UNIVERSITÀ PARTHENOPE
DiST
Dipartimento di Scienze e Tecnologie

Programmazione 3
e
Laboratorio di Programmazione 3

Unified Modeling Language
e
Java

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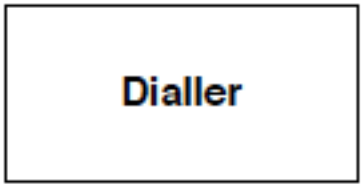
Class Diagram

- Il Class Diagram permette di denotare il contenuto statico e le relazioni tra classi

- Il Class Diagram permette di visualizzare relazioni e dipendenze strutturali che non sono riscontrabili scrivendo codice

Classi

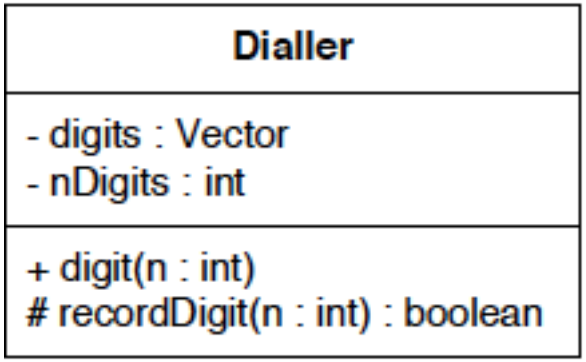


Rappresentazione di una classe in UML

```
public class Dialler
{
}
```

Rappresentazione in Java della classe

Classi

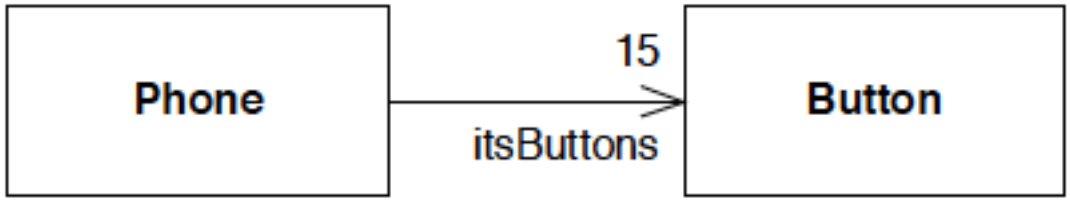


Dettagli della classe `Dialler`

```
public class Dialler
{
   private Vector digits;
   int nDigits;
   public void digit(int n);
   protected boolean recordDigit(int n);
}
```

Rappresentazione in Java della classe

Associazione

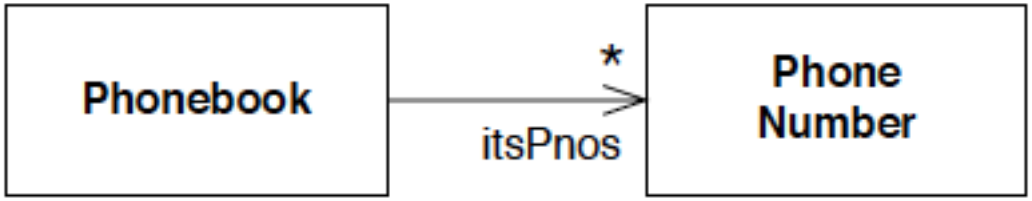


Associazione - la direzione della freccia ci dice che il telefono contiene un riferimento a pulsante

```
public class Phone
{
  private Button itsButtons[15];
}
```

Rappresentazione in Java della classe `Phone`

Molteplicità

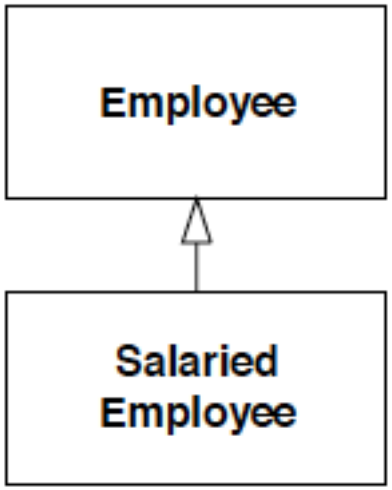


Molteplicità "many"

```
public class Phonebook
{
  private Vector itsPnos;
}
```

