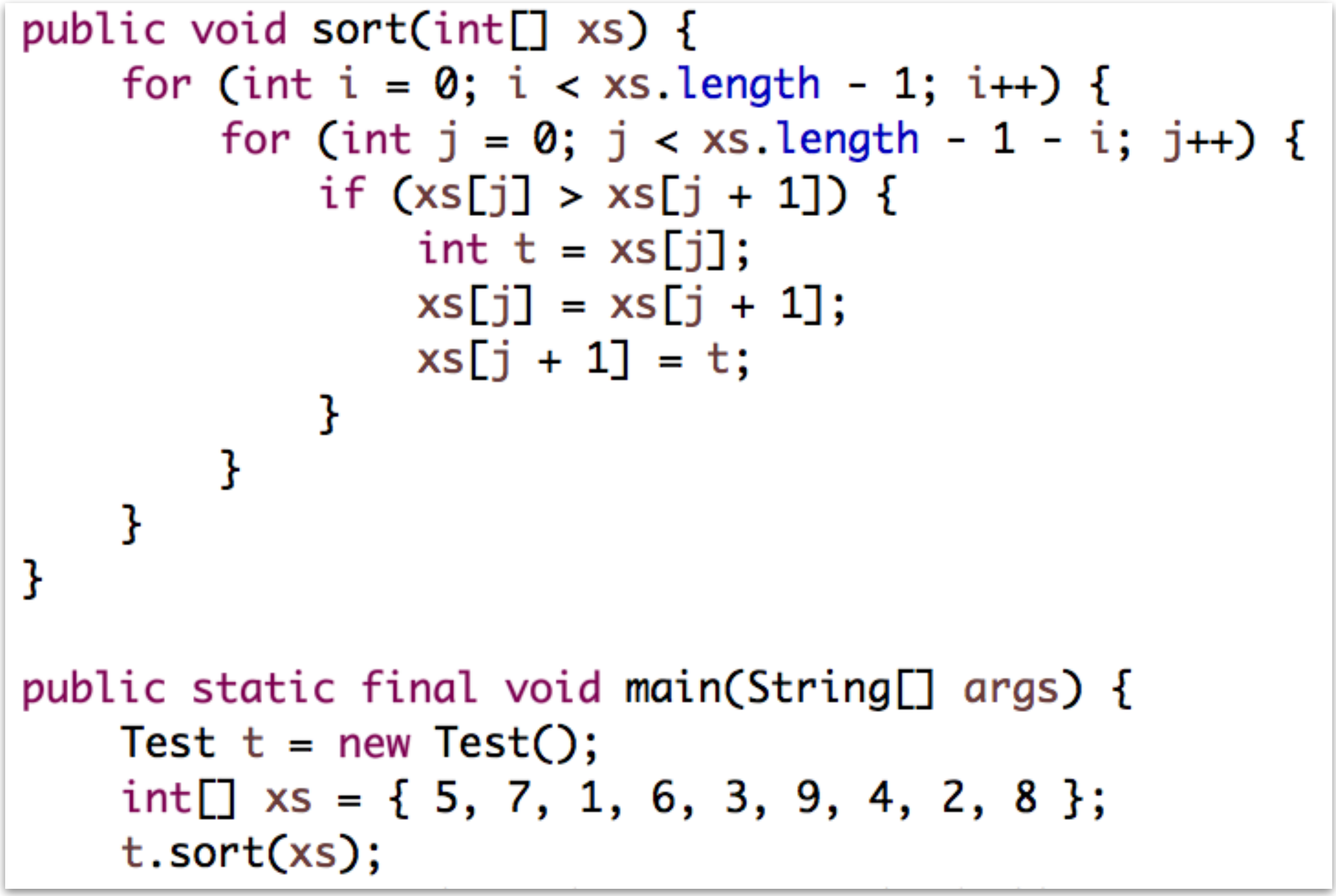
```
public void sort(int[] xs) {
    for (int i = 0; i < xs.length - 1; i++) {
        for (int j = i + 1; j < xs.length; j++) {
            if (xs[j] < xs[i]) {
                int t = xs[i];
                xs[i] = xs[j];
                xs[j] = t;
            }
        }
    }
}
```

- Source / Toggle

Refactor

- Refactor / Rename… (⌥⌘R)
- Refactor / Move… (⌥⌘V)

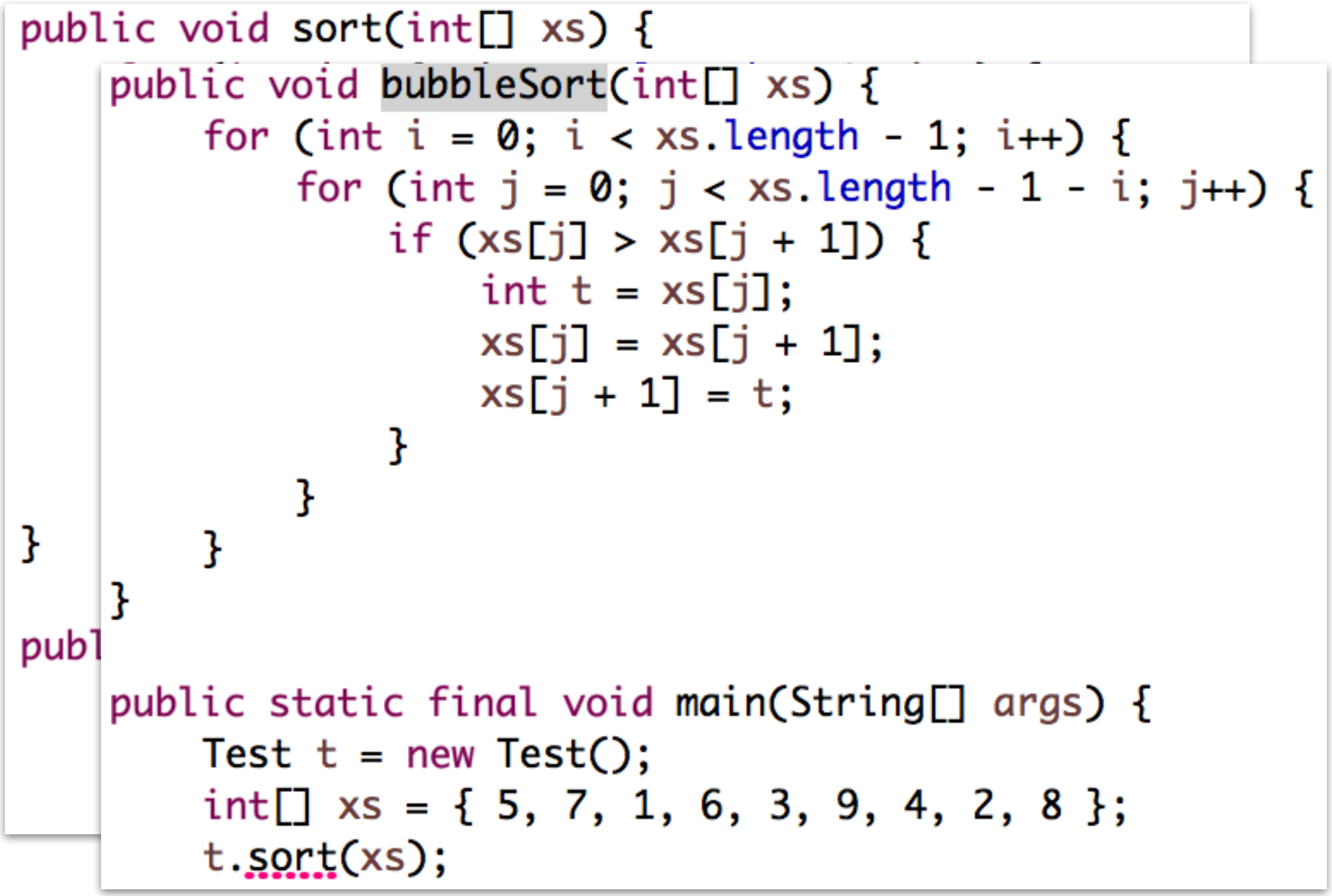
Refactor



```
public void sort(int[] xs) {
    for (int i = 0; i < xs.length - 1; i++) {
        for (int j = 0; j < xs.length - 1 - i; j++) {
            if (xs[j] > xs[j + 1]) {
                int t = xs[j];
                xs[j] = xs[j + 1];
                xs[j + 1] = t;
            }
        }
    }
}

public static final void main(String[] args) {
    Test t = new Test();
    int[] xs = { 5, 7, 1, 6, 3, 9, 4, 2, 8 };
    t.sort(xs);
```

