

## Applying *AspectMaps* to *HealthWatcher*

Now that you are acquainted with *AspectMaps*, we would like you to use this tool to perform a number of tasks. To this end, we will apply the tool to another case study: the *HealthWatcher* system.

### Case study

*HealthWatcher* is a real-world web application for handling health complaints. Within the aspect-oriented software development community, the system is known as a concrete test-bed for aspect technology. Throughout the development process of this system, from the requirements engineering phase to the implementation phase, aspect-oriented techniques have been applied to this system. Within the implementation, aspects are used to modularize both functional as well as non-functional concerns.

### Tasks

The goal is that you execute these tasks to the best of your ability, however, if you get stuck do not hesitate to skip the current (sub)task and continue with the next one. If this happens however, please indicate that you were not able to finish the task on the answer sheet. There is no upper time limit in order to execute these tasks.

#### Task 1

One of the crosscutting concerns implemented in *HealthWatcher* using aspects is exception handling. Although this is a relatively simple concern, the implementation of this concern contains a bug. In particular, there is a problem within the `HWDistributionExceptionHandler` aspect.

a) Locate the aspect in the system. In which package is it defined? List its pointcuts.

b) Where does the aspect intervene in the system?

c) How would you update the pointcut to have the aspect behave correctly?

## Task 2

Complaints within *HealthWatcher* can go through a transition of various states (e.g., open, closed, ...). This transition between states is implemented using aspects.

**a)** The names of all code entities related to this concern contain the string 'ComplaintState'. Find all these entities in the system. Which three groups can you distinguish?

**b)** We are going to study the role of the aspects in this crosscutting concern. Where do the aspects intervene in the system? (Hint: the 'Enabled Asp' button can be useful for accomplishing this task)

**c)** By looking at the visualization you can see that the aspects interact at particular places. Which of the aspects interact? And where?

**d)** Study the interaction (the places where multiple aspects intervene). What is the impact of this interaction on the type of complaint state that gets set?



## Task 4

In *HealthWatcher* a number of inter-type declarations add methods to classes or aspects. In this task we will investigate if there are many such methods and if their execution is intercepted by any aspect.

**a)** In what packages are inter-type declarations of methods defined or do they apply? (Hint: use the root level context menu to change the color parameter on packages)

**b)** In what classes do these methods apply? How many methods are they?

**c)** One of these above methods is affected by an aspect. Which is it? How does this aspect modify the behavior of the method?