

# COP 3330: Object-Oriented Programming Summer 2011

## The Java Environment

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Computer Science Division  
University of Central Florida



# The Java Environment

- For the moment we'll leave OO design issues behind and consider the more practical side of OO programming, the Java environment.
- To be able to write programs in Java, you will need the Java environment. There are several options available depending on what you are doing with Java. For our purposes (and most general use purposes), we'll need the Java Development Kit (JDK). This is available from <http://java.sun.com>. The instructions beginning on page 3 show you the basic steps to go through to install the JDK on your machine.
- Once you have the JDK installed, you'll need a development environment. You have many different options here ranging from a simple text editor like NotePad++ to full-scale IDEs like Microsoft Visual Studio and NetBeans. For our purposes, an IDE somewhere in the middle will be fine. I've included notes for basic install and set-up for Eclipse beginning on page 8 and JGrasp beginning on page 27. Eclipse can be downloaded from <http://www.eclipse.org>, while JGrasp can be downloaded from <http://jgrasp.org>.
- I've also included notes starting on page 38 that illustrates how to run Java from the command line.



# Getting Java



Go to [www.java.sun.com](http://www.java.sun.com) (You'll be redirected to this page.)




# JavaOne

JAVAONE

## JavaOne 2011 Call For Papers

The JavaOne Call for Papers is now open. Share your Java expertise with fellow community members. Don't delay, the deadline is May 23rd.

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## JavaOne 2011 Call For Papers

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Java SE Downloads - Windows Internet Explorer

http://www.oracle.com/technetwork/java/javase/downloads/index.html

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Java Platform (JDK) <a href="#">JDK JRE</a>	JDK + JavaFX Bundle	JDK + NetBeans Bundle	JDK + Java EE Bundle

Here are the Java SE downloads in detail.

Select the Java Platform JDK



Java SE JDK 6u25 Download - Windows Internet Explorer

http://www.oracle.com/technetwork/java/javase/downloads/jdk-6u25-dc

File Edit View Favorites Tools Help

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Java SE JDK 6u25 Download

### Java SE Downloads

Thank you for downloading this release of the Java™ Platform, Standard Edition (JDK™). The JDK is a development environment for building applications using the Java programming language.

The JDK includes tools useful for developing and testing programs written in the Java programming language and running on the Java™ platform.

You must accept the [Oracle Binary Code License Agreement for the Java SE Platform Products](#) to download this software.

Accept License Agreement  Decline License Agreement

#### Java SE Development Kit 6 Update 25

Product / File Description	File Size	Download
Linux x86 - RPM Installer	76.85 MB	<a href="#">jdk-6u25-linux-i586-rpm.bin</a>
Linux x86 - Self Extracting Installer	81.11 MB	<a href="#">jdk-6u25-linux-i586.bin</a>
Linux x64 - RPM Installer	77.06 MB	<a href="#">jdk-6u25-linux-x64-rpm.bin</a>
Linux x64 - Self Extracting Installer	81.36 MB	<a href="#">jdk-6u25-linux-x64.bin</a>
Solaris x86 - Self Extracting Binary	81.00 MB	<a href="#">jdk-6u25-solaris-i586.sh</a>

javascrip:showAgreement();

Internet | Protected Mode: Off

100%

Check this box for accepting the license agreement.

Select your platform (OS) from this list. Then install Java on your system.



# Getting Eclipse





Eclipse - The Eclipse Foundation open source community website. - Windows Internet Explorer

http://www.eclipse.org/

Go to www.eclipse.org

Indigo is Coming!  
Join the Indigo 500

Visit other Eclipse Sites

Home Downloads Users Members Committers Resources Projects About Us

Google™ Custom Search

Explore the Eclipse universe

Select the Downloads tab

Get Started now...  
**Download Eclipse**

- » Plugins
- » Documentation
- » Contri
- » Repor

**Announcements**

2011/05/06 **Help Support Eclipse: Join the Indigo 500**

The Indigo release train is scheduled for June 22, 2011. To celebrate, we are encouraging individuals to support the Eclipse community by becoming a **Friend of Eclipse**. The goal is to have 500 new friends join by July 31.

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Eclipse Downloads - Windows Internet Explorer

http://www.eclipse.org/downloads/

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Eclipse Downloads

# Indigo is Coming!







Join the Indigo 500

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## Eclipse Downloads

Packages Developer Builds Projects

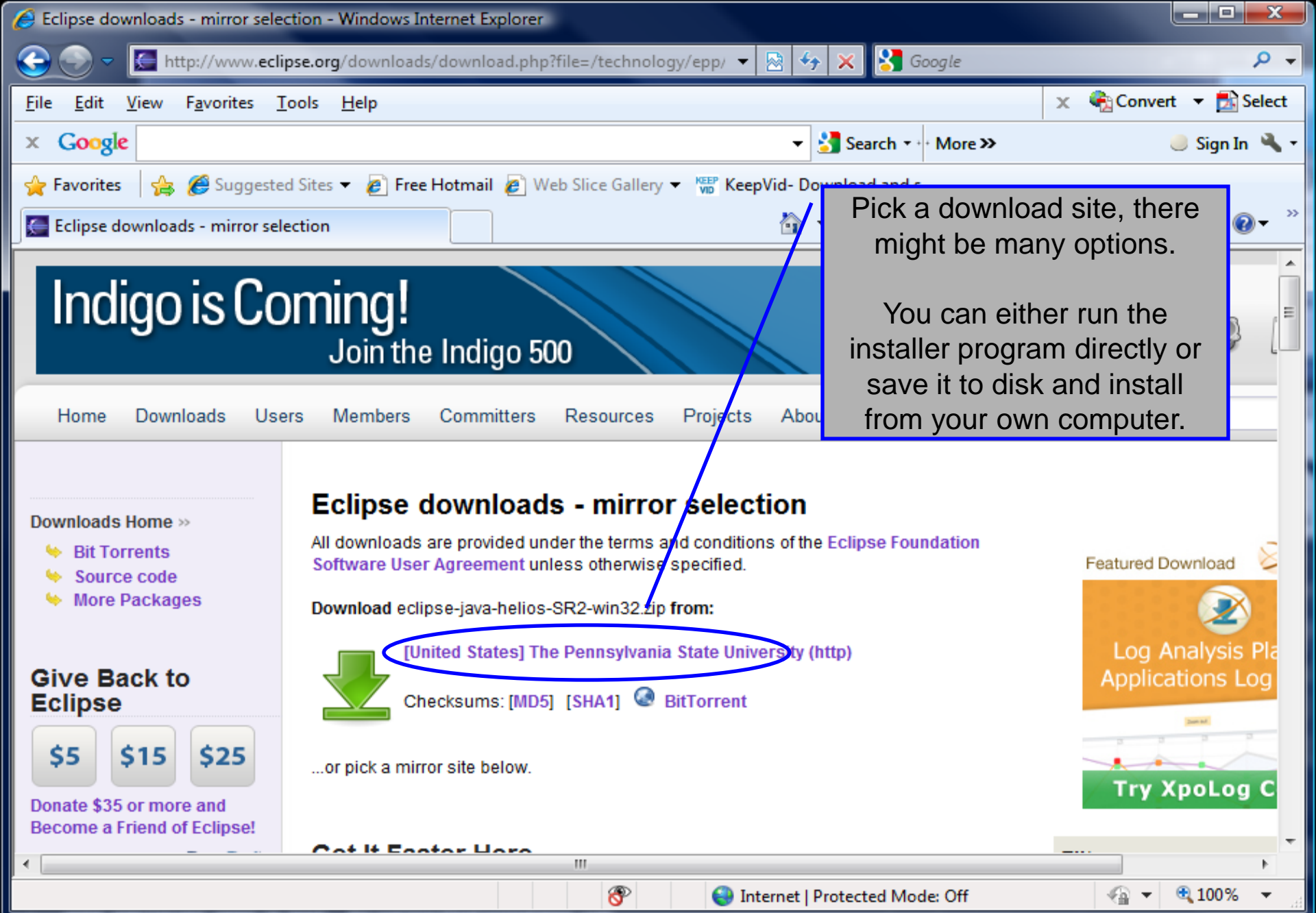
Compare Packages Older Versions Eclipse Helios (3.6.2) Packages for Windows

 <b>Eclipse IDE for Java Developers</b> , 99 MB Downloaded 1,362,850 Times <a href="#">Details</a>	 <a href="#">Windows 32 Bit</a> <a href="#">Windows 64 Bit</a>
 <b>Eclipse IDE for Java EE Developers</b> , 206 MB Downloaded 1,000,018 Times <a href="#">Details</a>	 <a href="#">Windows 32 Bit</a> <a href="#">Windows 64 Bit</a>
 <b>Eclipse Classic 3.6.2</b> , 171 MB Downloaded 822,124 Times <a href="#">Details</a> <a href="#">Other Downloads</a>	 <a href="#">Windows 32 Bit</a> <a href="#">Windows 64 Bit</a>

**Hint:** You will need a **Java run environment (JRE)** to use SE 5 or greater is recommended. Downloads are provided under the terms and conditions of the [Eclipse Software User Agreement](#) otherwise specified.

You want the Eclipse IDE for Java Developers





Pick a download site, there might be many options.

You can either run the installer program directly or save it to disk and install from your own computer.

### Eclipse downloads - mirror selection

All downloads are provided under the terms and conditions of the [Eclipse Foundation Software User Agreement](#) unless otherwise specified.

Download eclipse-java-helios-SR2-win32.zip from:



[\[United States\] The Pennsylvania State University \(http\)](#)

Checksums: [\[MD5\]](#) [\[SHA1\]](#) [BitTorrent](#)

...or pick a mirror site below.

Featured Download

Log Analysis Applications Log

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- Bit Torrents
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  - More Packages

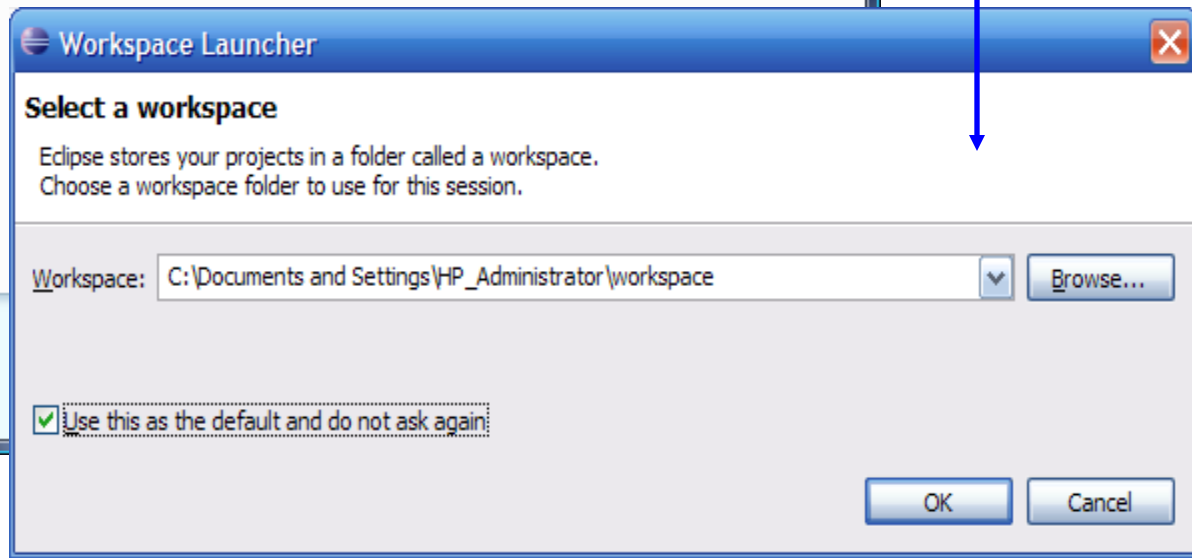
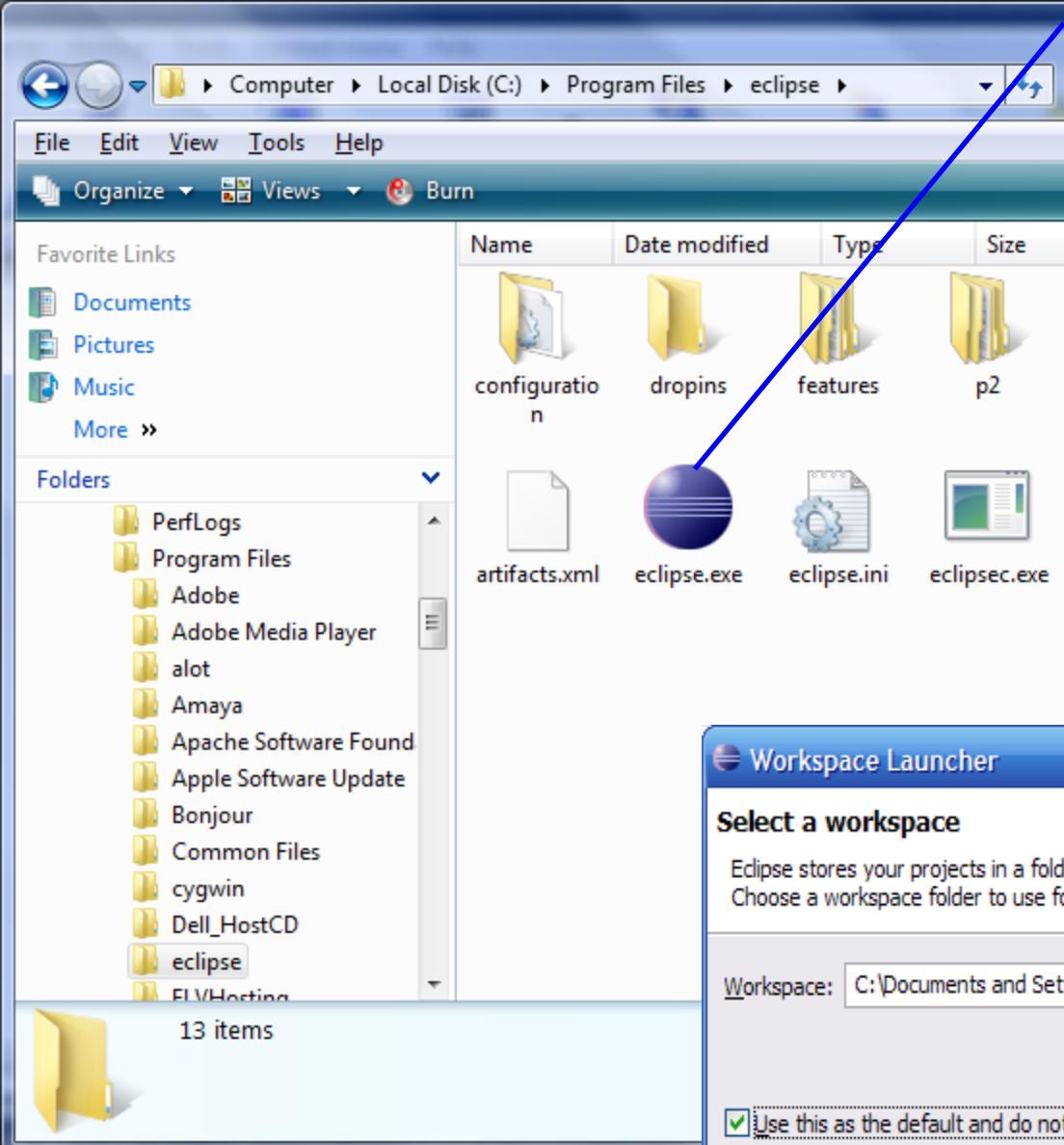
### Give Back to Eclipse