Original

Refactor

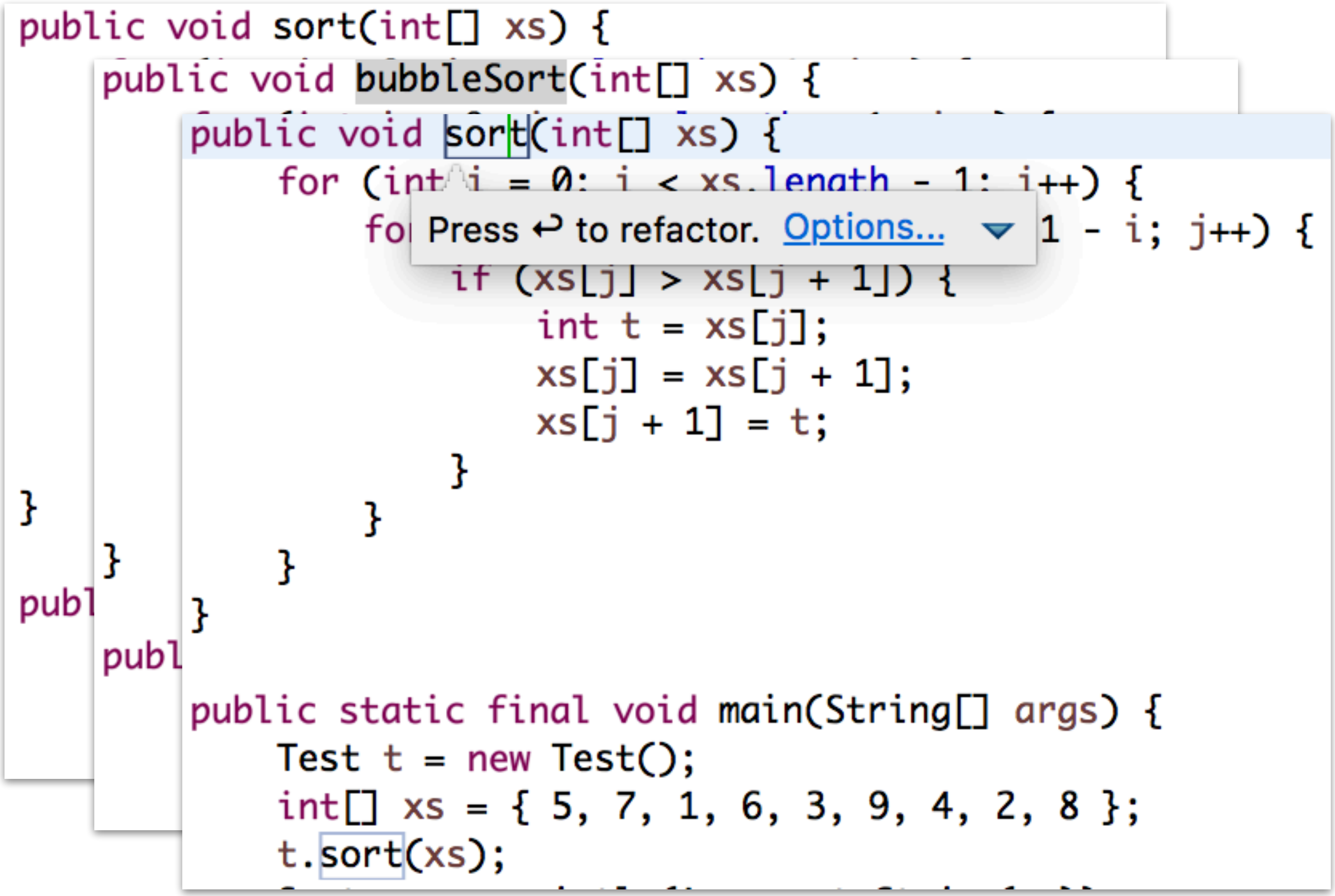


```
public void sort(int[] xs) {

}

publ
```

```
public void bubbleSort(int[] xs) {
    for (int i = 0; i < xs.length - 1; i++) {
        for (int j = 0; j < xs.length - 1 - i; j++) {
            if (xs[j] > xs[j + 1]) {
                int t = xs[j];
                xs[j] = xs[j + 1];
                xs[j + 1] = t;
            }
        }
    }
}

public static final void main(String[] args) {
    Test t = new Test();
    int[] xs = { 5, 7, 1, 6, 3, 9, 4, 2, 8 };
    t.sort(xs);
```

