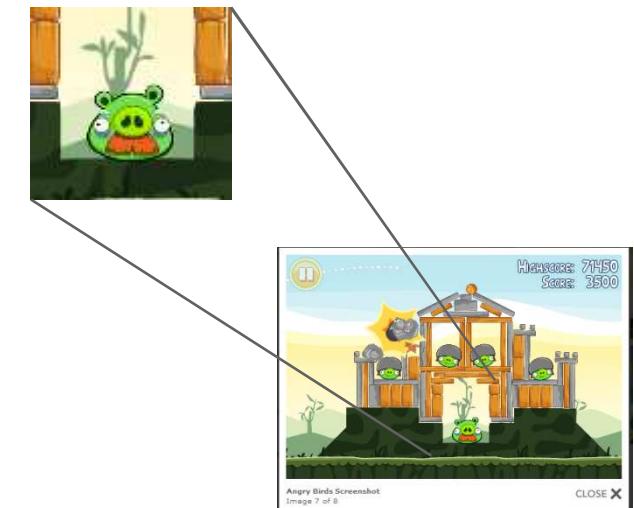


PyDev: Developing Python code in Eclipse

presented to the Python Interest Group

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401/B2100
2011-03-16

ICMS Content ID: [APS_1419152](#)



<http://www.rovio.com>

Abstract



Aptana PyDev (<http://pydev.org>) is a Python IDE for Eclipse which may be used in Python, Jython, and IronPython development. It can be used anywhere that Eclipse runs (including Windows, Mac, Linux). Features include syntax highlighting, code completion, source code debugging with breakpoints and inspection of variables, and refactoring.

Note that Python must be installed separately. It is possible to configure PyDev to use a specific Python if more than one Python is installed.

This presentation will focus on how to install, configure PyDev for routine use including systems with more than one Python installation.



Topics

- Installation
 - Python
 - Java
 - Eclipse
 - PyDev
- Configuration
 - Setting up Python
- Routine Use
 - Workspace
 - Project
 - Package
 - Module
 - Debugger
- Systems with more than one Python



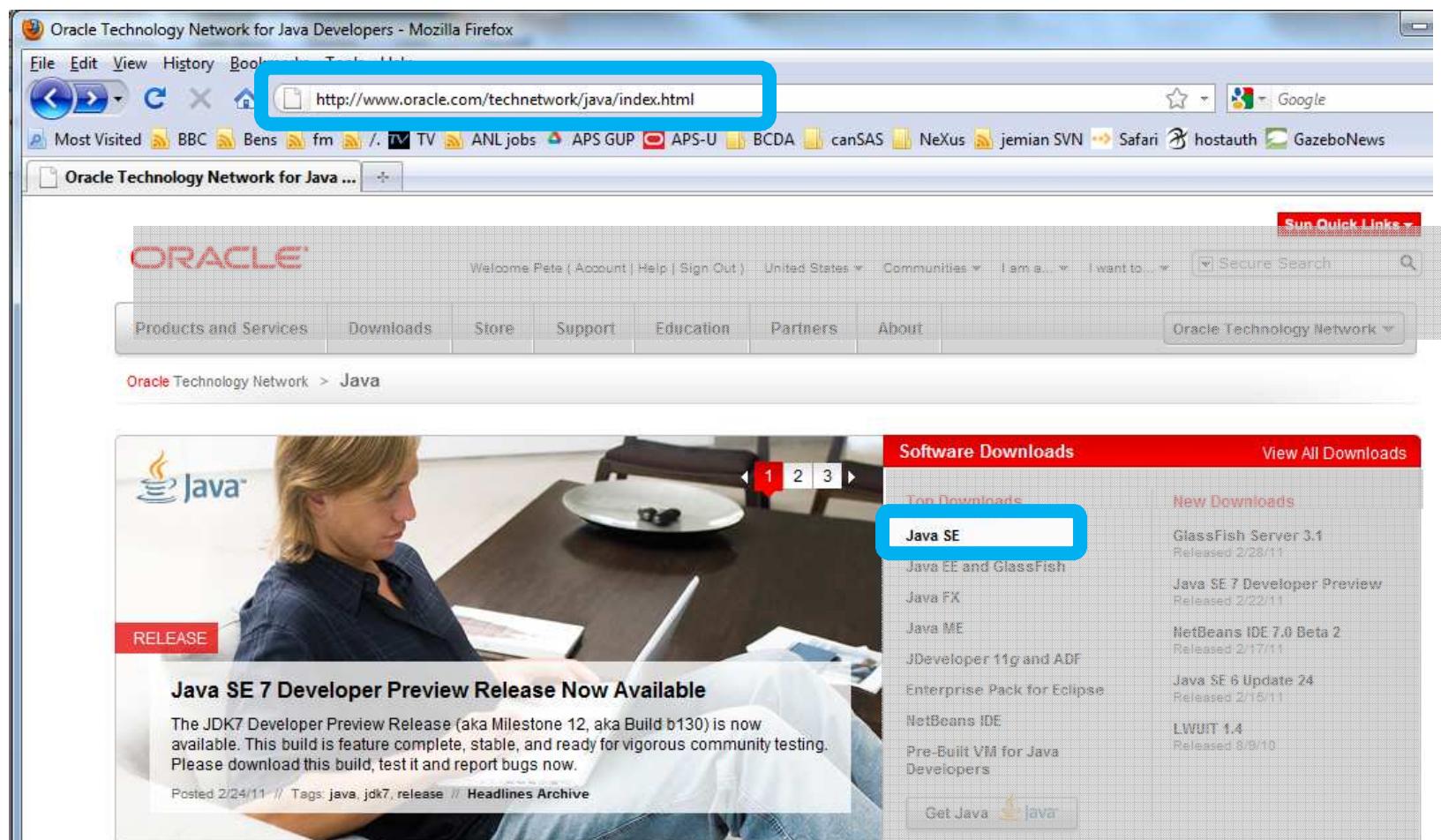
Python Distributions

(various distributions add extra packages)

- Python
 - <http://python.org/download/>
- Enthought Python Distribution (Win, Mac, Linux)
 - <http://www.enthought.com/products/epd.php>
- Python X,Y (Win, Linux)
 - <http://www.pythony.com/>
- Active State Python, Community Edition (Win, Mac, Linux)
 - <http://www.activestate.com/activepython>
- Linux package installer (Linux)

Note:
**Install Python in the
default location unless
you know better**

Eclipse needs Java: <http://java.oracle.com>
click on “Java SE”



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Select the Java Standard Edition (Java SE), Development Kit (JDK)

The screenshot shows the Java SE Downloads page. It features a grid of four download cards:

- Java Platform (JDK/JRE)**: Includes a Java logo icon and a "Download" button.
- JavaFX**: Includes a JavaFX logo icon and a "Download" button.
- NetBeans**: Includes a NetBeans logo icon and a "Download" button. A badge above it says "DEVELOPER.COM 2008 PRODUCT OF THE YEAR".
- Java EE**: Includes a Java EE logo icon and a "Download" button.

Below the cards, a note reads: "Here are the Java SE downloads in detail."

The screenshot shows the Java Platform, Standard Edition page for Java SE 6 Update 24. It includes the following sections:

- Java SE 6 Update 24**: Notes security enhancements and bug fixes. A "Learn more" link is provided.
- What Java Do I Need?**: Explains that the JRE is required for running Java applications, while the JDK is needed for development.
- Downloads**: Includes links for "Download JDK" (highlighted with a blue box and arrow), "Download JRE", "JDK 6 Docs", "JRE 6 Docs", "Installation Instructions", and "ReadMe".

Java SE Development Kit 6u24

This screenshot shows the "Provide Information, then Continue to Download" step for the Java SE Development Kit 6u24 download. It includes:

- Select Platform and Language for your download:**
 - Platform:** A dropdown menu set to "Windows x64".
 - Language:** Multi-language.
- License Agreement:** A checkbox labeled "I agree to the Java SE Development Kit 6u24 License Agreement".
- Continue:** A red "Continue »" button.



Start the download, then install it in the default place

Download Java SE Development Kit 6u24 for Windows x64, Multi-language

Download Information and Files

Instructions: Click the file name to start the download.

Available Files

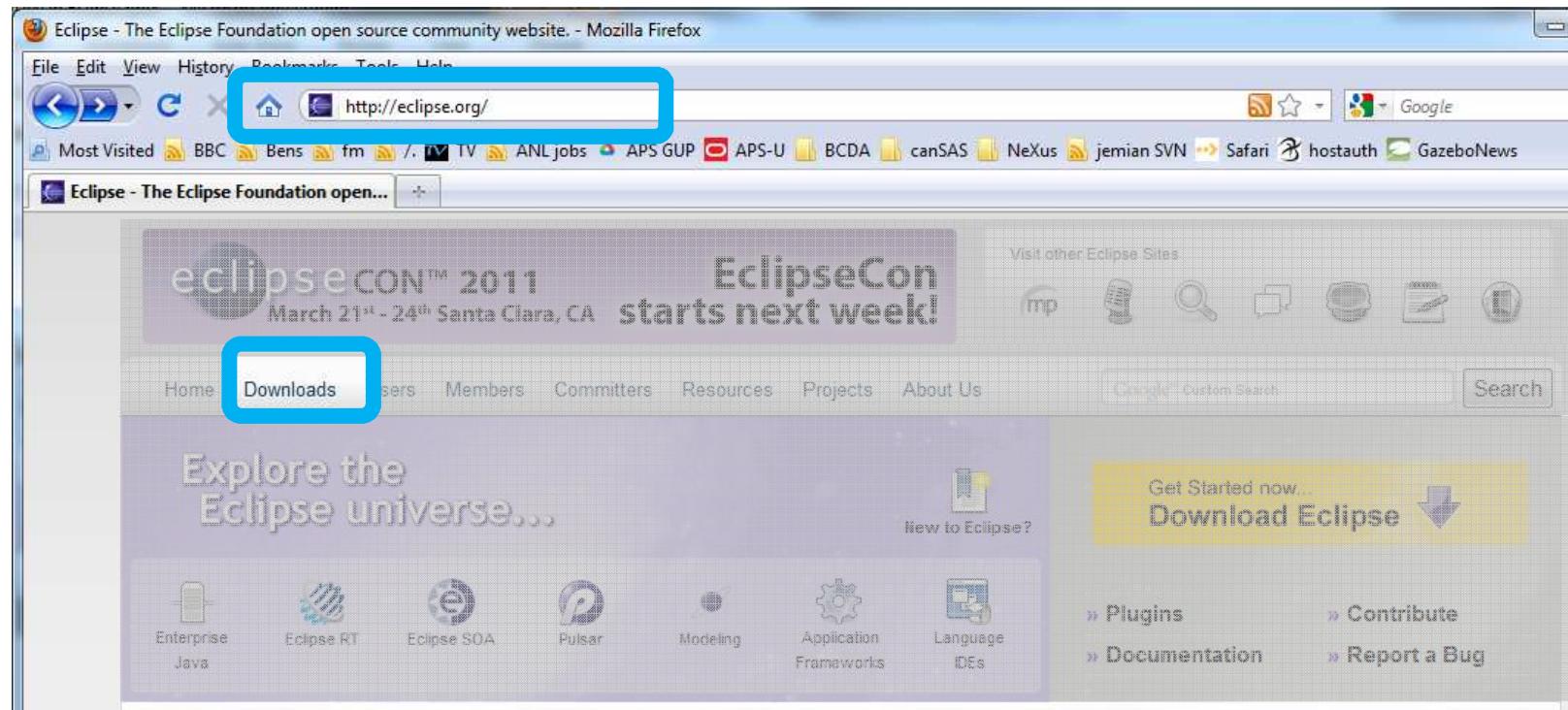
File Description and Name	Size
Java SE Development Kit 6u24 jdk-6u24-windows-x64.exe	66.85 MB

Notes:

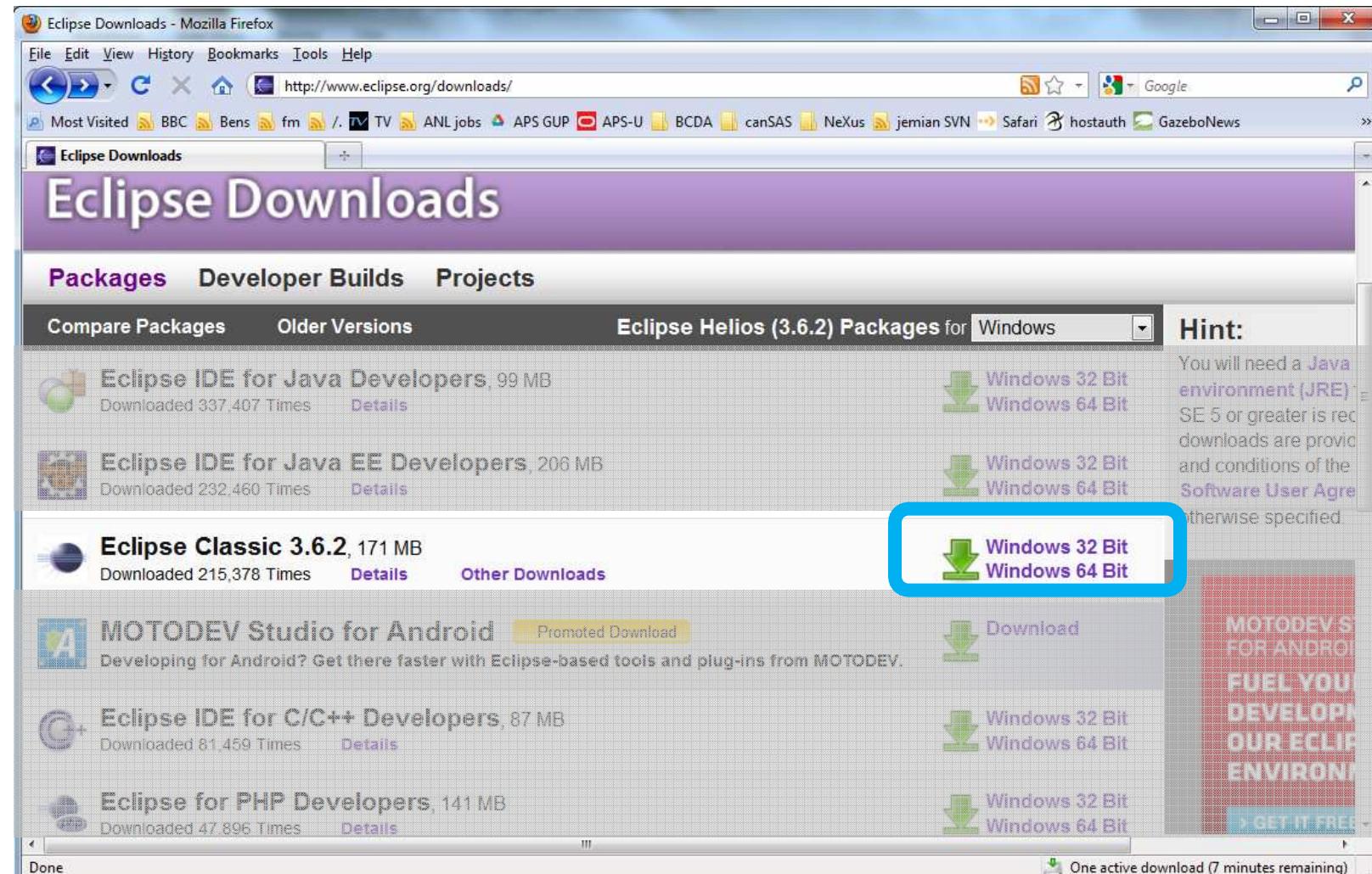


Downloading Eclipse: <http://eclipse.org>

Click on “Downloads”