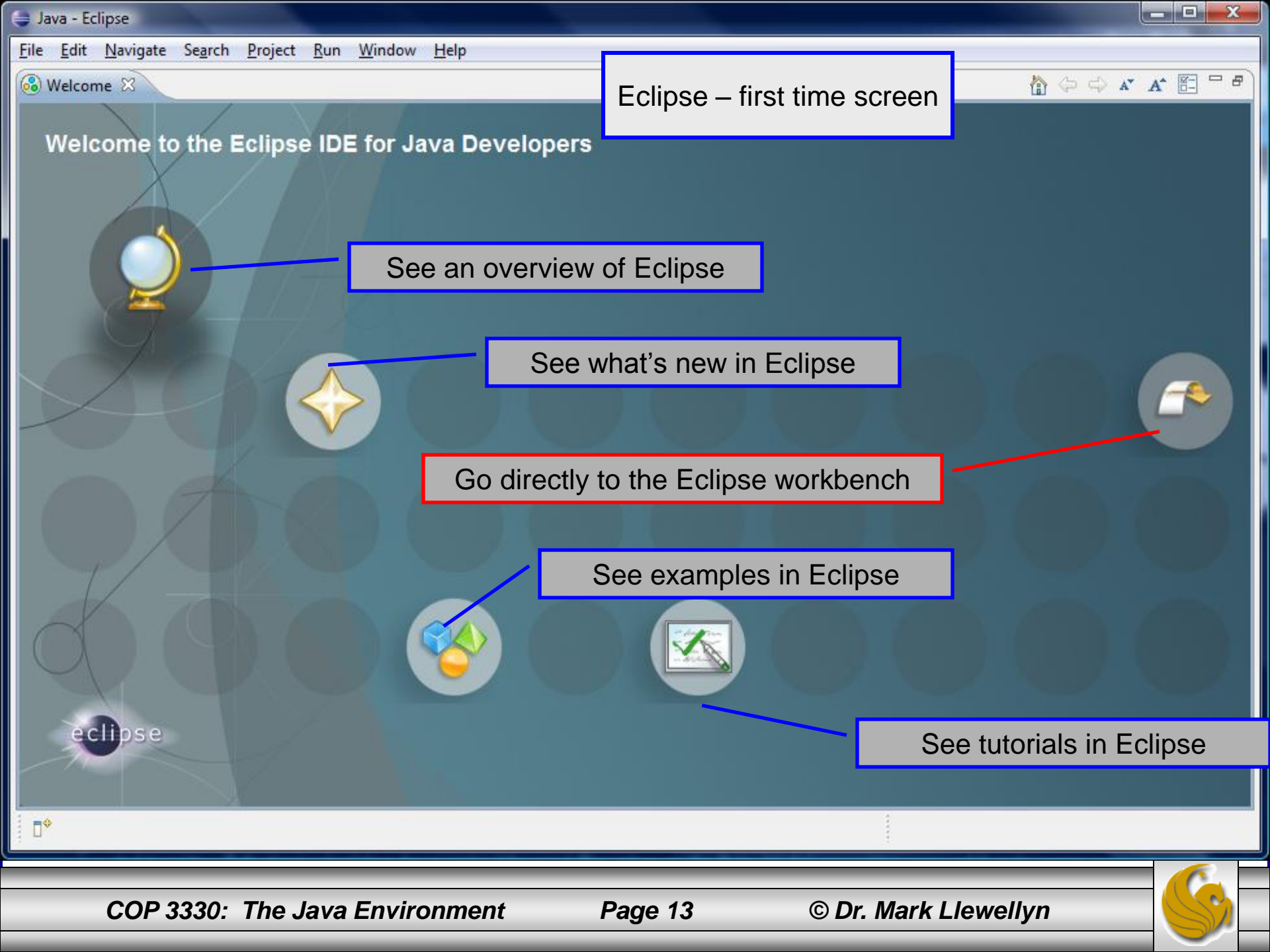
\$5 \$15 \$25

Donate \$35 or more and Become a Friend of Eclipse!



After installing Eclipse, your Eclipse directory will look like this. Click on the Eclipse.exe icon and the pop-up dialog below will appear. Select a workspace and click ok.





Eclipse – first time screen

See an overview of Eclipse

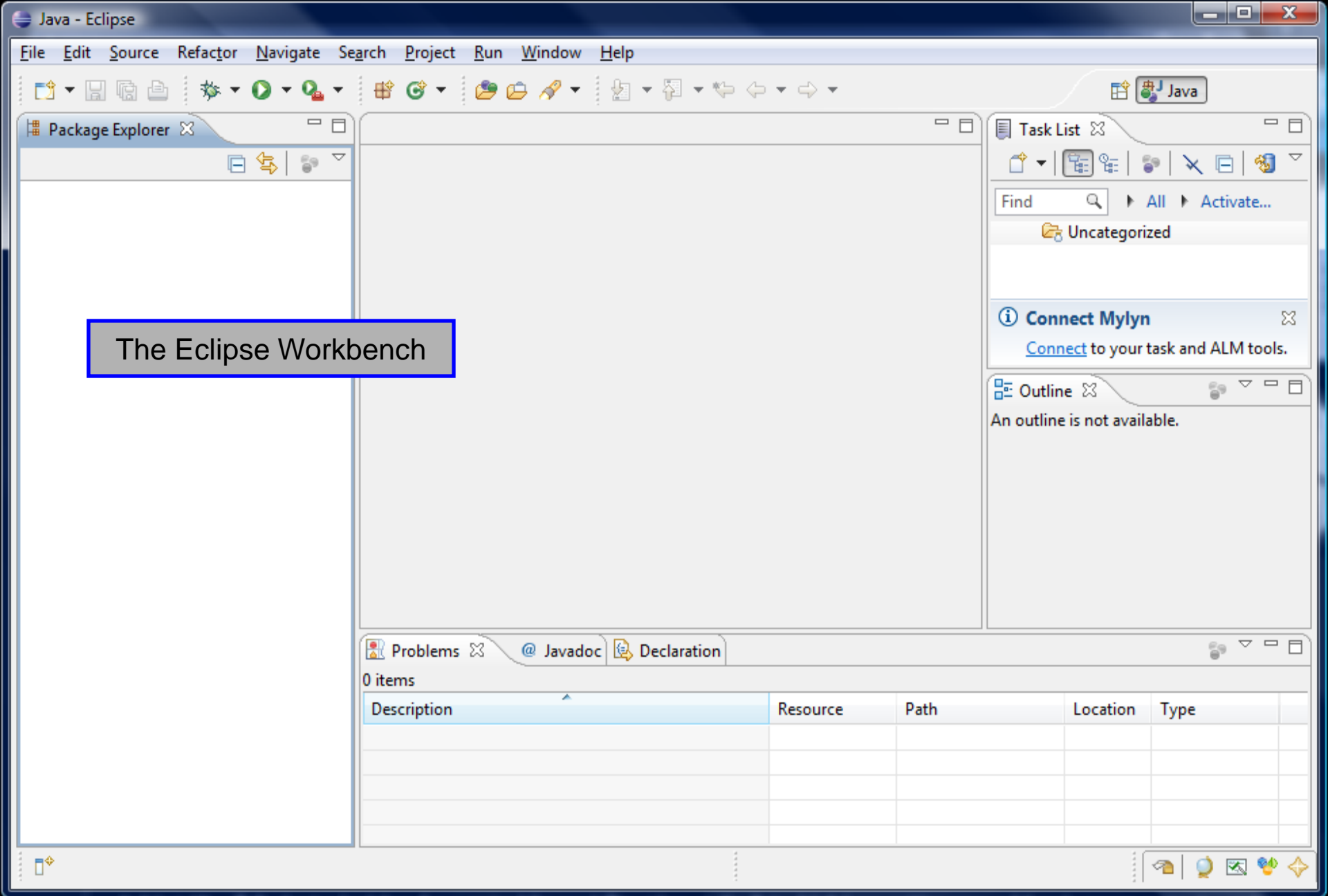
See what's new in Eclipse

Go directly to the Eclipse workbench

See examples in Eclipse

See tutorials in Eclipse





The Eclipse Workbench

Problems @ Javadoc Declaration

0 items

Description	Resource	Path	Location	Type



The screenshot shows the Eclipse IDE's File menu. The 'New' option is selected, and its submenu is open, with 'Java Project' highlighted. A blue arrow points from the 'New' option in the main menu to the 'Java Project' option in the submenu.

- New (Alt+Shift+N)
- Open File...
- Close (Ctrl+W)
- Close All (Ctrl+Shift+W)
- Save (Ctrl+S)
- Save As...
- Save All (Ctrl+Shift+S)
- Revert
- Move...
- Rename... (F2)
- Refresh (F5)
- Convert Line Delimiters To
- Print... (Ctrl+P)
- Switch Workspace
- Restart
- Import...
- Export...
- Properties (Alt+Enter)
- Exit

Submenu for 'New':

- Java Project
- Project...
- Package
- Class
- Interface
- Enum
- Annotation
- Source Folder
- Java Working Set
- Folder
- File
- Untitled Text File
- JUnit Test Case
- Task
- Example...
- Other... (Ctrl+N)

1. Click File tab
2. Select New
3. Select Java Project

The screenshot shows the Eclipse IDE's Task List panel. It contains a search bar with the text 'Find', a dropdown menu set to 'All', and a button labeled 'Activat...'. Below the search bar is a folder icon labeled 'Uncategorized'.

The screenshot shows the Eclipse IDE's Outline panel. It contains the text 'An outline is not available.'

The screenshot shows the Eclipse IDE's Problem view. It contains a table with columns for 'Description', 'Location', and 'Type'. The table is currently empty.

Description	Location	Type



**Create a Java Project**  
Create a Java project in the workspace or in an external location.

Project name: **My First Java Programs**

Contents

- Create new project in workspace
- Create project from existing source

Directory: C:\Documents and Settings\HP\_Administrator\work

JRE

- Use an execution environment JRE: JavaSE-1.6
- Use a project specific JRE: jre6
- Use default JRE (currently 'jre6')

[Configure JREs...](#)

Project layout

- Use project folder as root for sources and class files
- Create separate folders for sources and class files

[Configure default...](#)

Working sets

- Add project to working sets

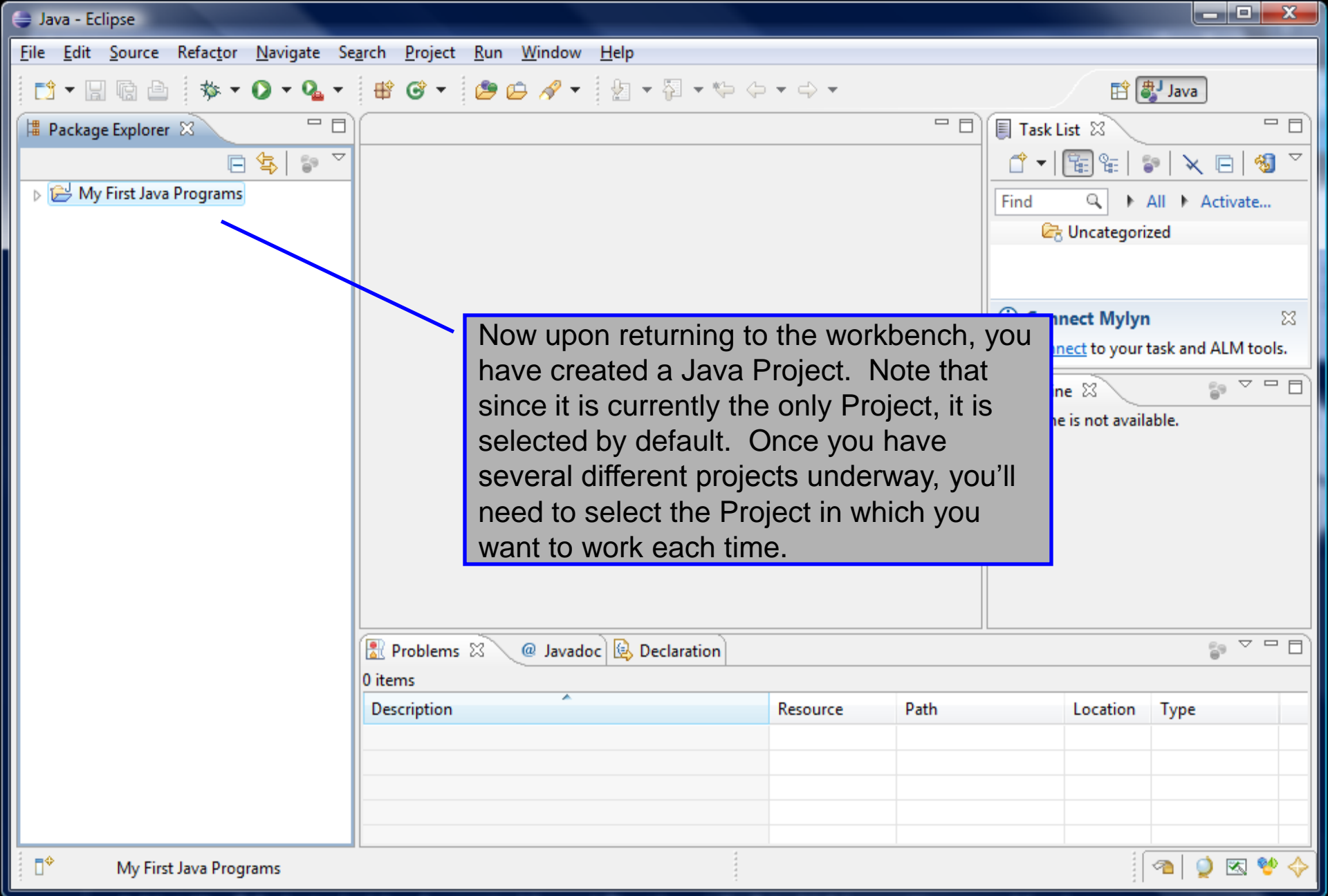
Working sets:  [Select...](#)

[? < Back](#) [Next >](#) [Finish](#) [Cancel](#)

Enter a Project Name – let's call this one "My First Java Programs". Accept the default values for all other items in this menu.  
Then click Finish.