Rename

Refactor



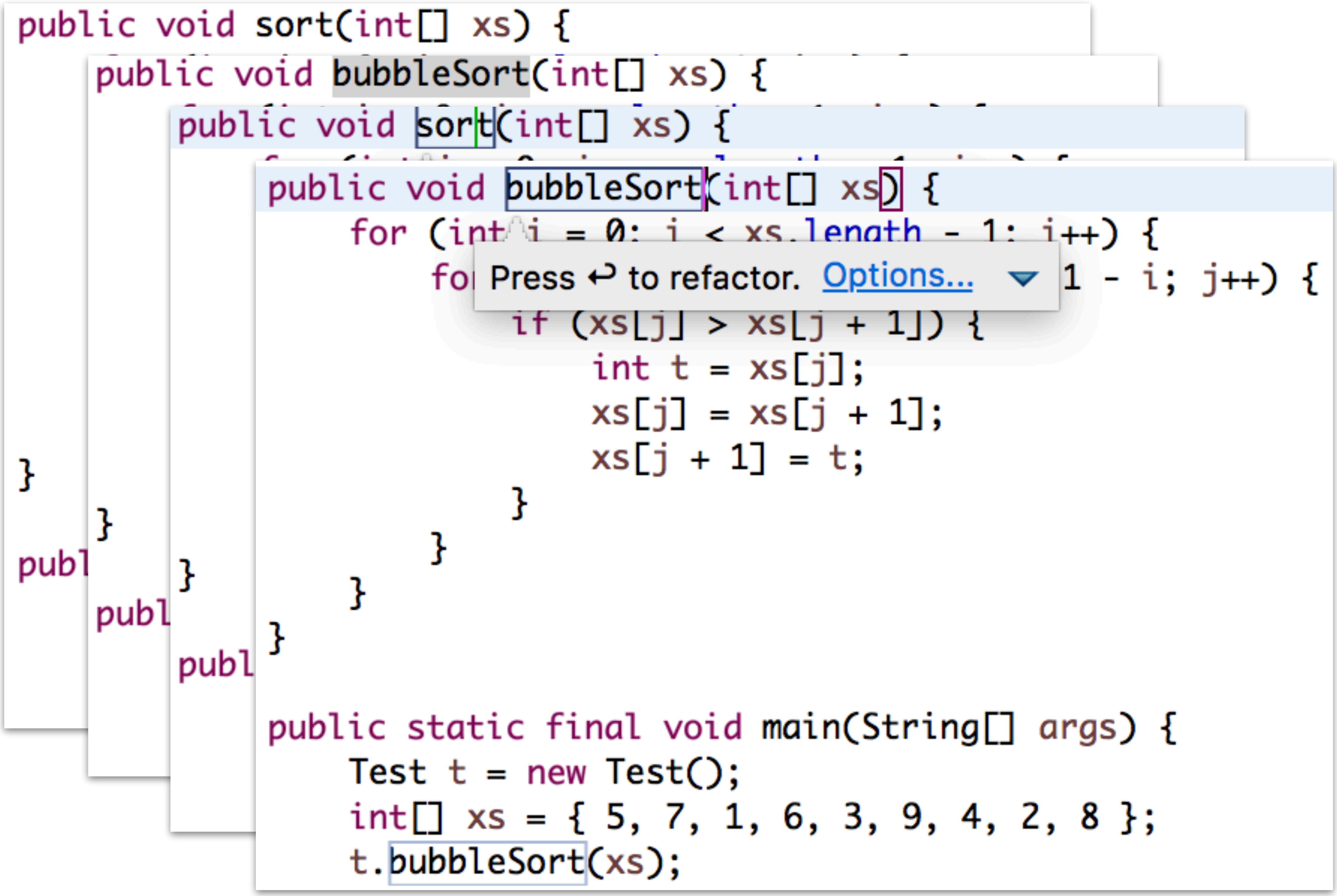
```
public void sort(int[] xs) {

}

publ
```

```
public void bubbleSort(int[] xs) {

}

publ
```

```
public void sort(int[] xs) {
    for (int i = 0; i < xs.length - 1; i++) {
        fo    1 - i; j++) {
            if (xs[j] > xs[j + 1]) {
                int t = xs[j];
                xs[j] = xs[j + 1];
                xs[j + 1] = t;
            }
        }
    }
}

public static final void main(String[] args) {
    Test t = new Test();
    int[] xs = { 5, 7, 1, 6, 3, 9, 4, 2, 8 };
    t.sort(xs);
```

Refactor / Rename…

Refactor



```
public void sort(int[] xs) {
}

publ
```

```
public void bubbleSort(int[] xs) {
}

publ
```

```
public void sort(int[] xs) {
}

publ
```

```
public void bubbleSort(int[] xs) {
    for (int i = 0; i < xs.length - 1; i++) {
        fo                                  1 - i; j++) {
            if (xs[j] > xs[j + 1]) {
                int t = xs[j];
                xs[j] = xs[j + 1];
                xs[j + 1] = t;
            }
        }
    }
}

public static final void main(String[] args) {
    Test t = new Test();
    int[] xs = { 5, 7, 1, 6, 3, 9, 4, 2, 8 };
    t.bubbleSort(xs);
```

Press ↩ to refactor. Options...

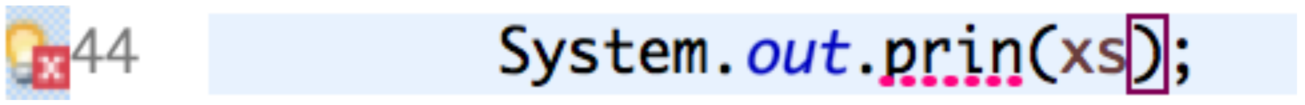
Refactor / Rename…

Others

- Quick Fix (⌘1)

- Shortcuts reference (⇧⌘L)

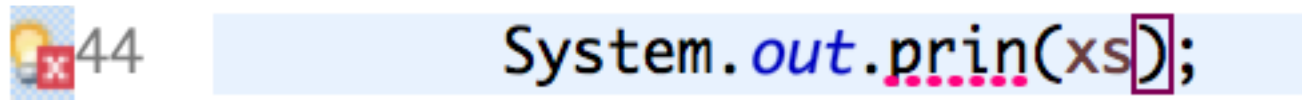
Others



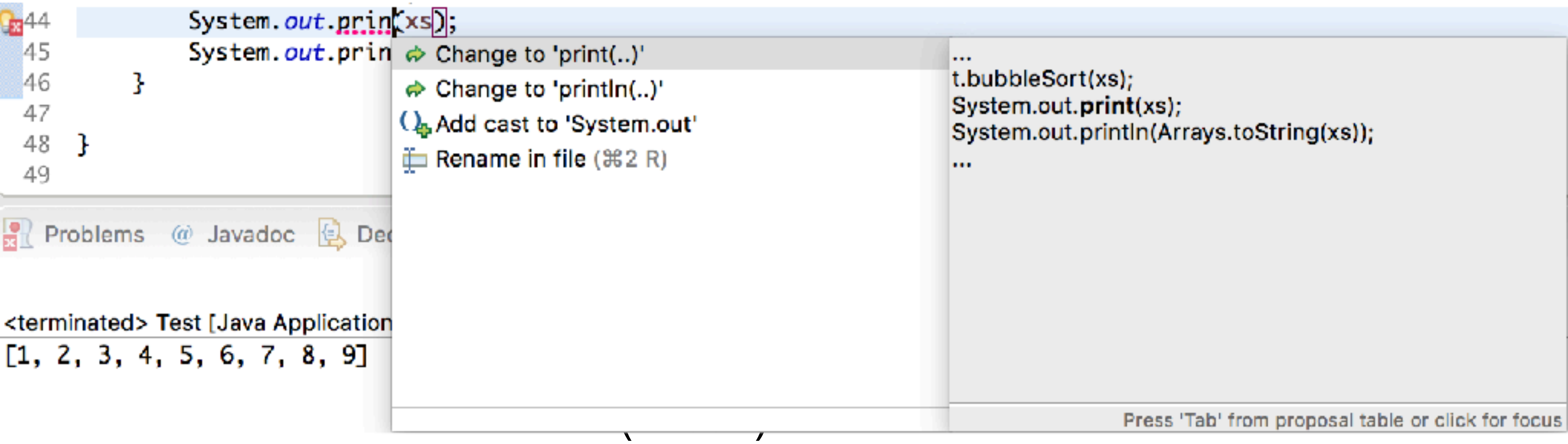
```
System.out.prin(xs);
```

- Quick Fix (⌘1)
- Shortcuts reference (⇧⌘L)

Others



```
System.out.prin(xs);
```



```
        System.out.prin(xs);
        System.out.prin
    }

}
```