Rappresentazione in Java della classe `Phonebook`

Ereditarietà

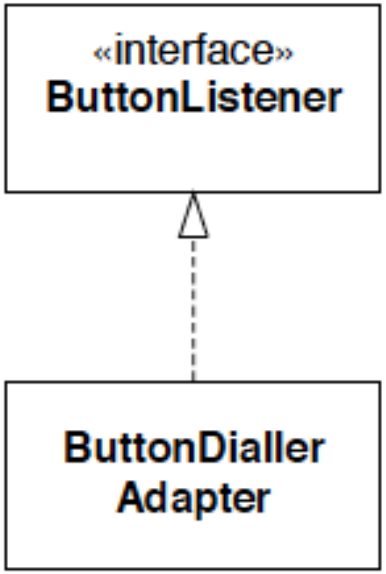


Esempio di ereditarietà

```
public class Employee
{
   ...
}

public class SalariedEmployee extends Employee
{
   ...
}
```

Rappresentazione in Java

Interfacce

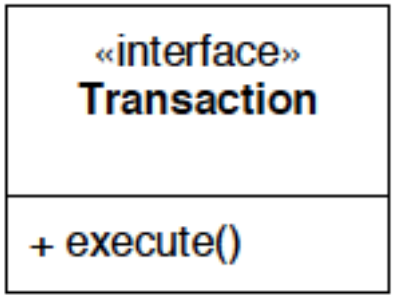


Implementazione di interfacce

```
interface ButtonListener
{
   ...
}

public class ButtonDiallerAdapter implements
ButtonListener
{
   ...
}
```

Rappresentazione in Java

Stereotipi di classe

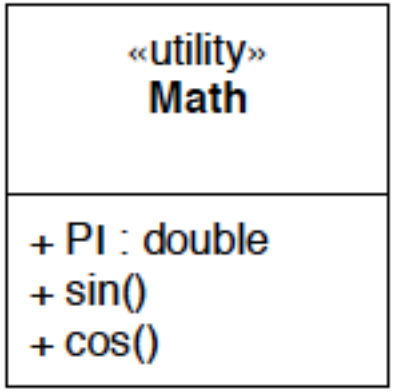


Stereotipo <<interface>>

```
interface Transaction
{
  public void execute();
}
```

Rappresentazione in Java

Stereotipi di classe

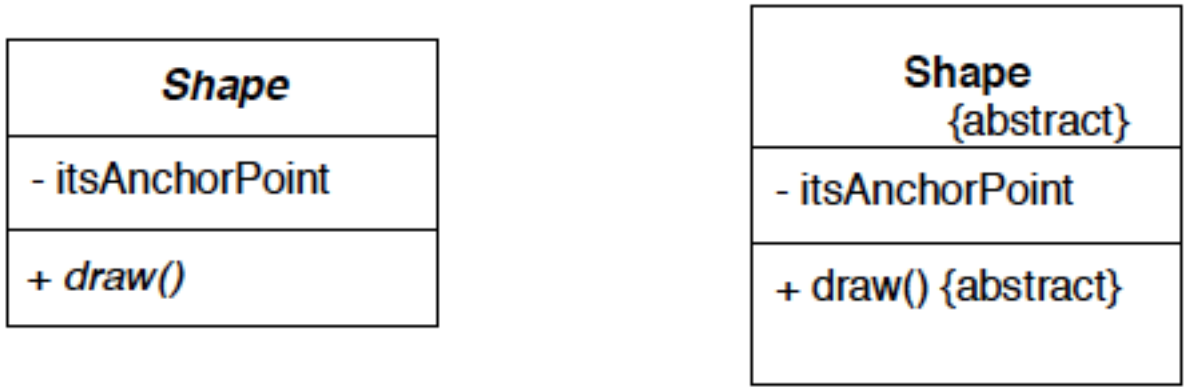


Stereotipo <<utility>>

```
public class Math
{
  public static final double PI = 3.14159265358979323;

  public static double sin(double theta){...};

  public static double cos(double theta){...};
}
```

Rappresentazione in Java

Classi astratte

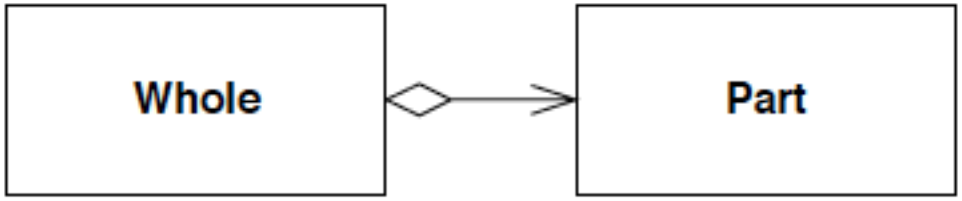


Rappresentazioni di classi astratte

```
public abstract class Shape
{
  private Point itsAnchorPoint;

  public abstract void draw();

}
```