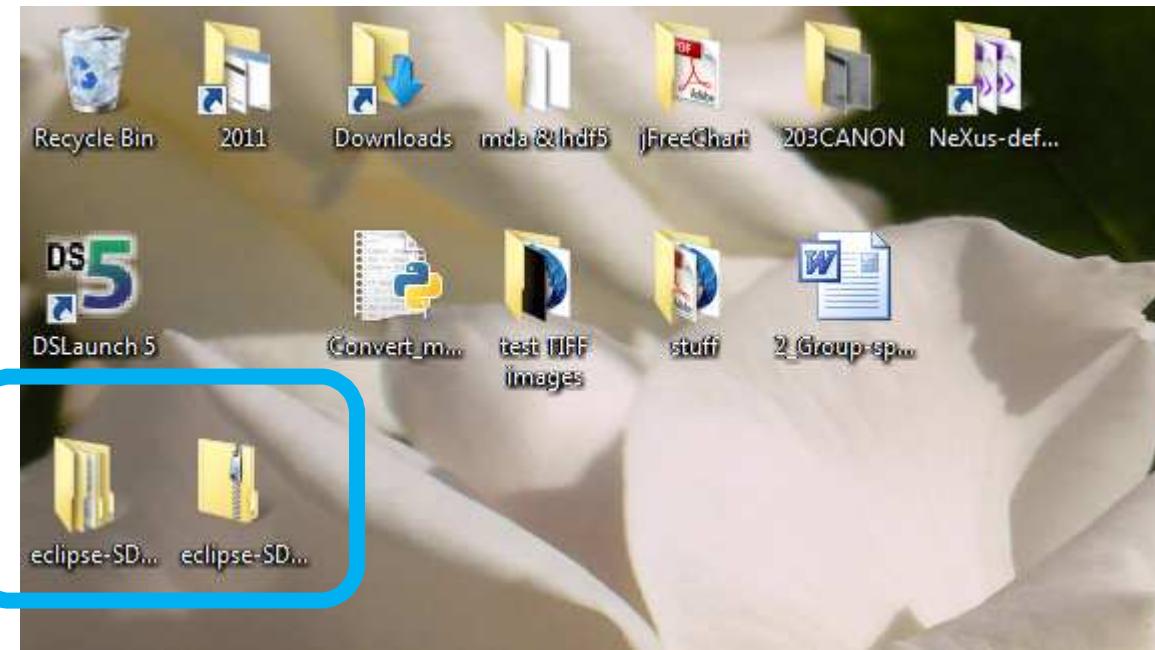
Pick a version: “Classic” provides many tools. You can always edit/remove other parts later



Downloads from a mirror

The screenshot shows a Mozilla Firefox window displaying the Eclipse downloads - mirror selection page. The URL in the address bar is http://www.eclipse.org/downloads/download.php?file=/eclipse/downloads/drops/R-3.6.2-201102101200/eclipse-SDK-3.6.2-win32-x86_64.zip. The page features a banner for "eclipseCON™ 2011" and "EclipseCon starts next week!". A sidebar on the left includes links for "Downloads Home", "Bit Torrents", "Source code", and "More Packages". Below this is a "Give Back to Eclipse" section with donation buttons for \$5, \$15, and \$25, and a link to "Donate \$35 or more and Become a Friend of Eclipse!" via PayPal. The main content area is titled "Eclipse downloads - mirror selection" and provides download links for "eclipse-SDK-3.6.2-win32-x86_64.zip" from various mirrors, including Indiana University (http) and BitTorrent. A large green download icon is highlighted with a blue circle. A sidebar on the right displays an advertisement for Sonatype.

Unzip the eclipse download *anywhere that is convenient*

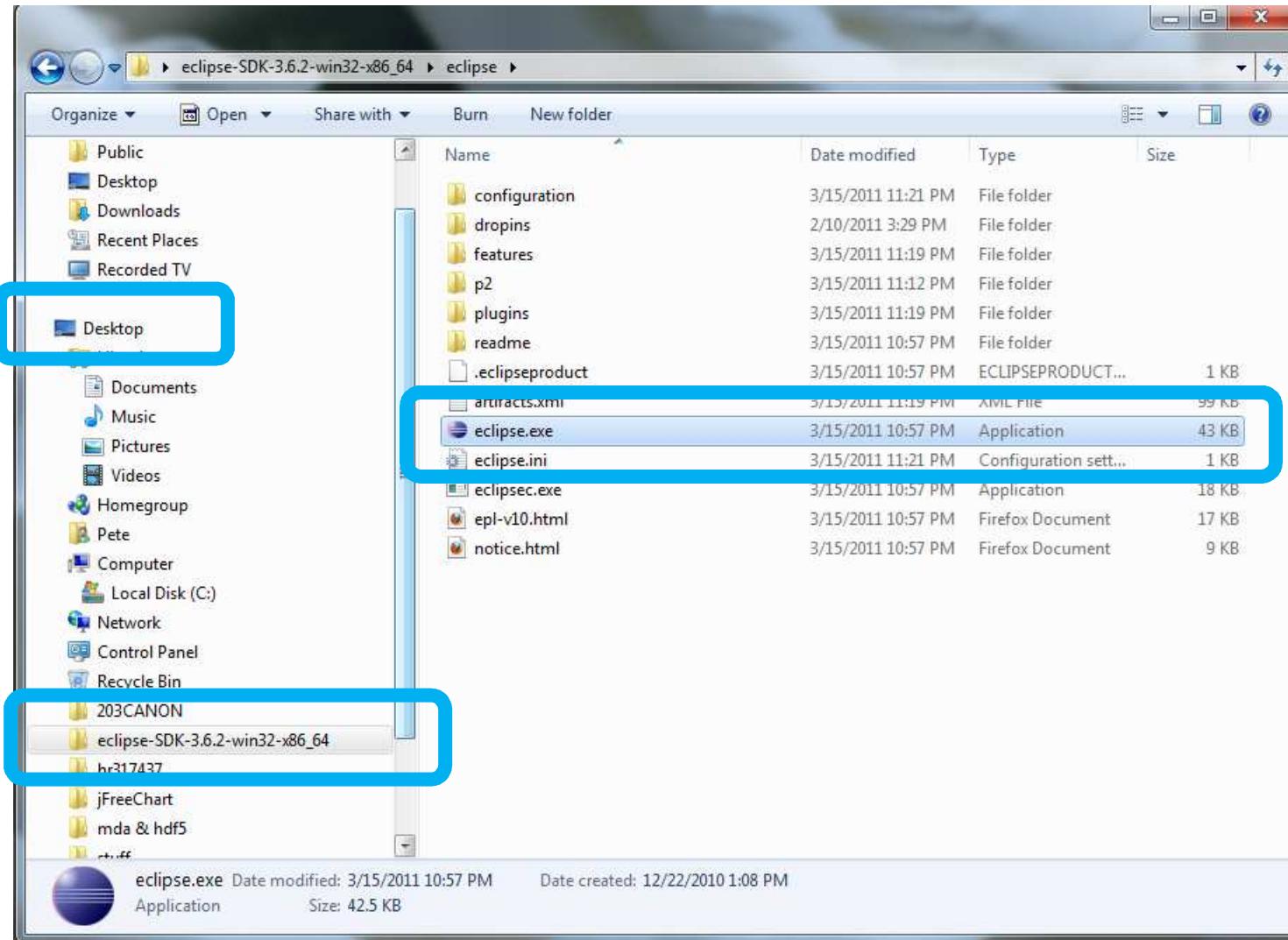


Note:

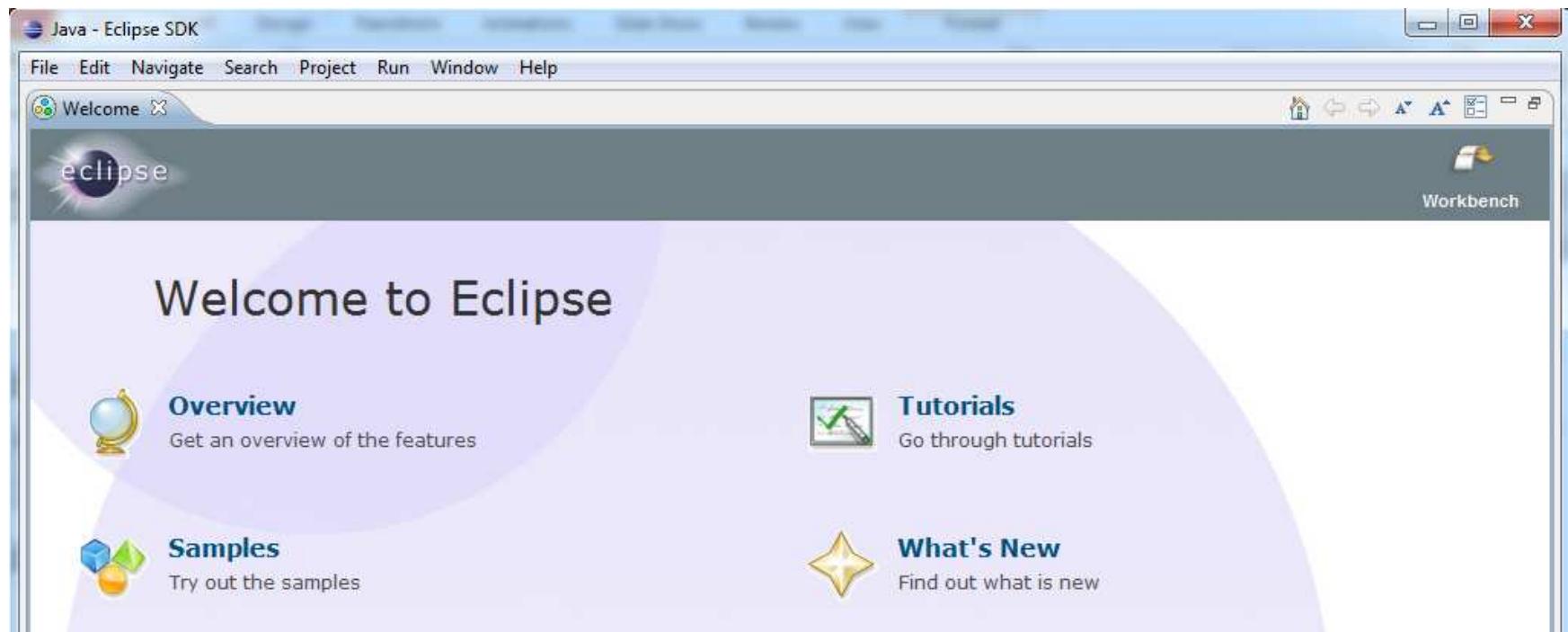
Here, the ZIP file is on the desktop and extracted to the desktop



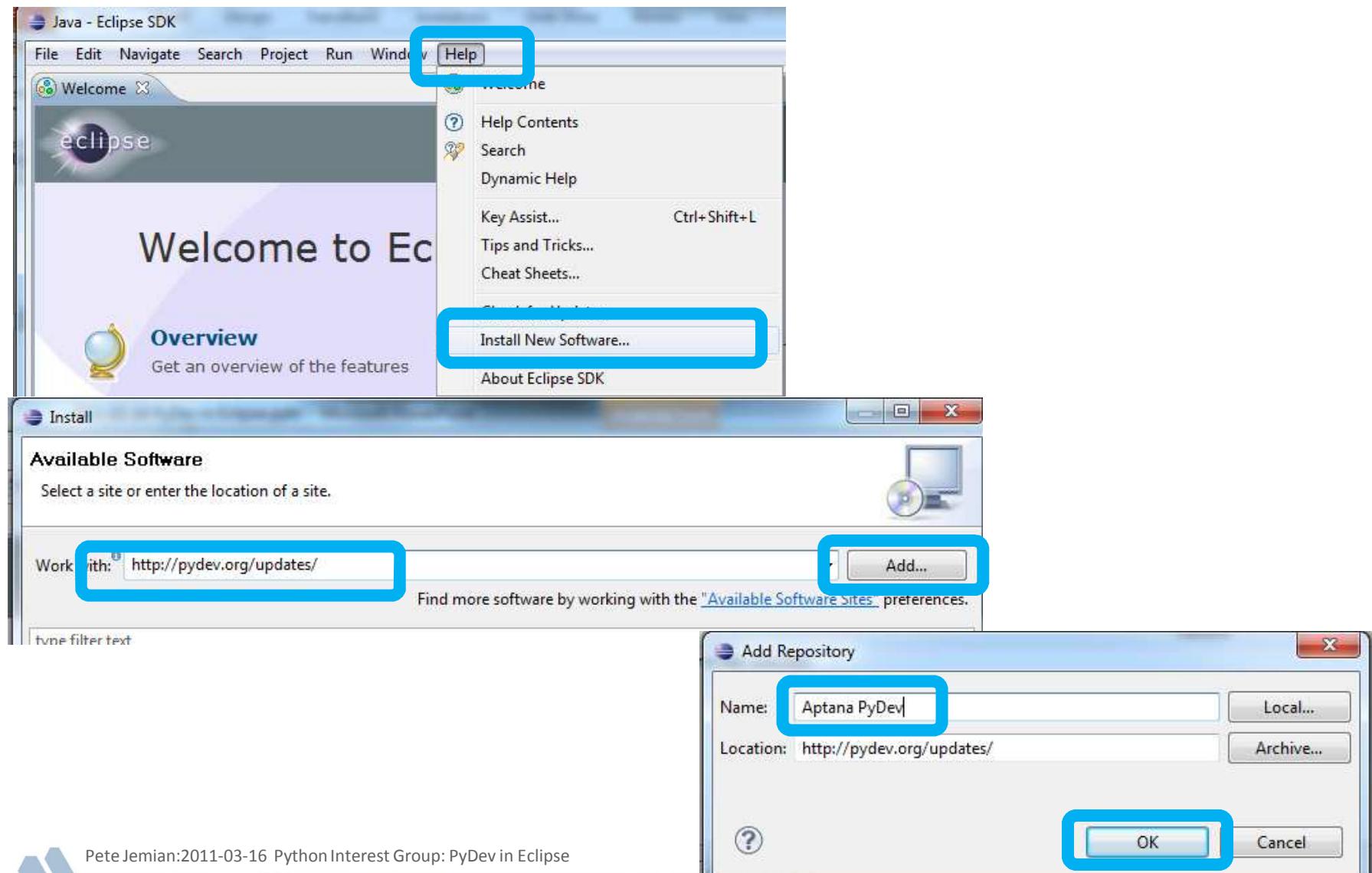
start the *eclipse* executable (look in <extracted_folder>/eclipse/)