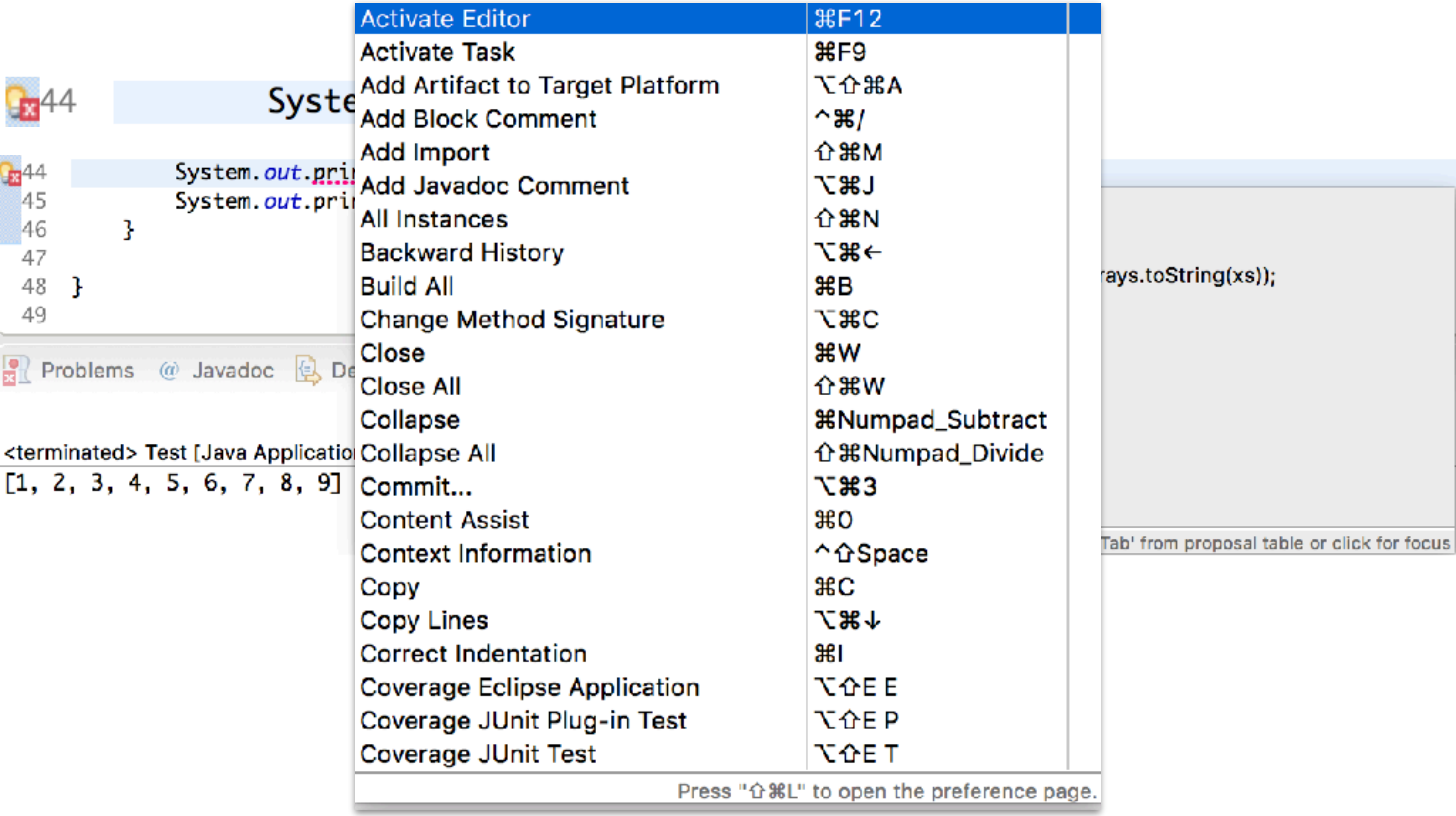
- Change to 'print(..)'
- Change to 'println(..)'
- Add cast to 'System.out'
- Rename in file (⌘2 R)

```
...
t.bubbleSort(xs);
System.out.print(xs);
System.out.println(Arrays.toString(xs));
...
```

Press 'Tab' from proposal table or click for focus

```
<terminated> Test [Java Application
[1, 2, 3, 4, 5, 6, 7, 8, 9]
```

Others



Activate Editor	⌘F12
Activate Task	⌘F9
Add Artifact to Target Platform	⌥⇧⌘A
Add Block Comment	^⌘/
Add Import	⇧⌘M
Add Javadoc Comment	⌥⌘J
All Instances	⇧⌘N
Backward History	⌥⌘←
Build All	⌘B
Change Method Signature	⌥⌘C
Close	⌘W
Close All	⇧⌘W
Collapse	⌘Numpad_Subtract
Collapse All	⇧⌘Numpad_Divide
Commit...	⌥⌘3
Content Assist	⌘0
Context Information	^⇧Space
Copy	⌘C
Copy Lines	⌥⌘↓
Correct Indentation	⌘I
Coverage Eclipse Application	⌥⇧E E
Coverage JUnit Plug-in Test	⌥⇧E P
Coverage JUnit Test	⌥⇧E T

Press "⇧⌘L" to open the preference page.

```
<terminated> Test [Java Applicati
[1, 2, 3, 4, 5, 6, 7, 8, 9]
```

Shortcuts reference

Other Languages

- Eclipse CDT for C/C++
- Eclipse PDT for PHP
- Eclipse JSDT for Javascript
- PyDev for Python
- Scala IDE for Scala

Other Features

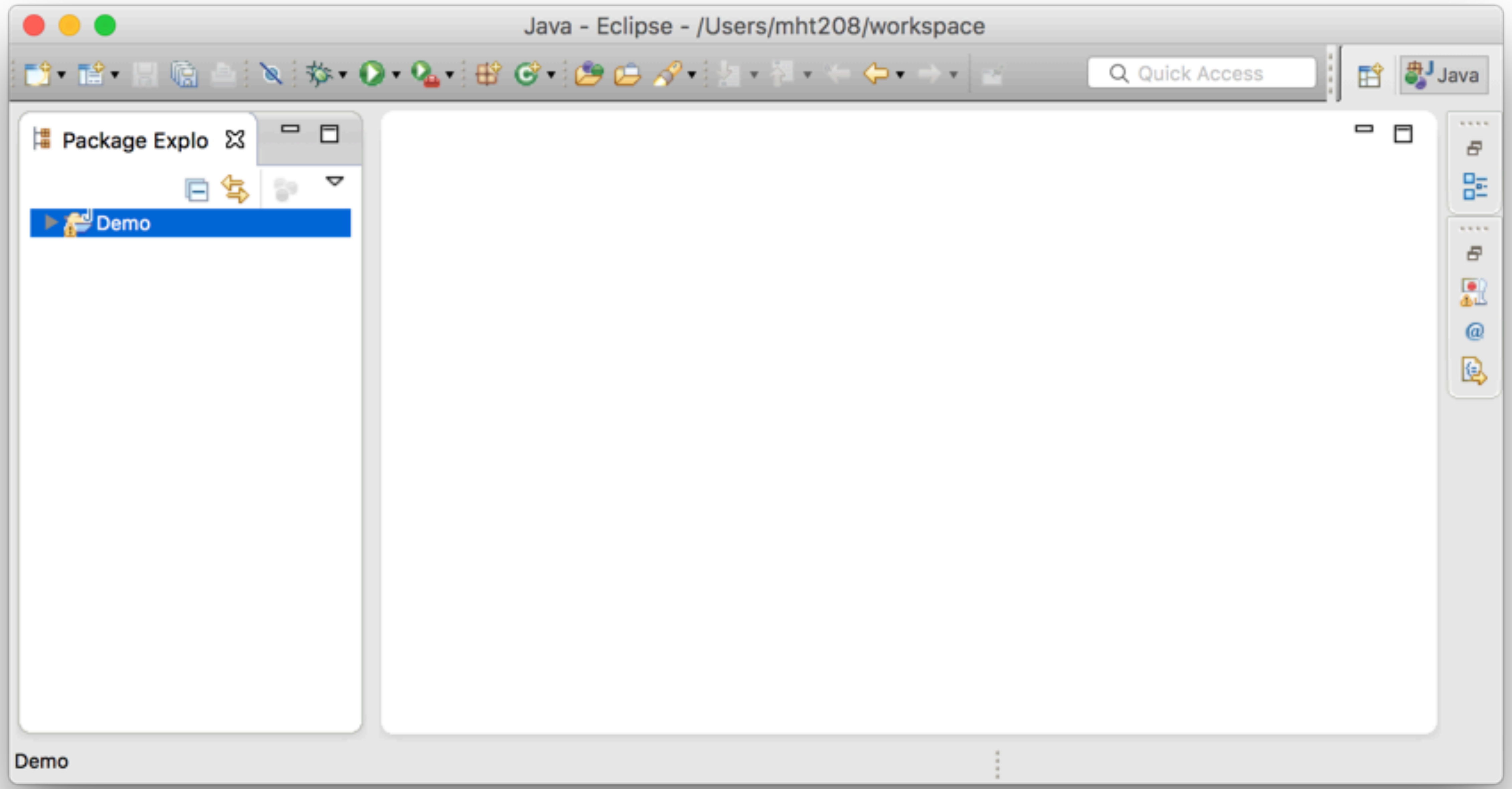
- Debugging
- UML diagrams and code generation
  - UML Designer, UML to Java code generator
- Task management
  - Mylyn
- Issue tracking
  - Bugzilla, JIRA, Redmine, …