Rappresentazione in Java

Aggregazione



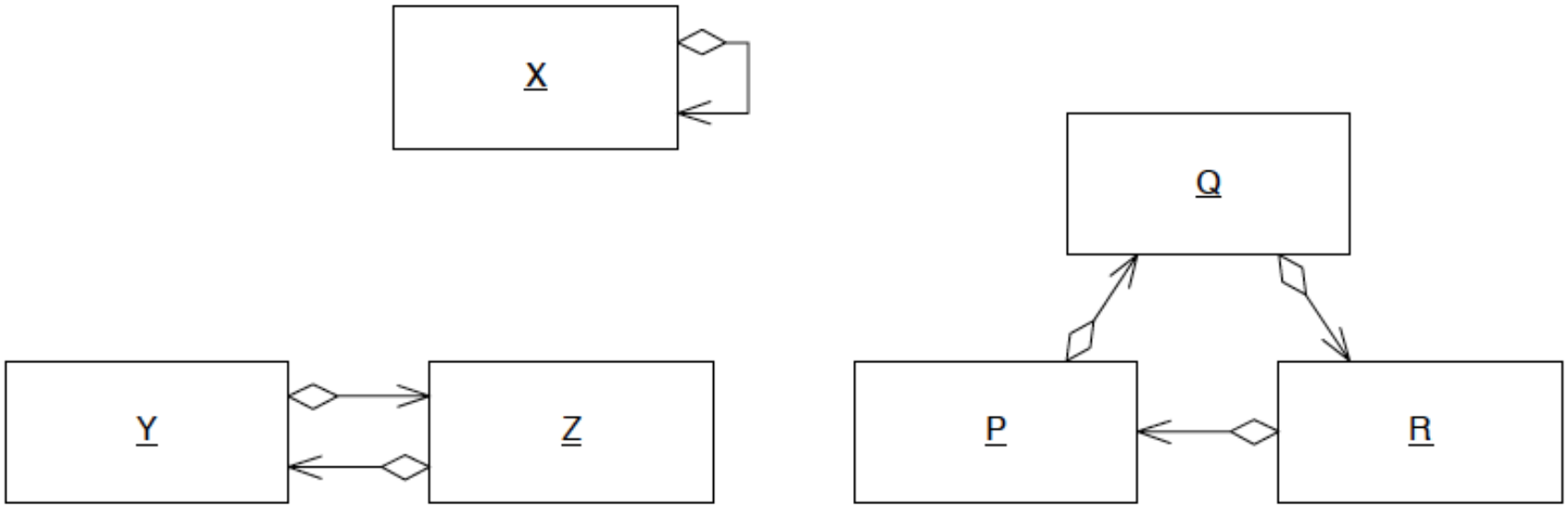
Rappresentazione di aggregazione (Parte-Intera)

```
public class Whole
{
  private Part itsPart;

}
```

Rappresentazione in Java

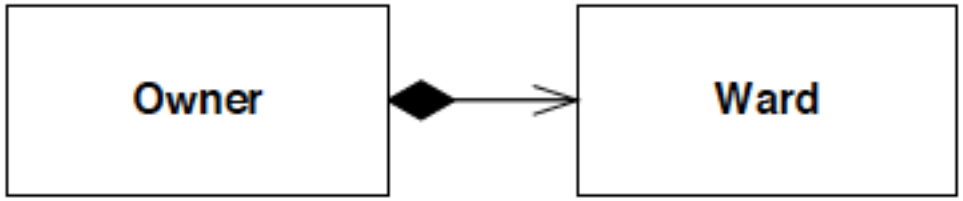
Stesso risultato dell'aggregazione

Aggregazione



Aggregazioni non ammesse tra istanze

Composizione



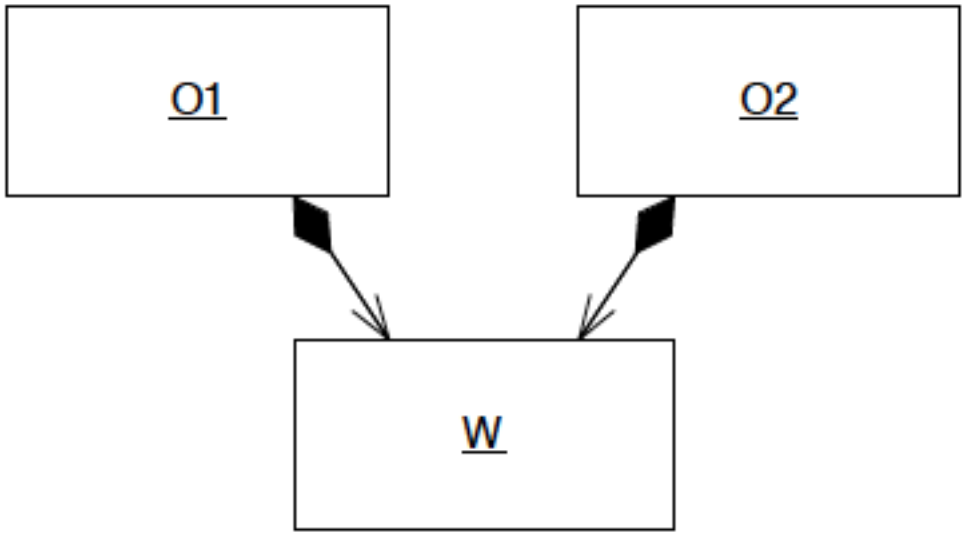
Rappresentazioni di composizione

```
public class Owner
{
  private Ward itsWard;
}
```