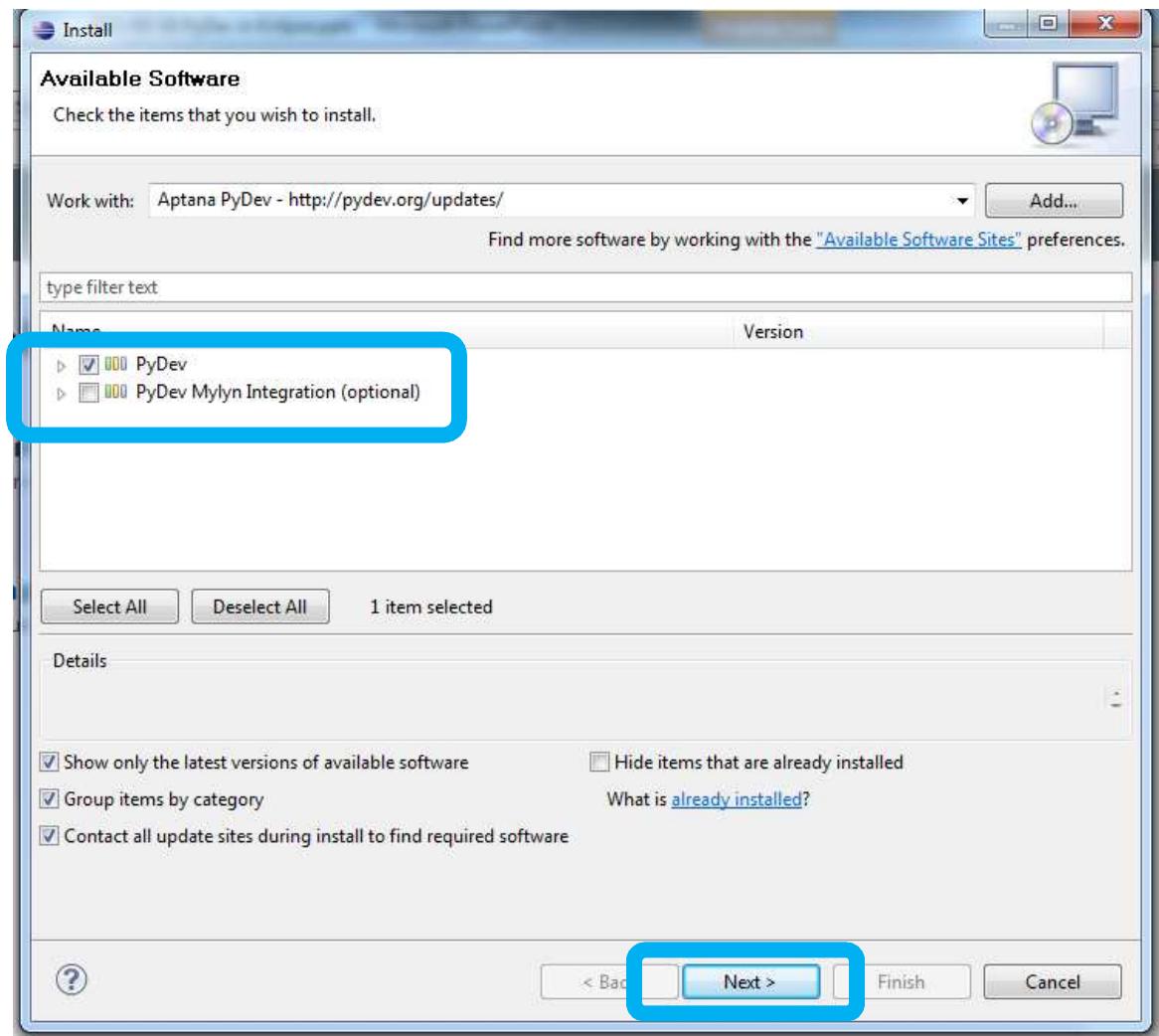
Welcome to eclipse



Installing PyDev: <http://pydev.org/updates/> (this URL is an eclipse update site - use eclipse to get it)



Select PyDev



Note:

**click [Next] and click through, including License Agreement and Certificate,
Then, restart eclipse as requested**



Installation is complete, take a break

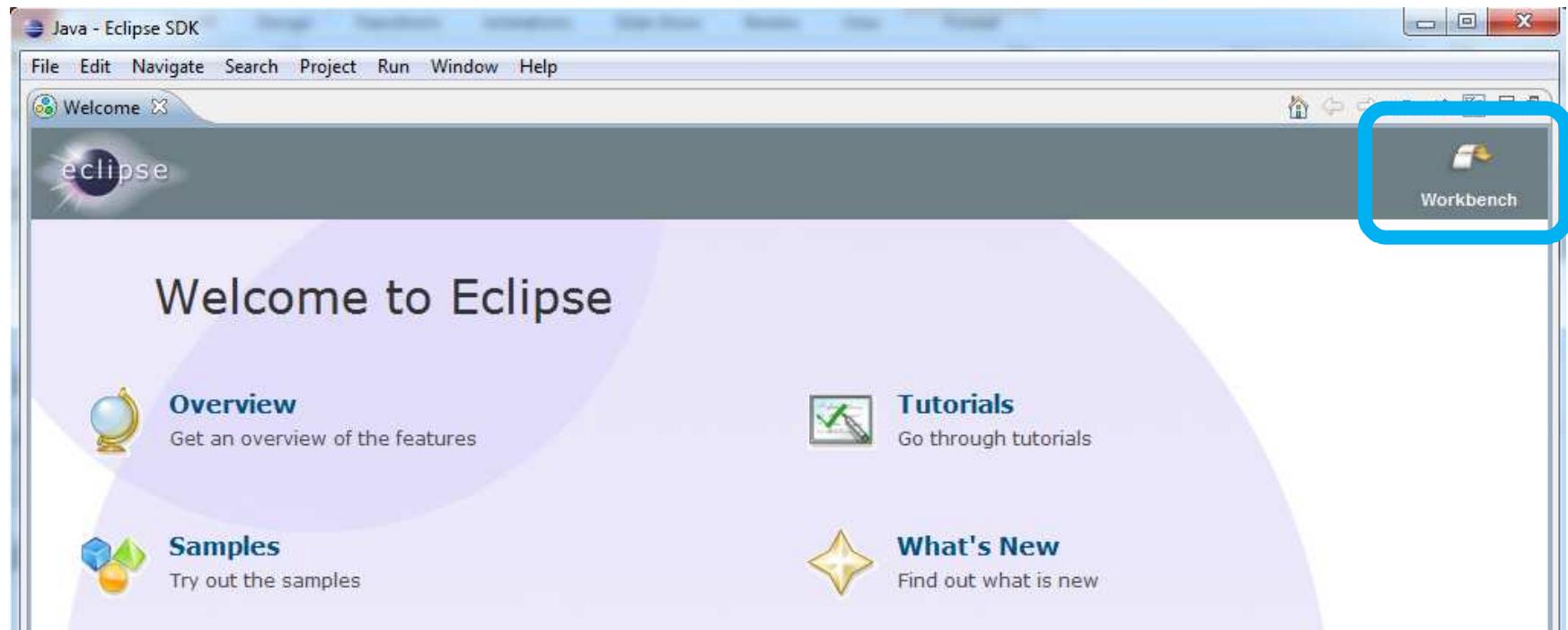


Worth 1000.com

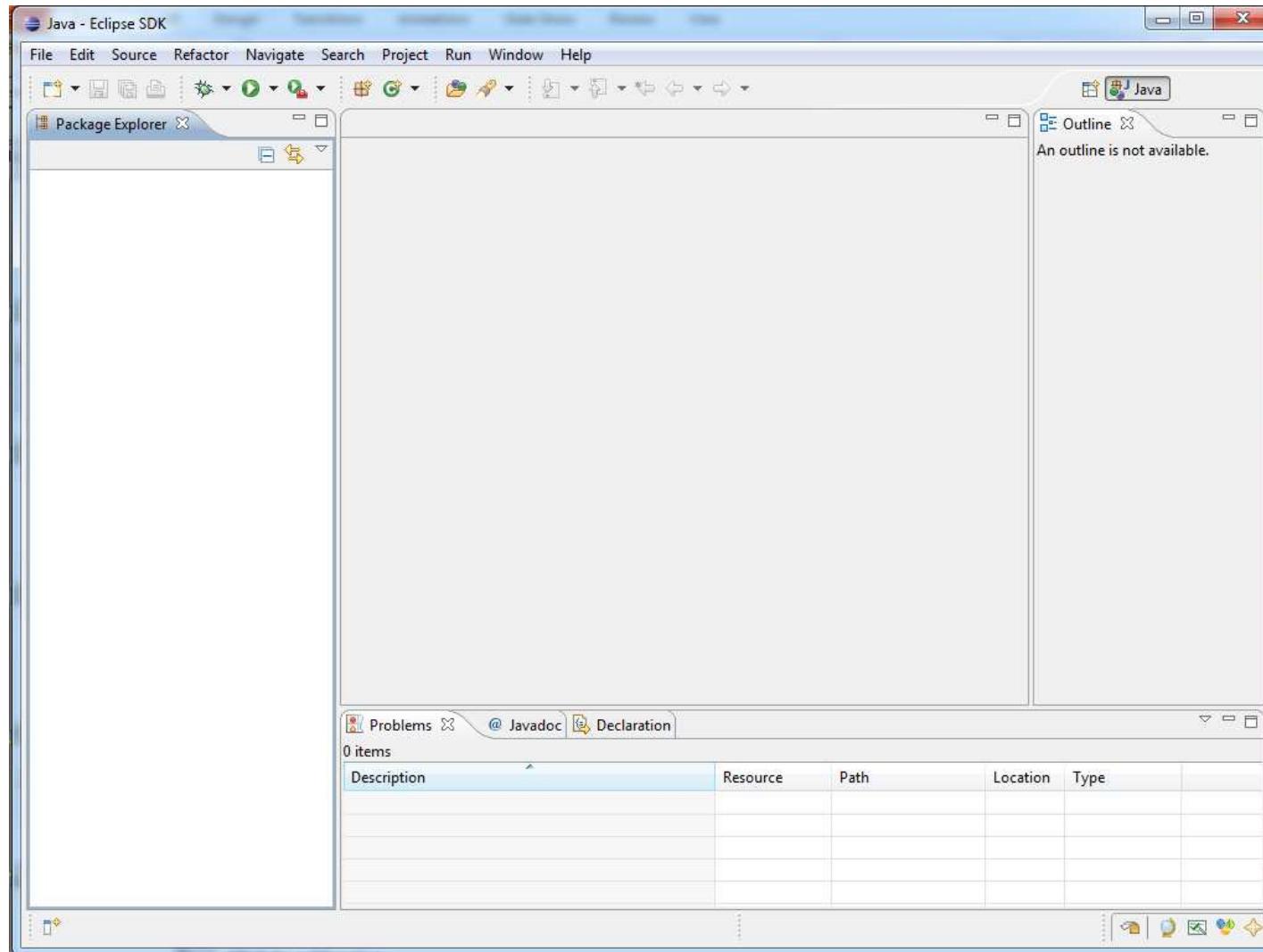
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Configure PyDev for the Python Interpreter

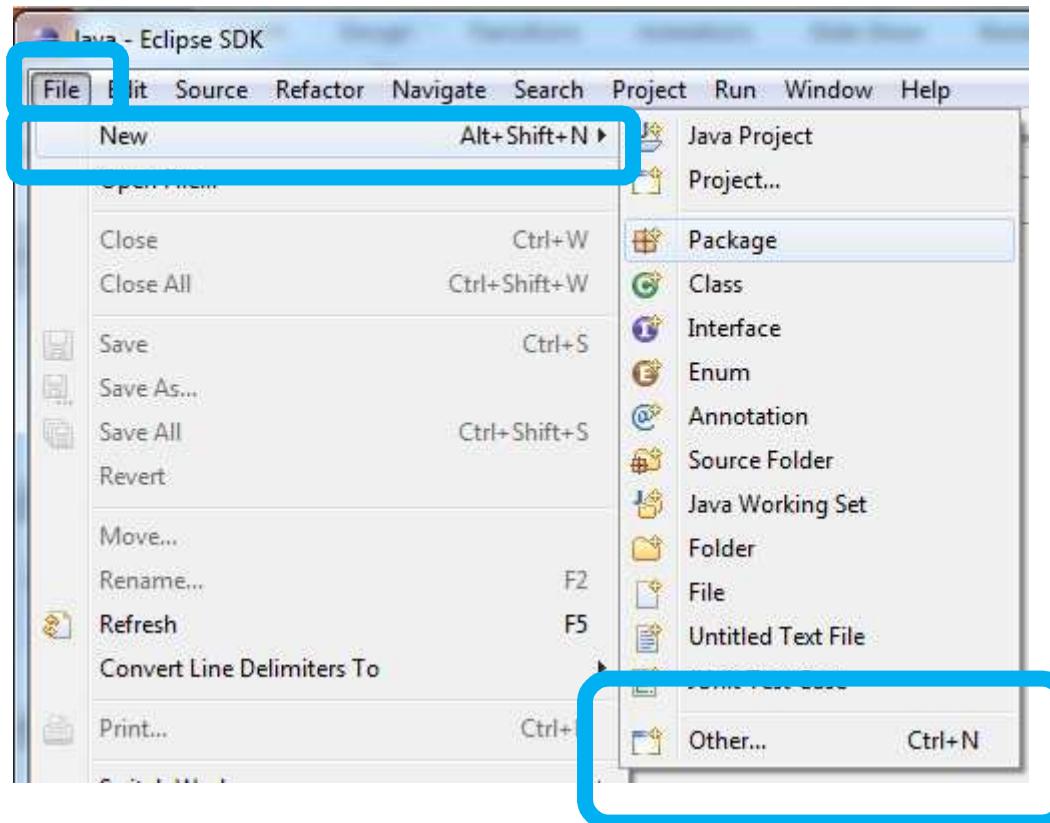


Arrive at the empty workbench (progressing to configure PyDev for Python interpreter ...)



New Python Project

(... still progressing to configure PyDev for Python interpreter ...)