Other Features

- Continuous integration
  - Eclipse Hudson
- Program verification
  - Java PathFinder, Leon, EpiSpin
- Design Patterns

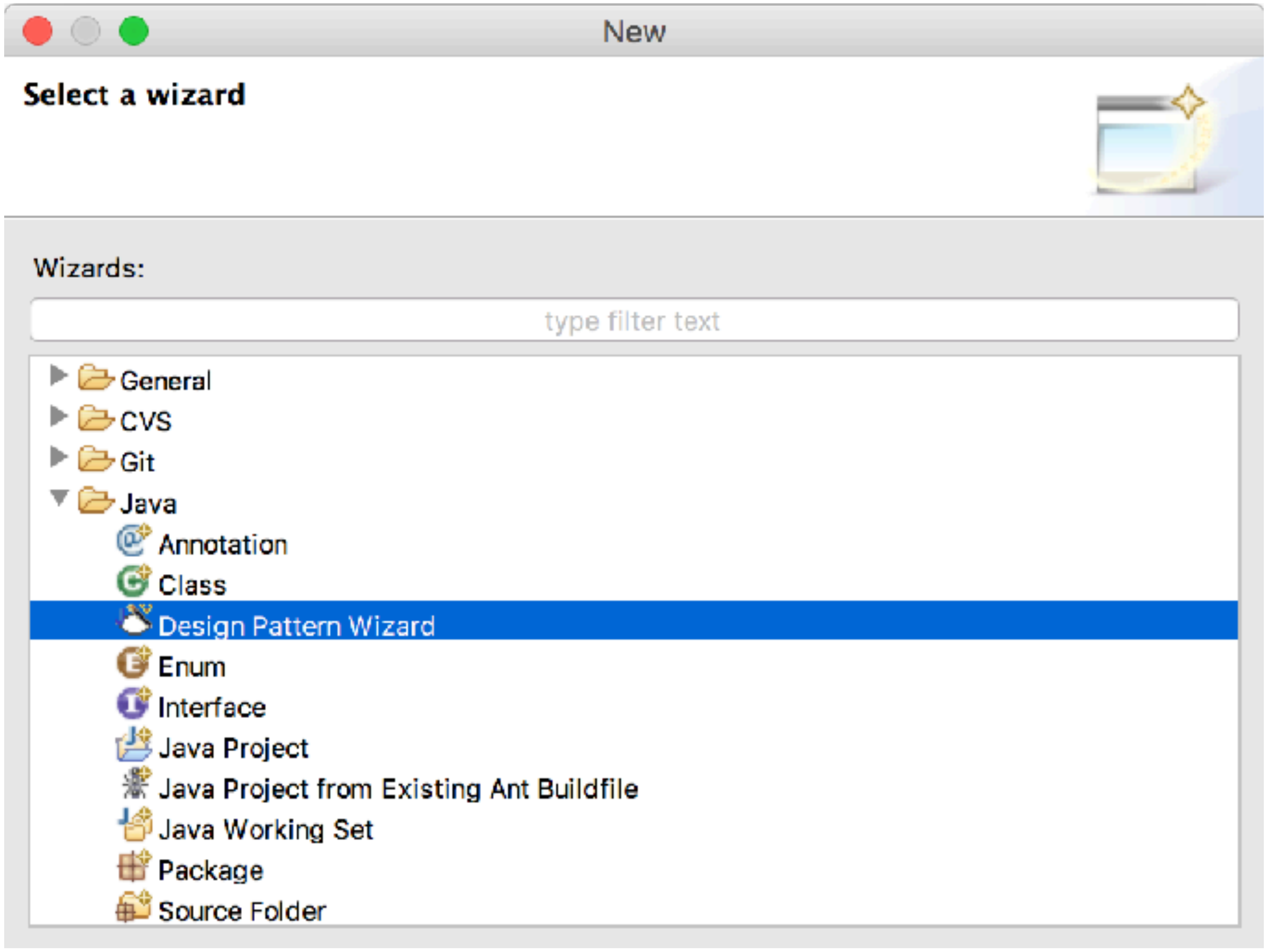
Design Patterns

with Eclipse Juno+PatternBox



Design Patterns

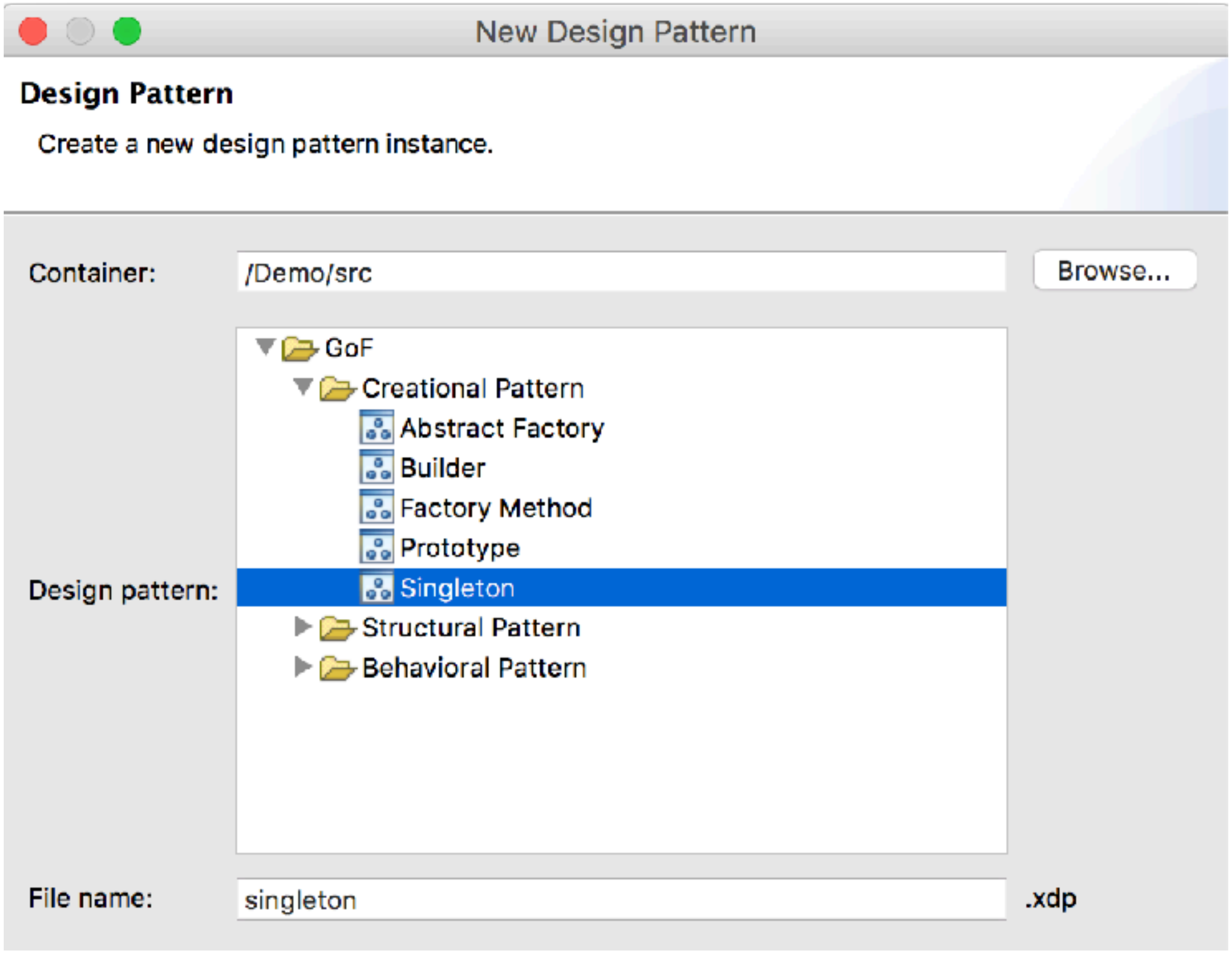
with Eclipse Juno+PatternBox



File / New / Other… / Java / Design Pattern Wizard