Rappresentazione in Java

Stesso risultato dell'aggregazione

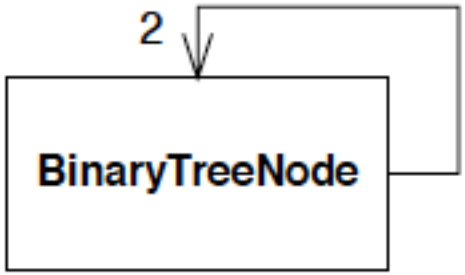
Composizione



Composizione non ammessa tra istanze – ogni istanza delle classi componenti può appartenere a una sola instanza della classe composta

La classe composta è responsabile della durata della clase composta

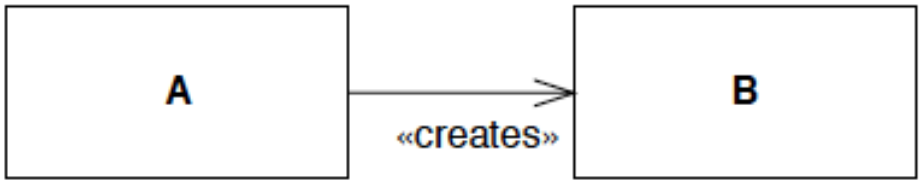
Molteplicità



Semplice molteplicità

```
public class BinaryTreeNode
{
   private BinaryTreeNode leftNode;
   private BinaryTreeNode rightNode;
}
```


Stereotipi



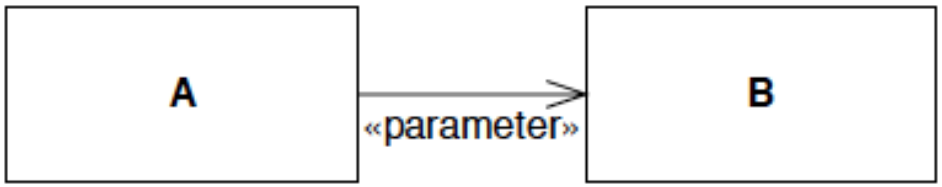
Stereotipo

```
public class A
{
 public B makeB(){
      return new B();
   }
}
```

Stereotipo

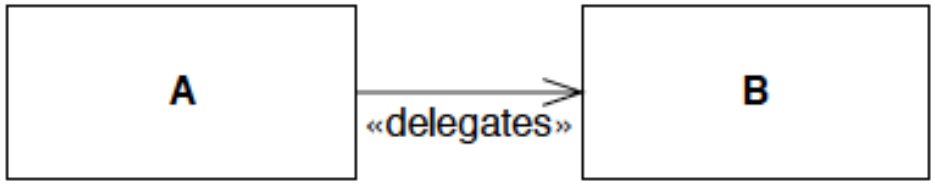
```
public class A
{
 public void f(){
   B b = new B();
   }
}
```


Stereotipi



Stereotipo

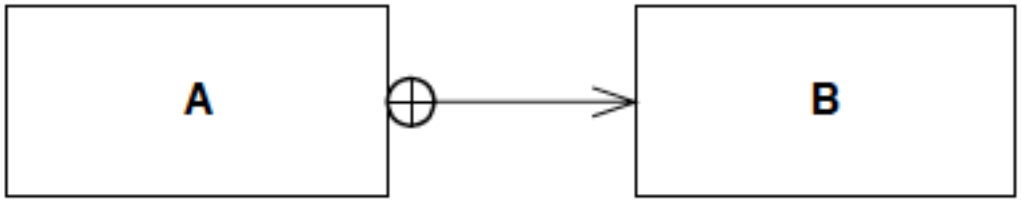
```
public class A
{
 public void f(b B){

   }
}
```



Stereotipo

```
public class A
{
 private B itsB;
 public void f(){
  itsB.f();
   }
}
```