Note:

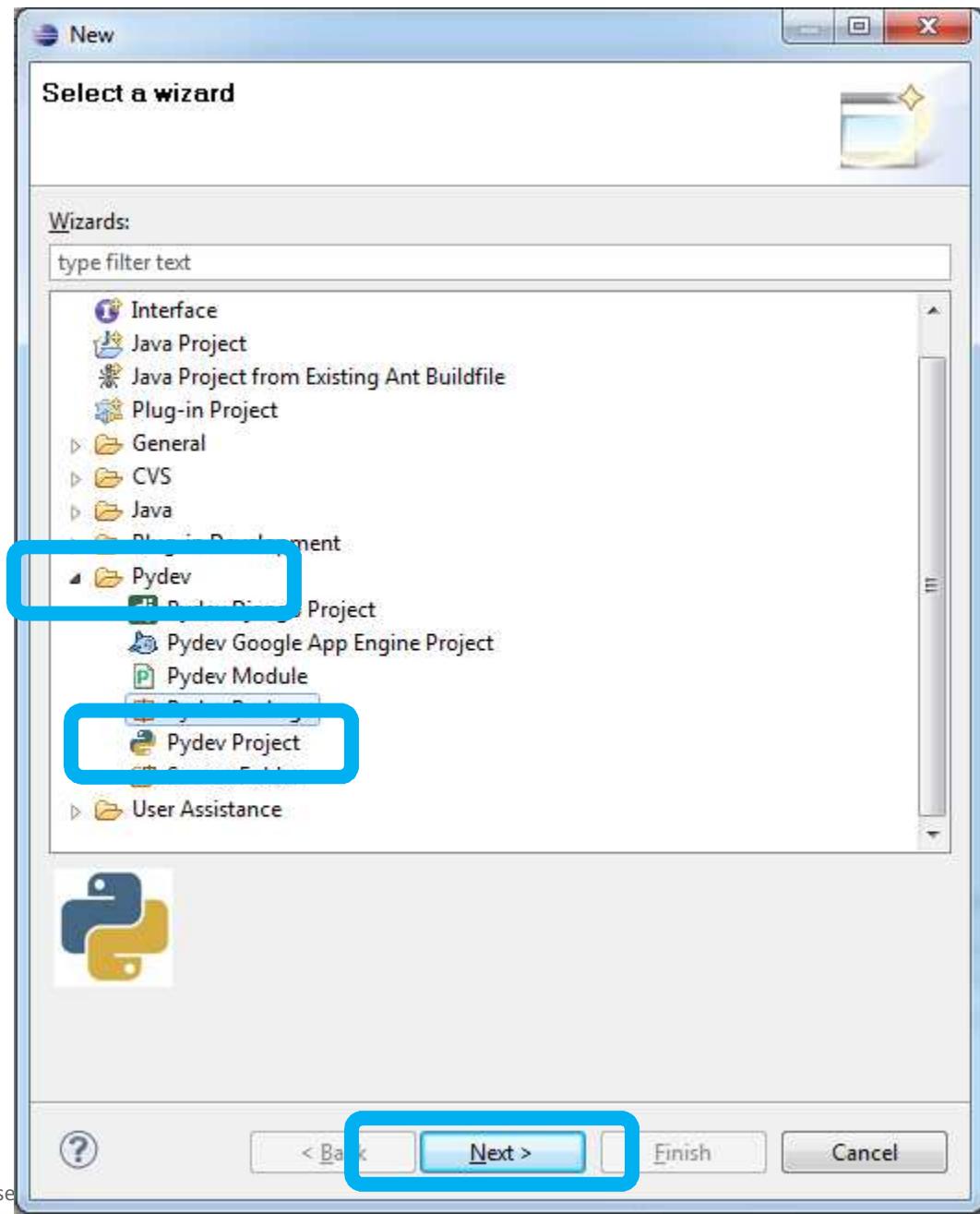
There are other ways to get to the Properties dialog to configure PyDev for the Python interpreter. This one seems indirect at first but is very short.



Expand this entry →

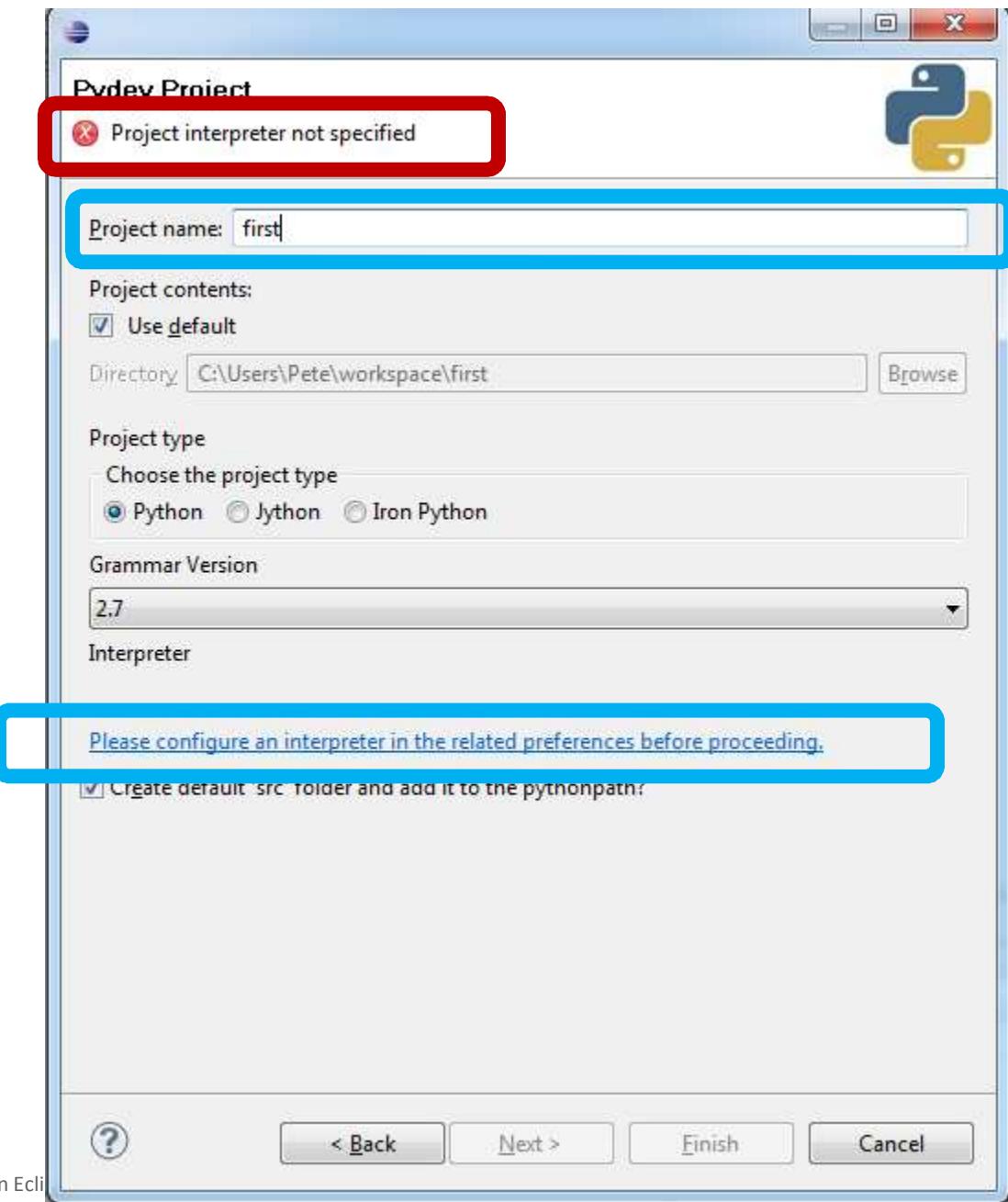
Click this next→

Click [Next >] →



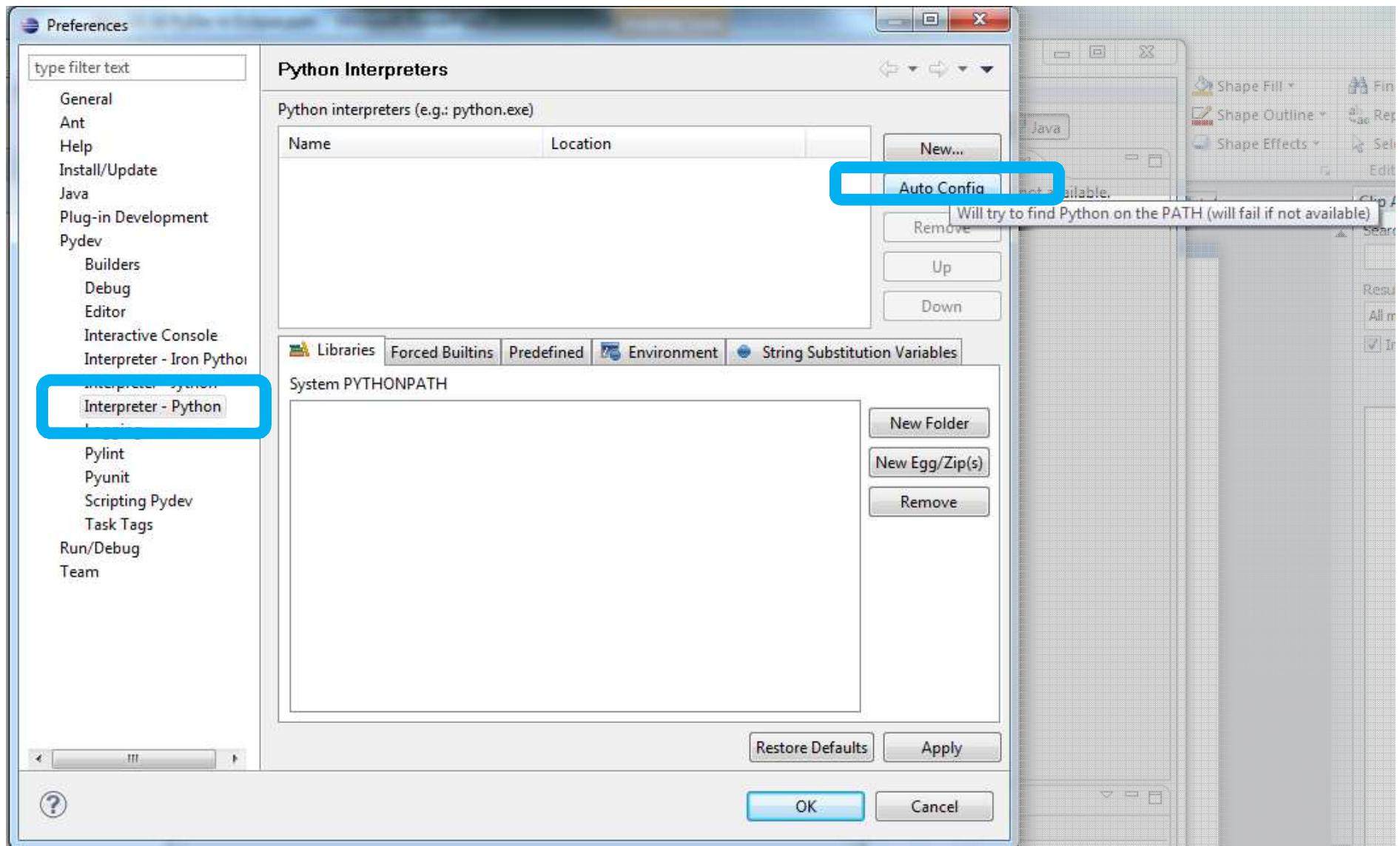
Make Project & Configure

Give some name ("test") →

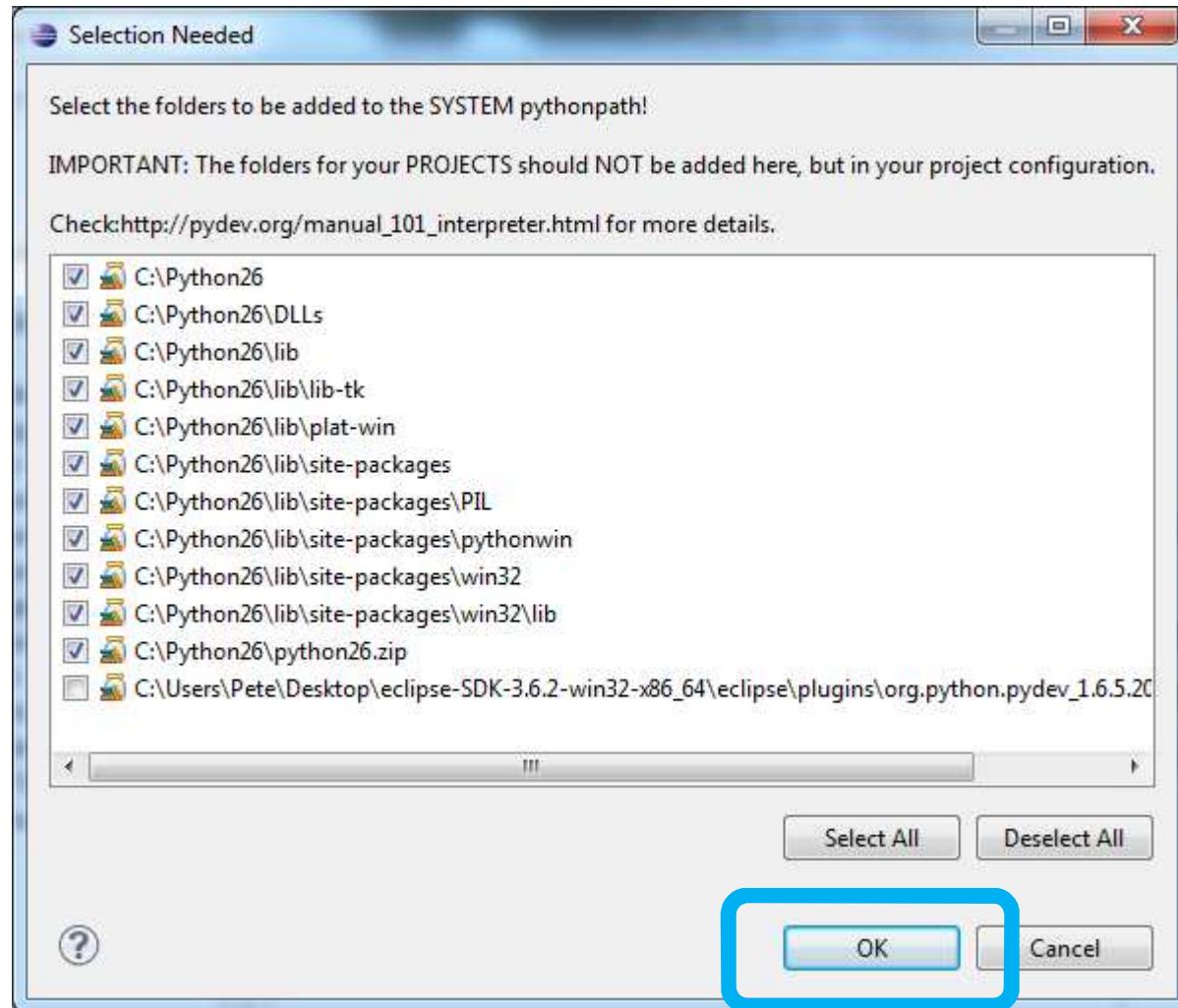


Click here →

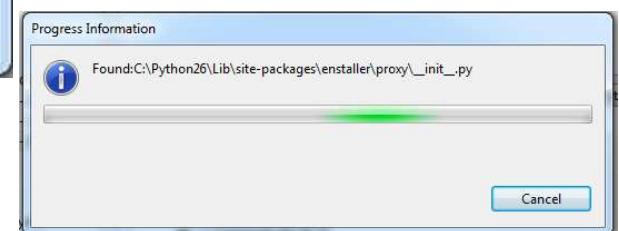
Run “Auto Config”



“Auto Config” found this ...

