

SEG@NJU

# Using Jasmine-AOI for Integrating Crosscutting Concern Models

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[2008-1-24]



[This is the user manual for Jasmine-AOI]

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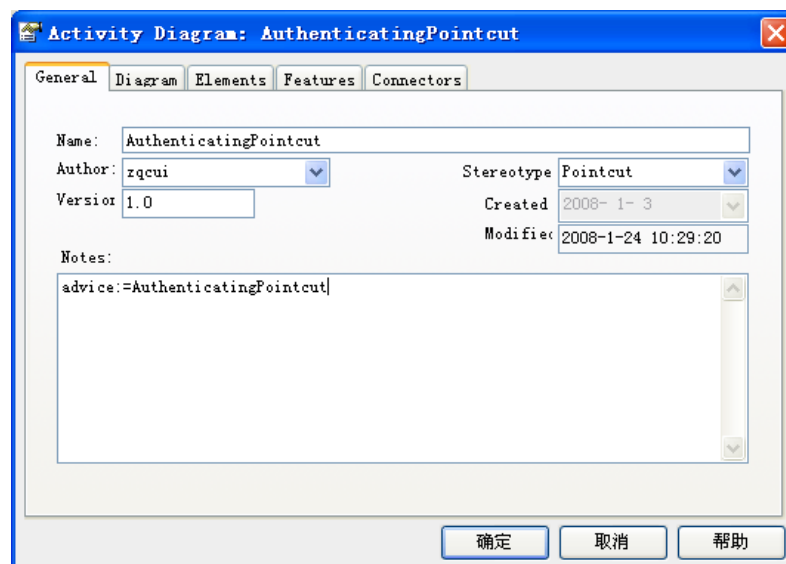
In this document we take the primary and aspect models of a bank system to exemplify how to use Jasmine-AOI. This example is a part of our case study 1. The Activity diagram is used to model primary functional requirements and some lightweight extensions are also added to support modeling pointcut and advice models for its versatility. The primary models and the aspect models are designed by Enterprise Architect (EA)<sup>1</sup>, which is a leading tool to design UML models. We chose EA as the design tool for its ability to export XMI files by package, and project. Section 1, 2, and 6 are carry out by EA, section 3, 4, and 5 are on Jasmine-AOI.

## 1. Modeling Crosscutting Concerns

This part describes the aspectual extensions of the activity diagram and exemplifies the process of modeling crosscutting concerns as aspect models. A aspect models is consisted of a piontcut mdoel and a advice model.

### 1.1. Model Pointcut Model

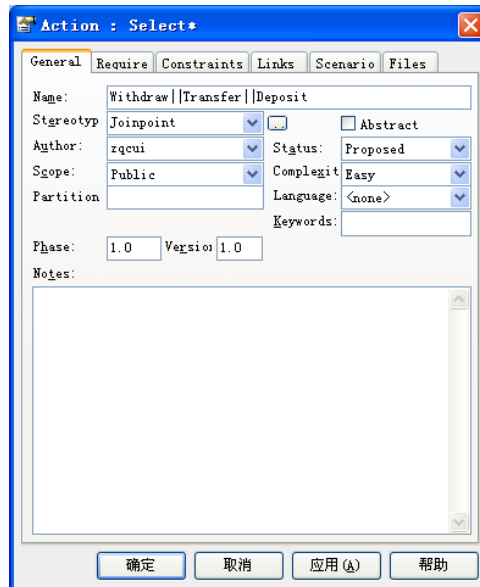
- Stereotyped an activity diagram with <<Pointcut>> to indicate it's a pointcut model.  
Right click the pointcut model, select "Properties", set the stereotype to <<Pointcut>>.
- Map advice model to corresponding pointcut model. Add a tagged value "advice" to <<Pointcut>> in order to indicate the corresponding advice model.



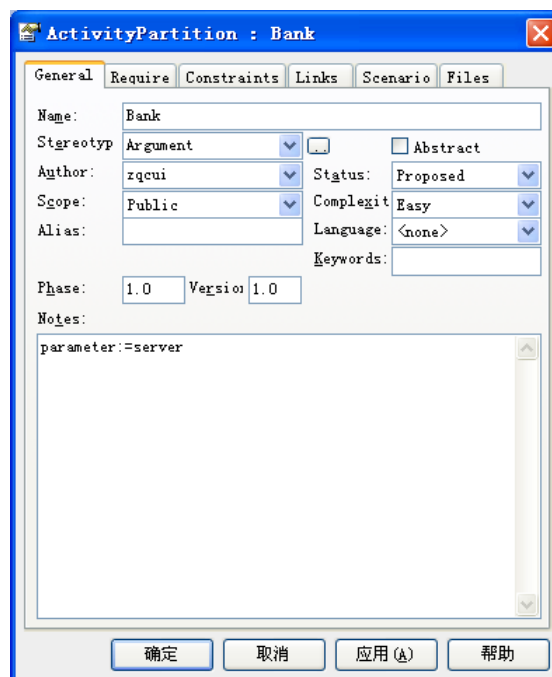
- Mark the joinpoint element with the stereotype <<Joinpoint>> to denote the position of the joinpoint element.  
Right click the joinpoint element, select "Properties", set the stereotype to <<Joinpoint>>

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<sup>1</sup> Enterprise Architect, <http://www.sparxsystems.com.au/>



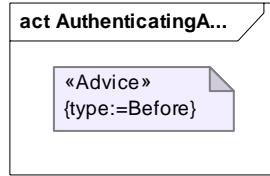
- Model actual arguments. Some variables around the places where crosscutting concerns emerged in primary models would change. In order to capture these changes and pass to the corresponding advice model, actual arguments are introduced to the pointcut model. Actual arguments are defined in activity diagram where the variables appears by stereotyping <<Argument>>. A tagged value “parameter” is add to these elements for denoting the mapping formal parameter in the corresponding advice model. And the formal parameters in the corresponding advice model can mapping to actual arguments by this tagged value.



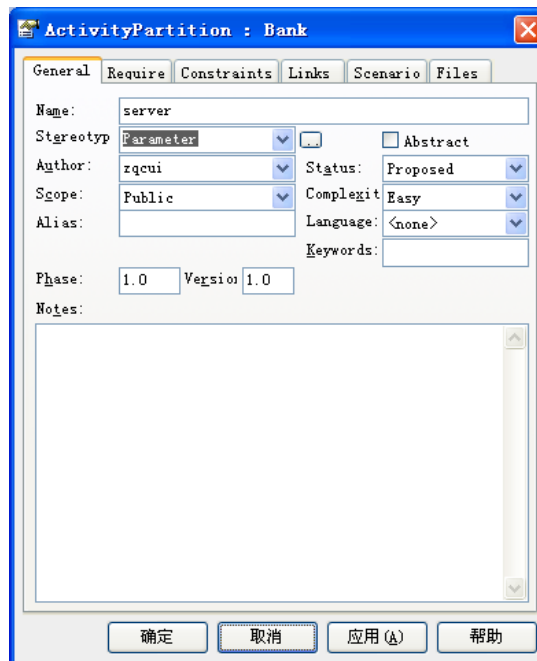
- Introduce logical operators and wildcards. Because pointcut model is designed to match a set of elements crosscutting the design models with similarity in some facets not designed to match only one element at particular position, logical operators and wildcards are introduced to enhance the expressibility. For example, logical operator “|” is used to express the logic or relation and wildcard “\*” is used to express a character string with arbitrary length.

## 1.2. Model Advice Model

- Stereotyped the activity diagram <<Advice>> to indicate it's an advice Model. This is the same with set stereotype of pointcut model.
- Declare the type of the advice. Add a tagged value "type" for the stereotype <<Advice>> to declare the type of advice. E.g.:



- Introduce formal parameters to make the advice model as a template and reusable for actual values captured by the corresponding pointcut form primary models. The elements served as formal parameters are stereotyped with <<Parameter>>.



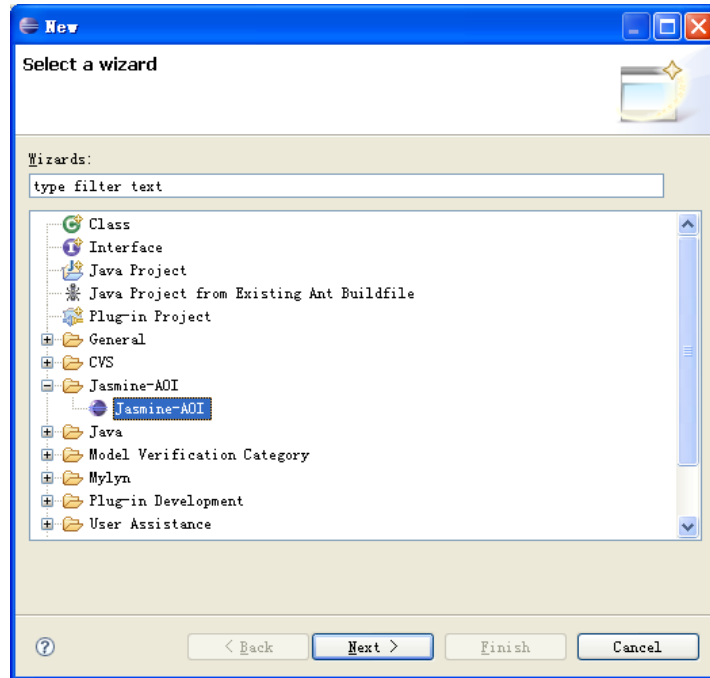
- Use two nodes stereotyped with: "Entry", "Exit" to denote where the tokens will flow in from and flow out to primary models in the advice model, respectively.