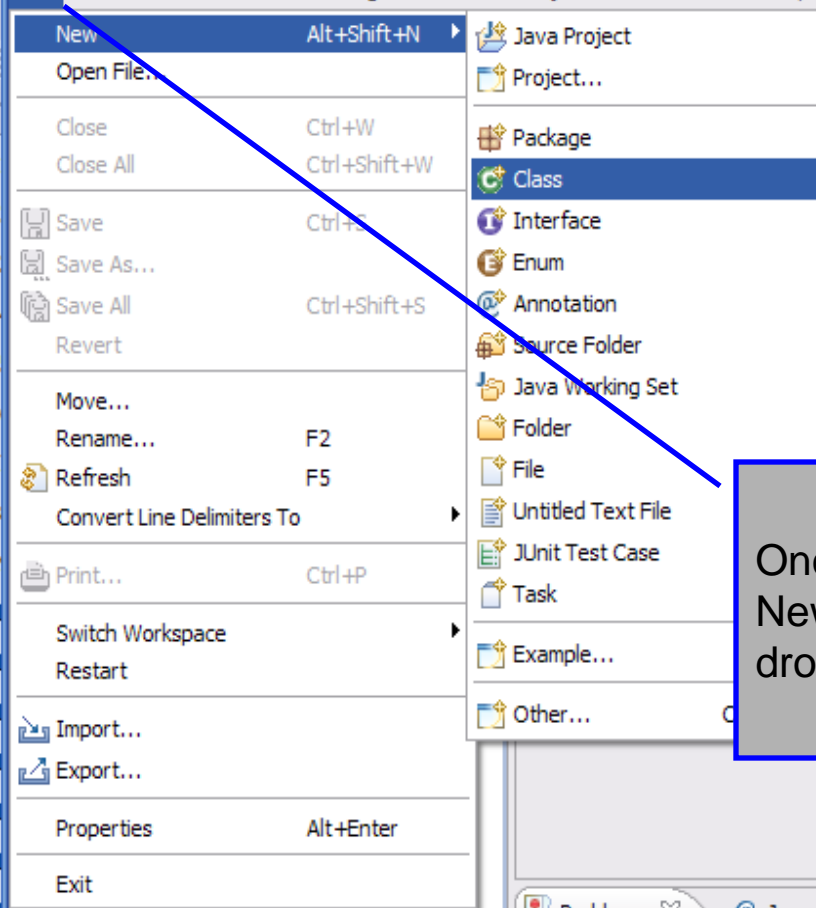






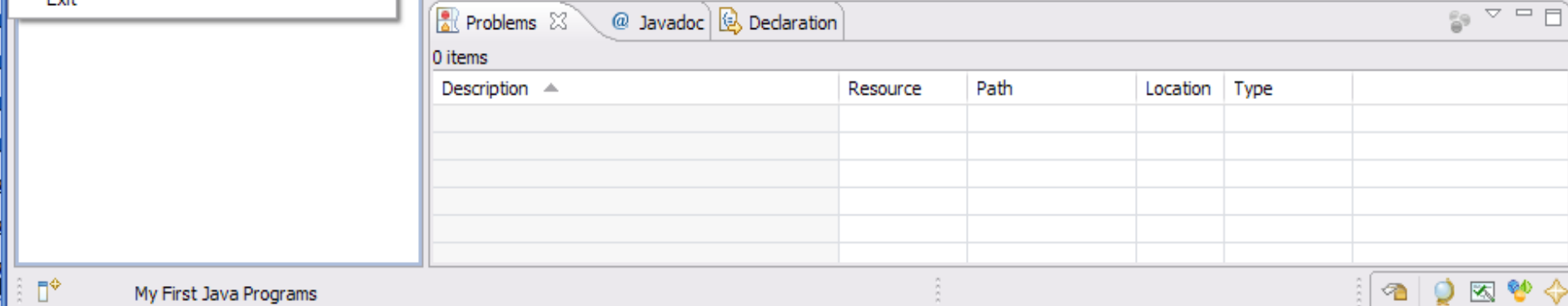
Now upon returning to the workbench, you have created a Java Project. Note that since it is currently the only Project, it is selected by default. Once you have several different projects underway, you'll need to select the Project in which you want to work each time.





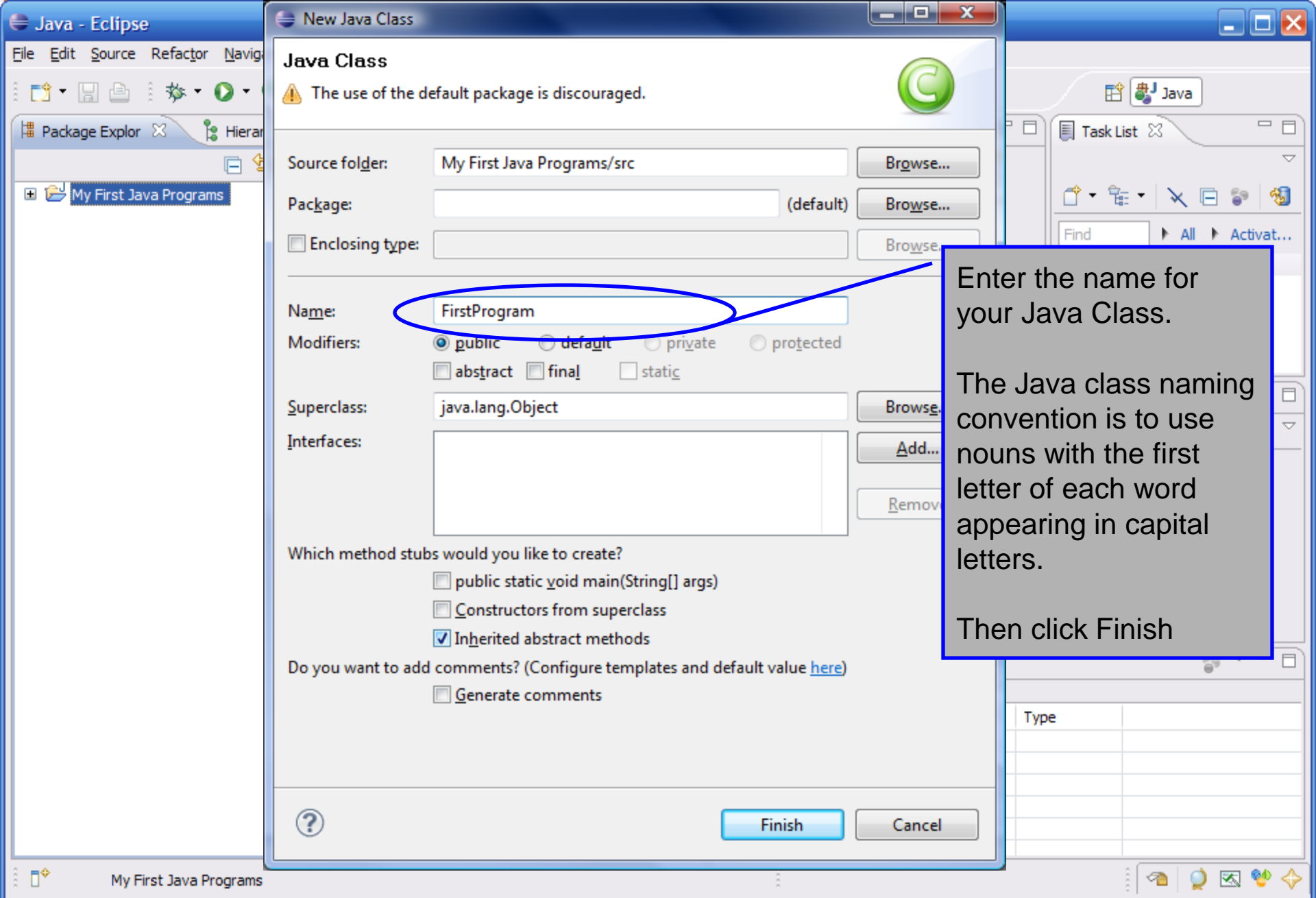
The screenshot shows the Eclipse IDE's File menu. The 'New' option is selected, and a sub-menu is open. In this sub-menu, 'Class' is highlighted. A blue arrow points from the 'Class' option to a text box. Other options in the sub-menu include Java Project, Project..., Package, Interface, Enum, Annotation, Source Folder, Java Working Set, Folder, File, Untitled Text File, JUnit Test Case, Task, Example..., and Other... The main menu also shows options like Open File..., Close, Close All, Save, Save As..., Save All, Revert, Move..., Rename..., Refresh, Convert Line Delimiters To, Print..., Switch Workspace, Restart, Import..., Export..., Properties, and Exit.

Once again, select the File tab and click New, but this time select Class from the drop-down list.



The screenshot shows the Eclipse IDE interface. The main editor area is empty. The Problems view is open at the bottom, showing 0 items. The Problems view has columns for Description, Resource, Path, Location, and Type. The status bar at the bottom shows 'My First Java Programs' and various icons.



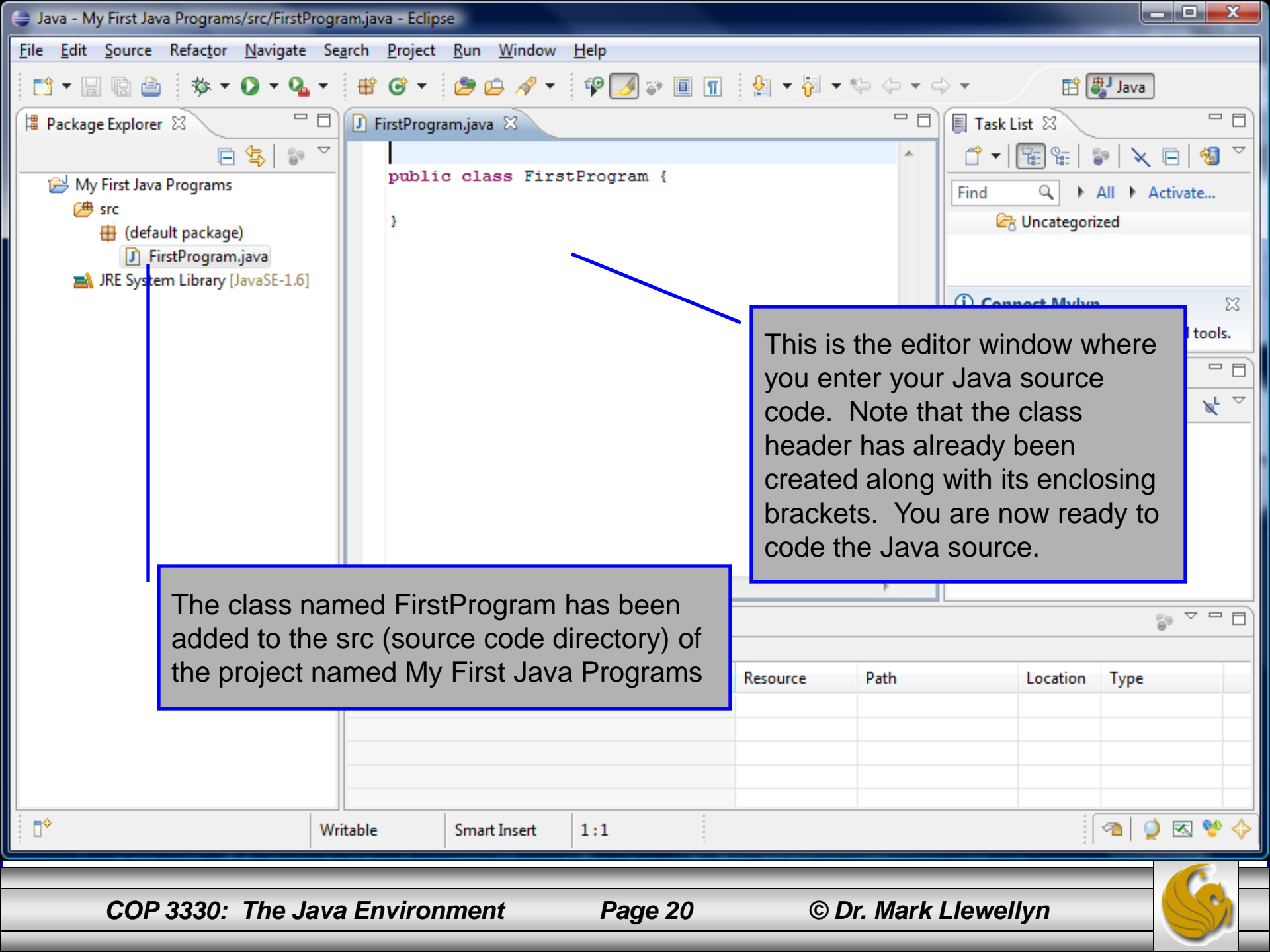


Enter the name for your Java Class.