Design Patterns

with Eclipse Juno+PatternBox



New Design Pattern

Design Pattern

Create a new design pattern instance.

Container: /Demo/src

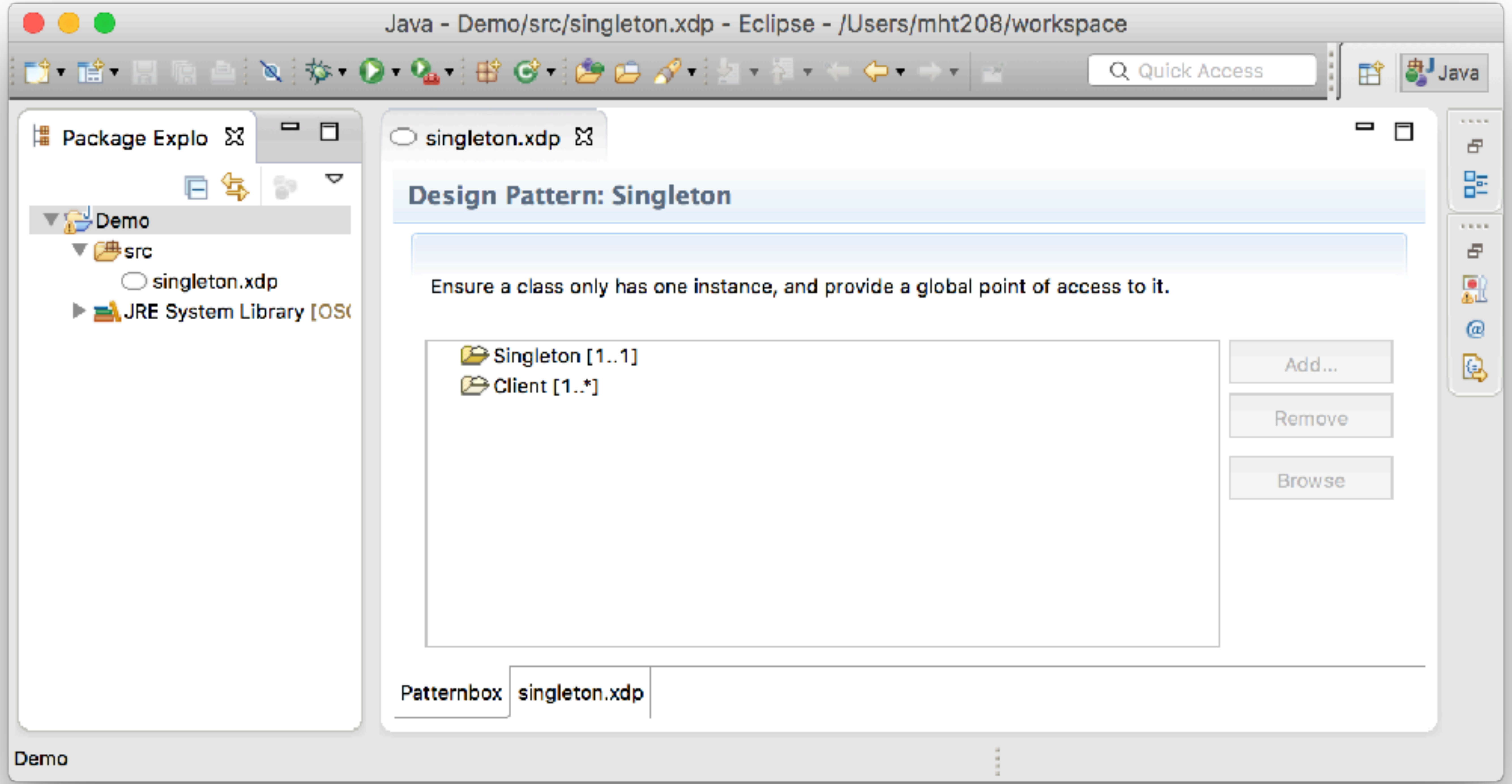
Design pattern:

- GoF
  - Creational Pattern
    - Abstract Factory
    - Builder
    - Factory Method
    - Prototype
    - Singleton
  - Structural Pattern
  - Behavioral Pattern