## 2. Export the models to XMI files from EA

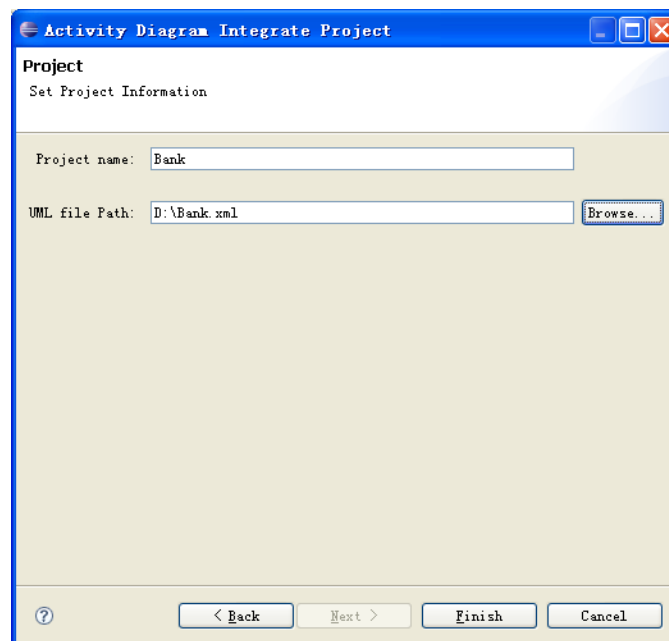
- Export primary models to XMI file.  
Right click the package of the primary design models, select "Export package to XMI file", browse to the folder intended to save XMI files, click "Export", after exporting finished, close the dialog.
- Export pointcut models to XMI files.  
Right click the package of the pointcut model, and export the package like primary models.
- Export advice models to XMI files.  
Right click the package of the advice model, and export the package like primary models.

## 3. Create a Integrating Project

After import plug-in "Jasmine-AOI", start eclipse. Select File -> New -> Other -> Jasmine-AOI -> Jasmine-AOI.

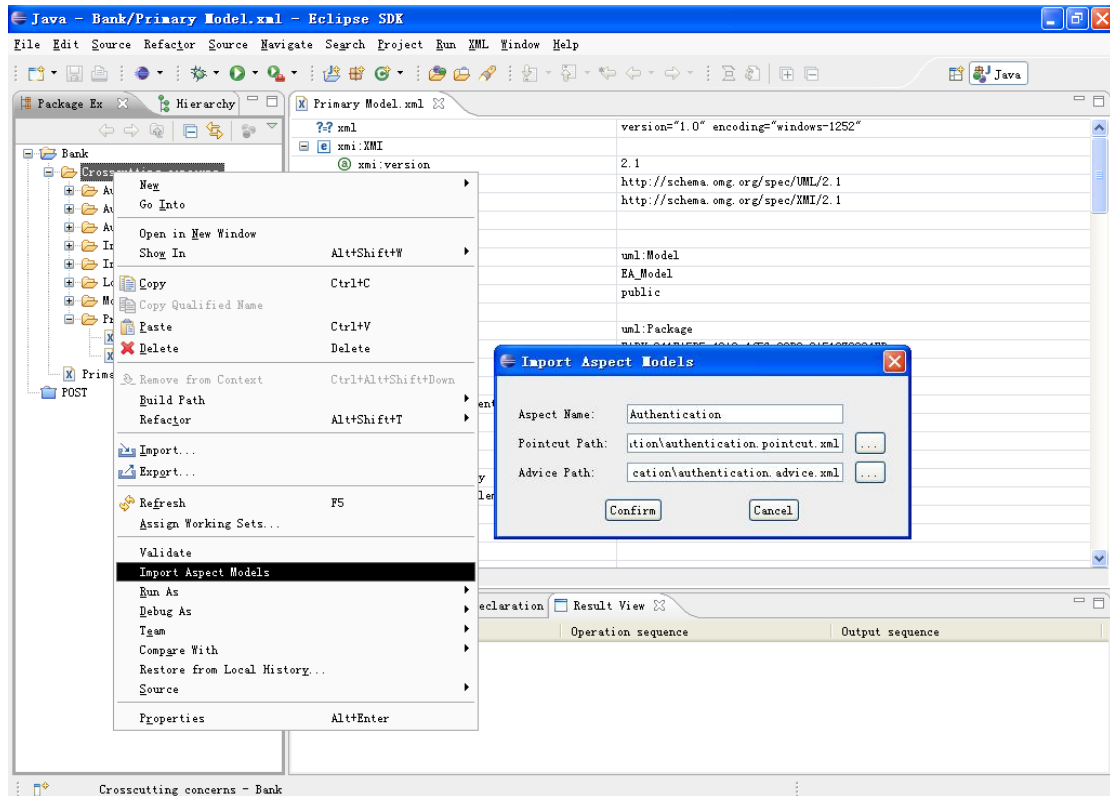


Set the project name and browse the XMI file of the primary models.



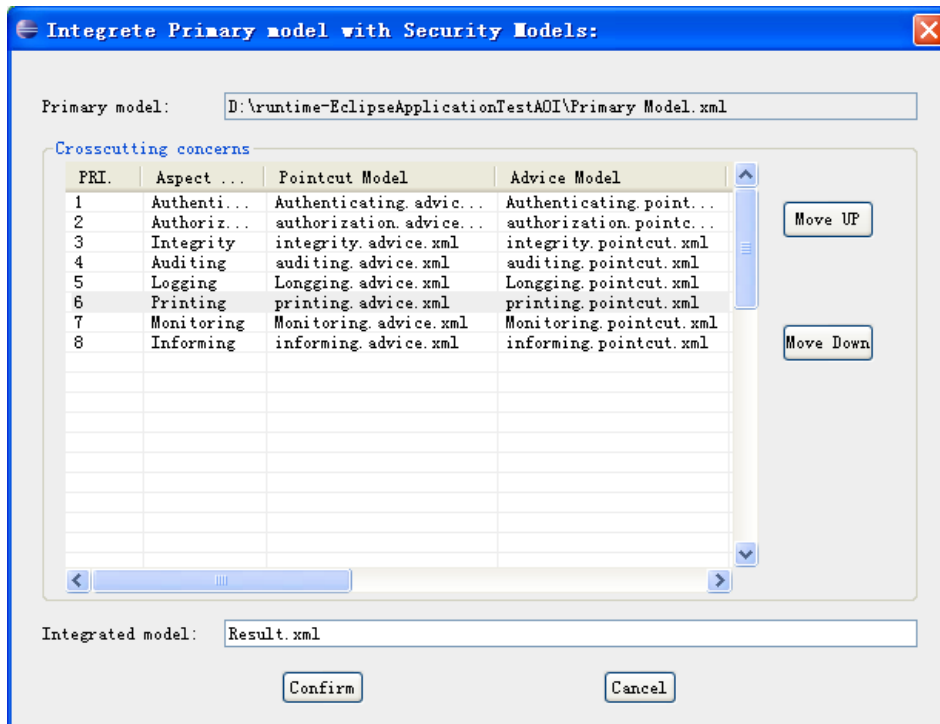
#### 4. Import Crosscutting Concern Models to Jasmine-AOI

Right click the folder of “Crosscutting concerns” and select “Import Aspect Models”. Browse to XMI file of pointcut model and advice model respectively.