The Java class naming convention is to use nouns with the first letter of each word appearing in capital letters.

Then click Finish

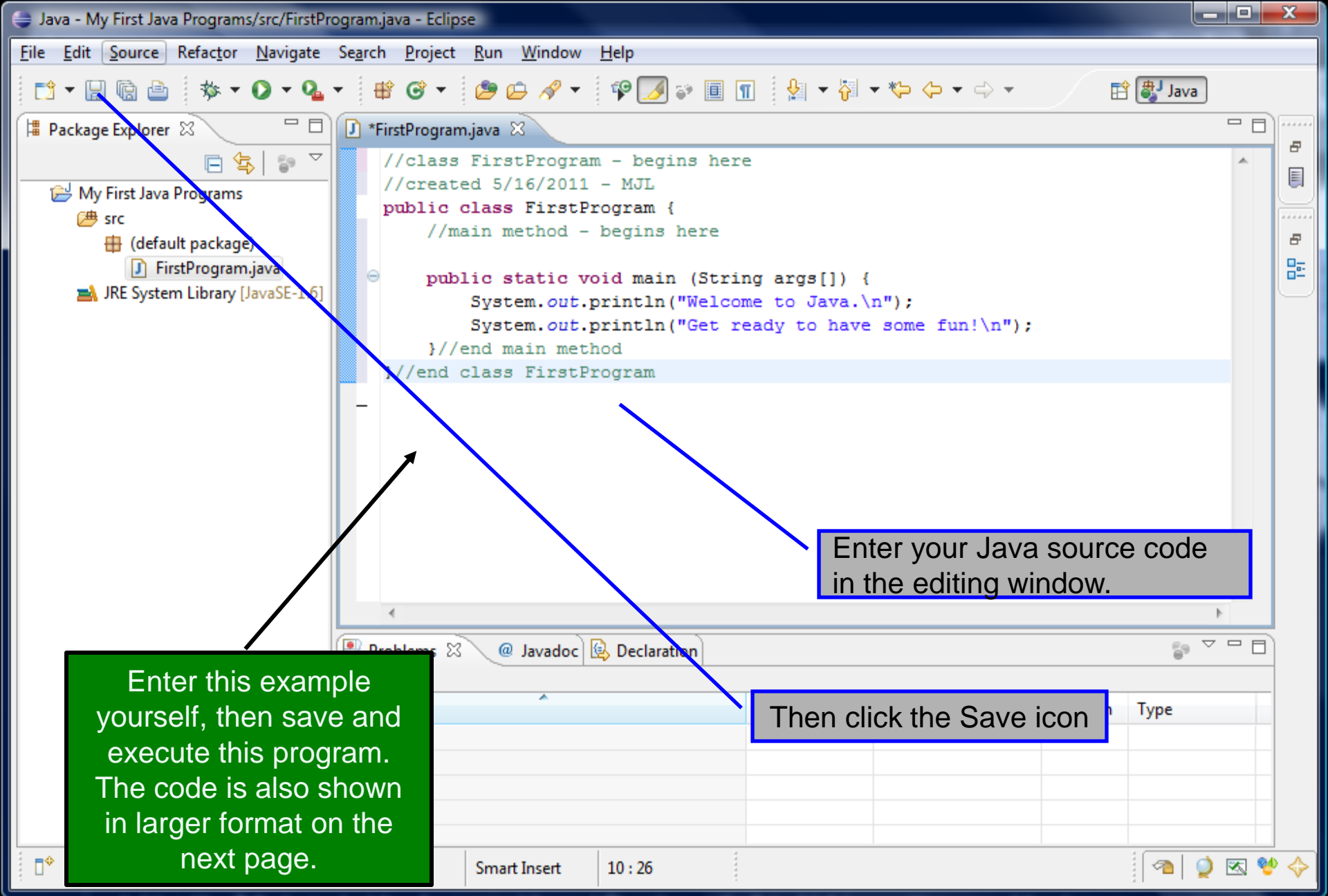




The class named FirstProgram has been added to the src (source code directory) of the project named My First Java Programs

This is the editor window where you enter your Java source code. Note that the class header has already been created along with its enclosing brackets. You are now ready to code the Java source.





```
//class FirstProgram - begins here
//created 5/16/2011 - MJL
public class FirstProgram {
    //main method - begins here

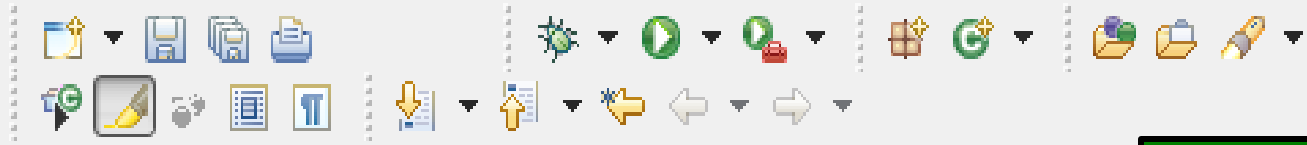
    public static void main (String args[]) {
        System.out.println("Welcome to Java.\n");
        System.out.println("Get ready to have some fun!\n");
    } //end main method
} //end class FirstProgram
```

Enter this example yourself, then save and execute this program. The code is also shown in larger format on the next page.

Enter your Java source code in the editing window.

Then click the Save icon





Put your own comments here!

\*FirstProgram.java

```
//class FirstProgram  
//created 5/16/2011 - MJL
```

```
public class FirstProgram {
```

```
    //begin main method
```

```
    public static void main (String args[]) {
```

```
        System.out.println("Welcome to Java.\n");
```

```
        System.out.println("Get ready to have some fun!\n");
```

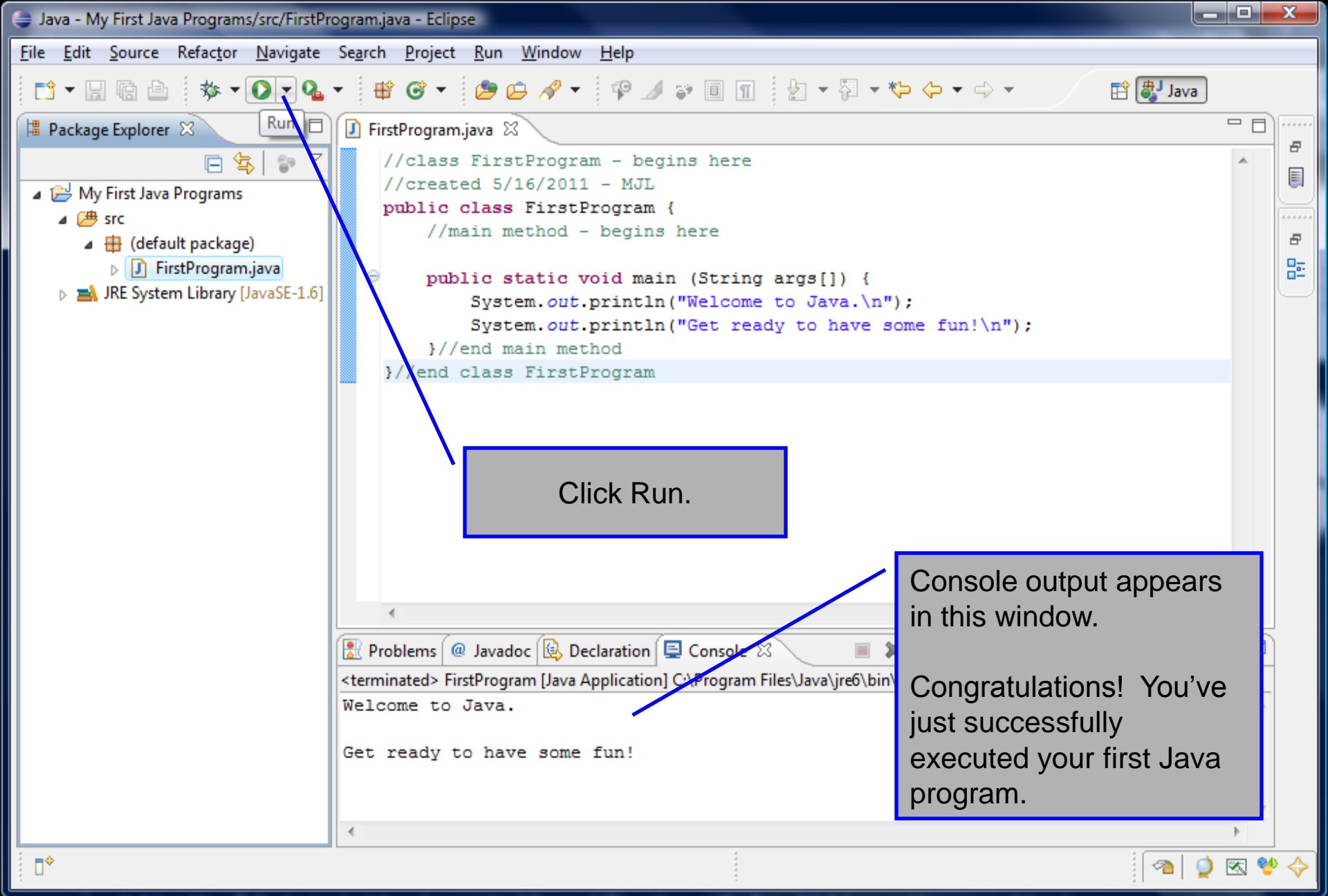
```
    } //end main method
```

```
} //end class FirstProgram
```

Writable

Smart Insert





Package Explorer

- My First Java Programs
  - src
    - (default package)
      - FirstProgram.java
  - JRE System Library [JavaSE-1.6]

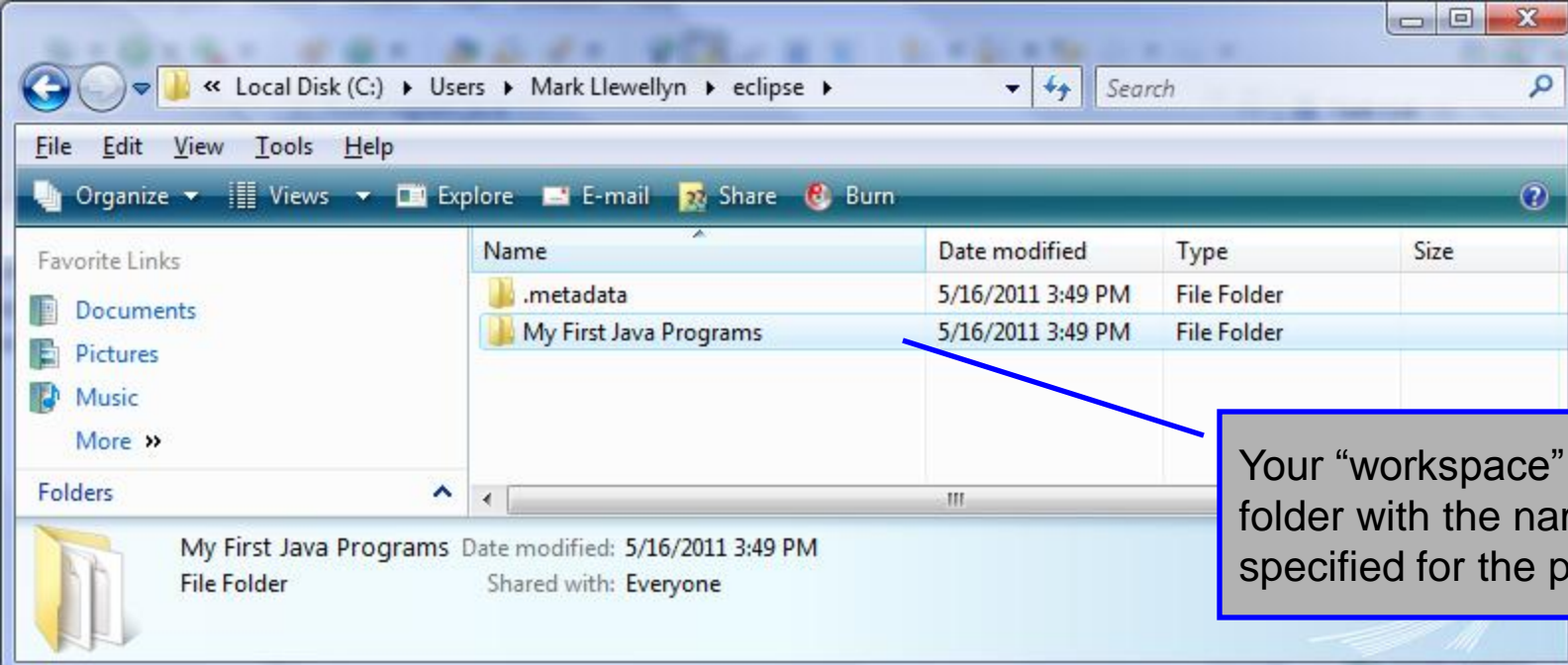
```
//class FirstProgram - begins here  
//created 5/16/2011 - MJL  
public class FirstProgram {  
    //main method - begins here  
  
    public static void main (String args[]) {  
        System.out.println("Welcome to Java.\n");  
        System.out.println("Get ready to have some fun!\n");  
    } //end main method  
} //end class FirstProgram
```

Click Run.