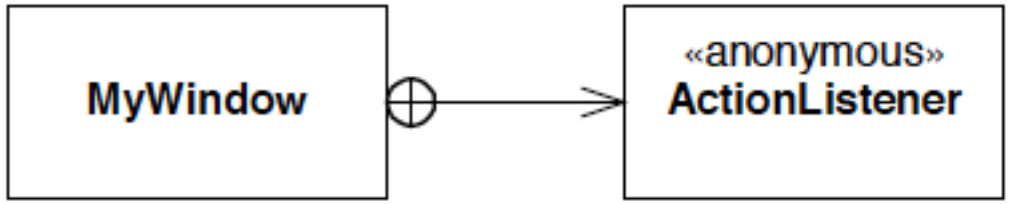
Classi nascoste



Classe nascosta

```
public class A {
   private class B {
   ...
   }
}
```

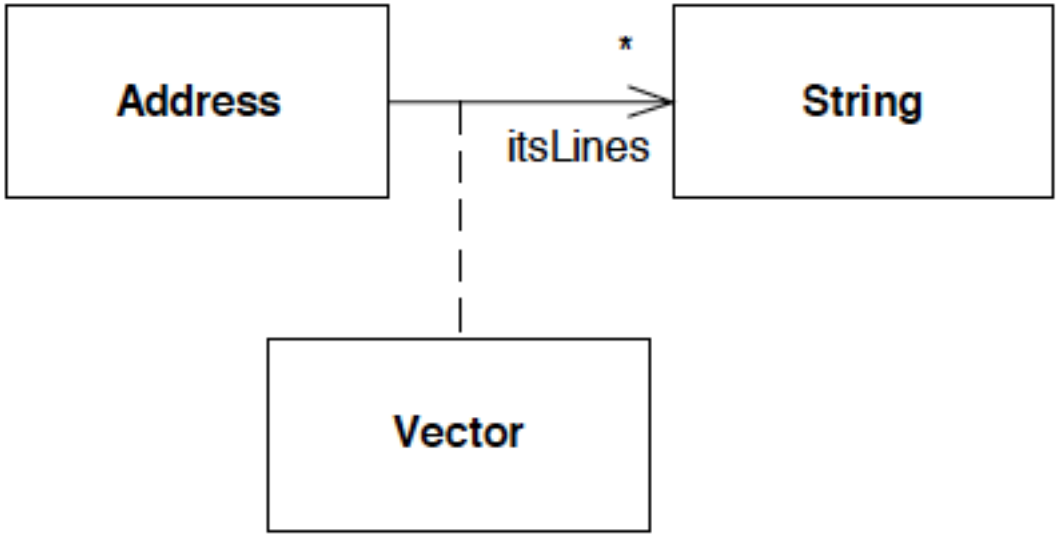
Classi nascoste



Classe nascosta anonima

```
public class Window {
  private void f() {
     ActionListner l = new ActionListener() {
     // implementazione
     };
  }
}
```