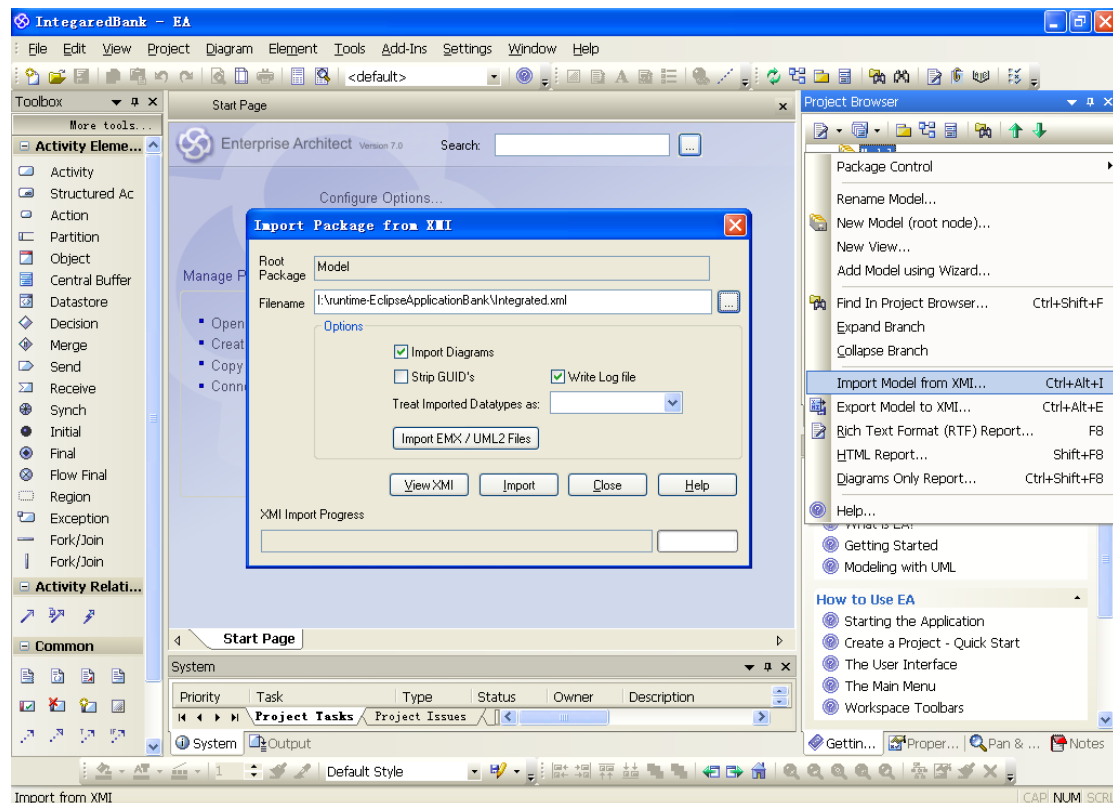
## 5. Integrating

After all the crosscutting concern models are imported, right click the primary model file and select "Integrate". Adjust the priority of security concerns by the buttons "Move Up" and "Move Down". The integrating sequence is based on their priority from top to bottom. Then, pass the "Confirm" button, the crosscutting concern models will be integrated into the primary model and generate a overall system design including both primary requirements and crosscutting concerns in the form of XMI.



## 6. Import Integrated XMI file to EA

Create a new project named “Integrated Bank” in EA, right click the root of the model, select “Import Model from XMI”, browse to the integrated xml file, click “Import”, after importing finished, close the dialog.

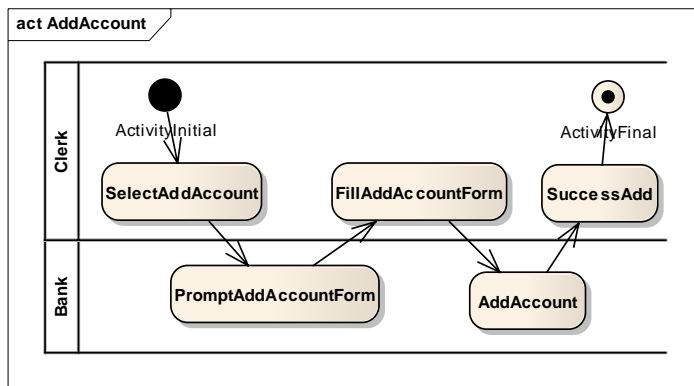




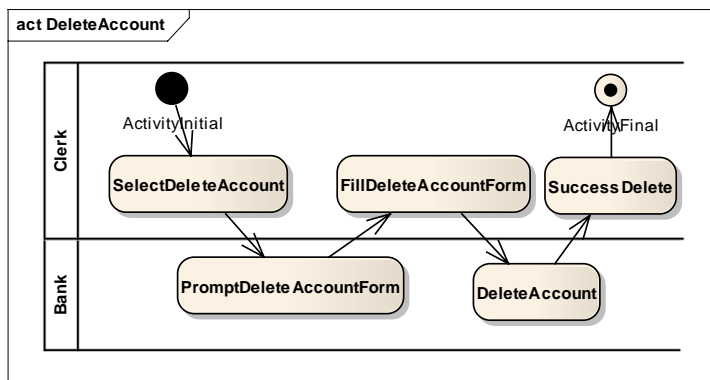
Adjust the location of elements in the integrated diagrams (Be careful do not change the relative locations, they are implied calculated by our integrating tool). The integrated diagrams of the sample bank system are in appendix C.