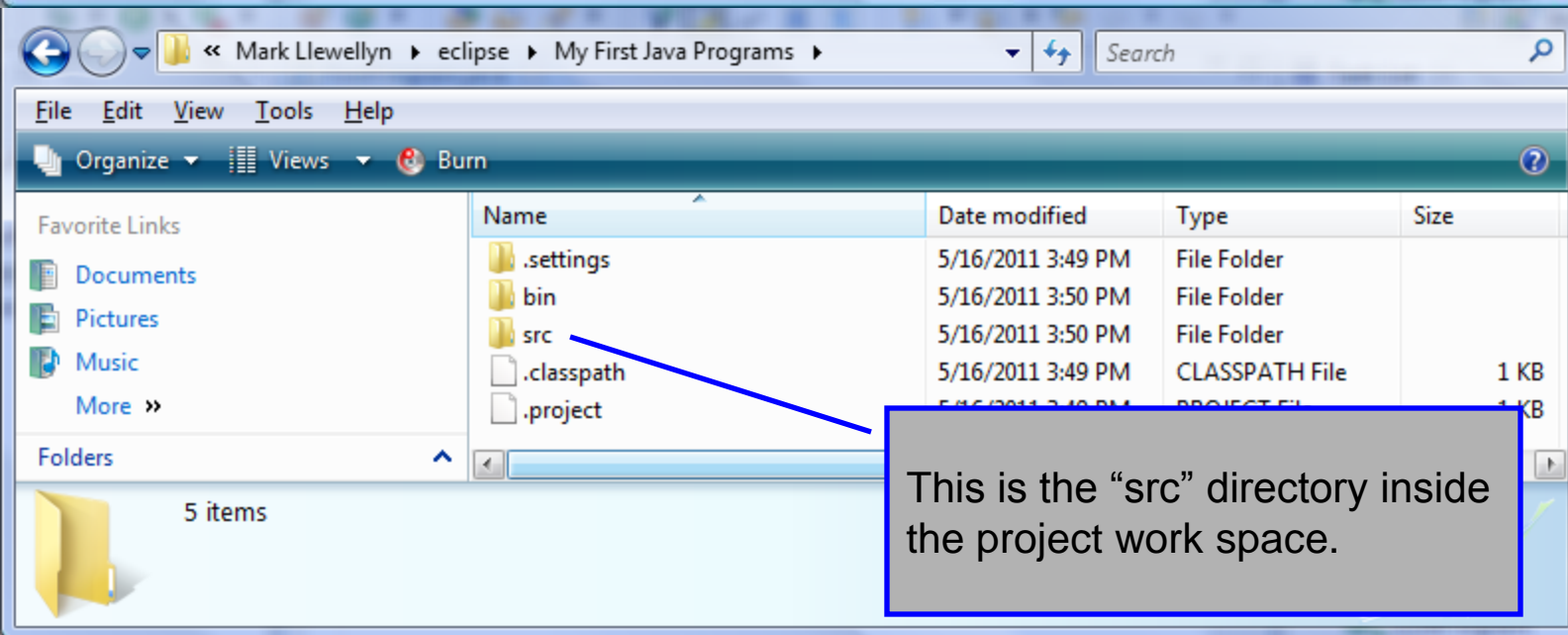
Console output appears in this window.  
Congratulations! You've just successfully executed your first Java program.

Problems Javadoc Declaration Console  
<terminated> FirstProgram [Java Application] C:\Program Files\Java\jre6\bin\  
Welcome to Java.  
  
Get ready to have some fun!





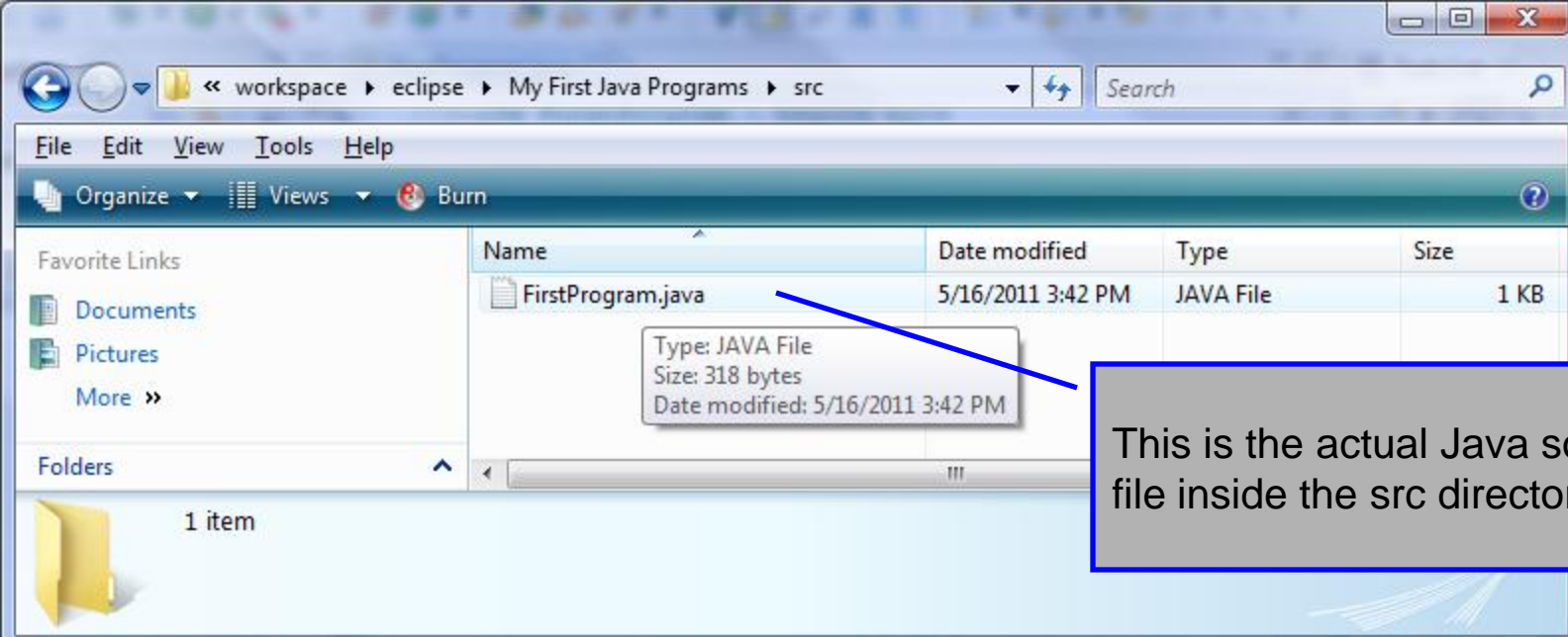
Your "workspace" now has a folder with the name you specified for the project.



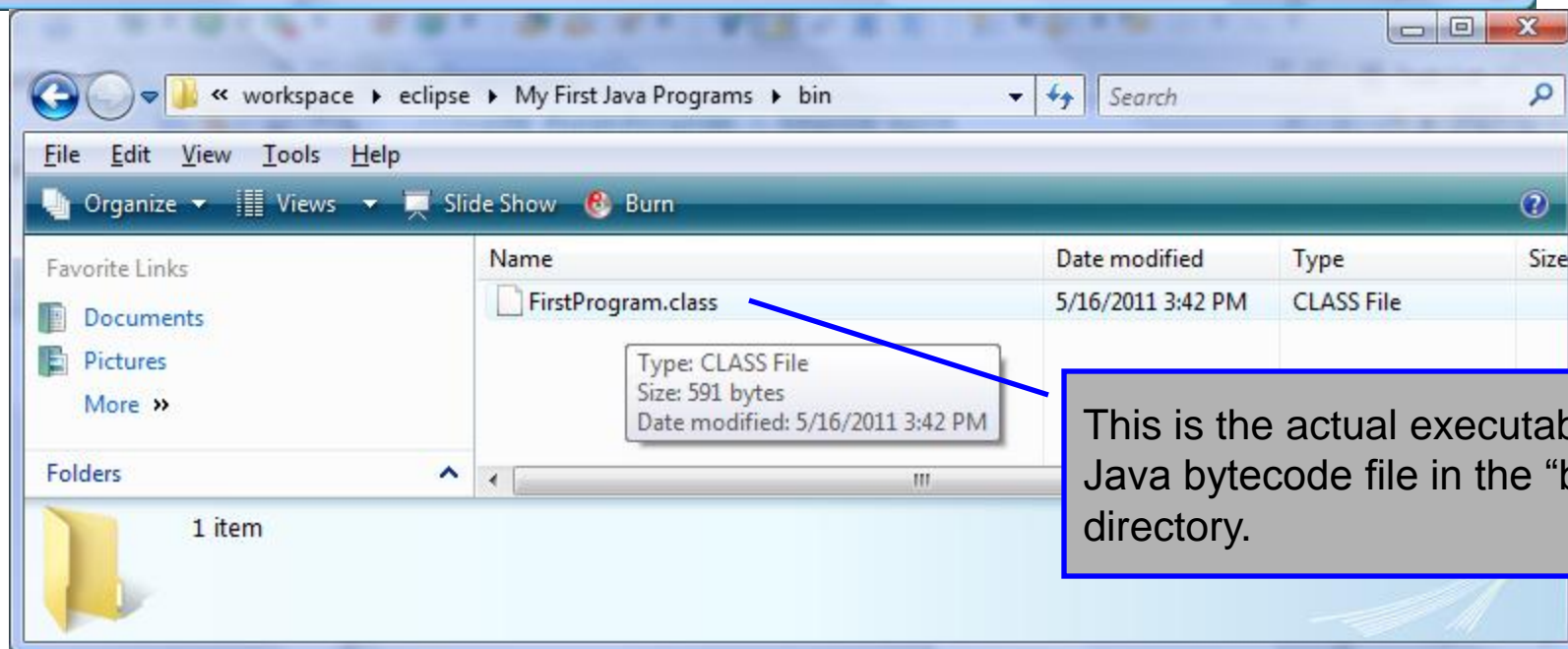
This is the "src" directory inside the project work space.





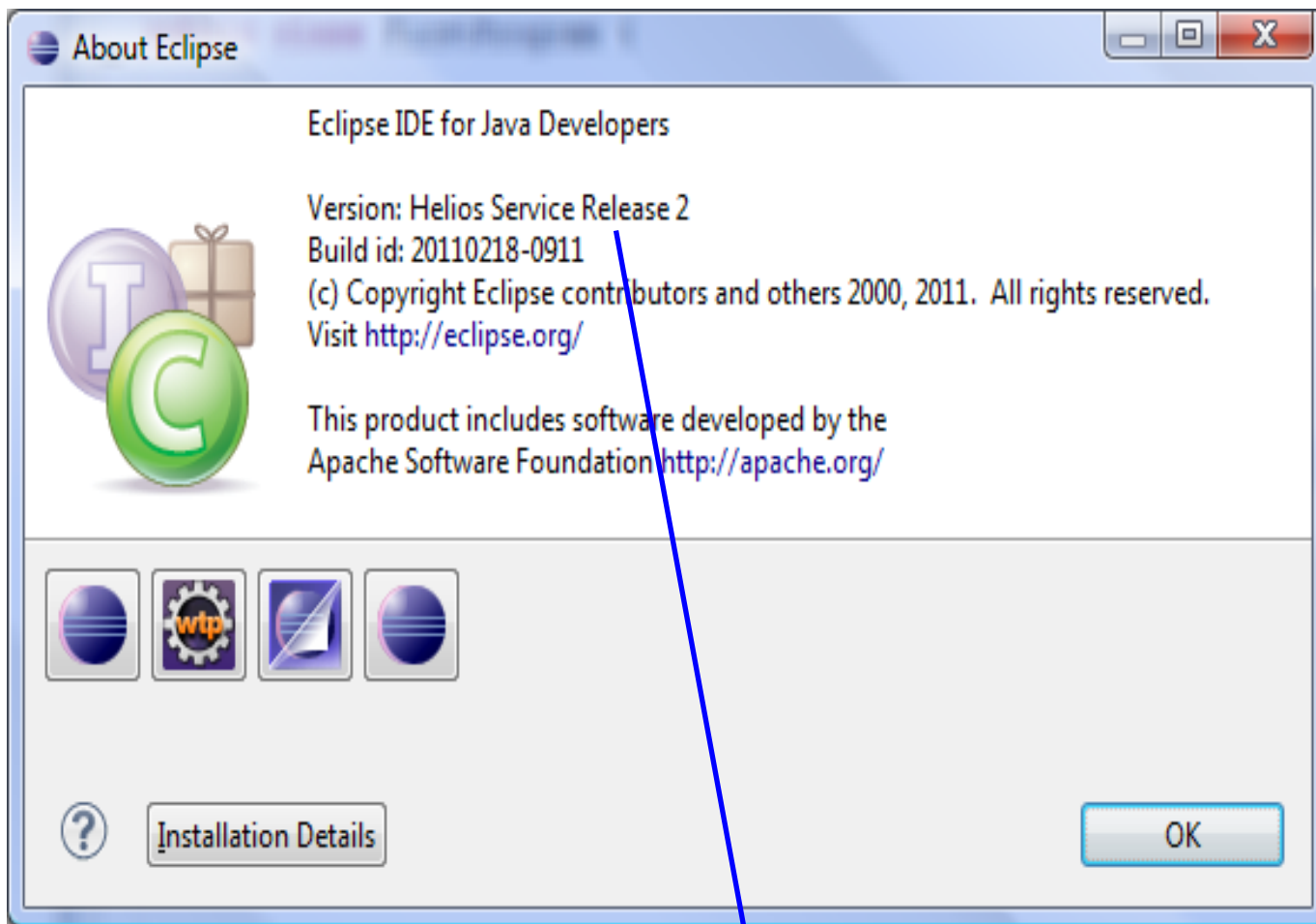


This is the actual Java source file inside the src directory.



This is the actual executable Java bytecode file in the "bin" directory.





The current version of Eclipse is Helios. You can verify that this is what you downloaded and setup by clicking the Help button in the workbench window and selecting “About Eclipse” from the menu.



# Getting JGrasp



http://www.jgrasp.org/

Go to www.jgrasp.org

# jGRASP

An Integrated Development Environment with Visualizations for Improving Software Comprehensibility

Current jGRASP release is version 1.8.8\_10 (April 18, 2011).

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- Download
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Click on download link

  
[Download jGRASP](#)

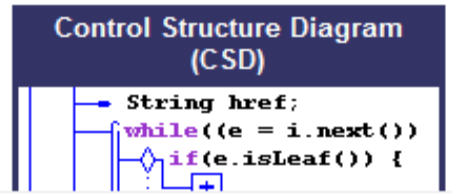
  
[Institutions Using jGRASP](#)

  
[Support jGRASP](#)

- Documentation**
- [jGRASP Help](#)
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  - [Tips](#)
  - [FAQ](#)
  - [Known Bugs](#)
  - [Version History](#)
  - [Future Plans](#)
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## About jGRASP

jGRASP is a lightweight development environment, created specifically to provide automatic generation of software visualizations to improve the comprehensibility of software. jGRASP is implemented in Java, and runs on all platforms with a Java Virtual Machine (Java version 1.5 or higher). jGRASP produces Control Structure Diagrams (CSDs) for Java, C, C++, Objective-C, Ada, and VHDL; Complexity Profile Graphs (CPGs) for Java and Ada; UML class diagrams for Java; and has dynamic object viewers that work in conjunction with an integrated debugger and workbench for Java. The viewers include a data structure identifier mechanism which



jGRASP Download - Windows Internet Explorer

http://spider.eng.auburn.edu/user-cgi/grasp/grasp.pl?dl=download\_jgra

File Edit View Favorites Tools Help

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jGRASP Download

case on the download button.