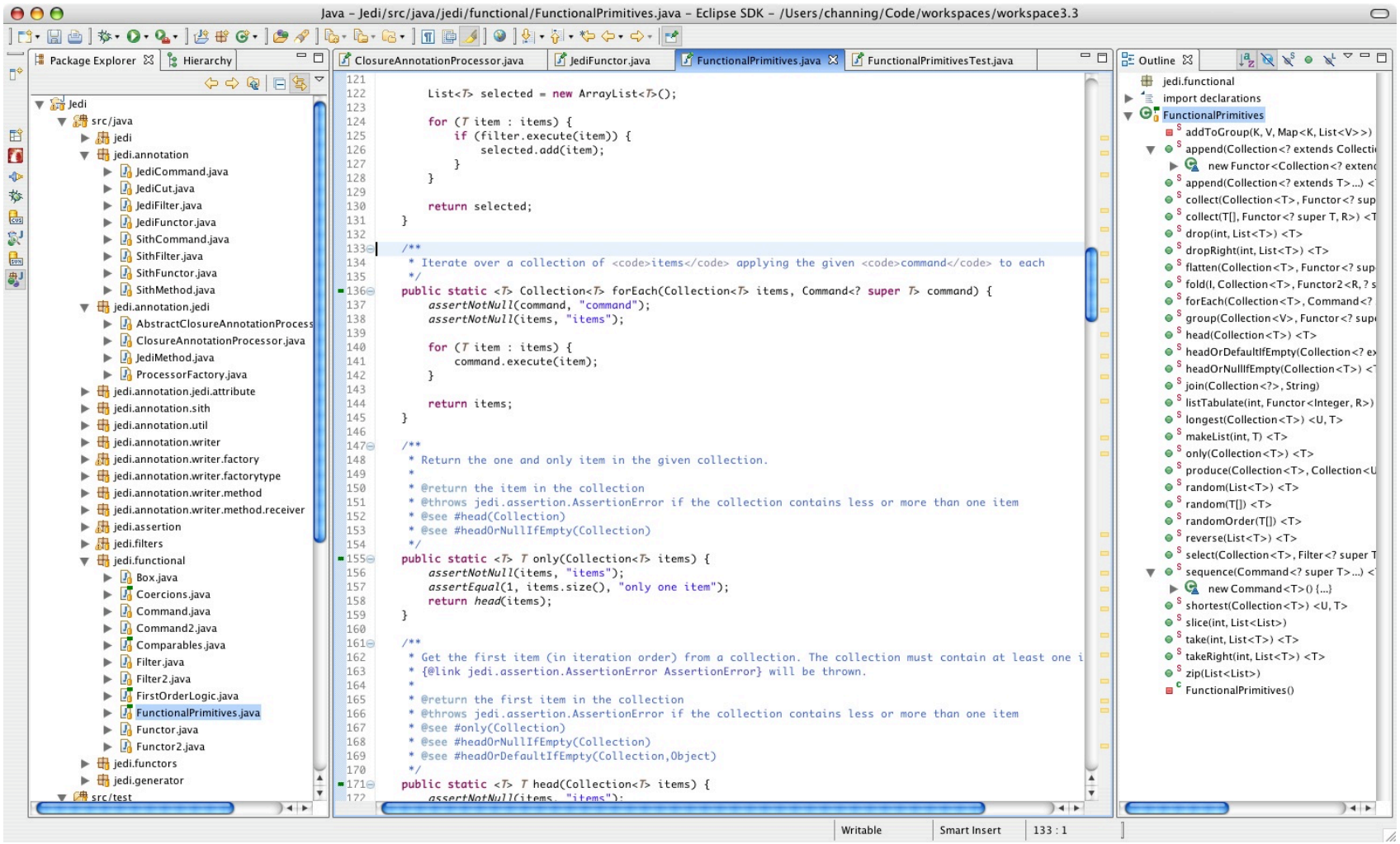
Association class



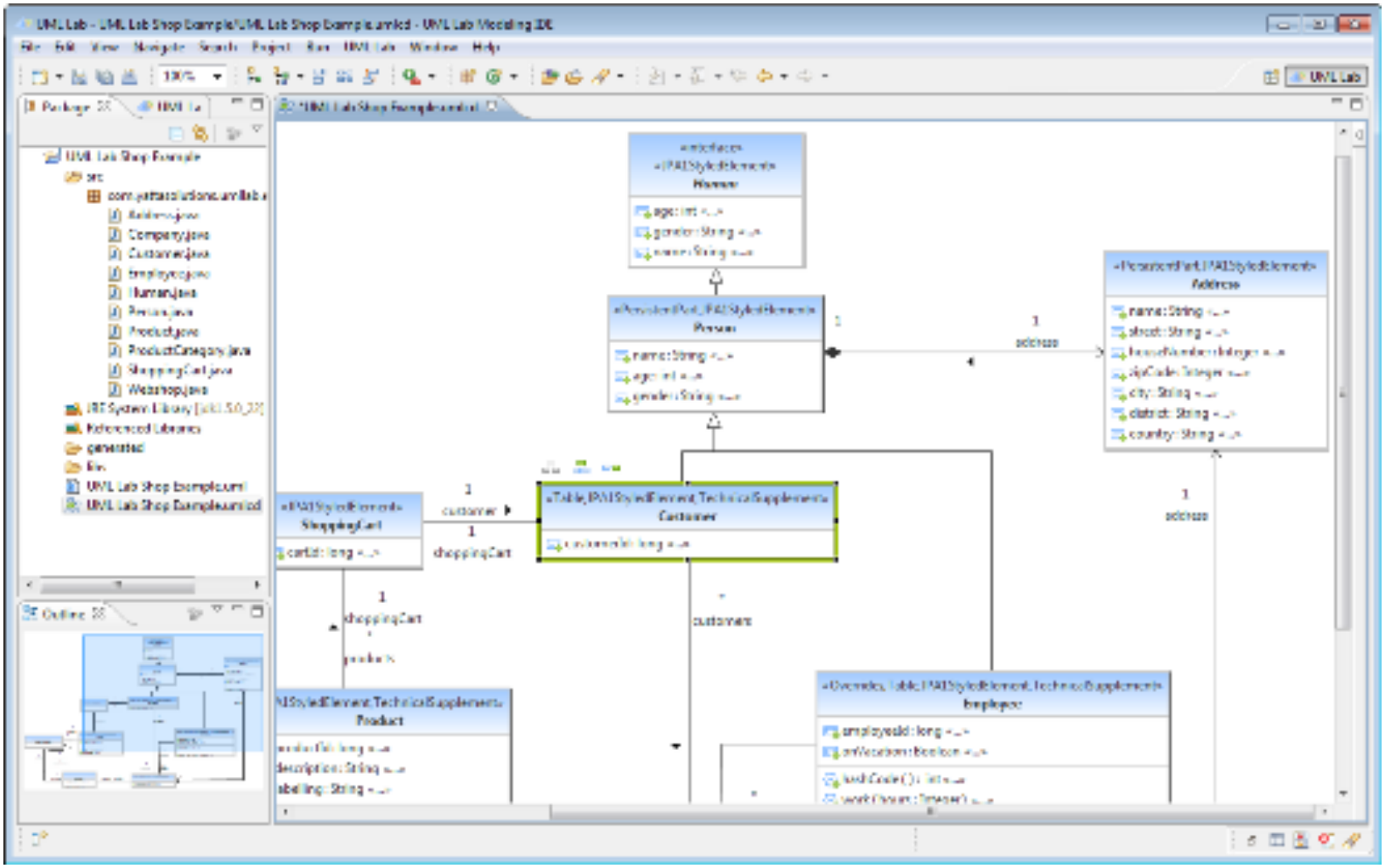
Association class

```
public class Address {
  private Vector itsLines;
};
```