## Appendix A. Primary Models of the Bank System

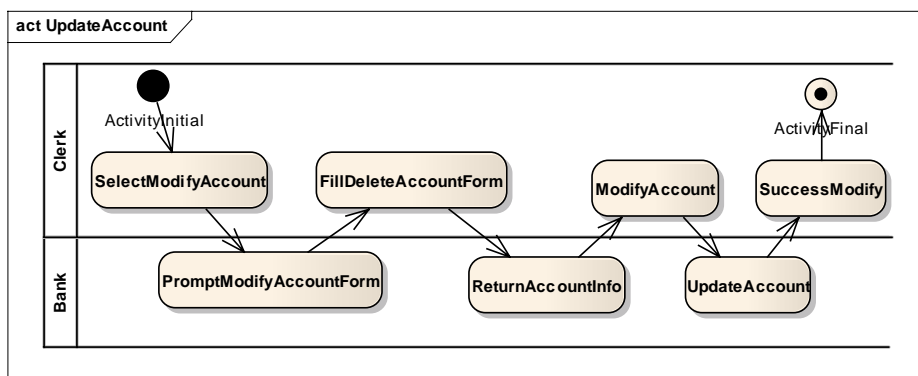
### 1. Add account



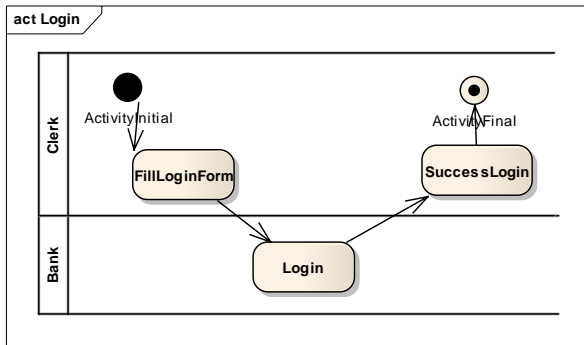
### 2. Delete account



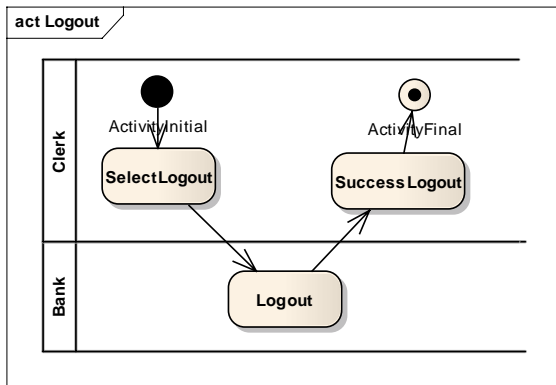
### 3. Update account



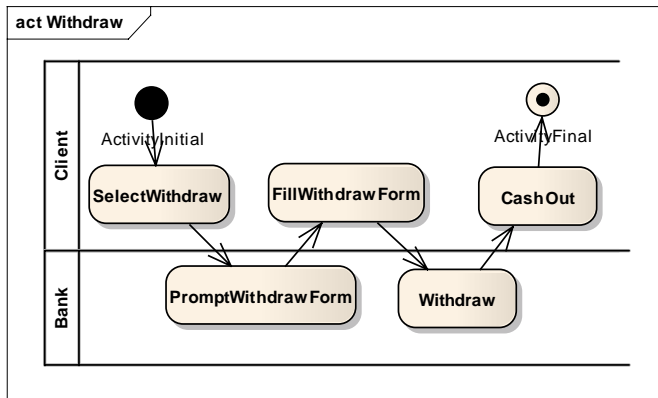
### 4. Login



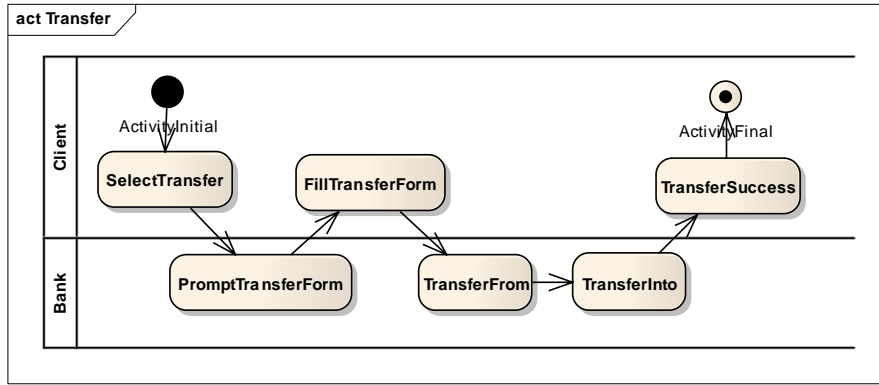
## 5. Logout



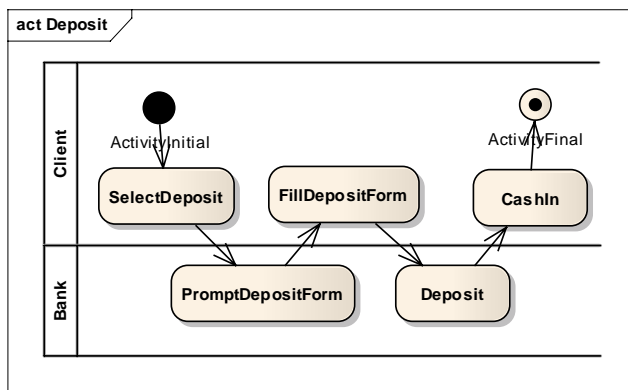
## 6. Withdraw



## 7. Transfer



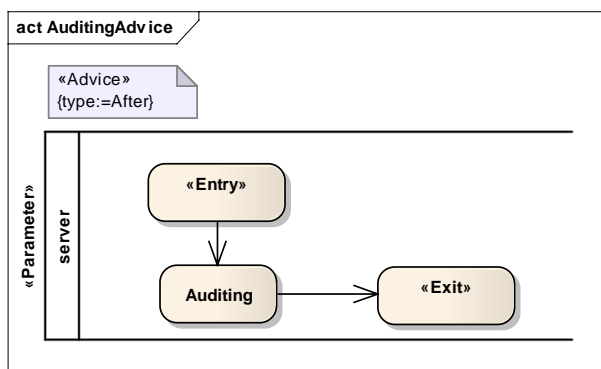
## 8. Deposit



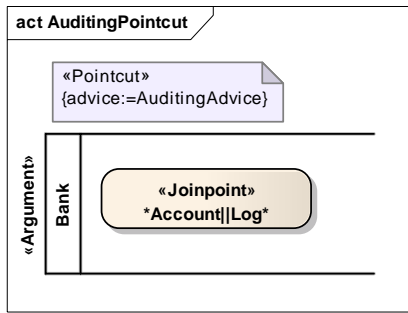
## Appendix B. Crosscutting Concern Models of the Bank System

### 1. Auditing

Advice model:

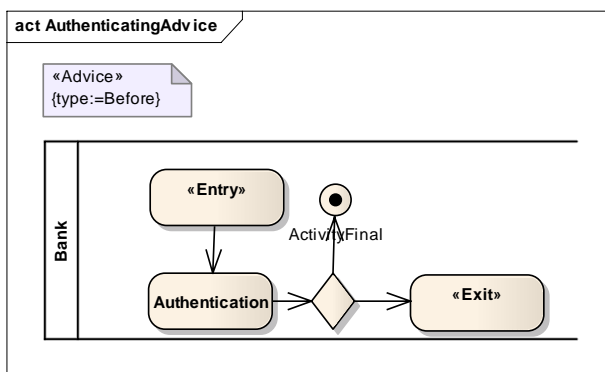


Pointcut model:

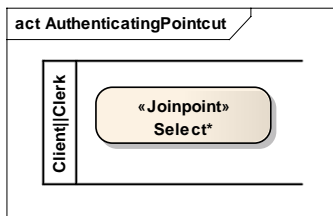


## 2. Authenticating

Advice model:

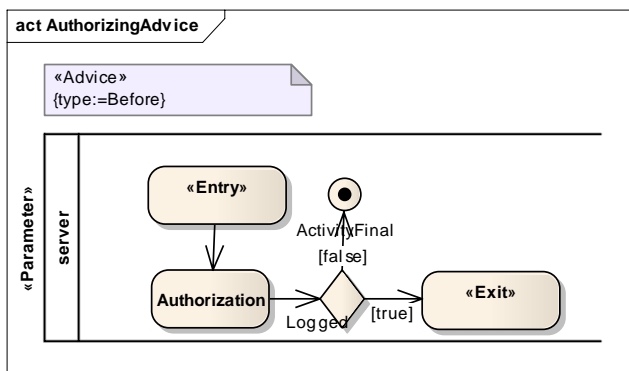


Pointcut model:

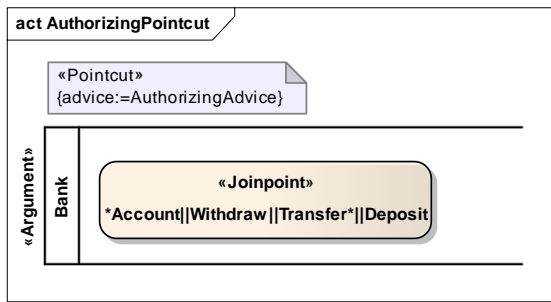


## 3. Authorizing

Advice model:

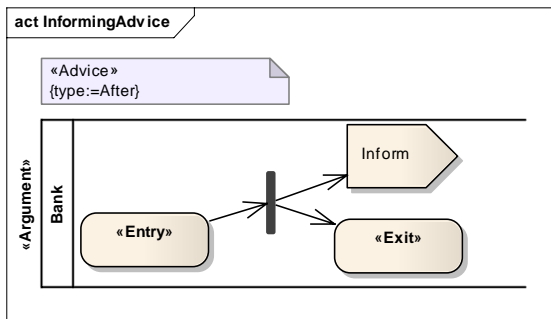


Pointcut model:

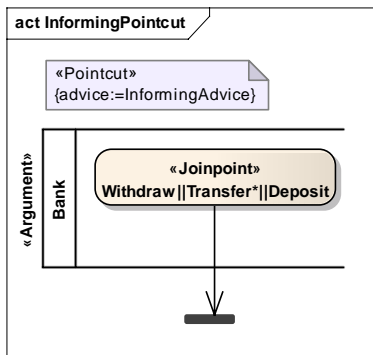


#### 4. Informing

Advice model:

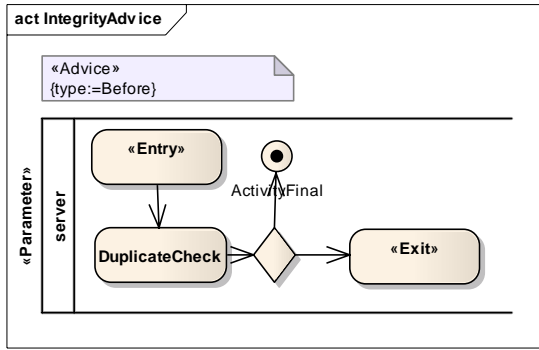


Pointcut model:

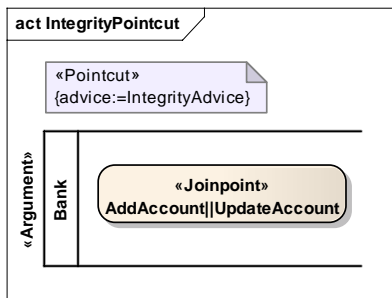


#### 5. Integrity

Advice model:

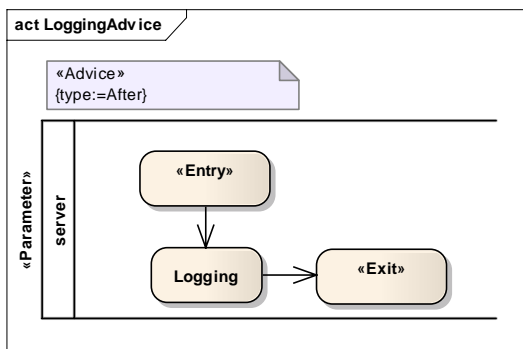


Pointcut model:

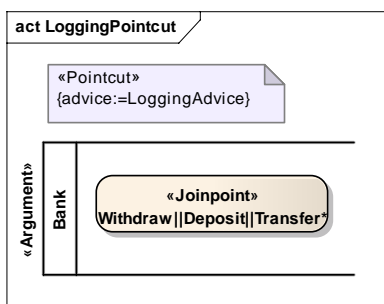


## 6. Logging

Advice model:

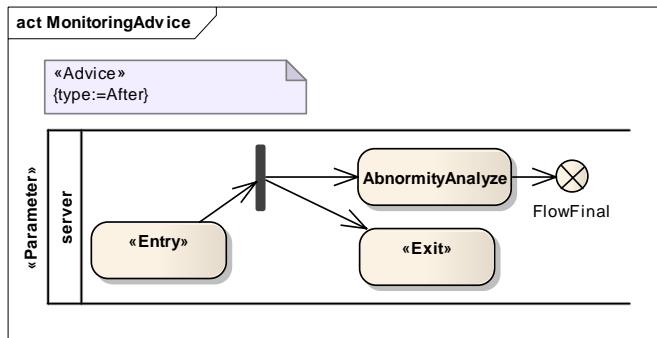


Pointcut model:

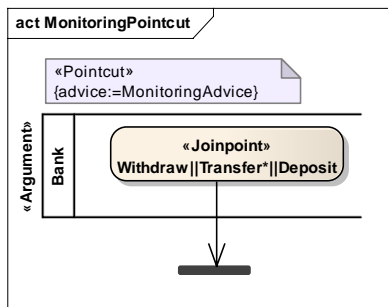


## 7. Monitoring

Advice model:

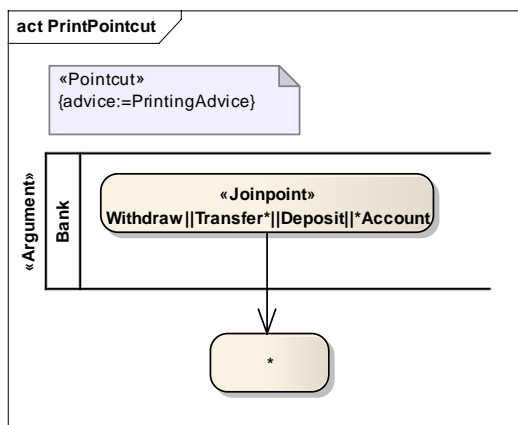


Pointcut model:

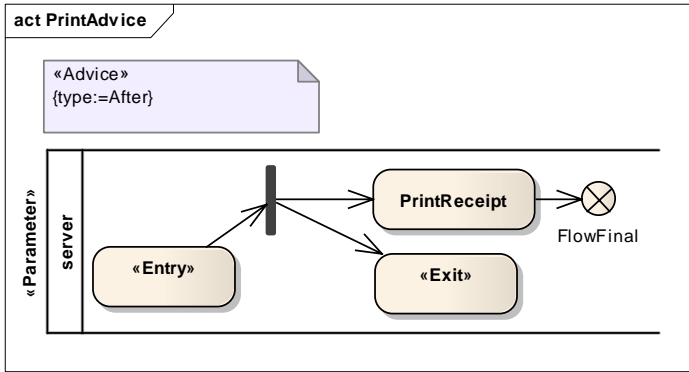


## 8. Printing

Advice model:

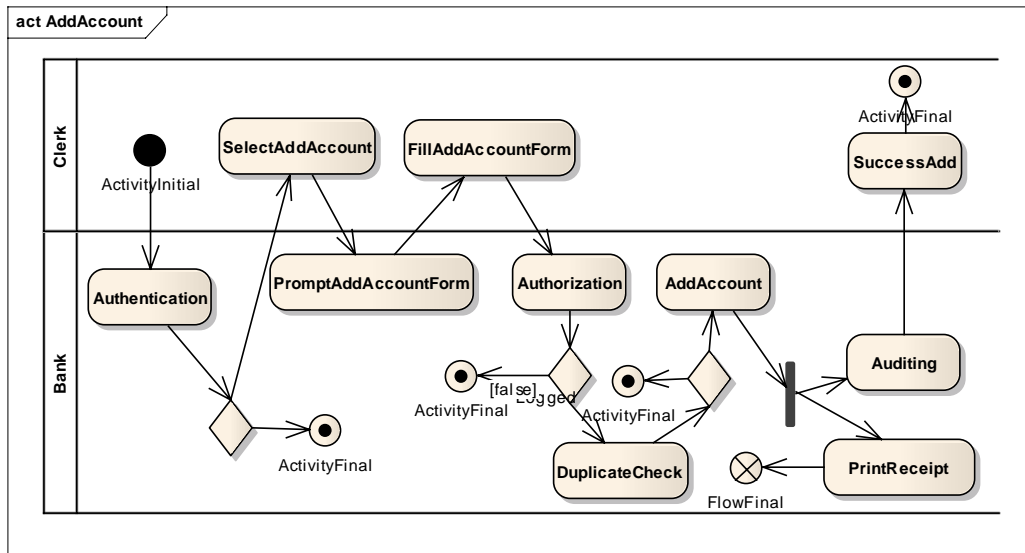


Pointcut model:

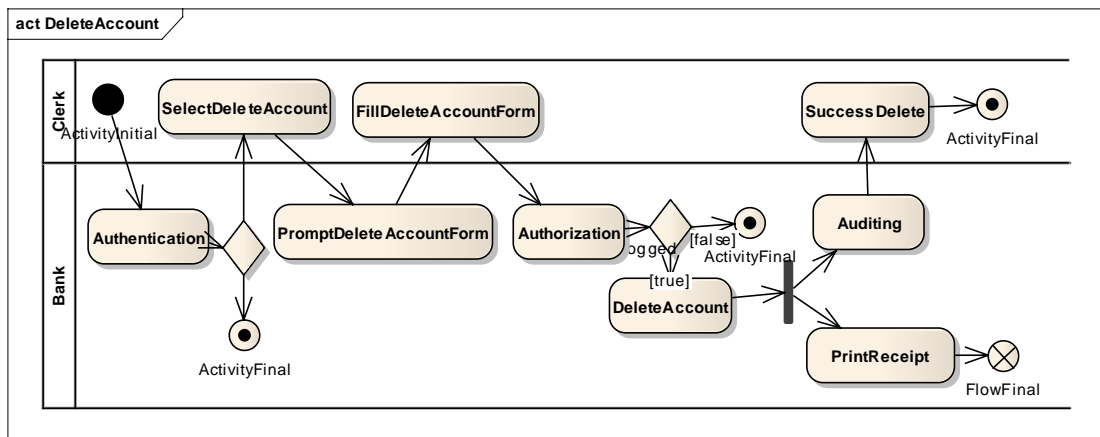


## Appendix C. Integrated models of the Bank System

### 1. Add account

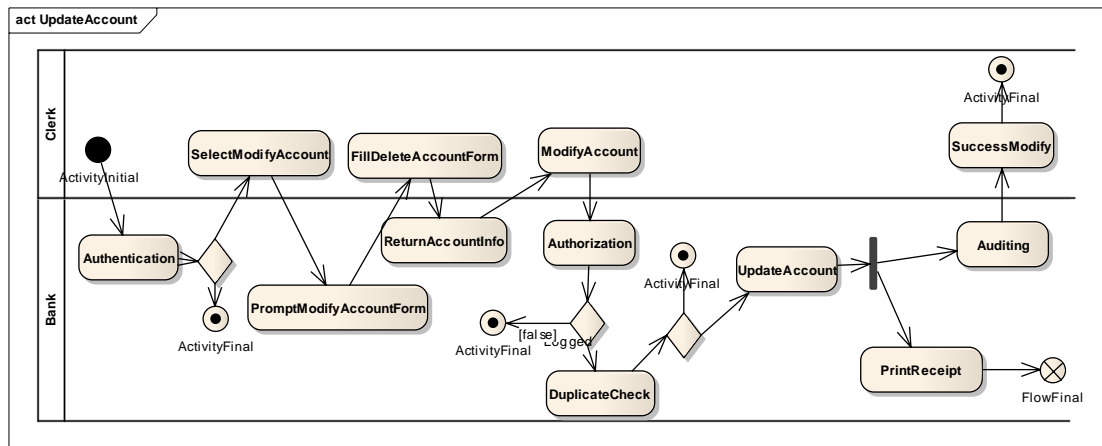


### 2. Delete account

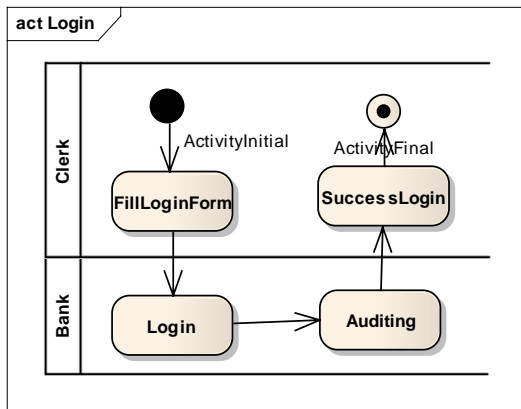




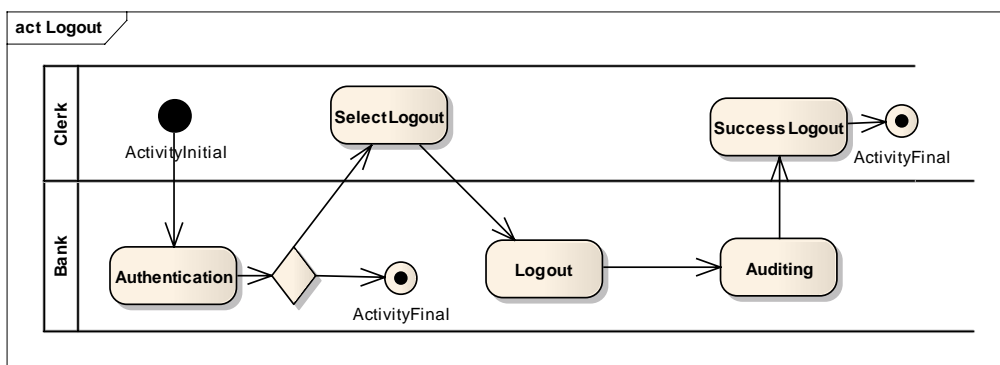
### 3. Update account



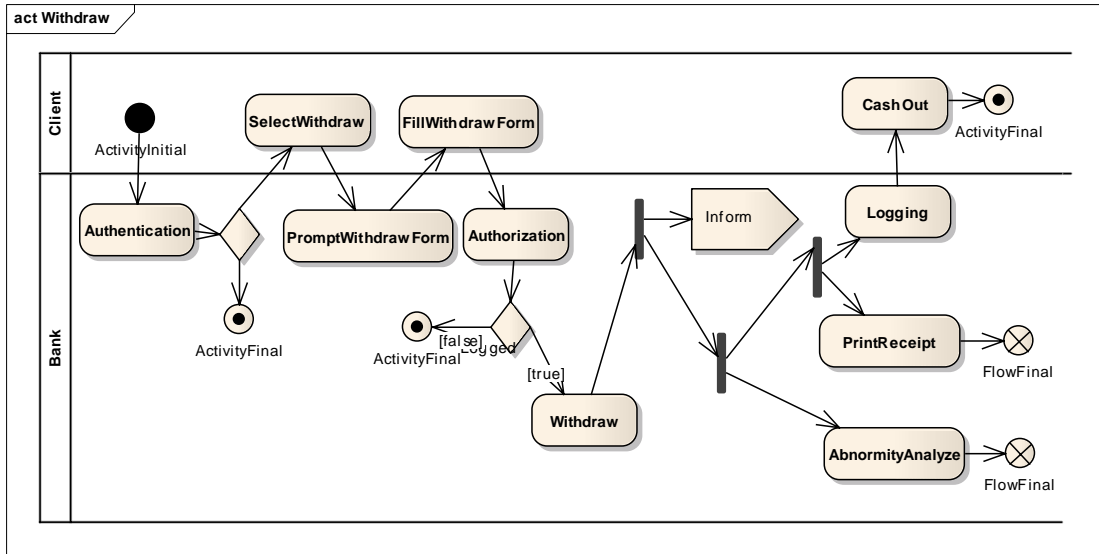
### 4. Login



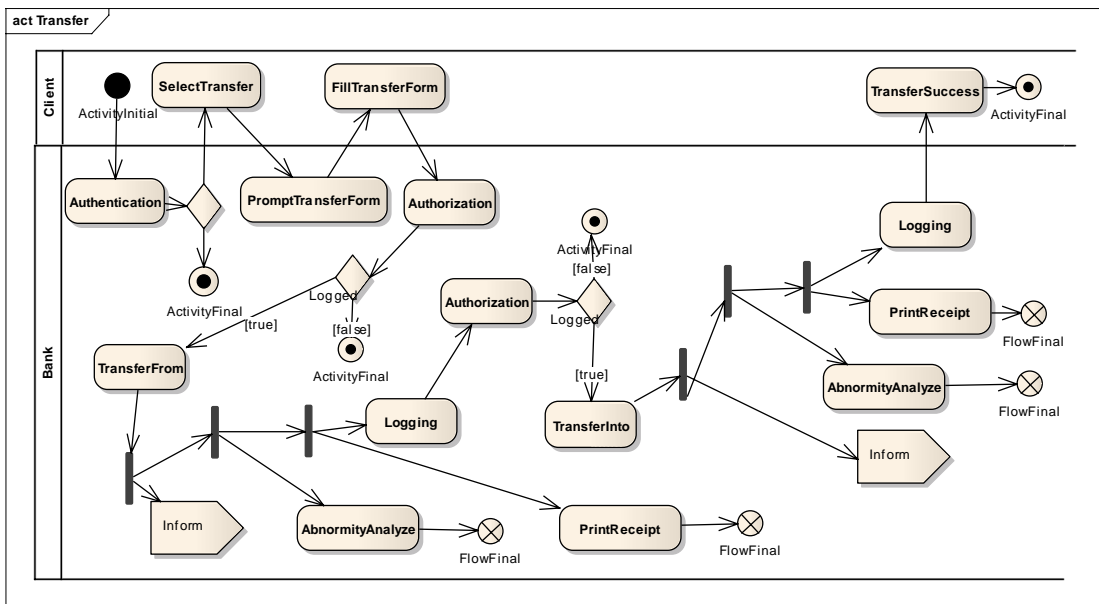
### 5. Logout



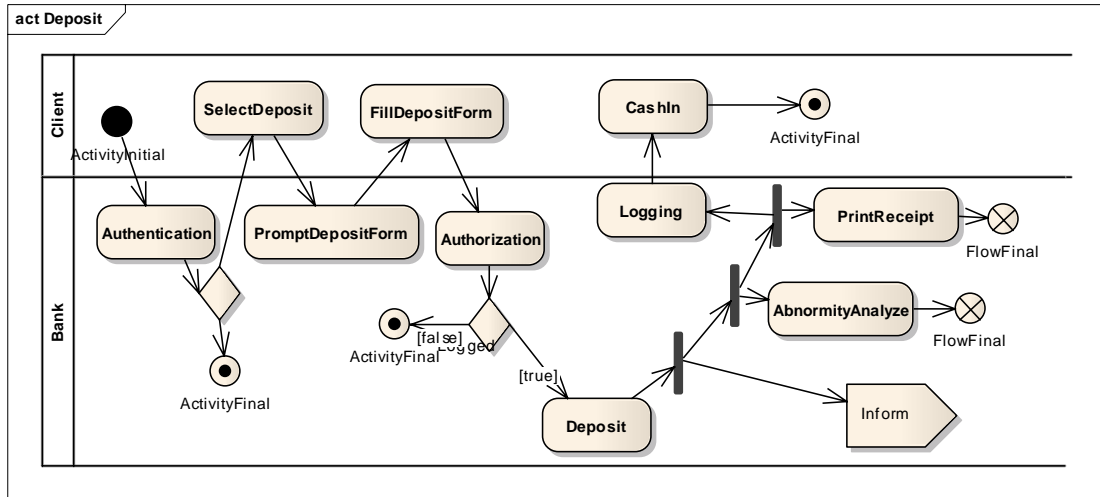
### 6. Withdraw



## 7. Transfer

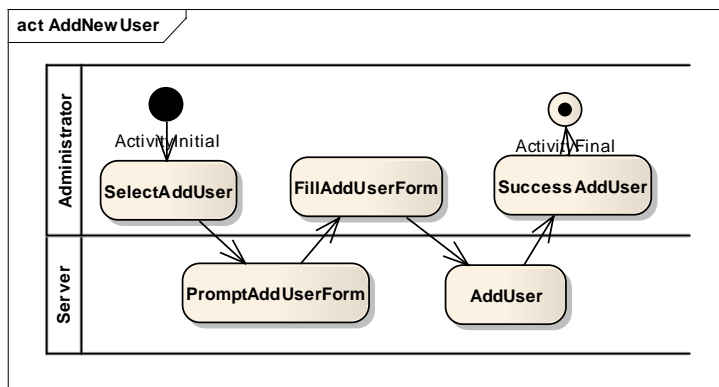


## 8. Deposit

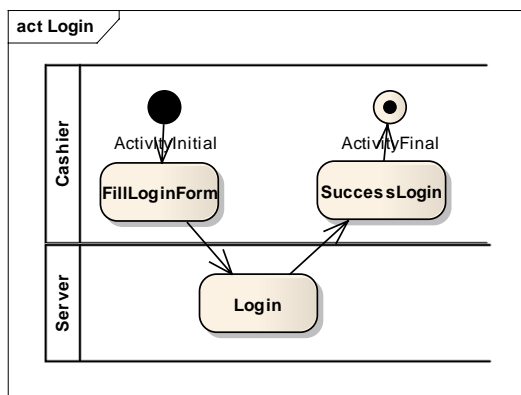


## Appendix D. Primary Models of the POST System

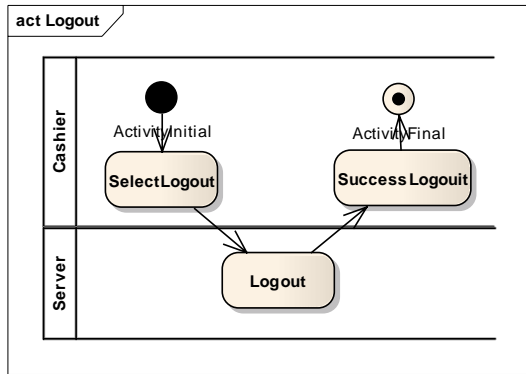