If the Windows or Mac OS X installer fails, you can download the [installation](#) (but please report the problem anyway).

**jGRASP 1.8.8\_10 (April 18, 2011) - requires Java 1.5 or higher**

Vista and Windows 7 users: if you are upgrading from jGRASP 1.8.7\_07 or older and have jGRASP docked on the taskbar, remove it and re-dock after installing this update. This will eliminate the extra taskbar icon that jGRASP runs.

[jGRASP exe](#) **Windows:** self-extracting exe. (5,268,379 bytes).

[jGRASP pkg.tar.gz](#) **Mac OS X 10.4 or higher (ppc or Intel):** tarred and gzipped package file (requires admin access to install). (5,394,297 bytes).

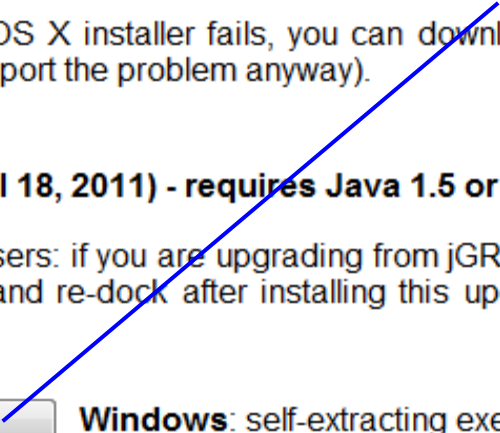
[jGRASP zip](#) **Linux, UNIX, and other systems:** zip file. (5,726,229 bytes).

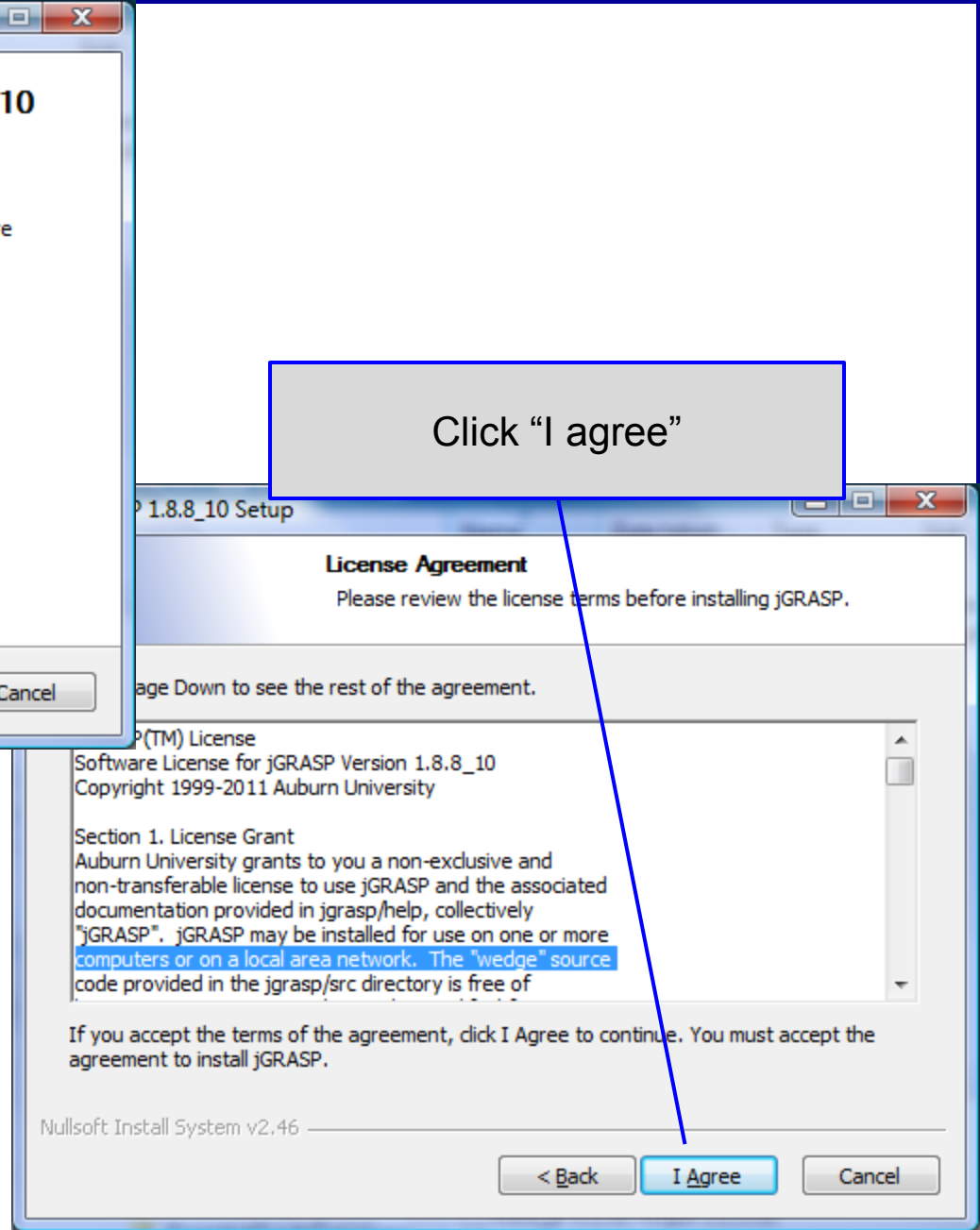
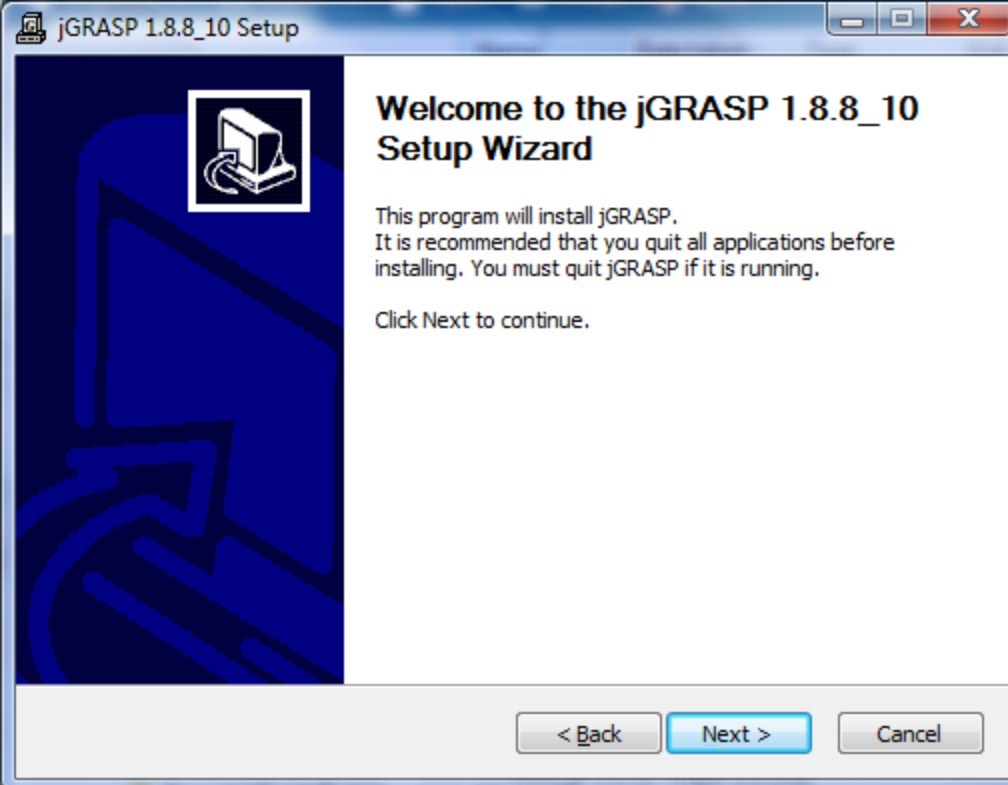
**jGRASP Tutorials (September 2, 2009)**

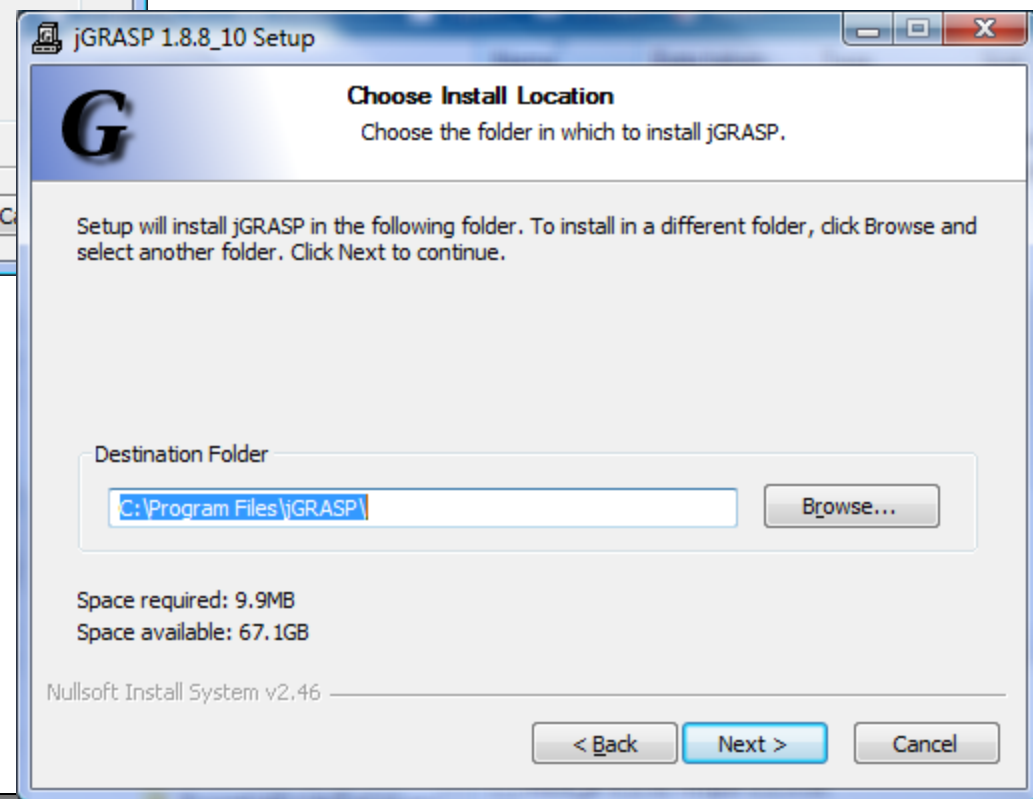
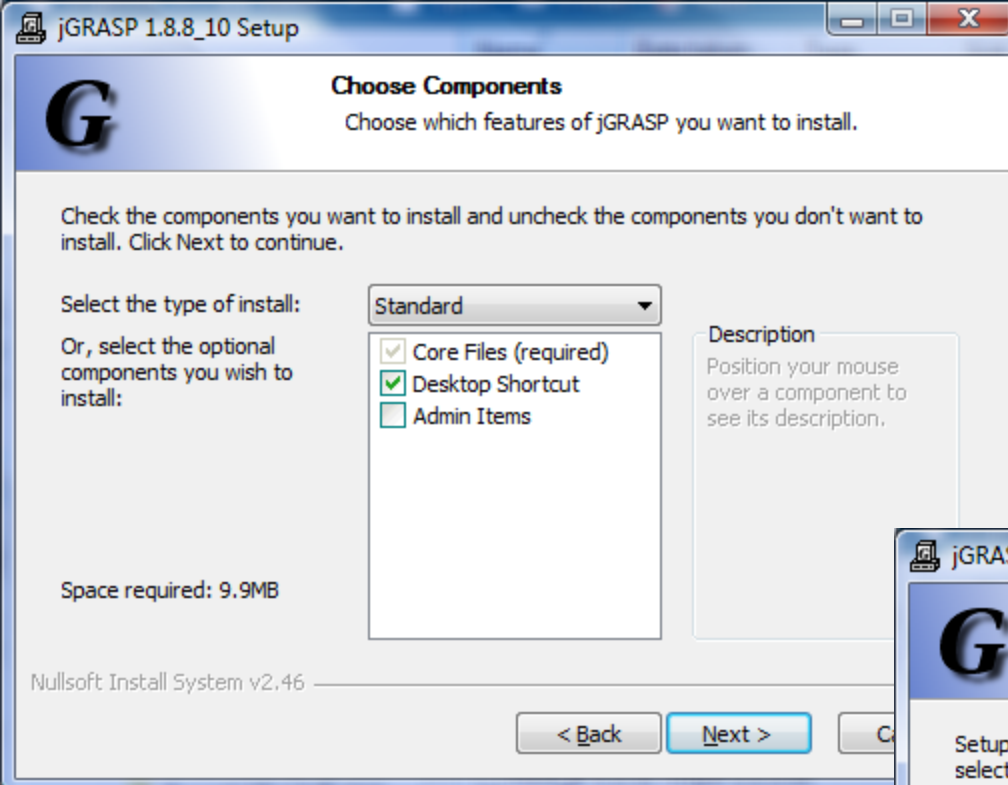
[jGRASP Tutorials zip](#) PDF tutorials for jGRASP 1.8.7, zipped up. This references the example source code that is distributed with jGRASP. (5,930,000 bytes).