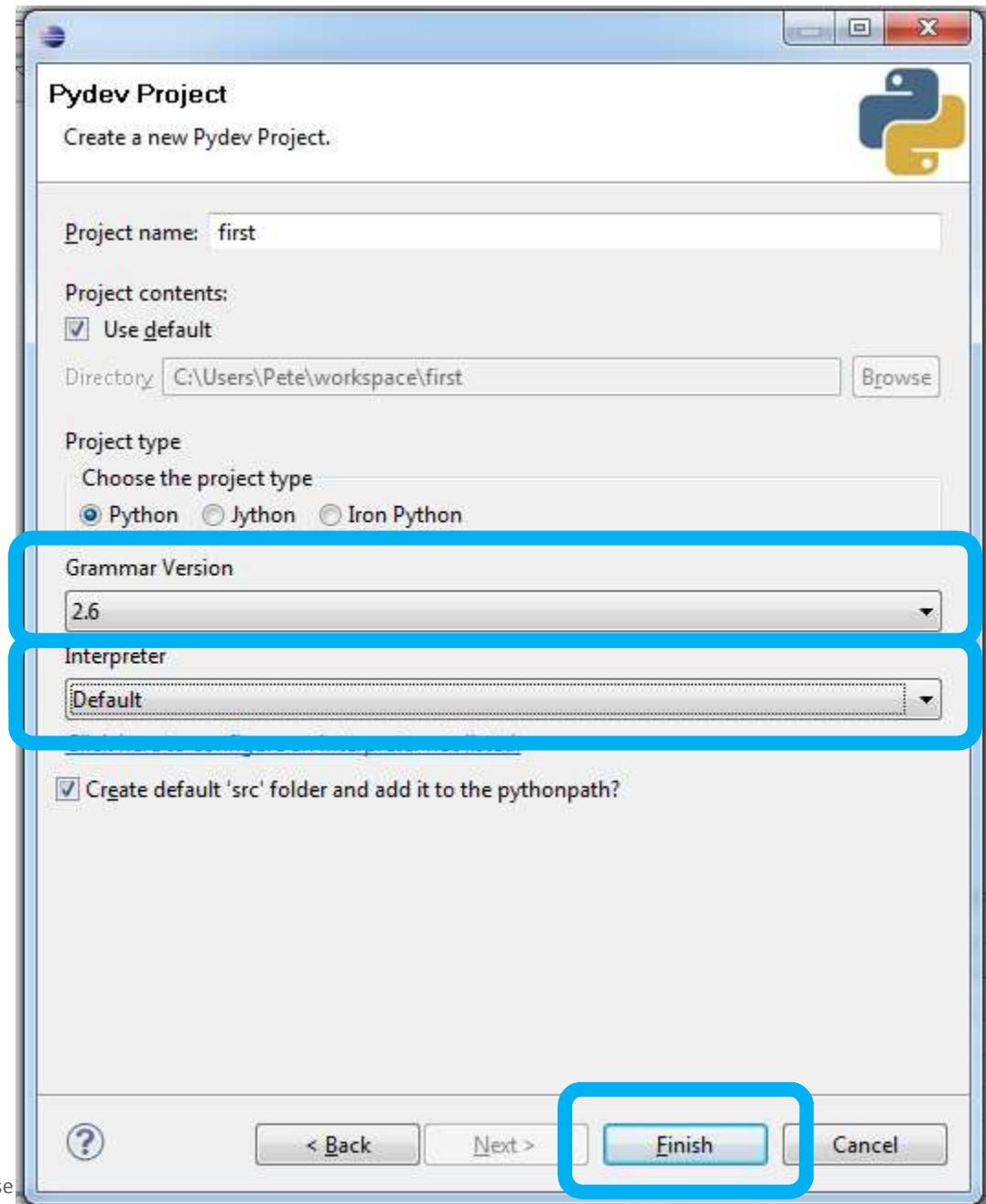


Click [OK] on next screen, also, then this step takes a few minutes ...

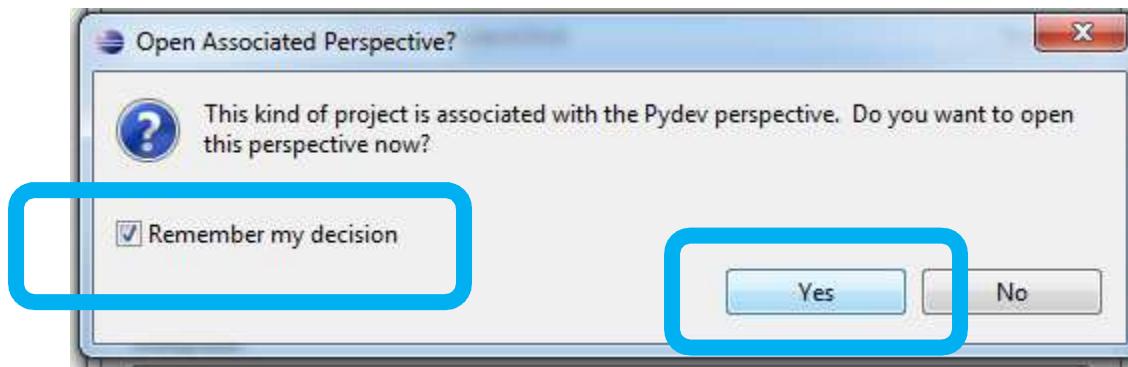


Finish making the project

Make sure the “Grammar
Version” your installed Python



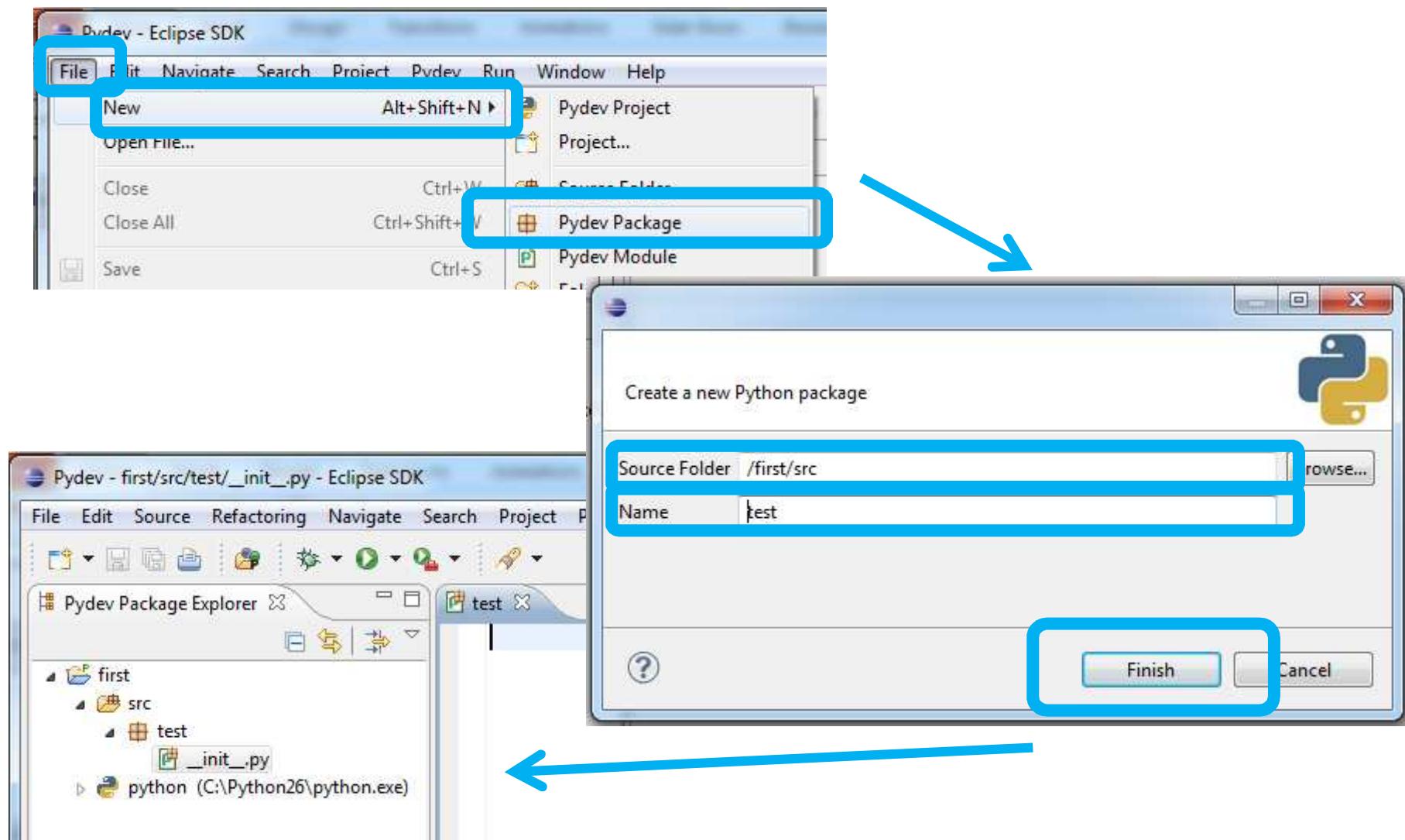
Switch to the “Python perspective”



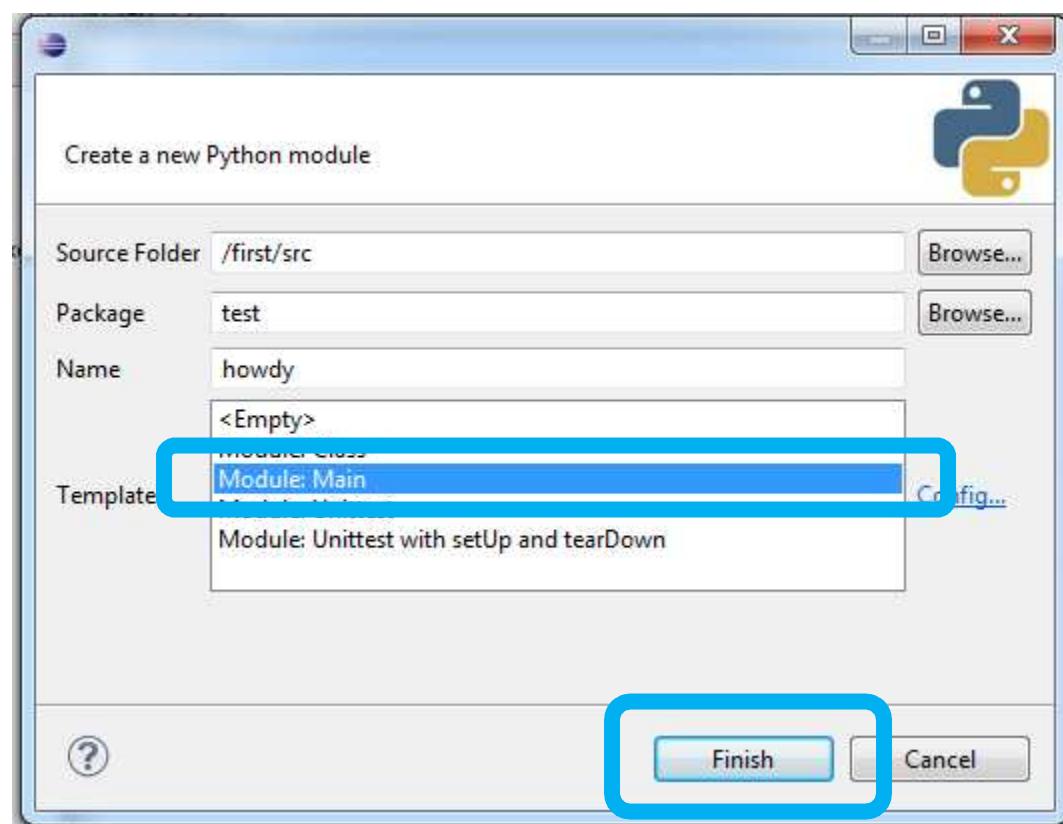
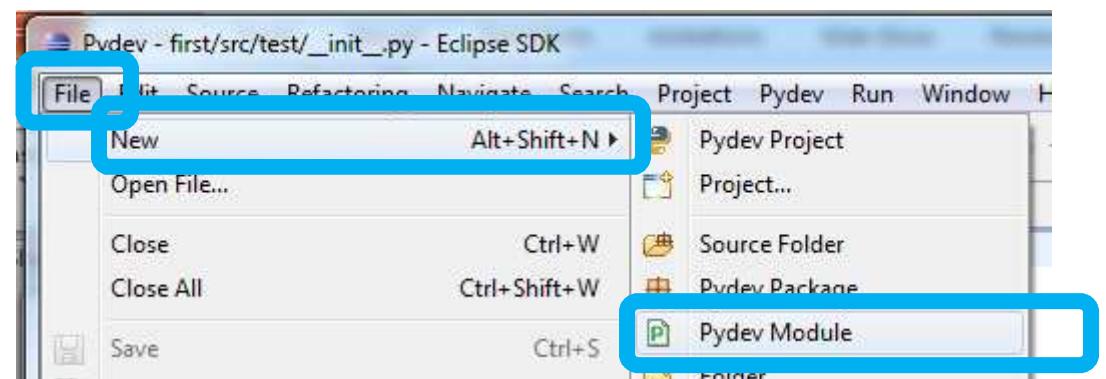
The “Python perspective” provides all the PyDev tools for developing Python code.



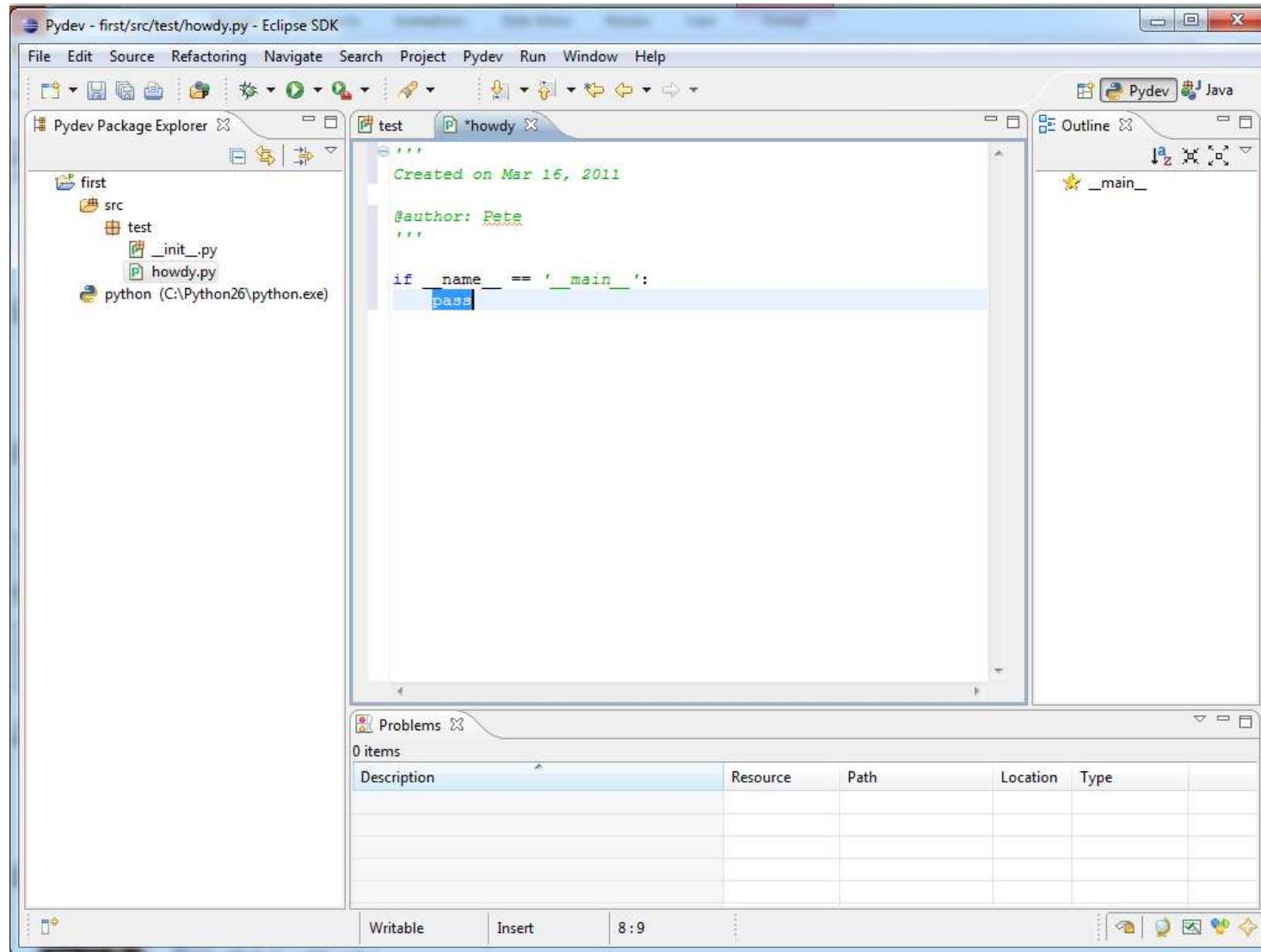
Make a Package ... (be sure to select src first)