### 1. Add new user



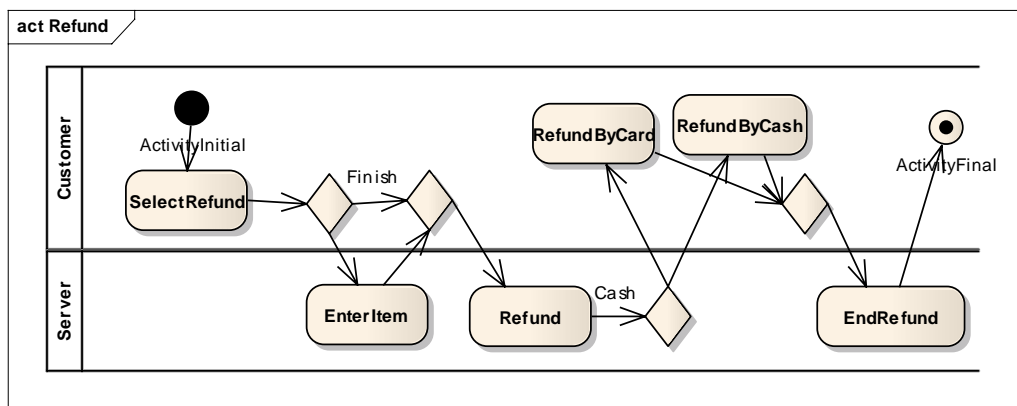
### 2. Login



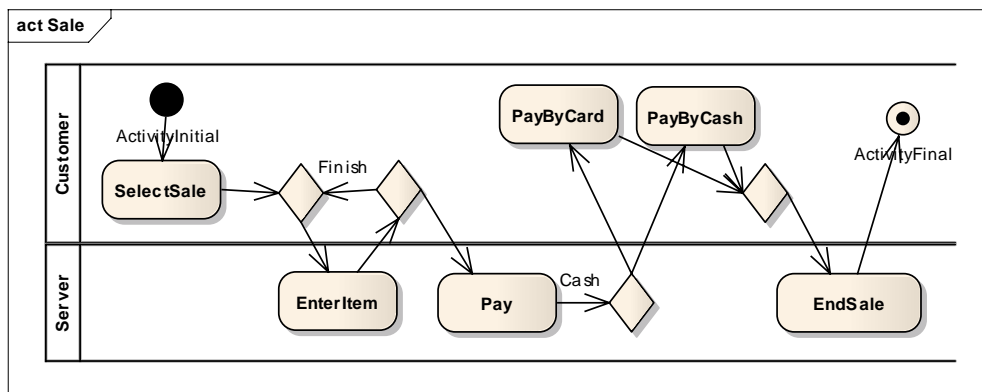
### 3. Logout



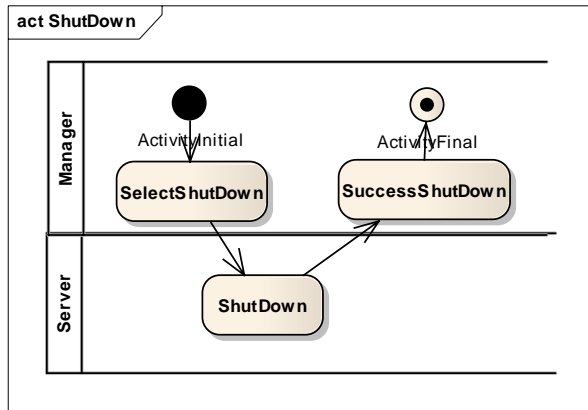
#### 4. Refund



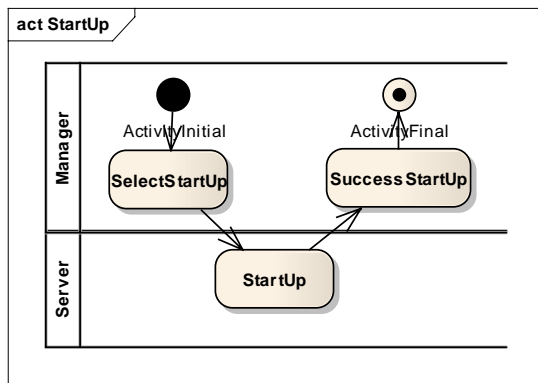
#### 5. Sale



#### 6. Shut down



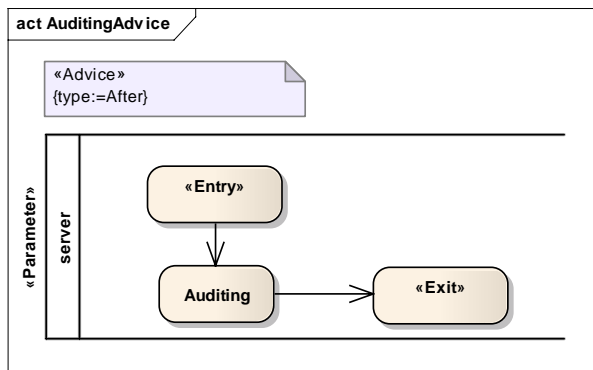
7. Start up



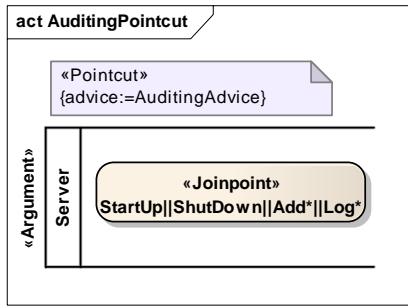
**Appendix E. Crosscutting Concern Models of the POST System**

1. Auditing

Advice model:

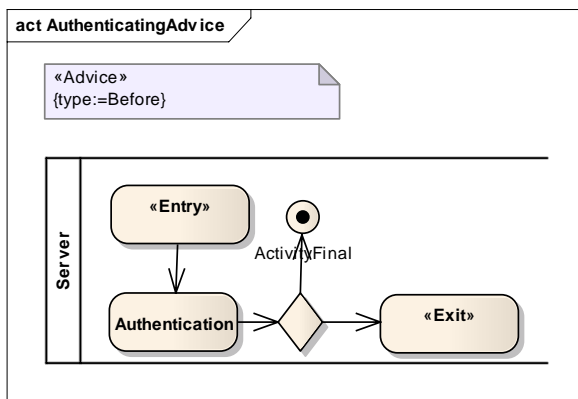


Pointcut model:

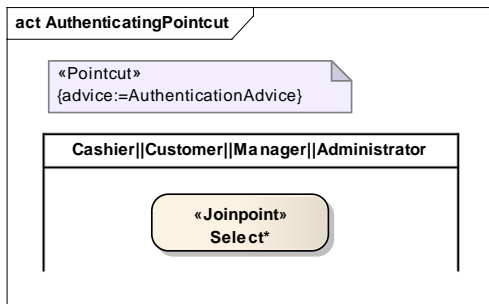


2. Authenticating

Advice model:

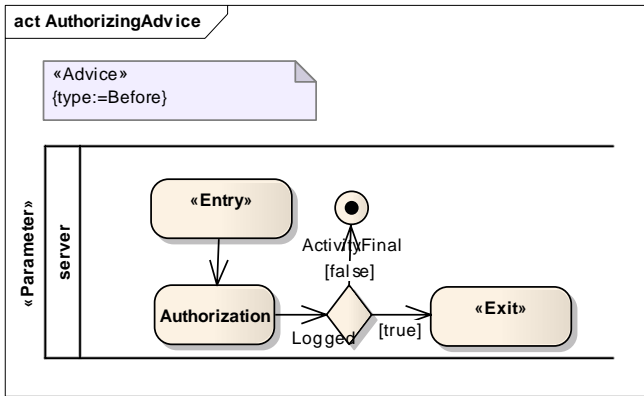


Pointcut model:

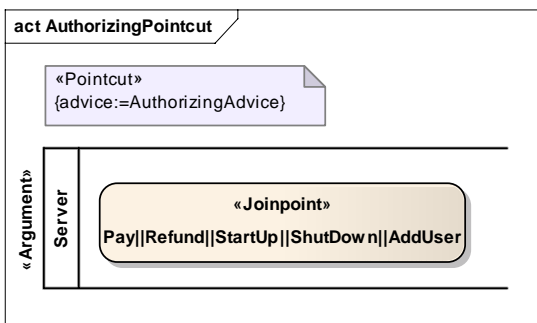


3. Authorizing

Advice model:

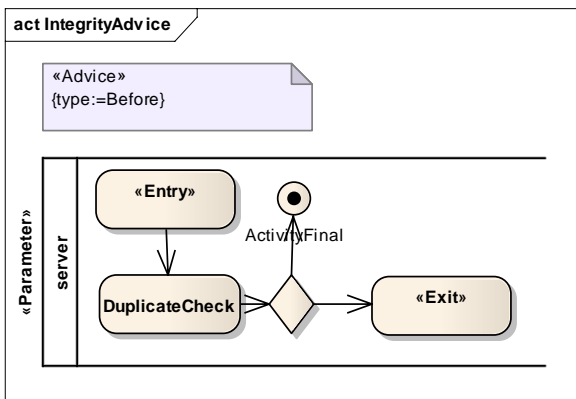


Pointcut model:

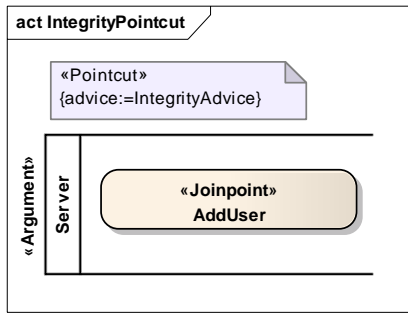


#### 4. Integrity

Advice model:

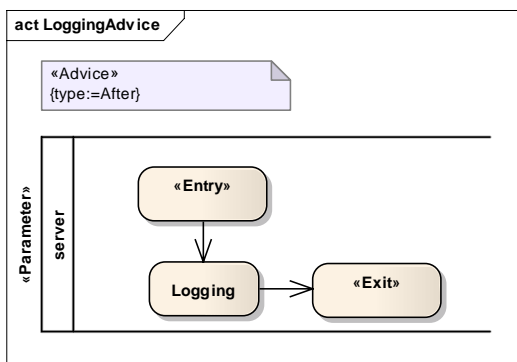


Pointcut model:

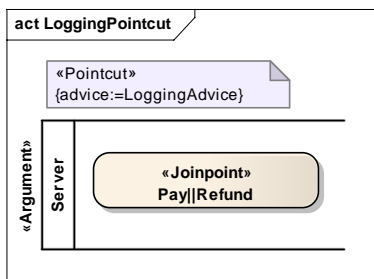


## 5. Logging

Advice model:

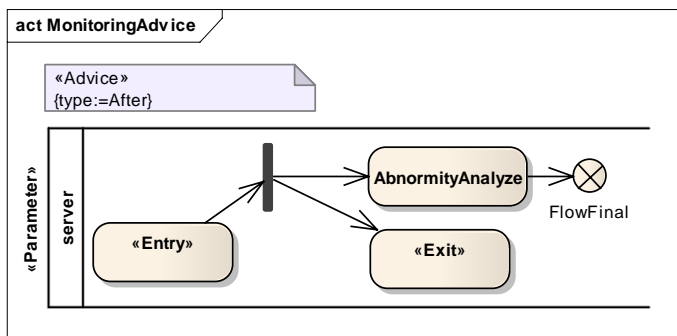


Pointcut model:



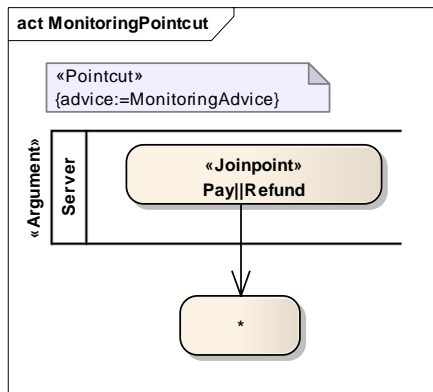
## 6. Monitoring

Advice model:



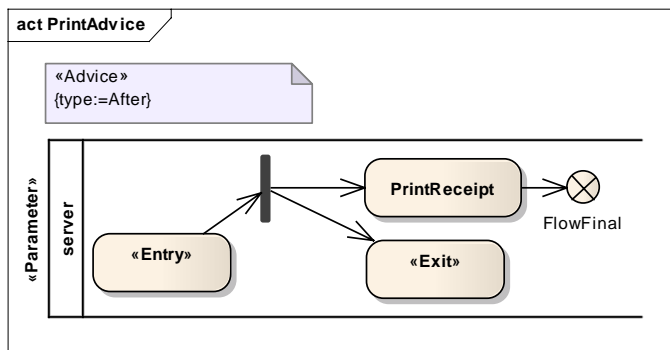


Pointcut model:

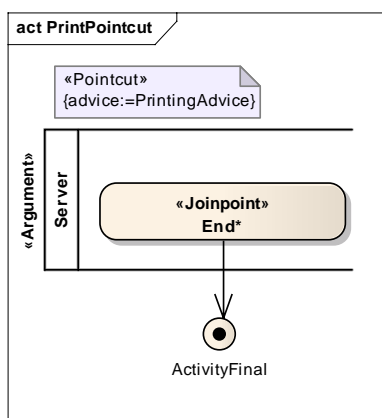


## 7. Printing

Advice model:

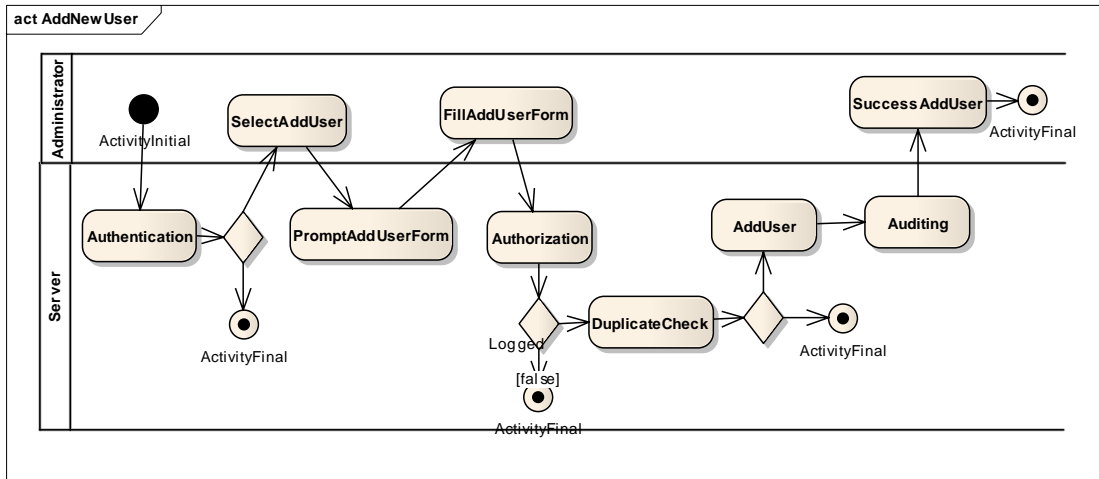


Pointcut model:

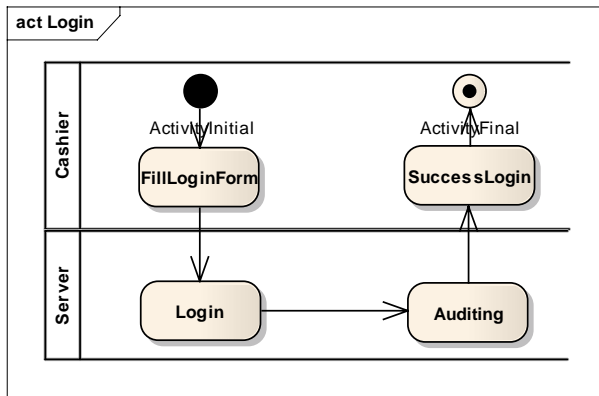


## Appendix F. Integrated models of the POST System

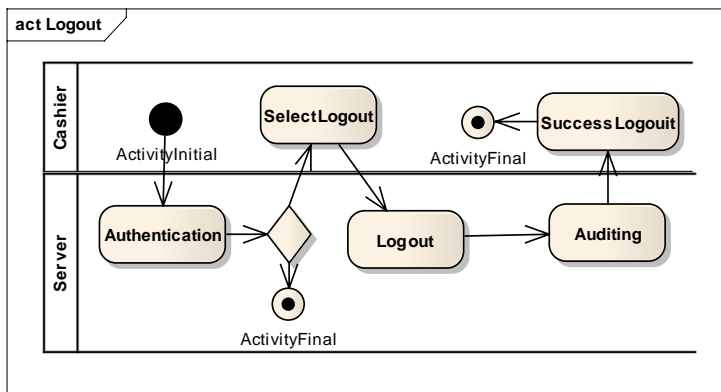
1. Add new user



## 2. Login



## 3. Logout



## 4. Refund



## 7. Start up