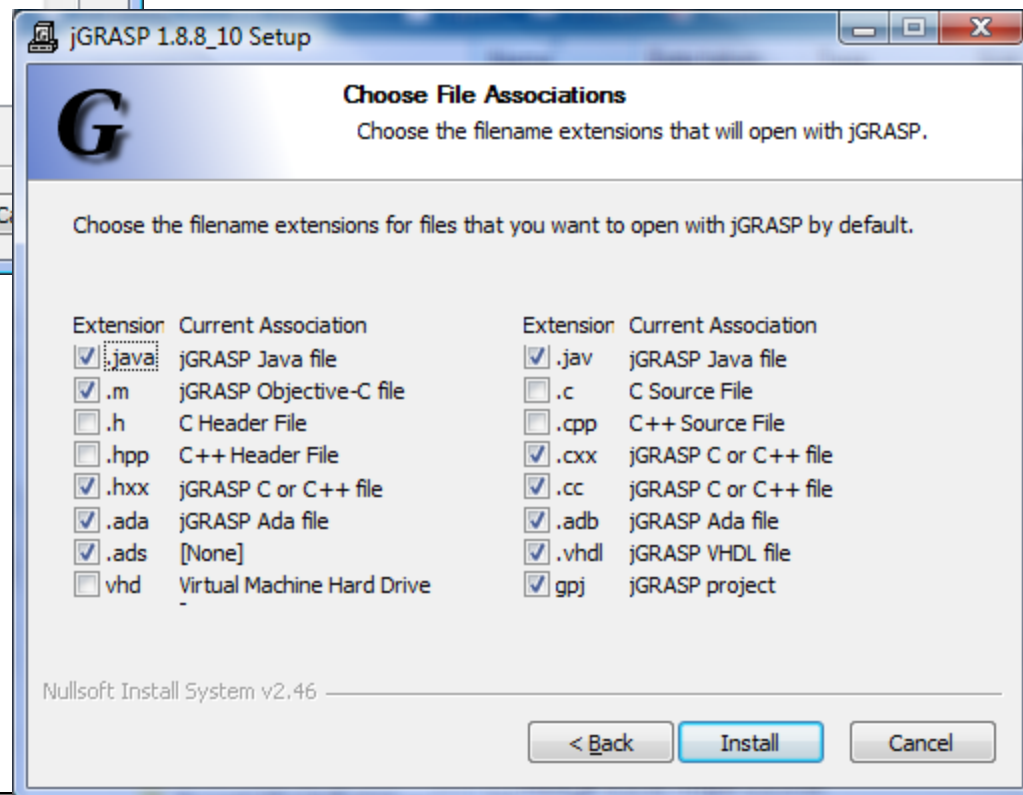
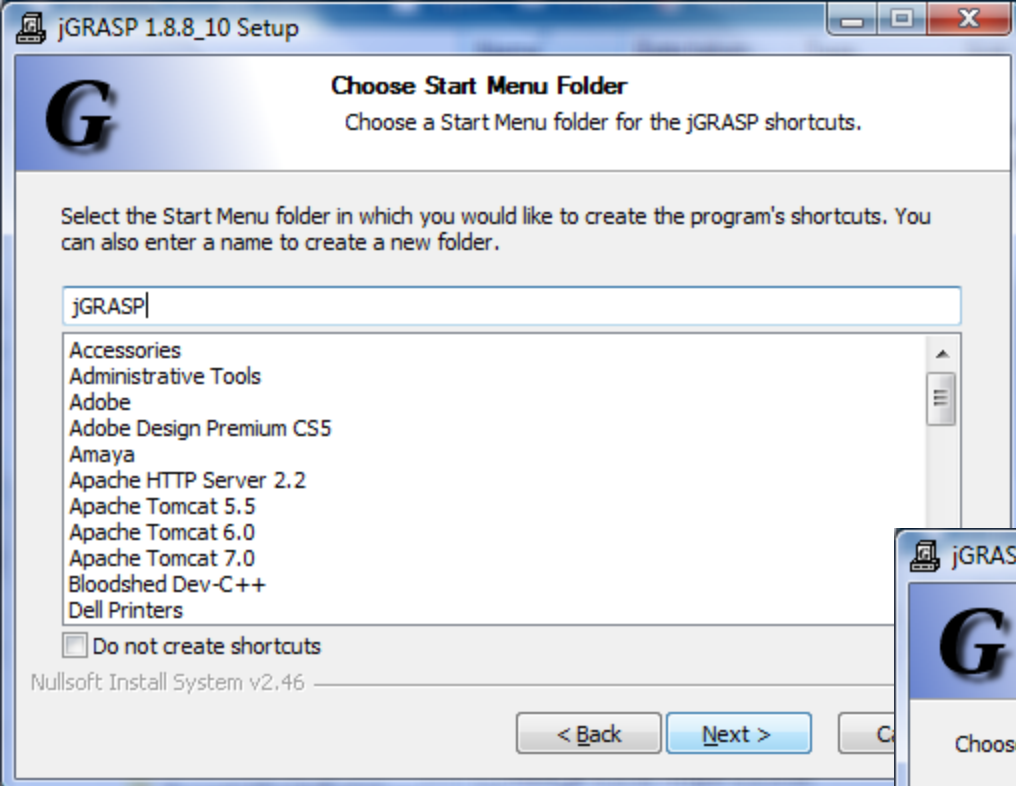
Internet | Protected Mode: Off 100%

Scroll down this page until you get to the right platform for your machine and click the button.

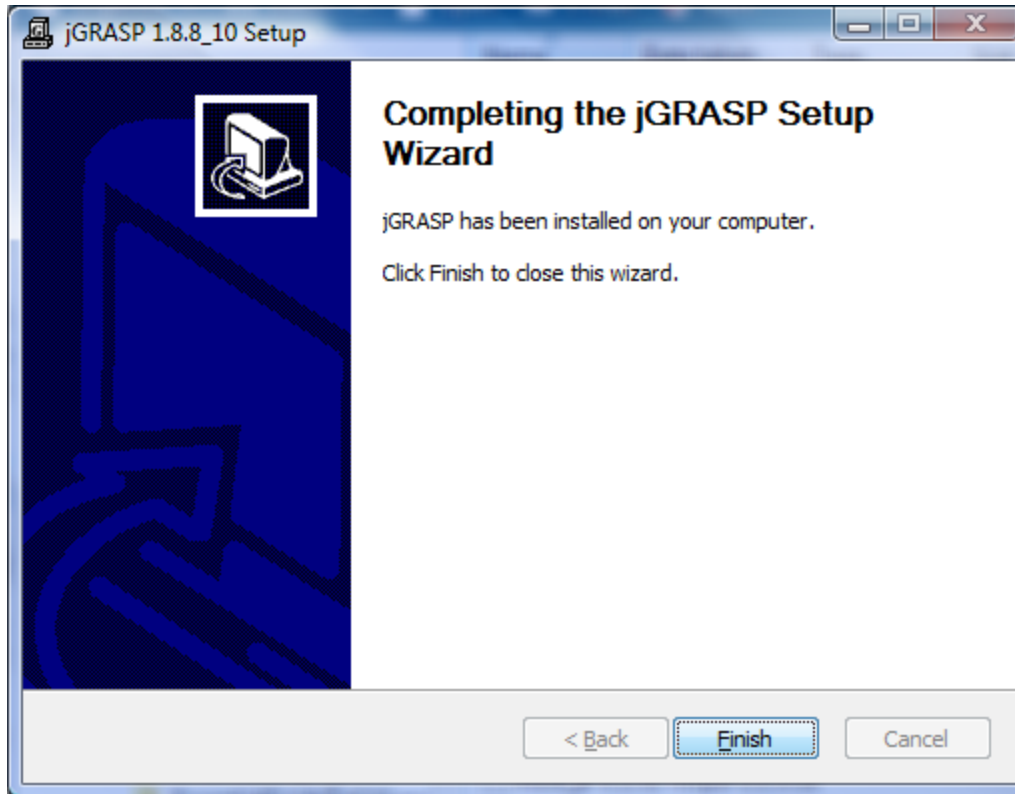


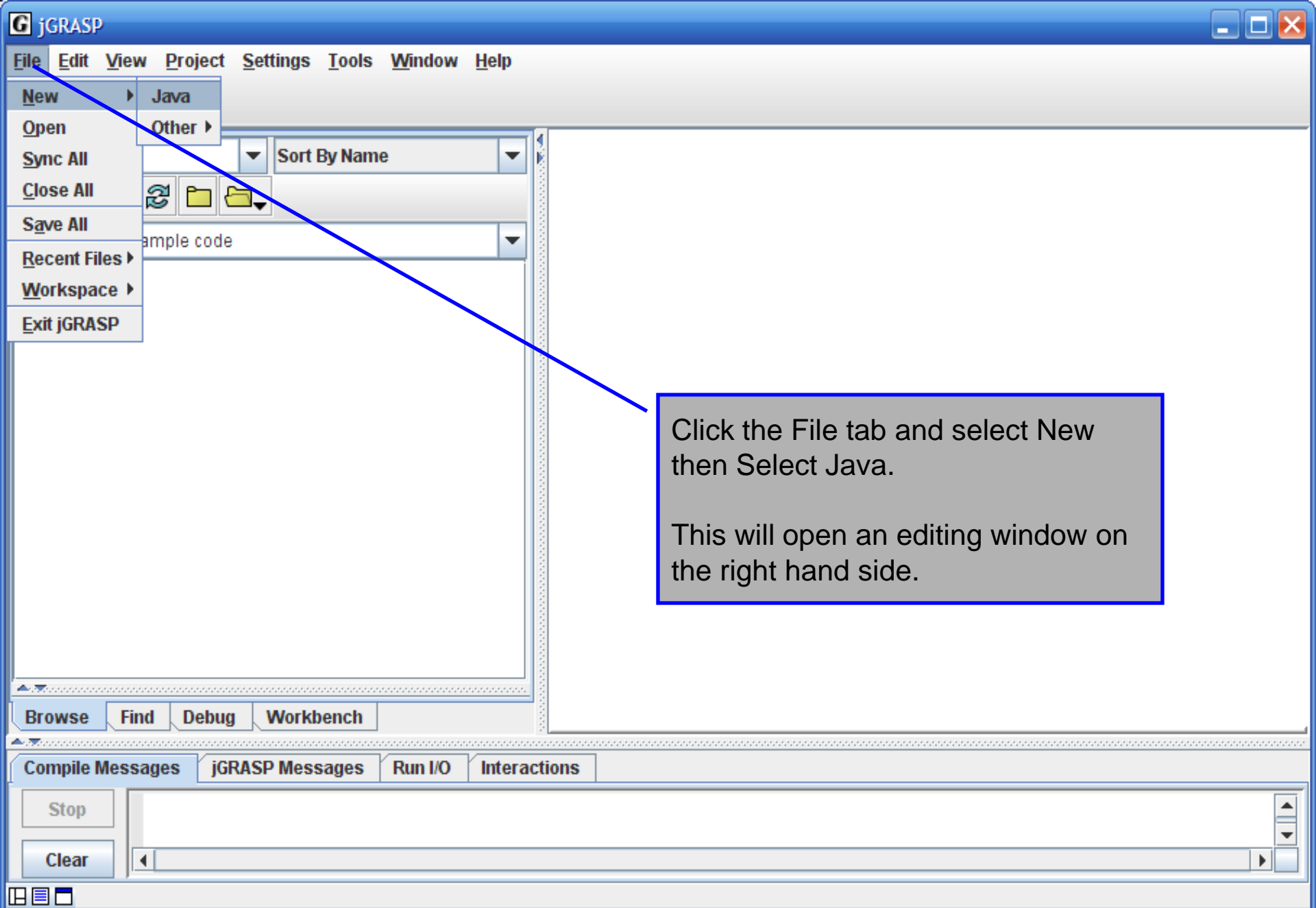








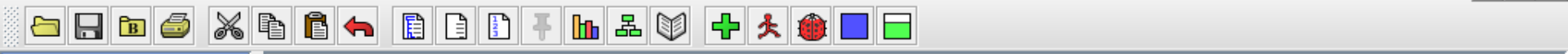




Click the File tab and select New then Select Java.

This will open an editing window on the right hand side.

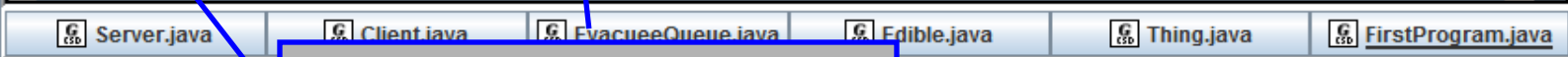




- All Files
- Sort By...
- Java Notes - Examples
  - Echo.java
  - FirstProgram.java**
  - Greetings.java
  - GreetingsUsingADialog
  - InputDialogBoxExamp
  - TestScanner.java
  - Thing.java
  - ThingVersion1.java
  - ThingVersion2.java
  - UniCodeExample.java

```
//class FirstProgram - begins here
//created 5/16/2011 - MJL
public class FirstProgram {
    //main method - begins here

    public static void main (String args[] ) {
        System.out.println("Welcome to Java.\n");
        System.out.println("Get ready to have some fun!\n");
    } //end main method
} //end class FirstProgram
```



Compile Messages

Stop

Clear

Copy

Open Projects

Browse Find

Debug Workbench

Enter your Java source code in this window and when you are done click the save icon and enter the same name as your class.





All Files Sort By...

Java Notes - Examples

- Echo.java
- FirstProgram.class
- FirstProgram.java**
- Greetings.java
- GreetingsUsingADialog
- InputDialogBoxExample
- TestS
- Thing
- Thing
- Thing
- UniCo

```
//class FirstProgram - begins here
//created 5/16/2011 - MJL
public class FirstProgram {
    //main method - begins here

    public static void main (String args[] ) {
        System.out.println("Welcome to Java.\n");
        System.out.println("Get ready to have some fun!\n");
    } //end main method
} //end class FirstProgram
```

Click the Compile button. Compilation statistics and syntax errors appear in the bottom window.