Make a Module



Your module in the PyDev eclipse editor



Add some test code

```
'''
```

Created on Mar 16, 2011

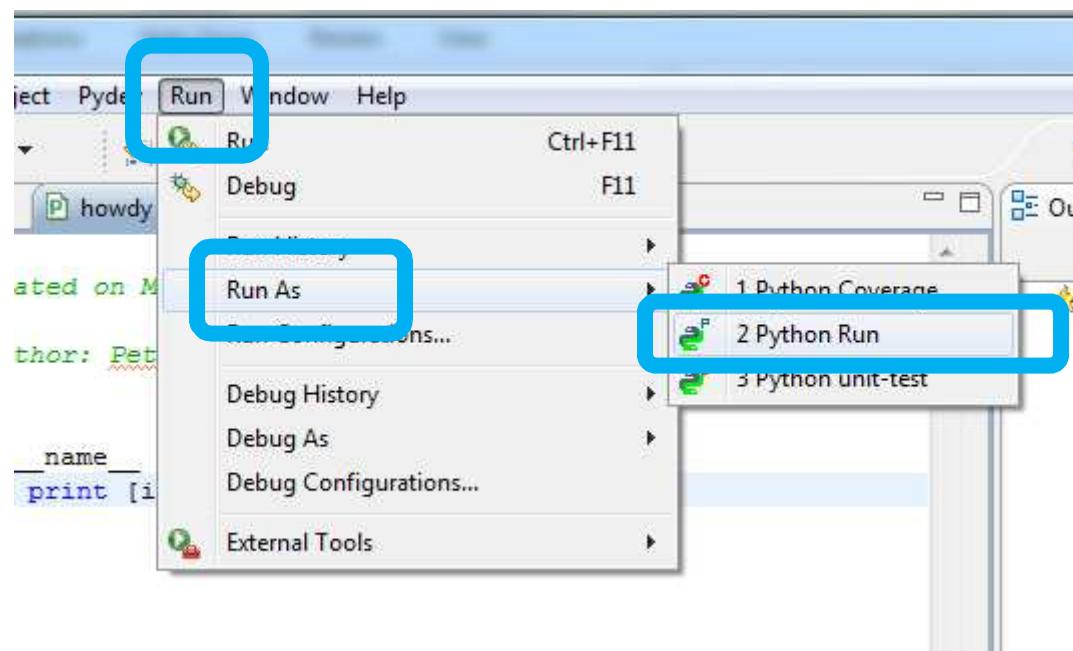
@author: Pete

```
'''
```

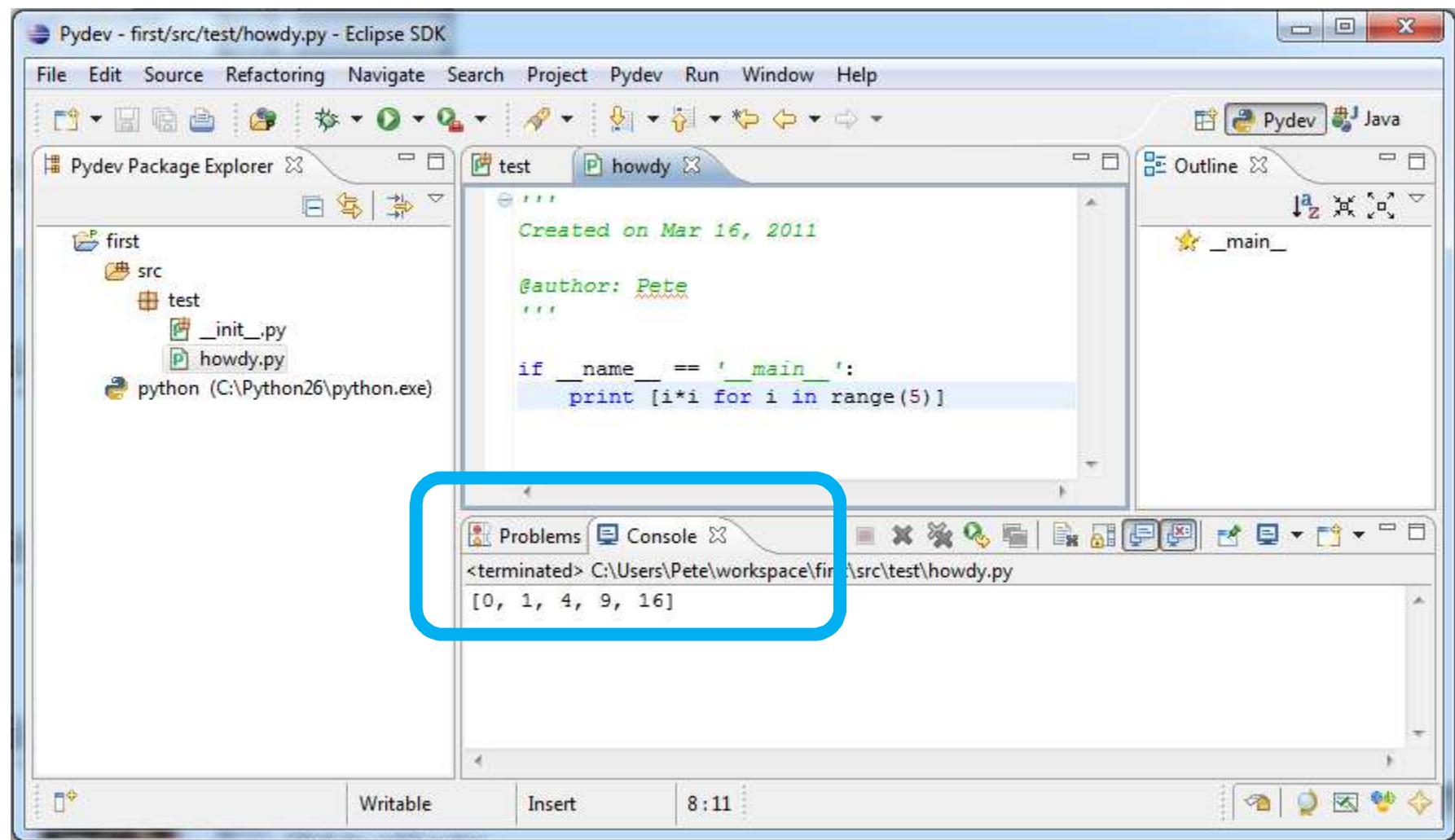
```
if __name__ == '__main__':
    print [i*i for i in range(5)]
```



Select this once for each .py to be run



Results



The screenshot shows the Eclipse PyDev interface with the following details:

- Title Bar:** Pydev - first/src/test/howdy.py - Eclipse SDK
- Menu Bar:** File, Edit, Source, Refactoring, Navigate, Search, Project, Pydev, Run, Window, Help
- Toolbars:** Standard toolbar with icons for file operations, search, and run.
- Pydev Package Explorer:** Shows a project named "first" with a "src" folder containing a "test" folder. Inside "test" are files "_init_.py" and "howdy.py".
- Outline View:** Shows the file "howdy.py" with the code content.
- Editor View:** Displays the Python code:

```
"""
Created on Mar 16, 2011

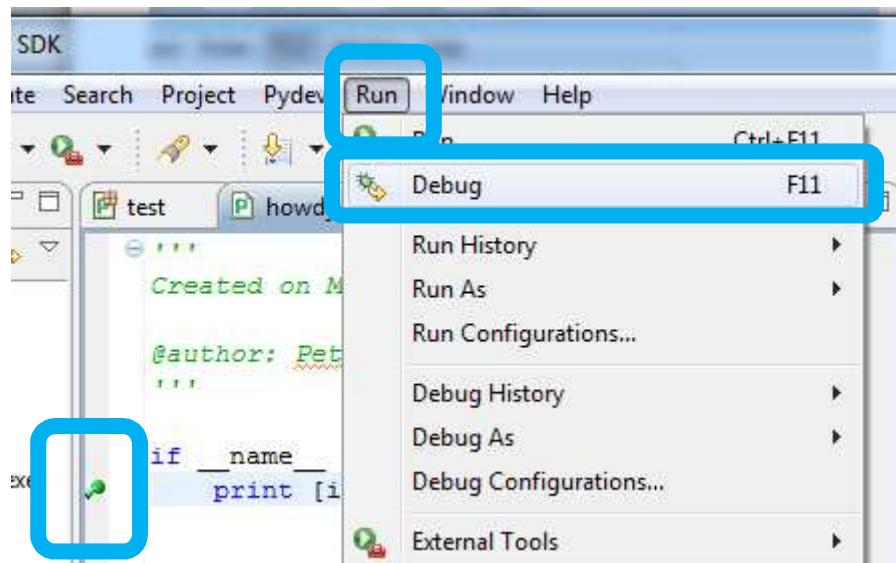
@author: Pete
"""

if __name__ == '__main__':
    print [i*i for i in range(5)]
```
- Console View:** Shows the output of running the script:

```
<terminated> C:\Users\Pete\workspace\first\src\test\howdy.py
[0, 1, 4, 9, 16]
```

The "Console" tab is selected, and the output is highlighted with a blue rectangle.
- Status Bar:** Shows "Writable", "Insert", and the time "8:11".

Source Code Debugger



Note:

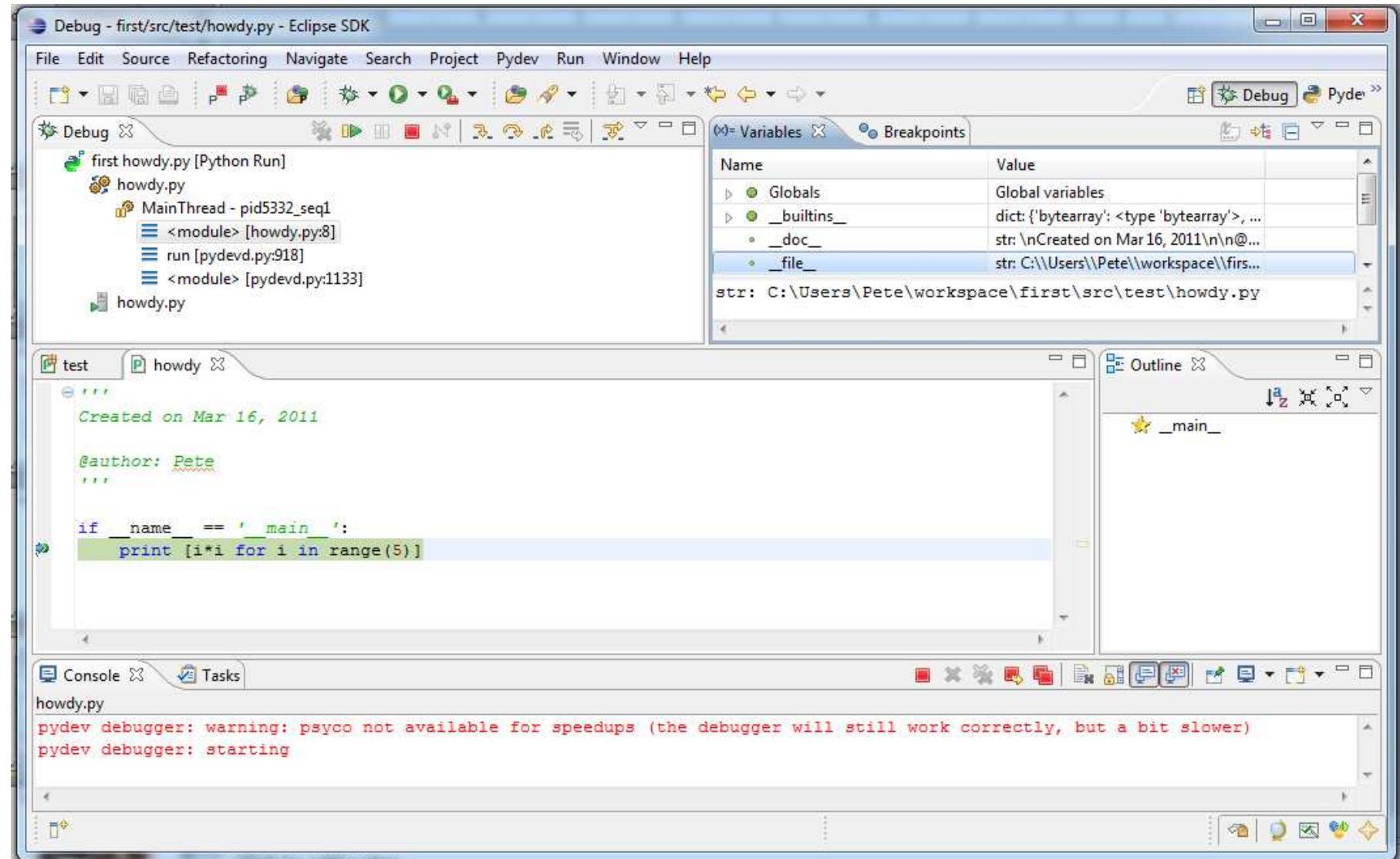
Set at least one breakpoint or the debugger will not stop



Debugging happens in the “Debug perspective”



Paused at first breakpoint



Example of debugging another project ...