File name: singleton .xdp

Design Patterns

with Eclipse Juno+PatternBox



Design Pattern: Singleton

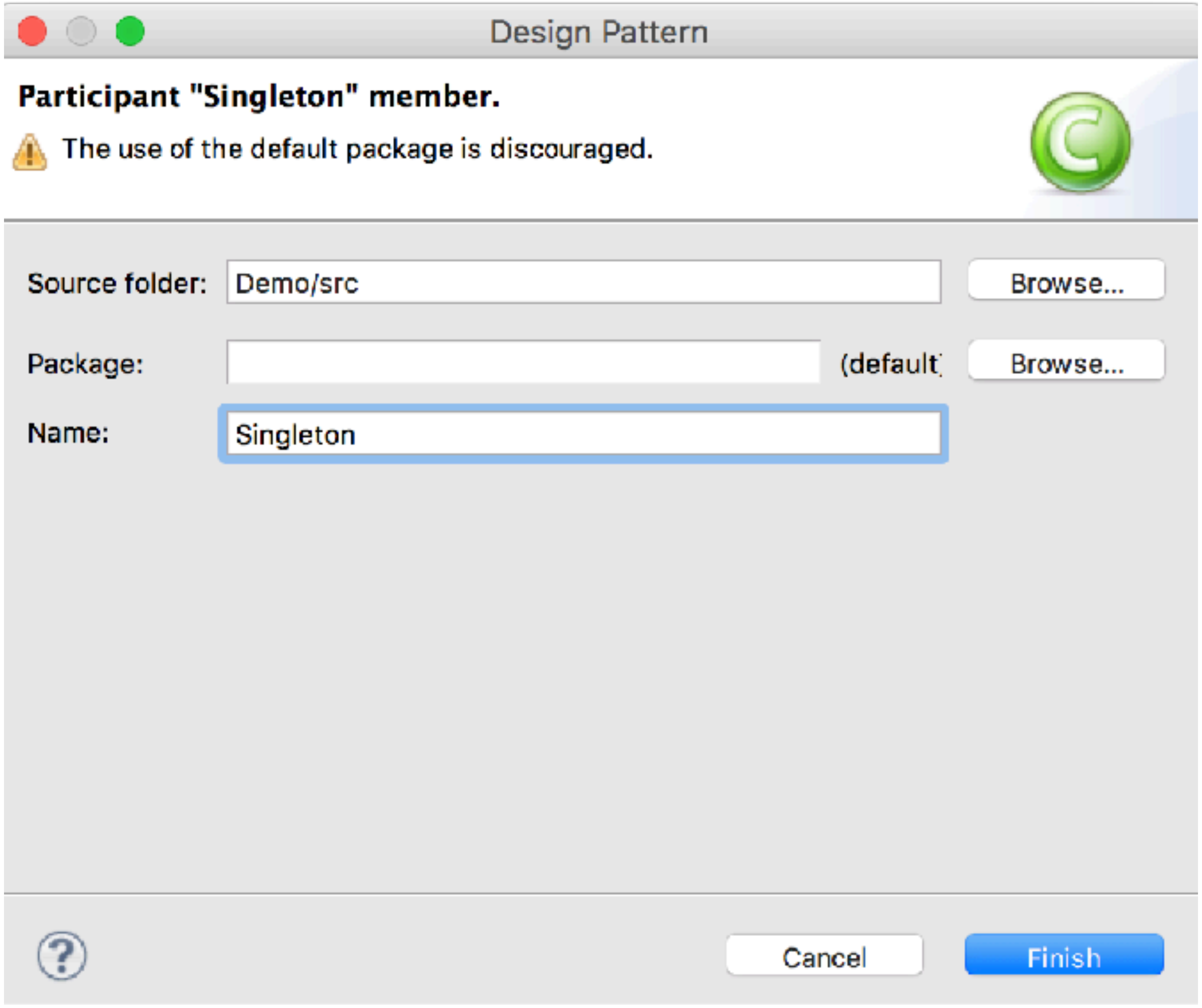
Ensure a class only has one instance, and provide a global point of access to it.

Singleton [1..1]
Client [1..*]

Add a new singleton

Design Patterns

with Eclipse Juno+PatternBox



Participant "Singleton" member.

⚠ The use of the default package is discouraged.

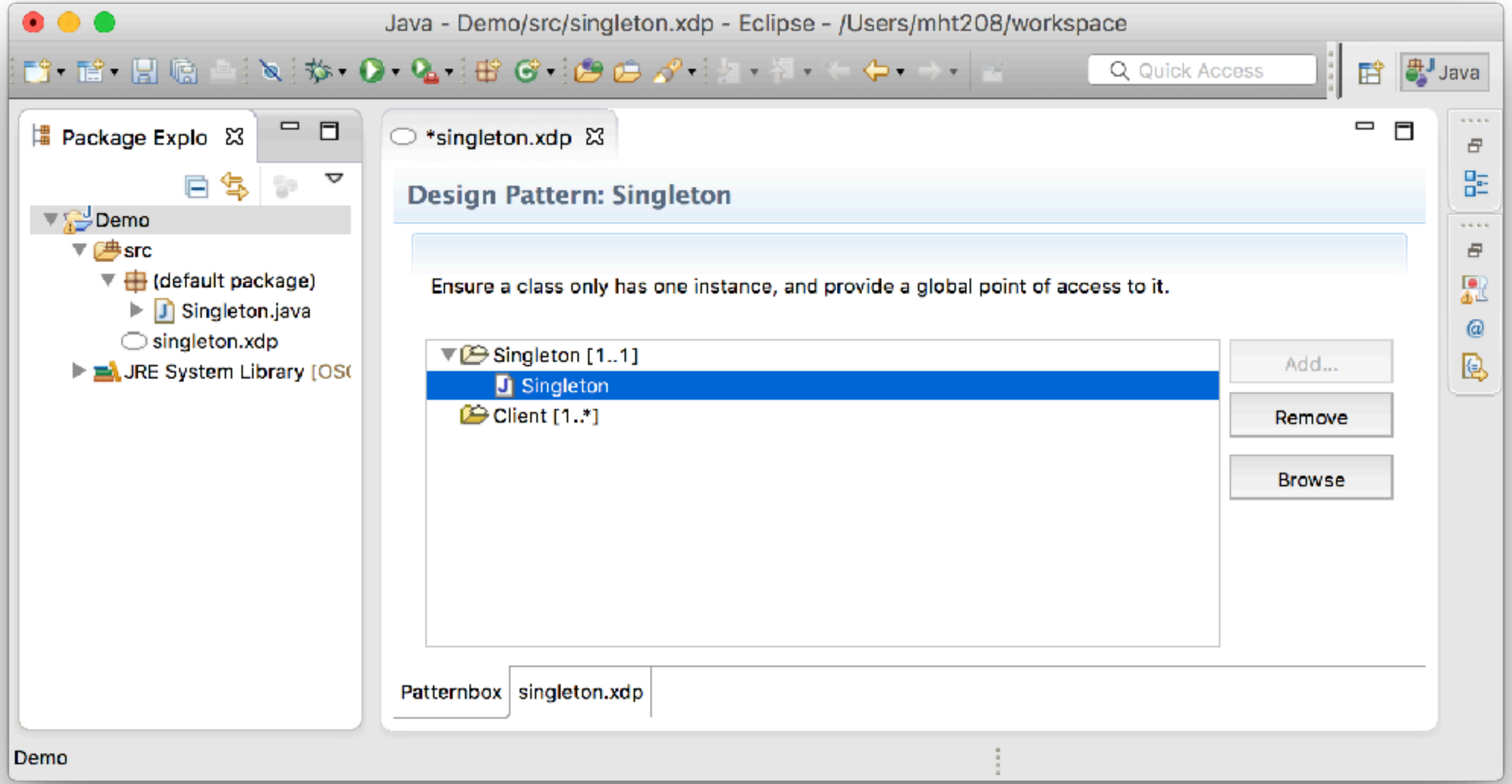
Source folder: Demo/src

Package: (default)