Client.java EvacueeQueue.java Edible.java Thing.java **FirstProgram.java**

Compile Messages jGRASP Messages Run I/O Interactions

Stop Clear Copy

```
----jGRASP exec: javac -g FirstProgram.java
----   at: May 16, 2011 5:41:30 PM

----jGRASP wedge: pid for wedge is 2712.
----jGRASP wedge2: pid for wedge2 is 3712.
----jGRASP wedge2: CLASSPATH is ".;.;C:\Program Files\Java\jre6\lib\ext\QTJava.zip;C
----jGRASP wedge2: working directory is [C:\Courses\COP 3330 - OOP\Summer 2010\new sa
----jGRASP wedge2: actual command sent ["C:\Program Files\Java\jdk1.6.0_25\bin\javac.
----jGRASP wedge2: pid for process is 4720.

----jGRASP wedge2: exit code for process is 0.
```



The compiled class file

```
class FirstProgram - begins here
//Created 5/16/2011 - MJL
public class FirstProgram {
    //main method - begins here

    public static void main (String args[] ) {
        System.out.println("Welcome to Java.\n");
        System.out.println("Get ready to have some fun!\n");
    } //end main method
} //end class FirstProgram
```

Click the Run icon to execute your program. Execution results appear in the window at the bottom.

Server.java Client.java EvacueeQueue.java Edible.java Thing.java FirstProgram.java

Compile Messages jGRASP Messages Run I/O Interactions

End  
Clear  
Help

```
Welcome to Java.
Get ready to have some fun!

----jGRASP wedge2: exit code for process is 0.
----jGRASP: operation complete.
```



# Working From The Command Prompt



# Using The Command Prompt

- If you use the command prompt to compile and execute your Java programs, you'll still need an editor in which to create the source code files. I would recommend Notepad++. Notepad++ is available free for download from <http://notepad-plus-plus.org>.
- The current version is Notepad++ 5.9.
- The remainder of these notes show you how to install Notepad++ and run your Java program from the command prompt.



Notepad++ | 5.9 - Windows Internet Explorer


http://notepad-plus-plus.org/

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Notepad++ | 5.9

free as in both "free speech" and "free beer"



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Current Version: 5.9

Notepad++ is a free (as in "free speech" and also as in "free beer") source code editor and Notepad replacement that supports several languages. Running in the MS Windows environment, its use is governed by GPL License.

Based on the powerful editing component Scintilla, Notepad++ is written in C++ and uses pure Win32 API and STL which ensures a higher execution speed and smaller program size. By optimizing as many routines as possible without losing user friendliness, Notepad++ is trying to reduce the world carbon dioxide emissions. When using less CPU power, the PC can throttle down and reduce power consumption, resulting in a greener environment.

You're encouraged to translate Notepad++ into your native tongue if there's not already a translation present in the Binary Translations page. And if you want, help translating Notepad++ official site into your native tongue would be greatly appreciated.

NEWS

Happy April 1st: No donations to Scientology cult  
04/01/2011 - 23:22  
Redirect donations to the Scientology  
04/01/2011 - 00:06  
Notepad++ v5.9 is released

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Notepad++ 5.9 Release | 5.9 - Windows Internet Explorer


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Notepad++

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## Notepad++ 5.9 Release

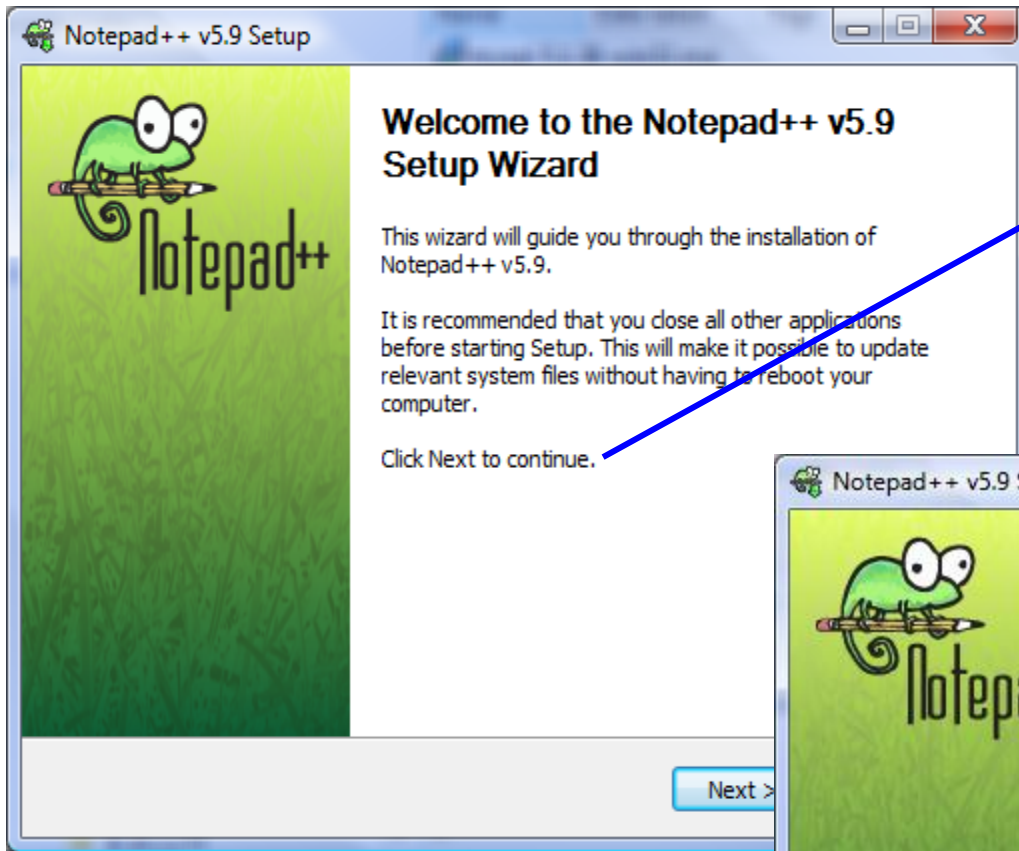
Release Date: 2011-03-31

- ▶ [Notepad++ v5.9 Installer](#)
- ▶ [Notepad++ v5.9 zip package](#)
- ▶ [Notepad++ v5.9 7z package](#)
- ▶ [Notepad++ v5.9 minimalist package](#)
- ▶ [SHA-1 digests for binary packages](#)
- ▶ [Notepad++ v5.9 code source \(source code\)](#)

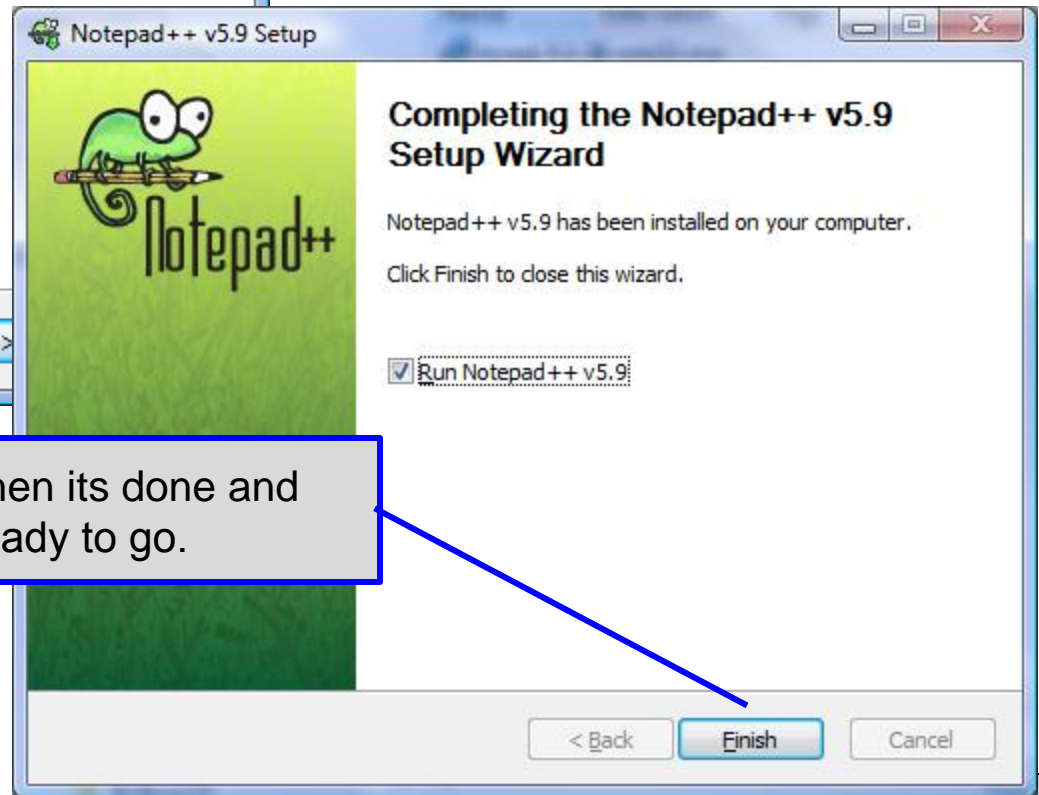
Internet | Protected Mode: Off 100%

**Select your choice**





Run the Notepad++ installer



Click Finish when its done and you're ready to go.

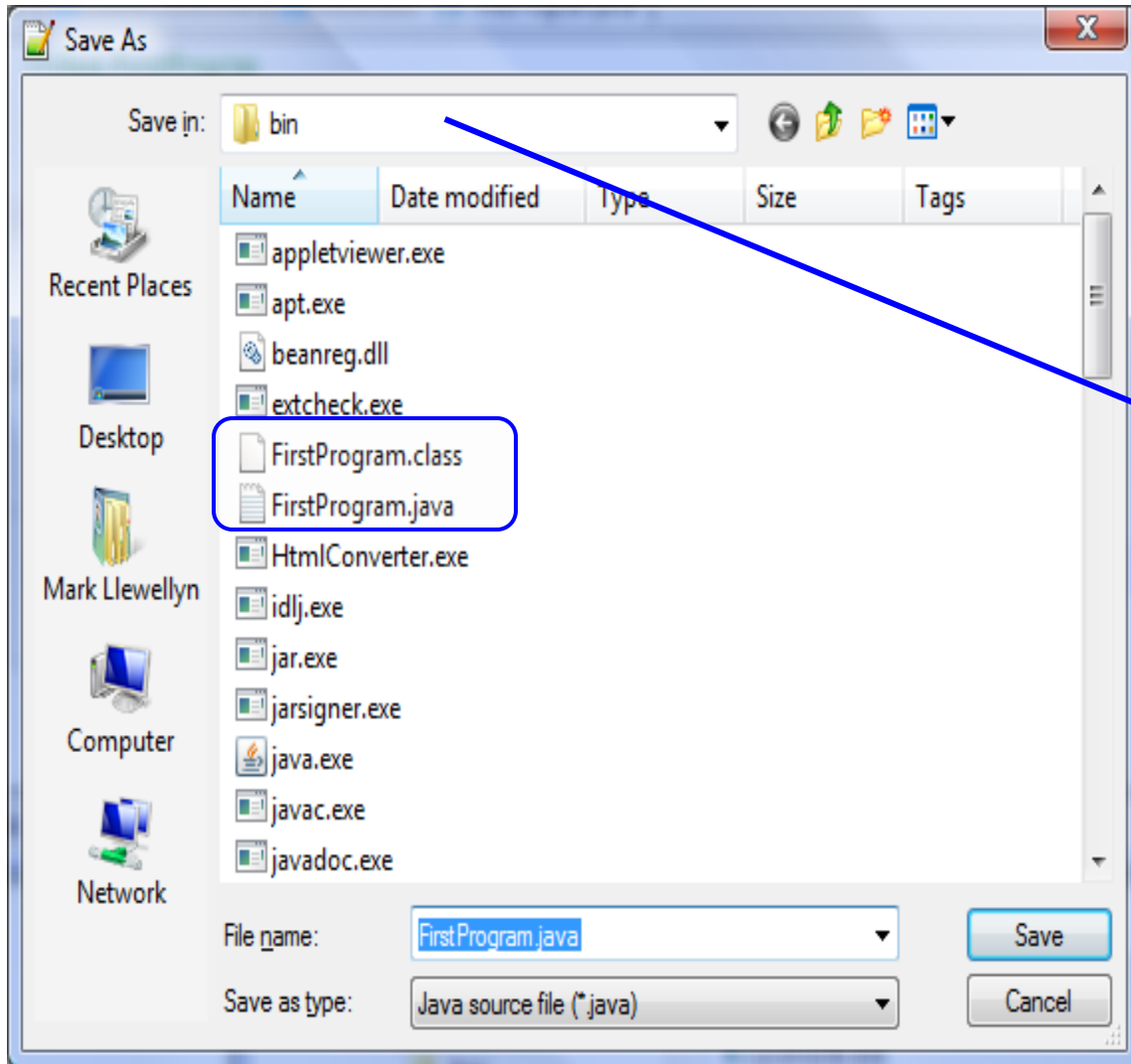


```
C:\Program Files\Java\jdk1.6.0_25\bin\FirstProgram.java - Notepad++
File Edit Search View Encoding Language Settings Macro Run TextFX Plugins Window ?
license.txt course_styles.css notes.html FirstProgram.java
1 //class FirstProgram
2 //created 5/16/2011 - MJL
3
4 public class FirstProgram {
5
6     //begin main method
7     public static void main (String args[]) {
8         System.out.println("Welcome to Java.\n");
9         System.out.println("Get ready to have some fun!\n");
10    } //end main method
11
12 } //end class FirstProgram
13
length : 300 lines : 13 Ln:11 Col:5 Sel:0 Dos\Windows ANSI INS
```

Run Notepad++ and enter the source code and save the file.

The simplest way to use the command prompt to execute your Java code is to place the .java files into the bin directory of your Java installation.





The simplest way to use the command prompt to execute your Java code is to place the `.java` files into the `bin` directory of your Java installation.

Once you've done this, start the command prompt and switch the working directory to the `bin` directory of your Java installation (see next page).



# Running Java from the Command Prompt

```
Administrator: Command Prompt
C:\>cd program files\java\jdk1.6.0_25\bin
C:\Program Files\Java\jdk1.6.0_25\bin>javac FirstProgram.java
C:\Program Files\Java\jdk1.6.0_25\bin>java FirstProgram
Welcome to Java.
Get ready to have some fun!
C:\Program Files\Java\jdk1.6.0_25\bin>_
```

Switch the working directory to the `bin` directory of your Java installation.

Compile the Java source using `javac`

Execute the class file created by the compiler using `java`

Work from within the Java JDK `bin` directory. Its also easiest to place all source and class files in this `bin` directory.

