Tutorial 6
Aspect-oriented programming

How to program an aspect?

Tool support in aspectJ, AJDT

Last lecture…

On Aspect-Orientation

- We explained the concepts of aspect-orientation: a recent paradigm in Software Engineering
- We shown a case study of aspect-oriented requirements engineering: (1) how to identify early aspects along with goal-oriented requirements analysis, (2) how the goal aspects are associated with the code aspects …
- What are code aspects?

Today…

This tutorial will cover code aspects:

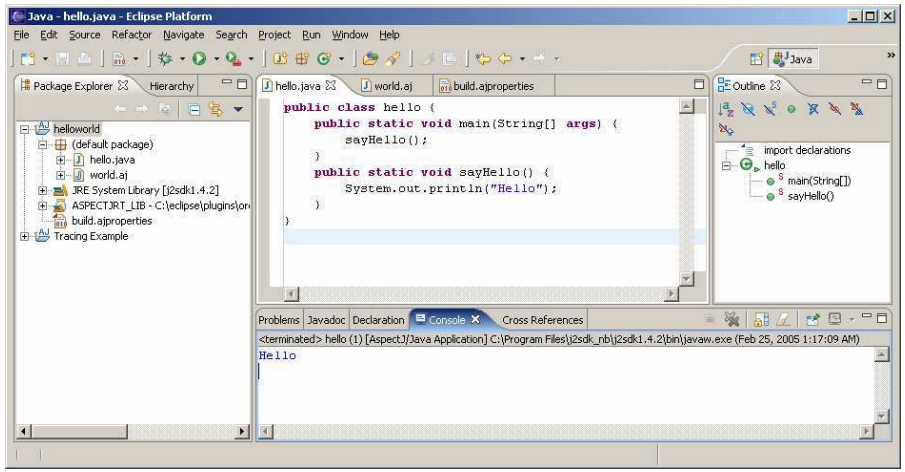
1. AOP examples
2. aspectJ syntax
3. Eclipse/AJDT toolset
4. Relation to the OpenOME

5. How to deploy of our phase B results …

1. AspectJ

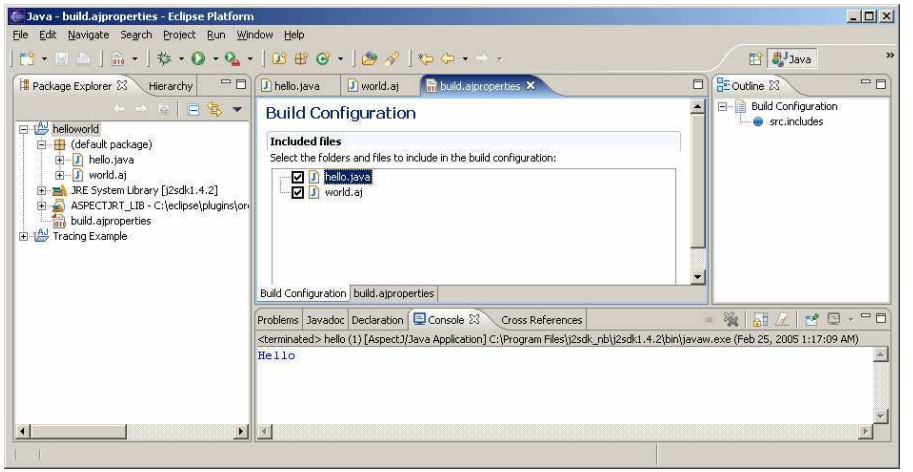
- It is one of the most mature aspect compilers http://www.eclipse.org/aspectj
- It has convenient tool support through Eclipse http://www.eclipse.org/ajdt

