

# Assignment Sheet 7

Due: Tuesday, December 06, 2011, 23:59

For help, contact [atsc-lecture@lists.iai.uni-bonn.de](mailto:atsc-lecture@lists.iai.uni-bonn.de) (staff and participants).

Submit your solution into your group's SVN under the folder "assignment07".  
The solutions (if not otherwise mentioned) must be submitted as **PDF files**.

## Task 1. *AspectJ Development Tools* (0 Points)

In this Assignment we will use the AspectJ Development Tools (AJDT) for Eclipse. You can find more information about the tool on its website <http://www.eclipse.org/ajdt/>.  
The Eclipse Update Site for Indigo (3.7) is located at:

<http://download.eclipse.org/tools/ajdt/37/update>

## Task 2. *Aspects* (3 Points)

Formulate in 1-3 sentences a description in your own words for:

- jointpoint
- pointcut
- advice
- intertype declaration
- call pointcut

## Task 3. *"cflow"* (3 Points + 3 optional Points)

Are the following equations true? The == operator should be read as "has the same semantics as". Find a counterexample for each equation that is *not* true.

$$\text{a) } \text{cflow}(\text{cflow}(\text{ptc})) \quad == \quad \text{cflow}(\text{ptc})$$

$$\text{b) } \text{cflow}(\text{ptc1} \ || \ \text{ptc2}) \quad == \quad \text{cflow}(\text{ptc1}) \ || \ \text{cflow}(\text{ptc2})$$

$$\text{c) } \text{cflow}(\text{ptc1} \ \&\& \ \text{ptc2}) \quad == \quad \text{cflow}(\text{ptc1}) \ \&\& \ \text{cflow}(\text{ptc2})$$

$$\text{d) } \text{cflow}(\text{cflow}(\text{ptc1}) \ || \ \text{ptc2}) \quad == \quad \text{cflow}(\text{ptc1}) \ || \ \text{cflow}(\text{ptc2})$$

$$\text{e) } \text{cflow}(\text{cflow}(\text{ptc1}) \ \&\& \ \text{ptc2}) \quad == \quad \text{cflow}(\text{ptc1}) \ \&\& \ \text{cflow}(\text{ptc2})$$

$$\text{f) } (\text{cflow}(\text{ptc1}) \ \&\& \ !\text{cflow}(\text{ptc2})) \ || \ (!\text{cflow}(\text{ptc1}) \ \&\& \ \text{cflow}(\text{ptc2})) \\ == \\ (\text{cflow}(\text{ptc1}) \ || \ \text{cflow}(\text{ptc2})) \ \&\& \ !(\text{cflow}(\text{ptc1}) \ \&\& \ \text{cflow}(\text{ptc2}))$$

The following equations deal with `cflowbelow`. They are **optional** and provide a challenge for interested students.

- g) `cflowbelow(cflow(ptc))` == `cflow(ptc)`  
 h) `cflowbelow(cflow(ptc))` == `cflowbelow(ptc)`  
 i) `cflow(cflowbelow(ptc))` == `cflow(ptc)`  
 j) `cflow(cflowbelow(ptc))` == `cflowbelow(ptc)`  
 k) `!cflow(!cflowbelow(ptc1))` ==  
`!cflow(ptc2) && (cflowbelow(ptc2) || ptc2)`

#### **Task 4.** *Removing Tangling with Aspects* (5 Points)

For this task you require an additional resource in form of the Banking project. This resource can be found on the Assignments web page and is named "Assignment7Task4.zip". `BankSession` in the folder `tangled` contains the example for tangled code from the lecture. The folder `untangled` contains already a new untangled version with aspects.

The aspects `ContractChecking`, `SecurityLogging` and `Transactionality` are still missing their implementation. The aspect `ContractChecking` should contain all functionality that checks the input arguments, the supposed content of the aspects `Security`, `Logging` and `Transactionality` should be obvious.

Your task is to restore the functionality found in the tangled example code. You are not allowed to change anything except for the aspects. Also make sure that in the end all tests pass.

#### **Task 5.** *Removing Scattering with Aspects* (3 Points) (Optional)

Your task is to de-scatter another banking example. The source code for the project is available in the "Assignments7Task5.zip" on the Assignments web site.

Extract the permission checking (the calls to `AccessController.checkPermission(...)`) into an aspect.

After each step that you change run the tests. Before you can run the tests you will have to adapt the `banking.policy` file as described in `notes.jpape`.

## **Dictionary Task\*** (0 Points)

On each assignment sheet you will find a set of terms used in the lecture. Your (optional) task is to write a short description for each term in your own words. Try to make it as short and precise as possible. We do not accept copied sentences.

The best solution of each week will be added to a combined dictionary on our lecture website:

<http://sewiki.iai.uni-bonn.de/teaching/lectures/atsc/2011/dictionary>

There you can also see which group contributed which description. You can also at any time improve an existing entry.

Creating the dictionary is also an opportunity to check your knowledge on the topics. This also directly gives you feedback on which topics you probably need to improve for the exam.

Terms:

Joinpoint

Pointcut

Advice

Scattering

Tangling