Name: Singleton

Design Patterns

with Eclipse Juno+PatternBox



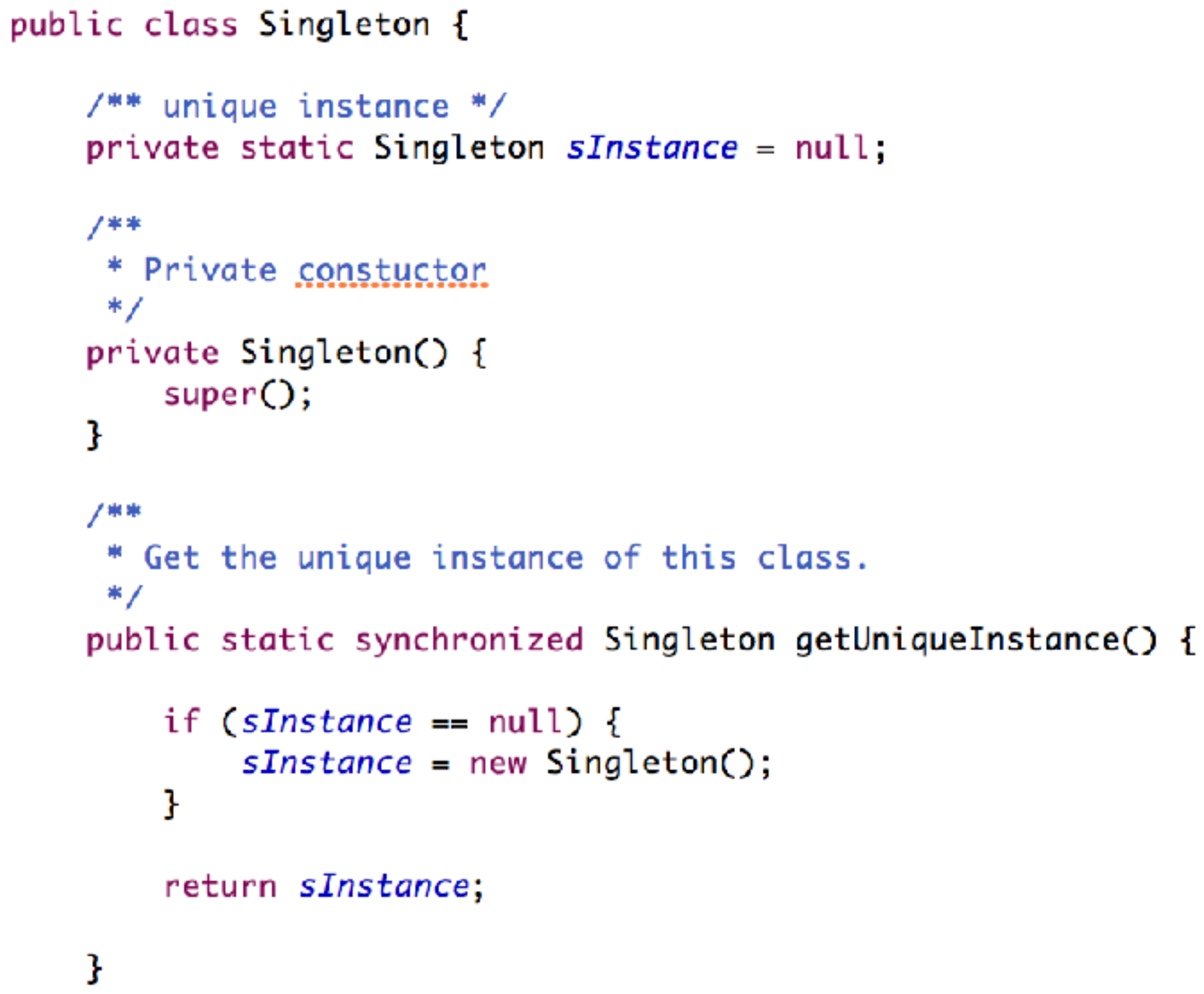
Java - Demo/src/singleton.xdp - Eclipse - /Users/mht208/workspace

Design Pattern: Singleton

Ensure a class only has one instance, and provide a global point of access to it.

Design Patterns

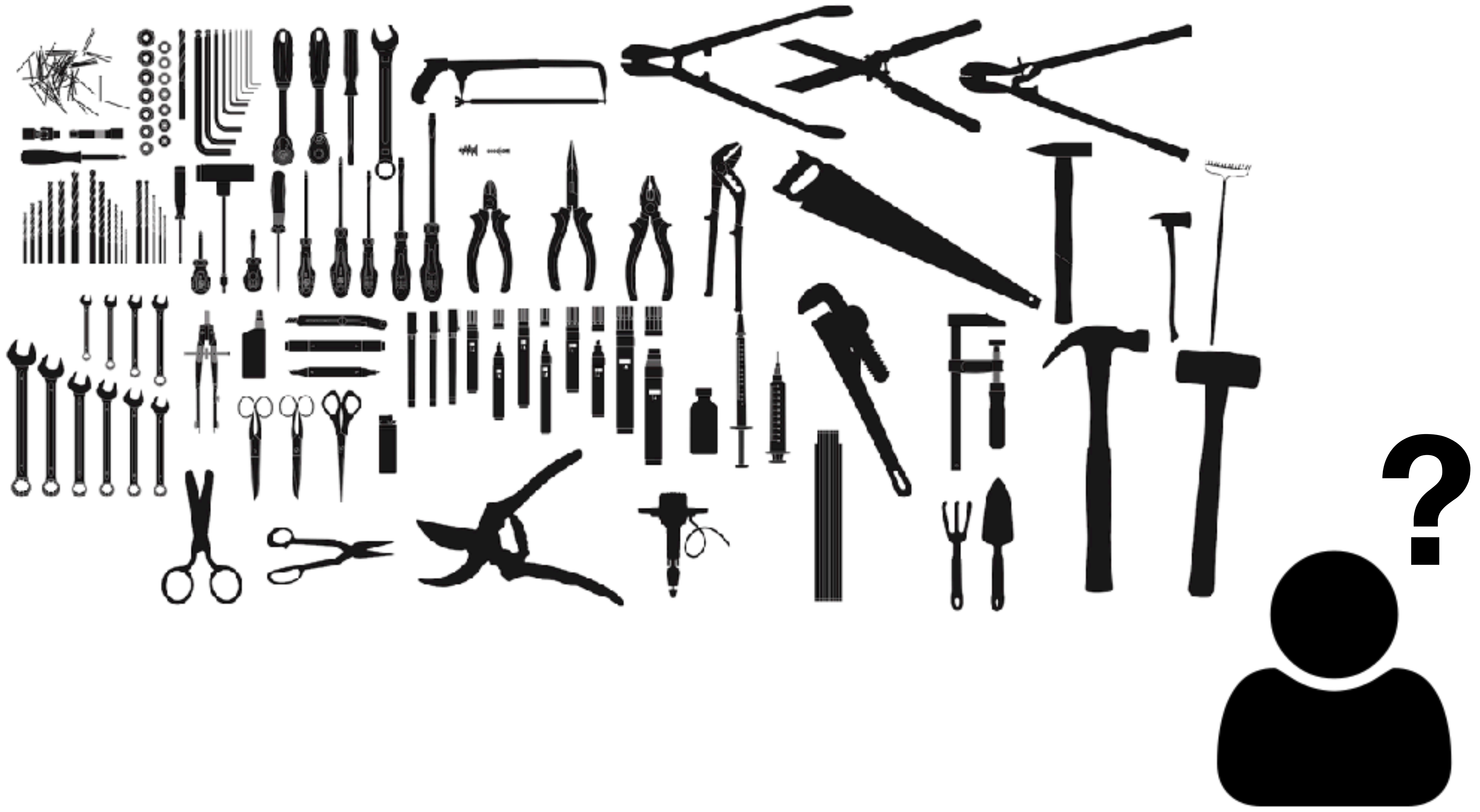
with Eclipse Juno+PatternBox



```
public class Singleton {

    /** unique instance */
    private static Singleton sInstance = null;

    /**
     * Private constuctor
     */
    private Singleton() {
        super();
    }

    /**
     * Get the unique instance of this class.
     */
    public static synchronized Singleton getUniqueInstance() {

        if (sInstance == null) {
            sInstance = new Singleton();
        }

        return sInstance;

    }
```

Design Patterns

with Eclipse Juno+PatternBox



Picture from http://tw.clipartlogo.com/image/vector-tool-life_381122.html