1.1 Example: the Hello class

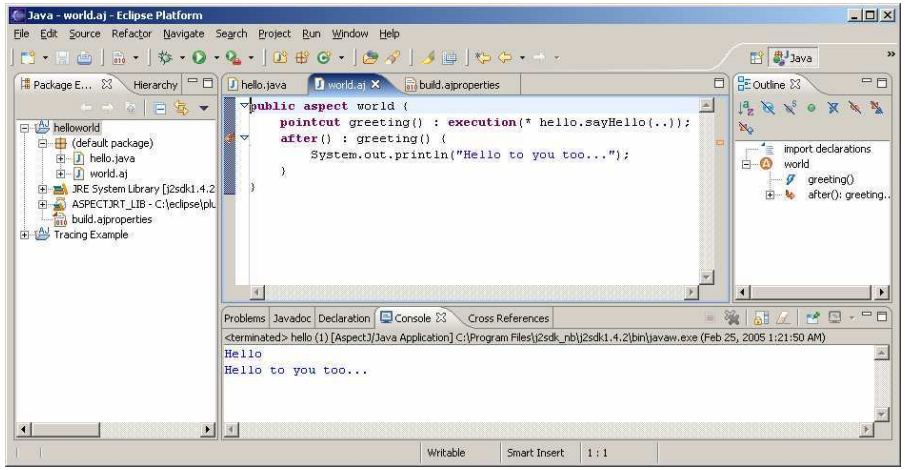


See the online tutorial

1.2 Enable the World aspect



1.3 Run the woven code



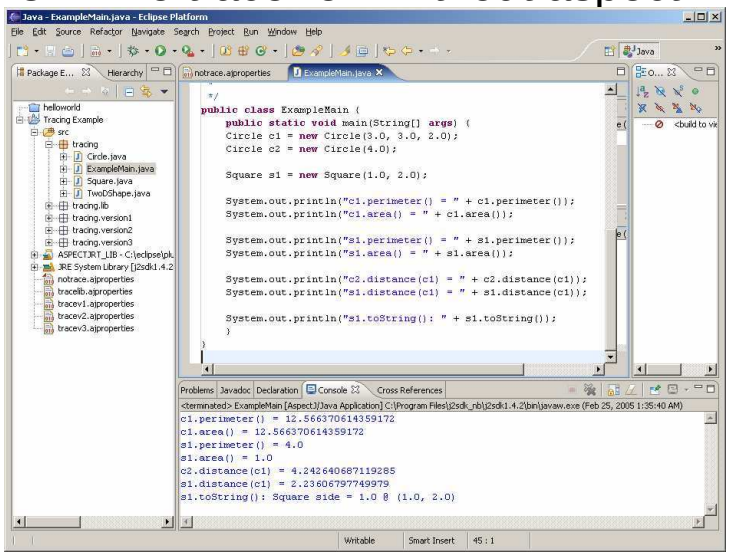
2 The AspectJ syntax

- *aspect* vs. *class*
- *advice* vs. *method*
  - **before**(), **after**(), **around**()
  - allow formal parameters in regular expressions
  - special parameter joinpoint
  - allow “theJoinPoint” to access the call stack
  - around() can call the replaced method with **proceed**()
- (anonymous) pointcut vs. expression
  - just like any boolean expression, where the predicates are joinpoints
- joinpoints
  - **call(), execute()**: method calls (caller), execution (callee), try/catch blocks
  - **set(), get()**: field accesses
  - **within()**: to limit the scopes to method, class or packages
- declarations
  - Change the class structures: introducing fields, method, structural relations

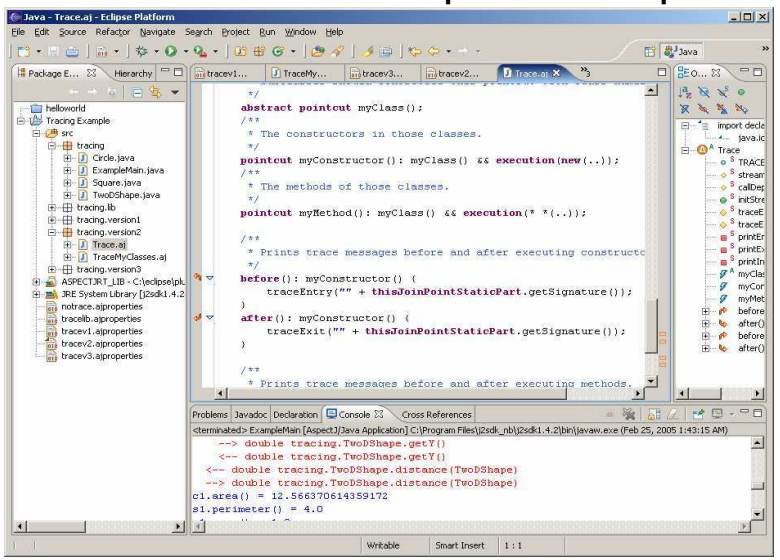
Reference
The “quickref” document:

3 Some AJDT features

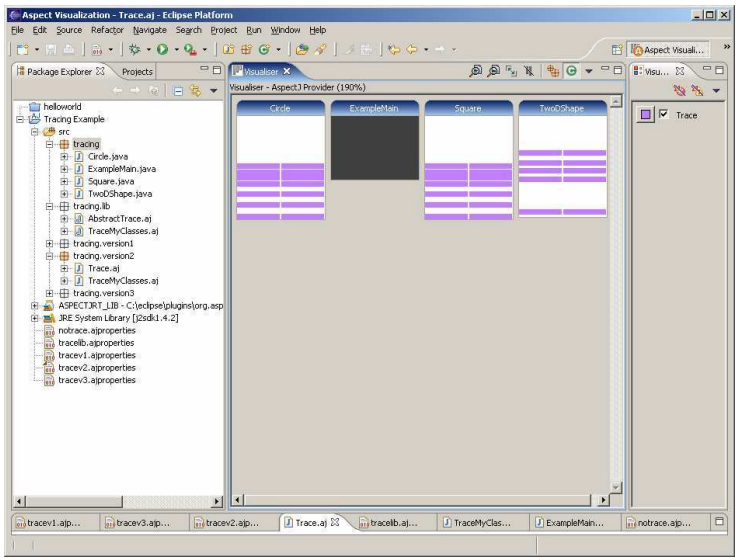
3.1 The tracer ex. without aspect



3.2 The Tracer example with aspect

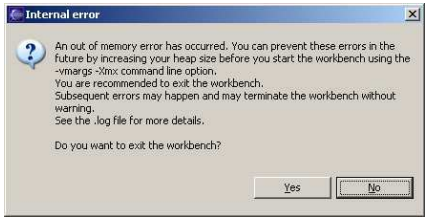


3.3 A visualizer

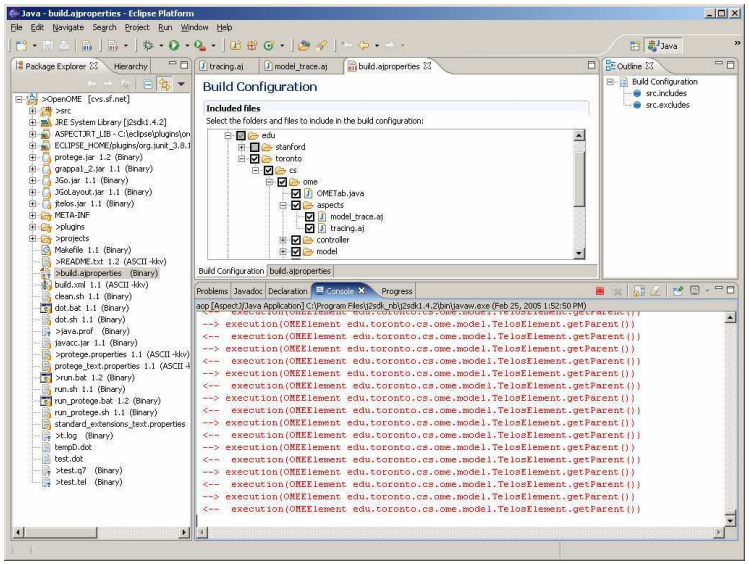


4. Applying to the OpenOME

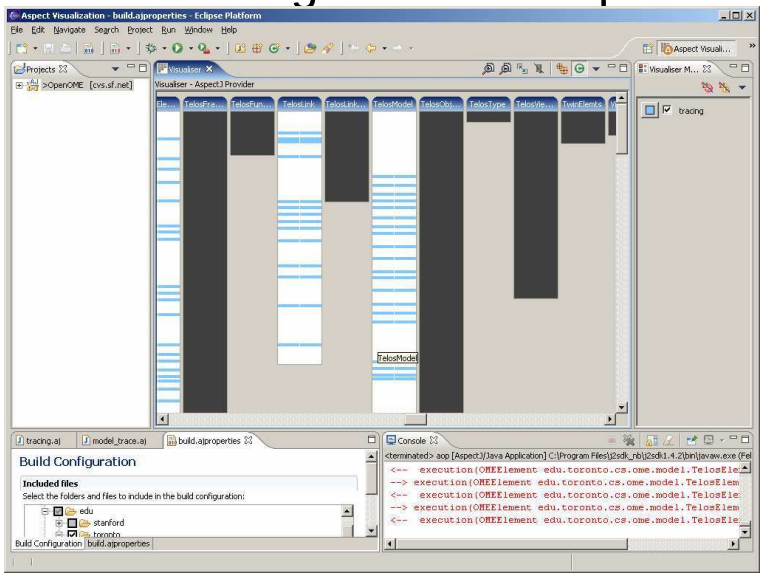
- I would show you an AOP example in OpenOME, however …
- AJDT requires more Memory resources, when I was compiling it with the complete OpenOME … Memory overflow problem
- Gold plating in AJDT?



The effects of the woven code



Visualizing the trace aspect



5. Hosting the course projects

- We have 11 teams, codenames are:
  mindz, photons, team2, xteam, lumiere solutions, mugqq, overnight enterprise, team7, websilon, team9, canadiantired
- Any windows ECF lab, use “terminal services”, the first server is ***dedicated*** for us, enter your team’s code name as username, “ece450” as password for now, you can access it, only within the lab for now
- The URL of the tomcat server is http://127.0.0.1:8080
- The deployed web service should be placed under c:\program files\apache software foundation\tomcat 5.5\webapps\axis\WEB-INF\classes\<codename>
- These directories are shared as \\128.100.36.17\<codename> so that you can copy the binary files into the place
- We also installed an Eclipse plugin for collecting metrics in the ECF windows lab