The screenshot shows the Eclipse IDE interface during a Python debugging session. The top menu bar includes File, Edit, Source, Refactoring, Navigate, Search, Project, Pydev, Run, Window, Help. The title bar says "Debug - topdoc/src/TopDoc/EpicsDatabase.py - Eclipse". The code editor displays the following Python code:

```
        result[k][field] = utilities.replaceMacros( v, macros )
    return result

def __parse(self):
    """
    Interpret the contents of the .db file
    into the internal memory structure.
    """
    pvDict = {}
    tkn = self.tokenLog.nextActionable()
    while tkn is not None:
        if tkn['tokName'] == 'NAME' and tkn['tokStr'] in ('record', 'grecord'):
            # start of record declaration
            tkn = self.tokenLog.nextActionable() # token with "(" character
            rtyp, name, tkn = self.getTwoItems(tkn)
            fieldDict = {
                'RTYP': rtyp,      # record type
                'NAME': name       # record name
            }
            tkn = self.tokenLog.nextActionable() # load the next token
            while tkn['tokStr'] != ")":
                if tkn['tokName'] == 'NAME' and tkn['tokStr'] in ('field'):
                    tkn = self.tokenLog.nextActionable() # "(" character
                    s = tkn['tokLine'].strip()[len('field'):]
                    args = utilities.strip_outer_pair(s, '(', ')').split(",")
                    print len(args), args
                    # TODO add an option for dynamic fields
                    tkn = self.tokenLog.nextActionable()
                else:
                    tkn = self.tokenLog.nextActionable()
        else:
            tkn = self.tokenLog.nextActionable()
```

The Variables view on the right shows the current state of variables:

Name	Value
Globals	Global variables
pvDict	dict: {}
self	Db: <__main__.Db instance at 0x024CEF80>
tkn	dict: {'tokName': 'OP', 'end': (4, 8), 'start': (4, 7)} __ _len__ __ end (30593632) __ start (30470624) __ tokLine (38573312) __ tokName (38572928) __ tokStr (38573024) __ tokType (38605984)
__ int: 6	
__ tuple: (4, 8)	
__ tuple: (4, 7)	
__ str: grecord(scaler,"\$(P)\$(\$S)") {\n	
__ str: OP	
__ str: (
__ int: 51	

The Call Stack view shows the current stack trace:

```
topdoc EpicsDatabase.py [Python Run]
EpicsDatabase.py
>MainThread - pid5804_seq1
  __parse [EpicsDatabase.py:135]
  __init__ [EpicsDatabase.py:56]
  <module> [EpicsDatabase.py:234]
  run [pydevd.py:918]
  <module> [pydevd.py:1133]
```

The Console view shows the following output:

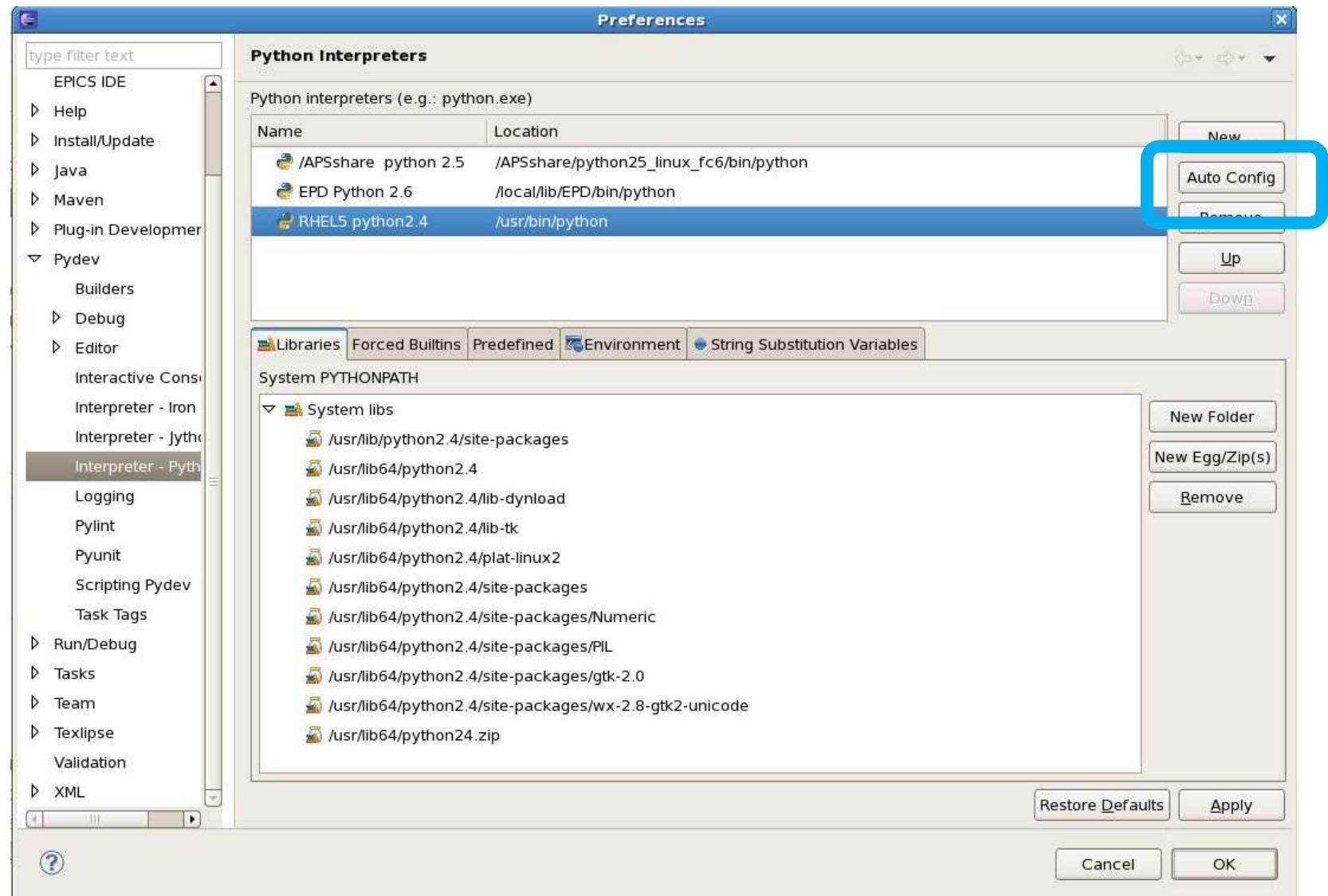
```
pydev debugger: warning: psyco not available for speedups (the debugger will still work correctly, but a bit slower)
pydev debugger: starting
```

Systems with more than one Python distribution

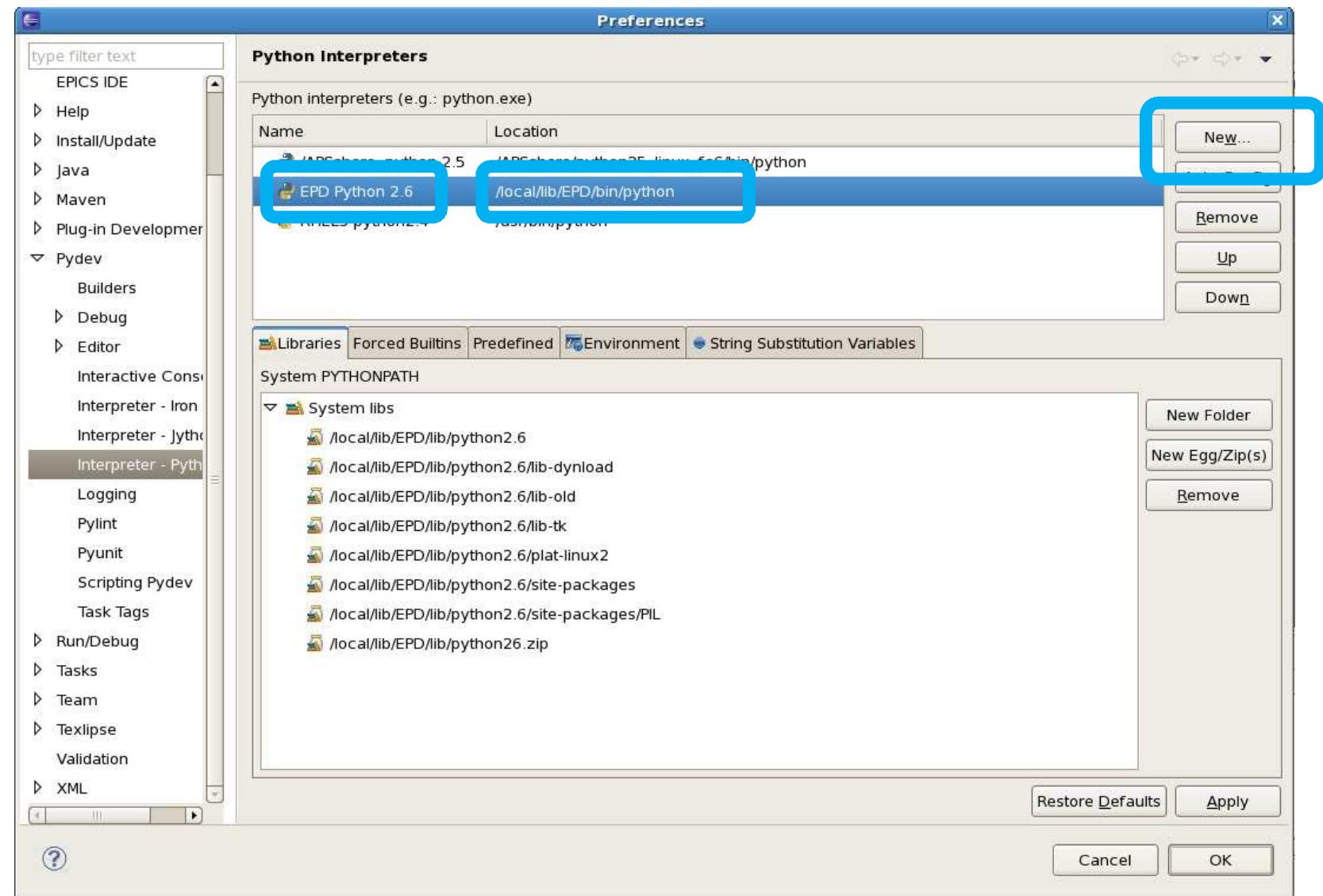
- Example Linux system has 3 Pythons to choose:
- RedHat Enterprise License v5 server
 - Python 2.4 supplied by RedHat
 - Found by “Auto Config” in PyDev
- User-installed Enthought Python Distribution in local directory
 - Python 2.6
 - Manually configured in PyDev
- BCDA Python on /APSshare
 - Python 2.5 with CaChannel, CaPython, and ca_utils
 - Manually configured in PyDev



RHEL5 configuration

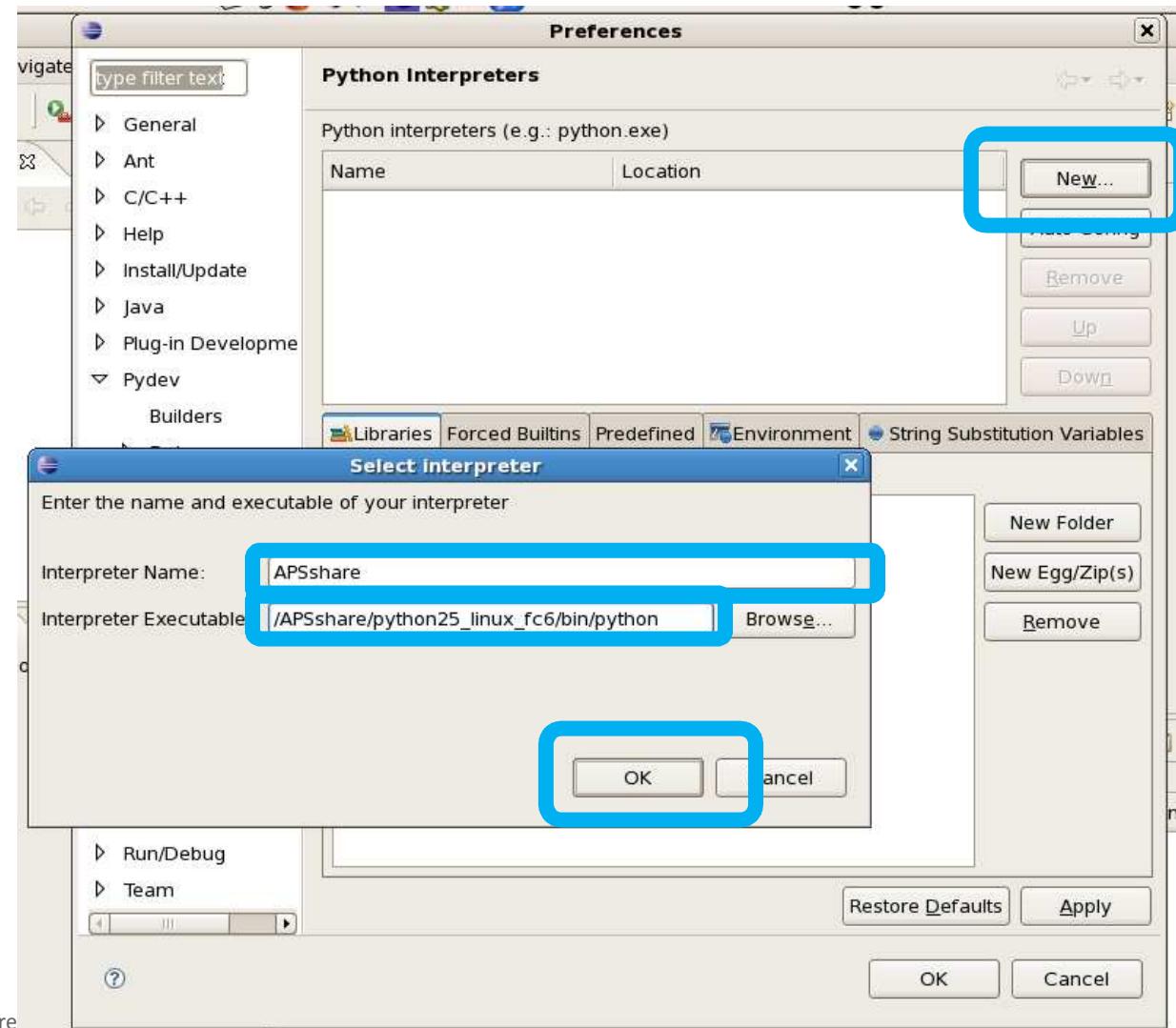


local EPD Python configuration



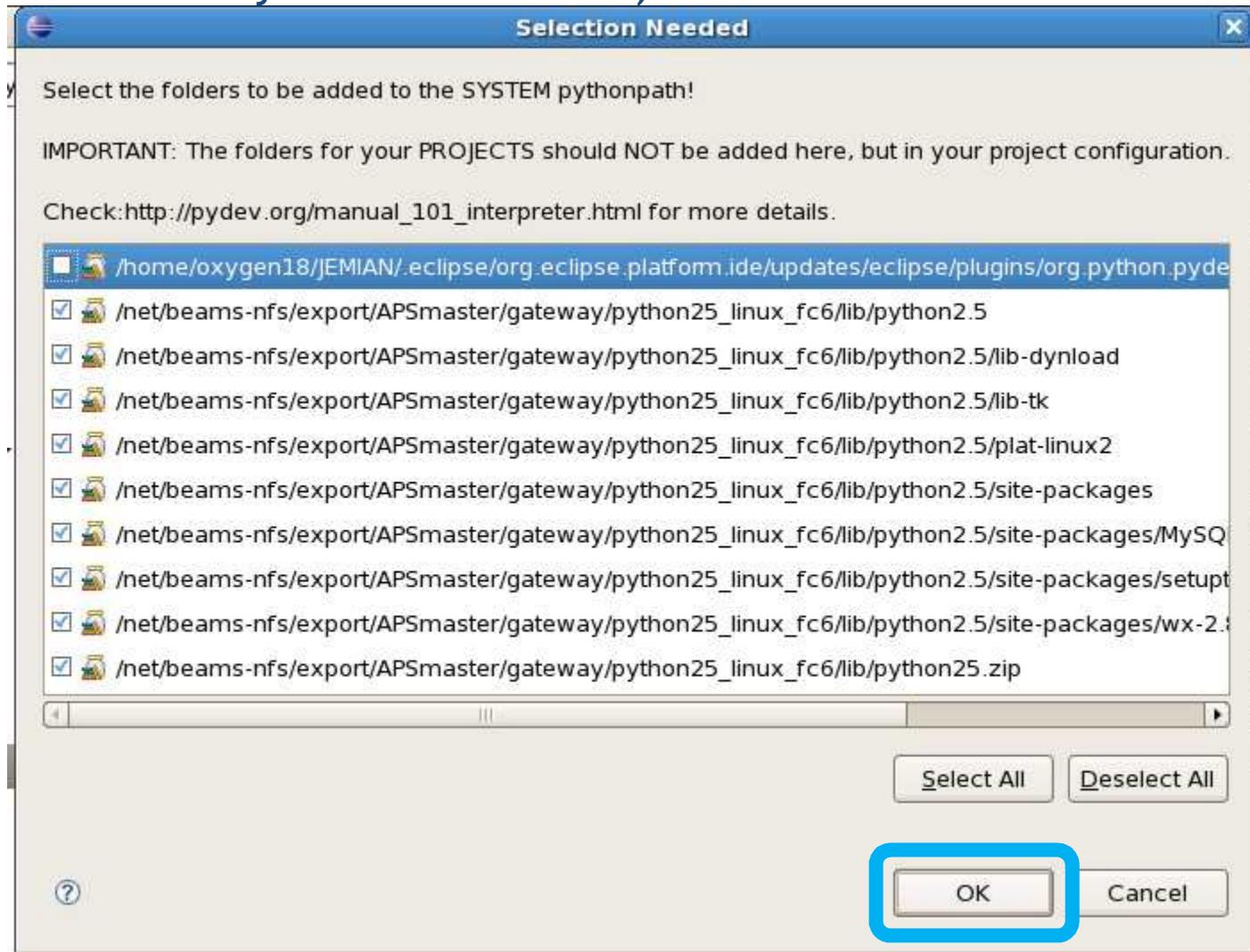
/APSshare/bin/python configuration

executable: /APSshare/python25_linux_fc6/bin/python

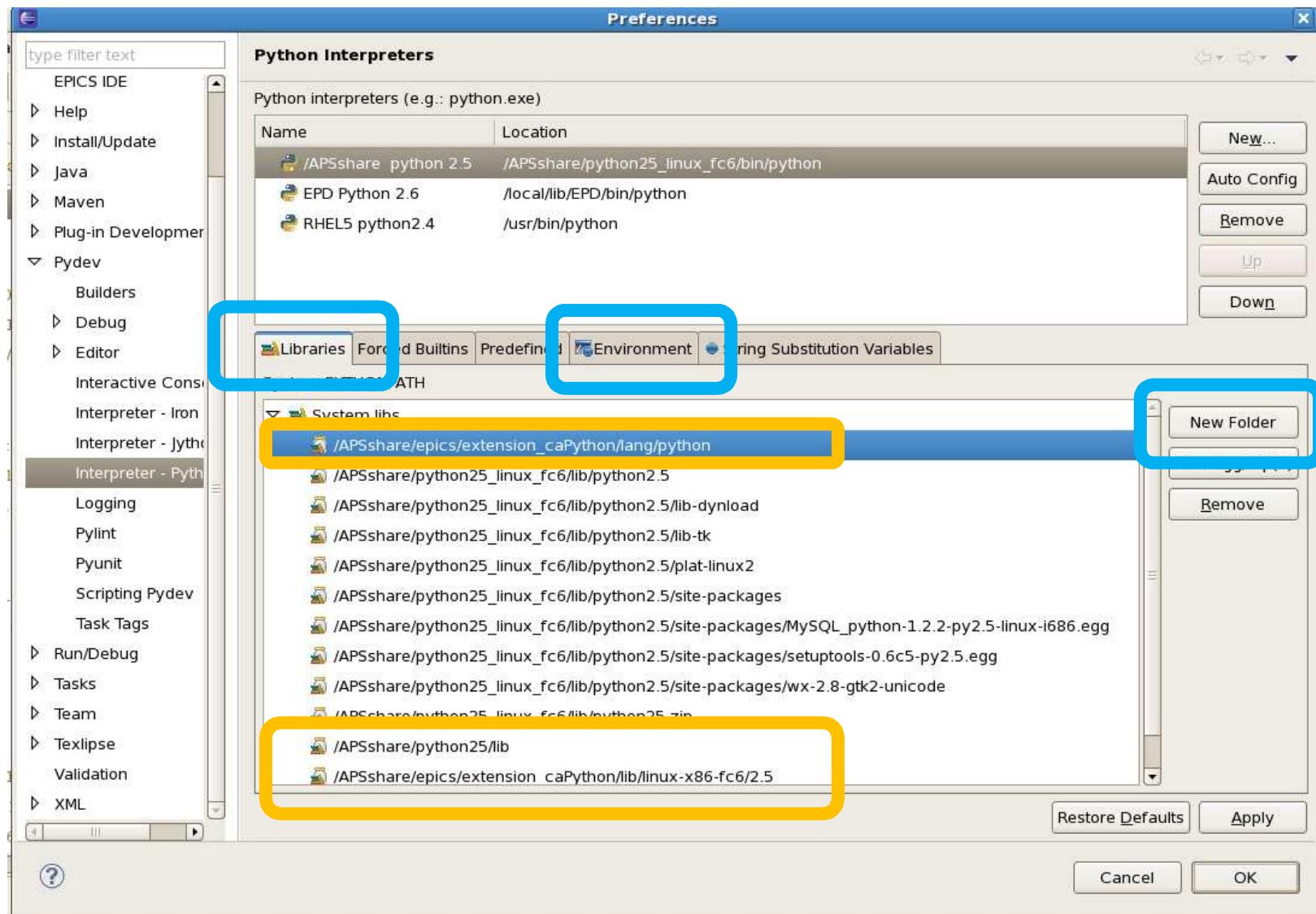


Confirm this selection (probably all OK)

(note my paths are probably different than yours here,
maybe shown like yours on next slide)

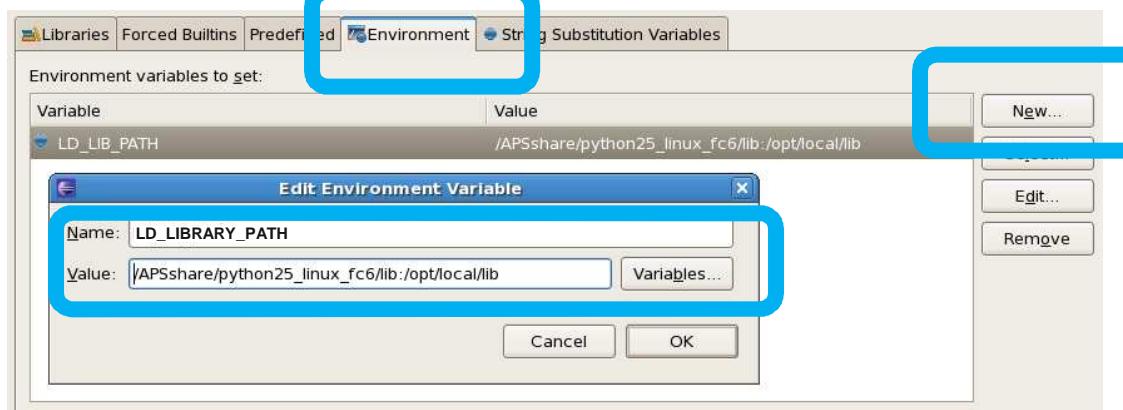


Still more work to do ... (see next slide)



Add to the APSshare Python

- Add these folders:
 - /APSshare/epics/extension_caPython/lang/python
 - /APSshare/python25/lib
 - /APSshare/epics/extension_caPython/lib/linux-x86-fc6/2.5
 - /APSshare/pythonlib
- Add this environment variable (ENVIRONMENT tab)
 - LD_LIBRARY_PATH /APSshare/python25_linux_fc6/lib:/opt/local/lib



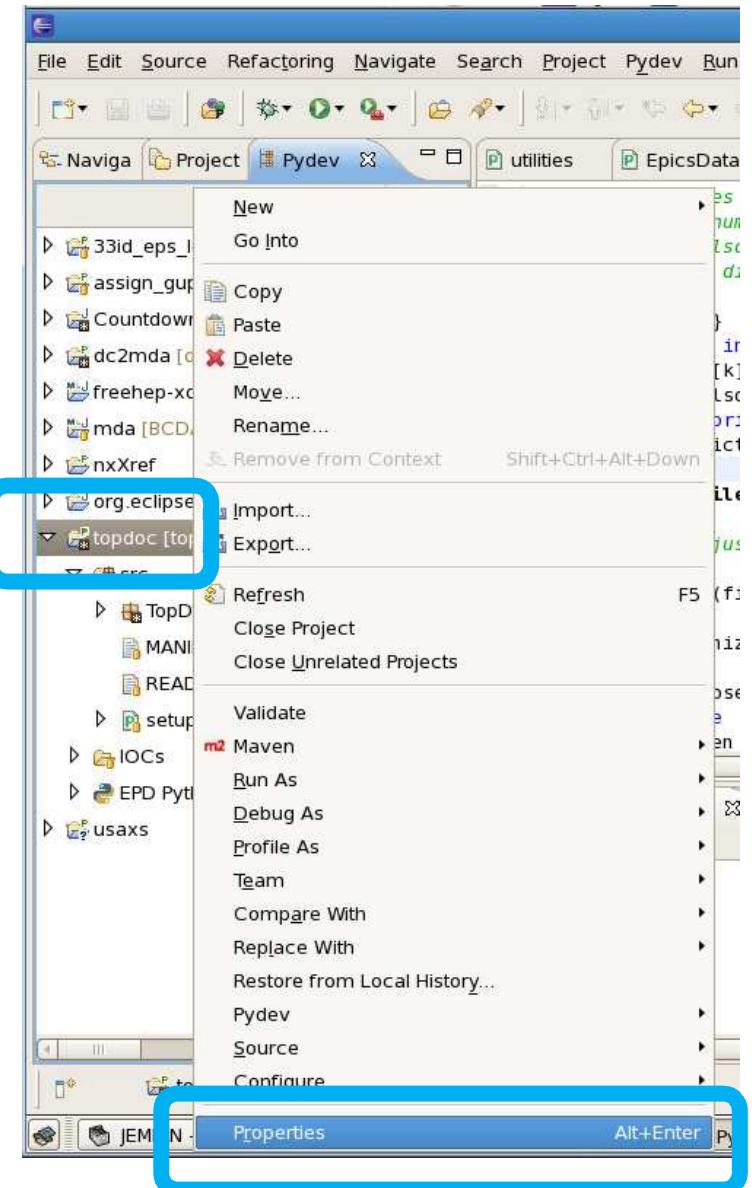
Click through the [Ok] buttons and accept the new configuration ...



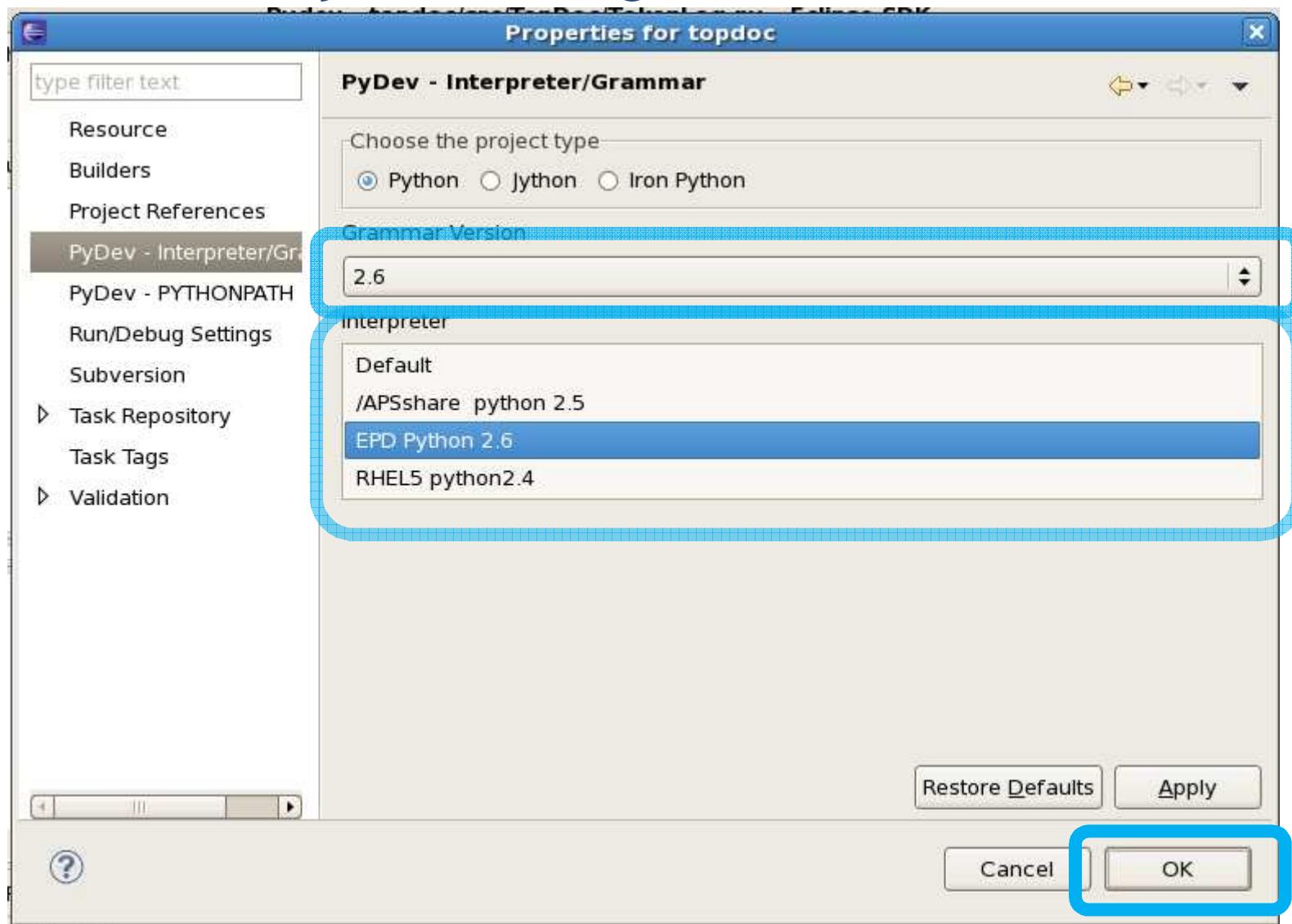
Getting to the Properties ...

- Select your project (“topdoc” here)
- Right click on the project name in the Navigator
- Pop-up menu appears
- Select “Properties” item at bottom of list

- On next screen ...
- Select “PyDev – Interpreter/Grammar” in tree pane (on left)
- Select per next slide



Selection of Python configuration



Thank you for your attention