Software … Eclispe



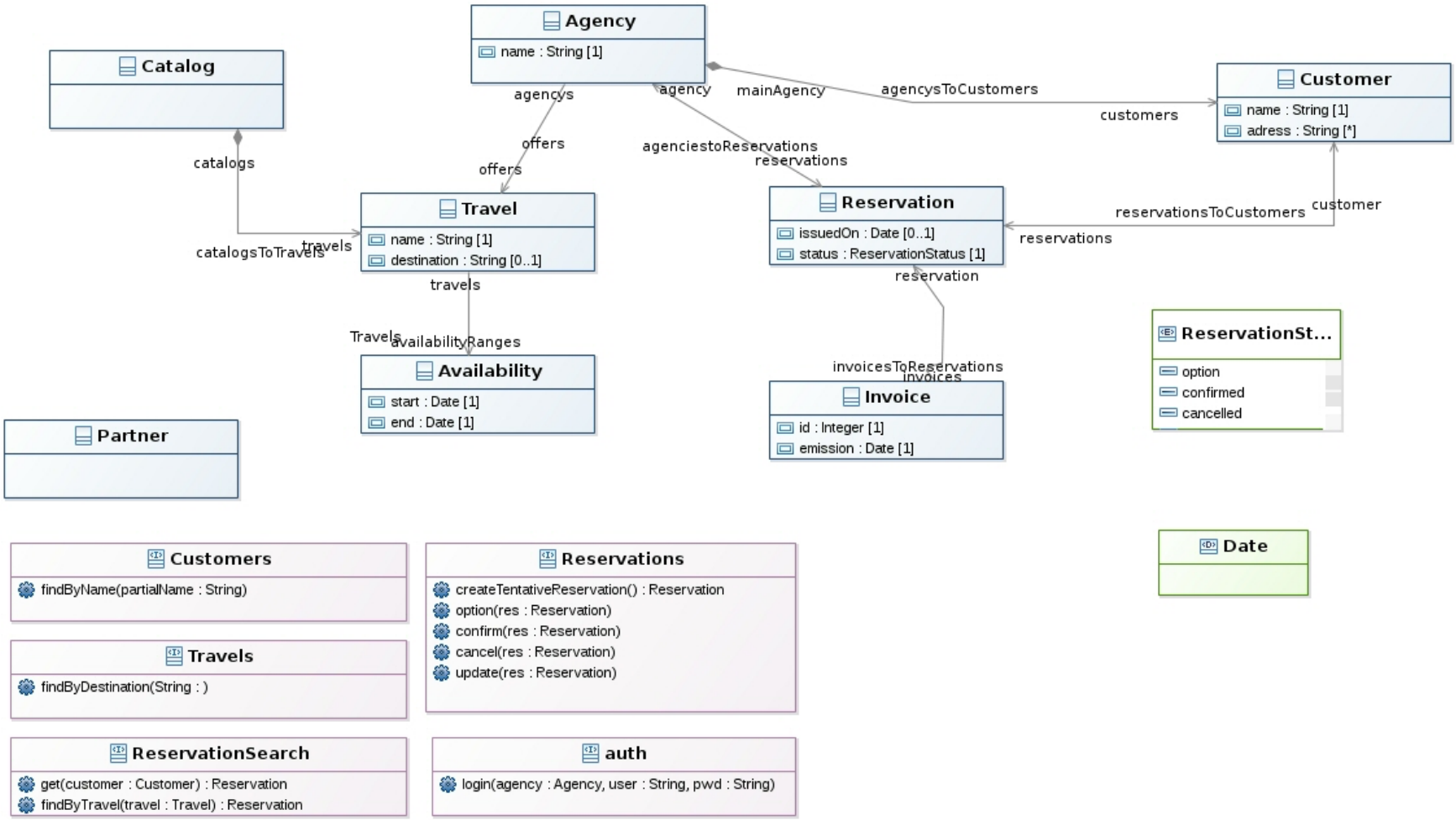
Software ... UML Lab Class Diagrams



Software ... UML Designer

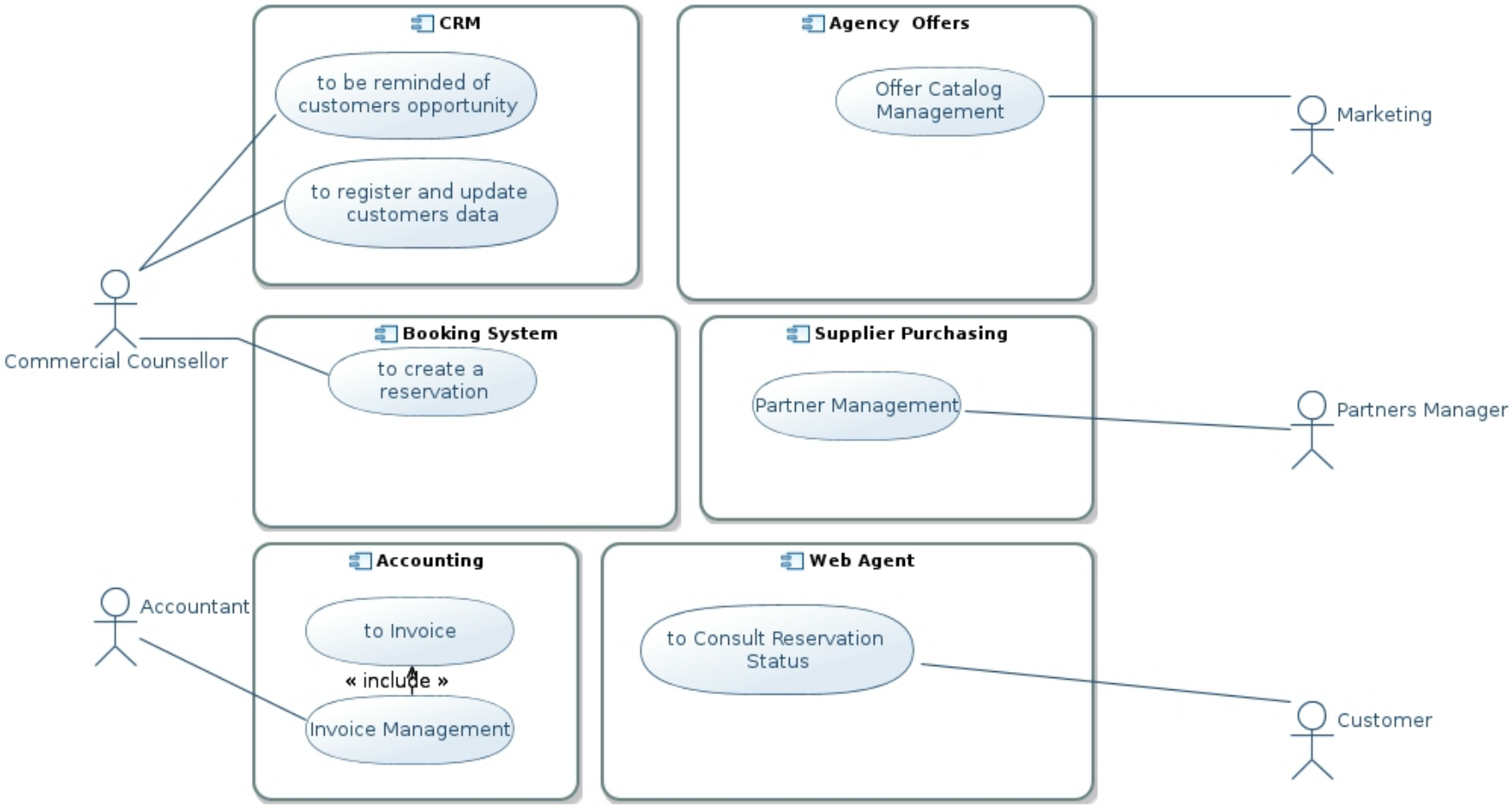
- Diagrammi di UML Designer
  - Package Hierarchy
  - Class Diagam
  - Component Diagram
  - Composite Structure Diagram
  - Deployment Diagram
  - Use Case Diagram
  - Activity Diagram
  - State Machine Sequence Diagram
  - Profile Diagram

Software …



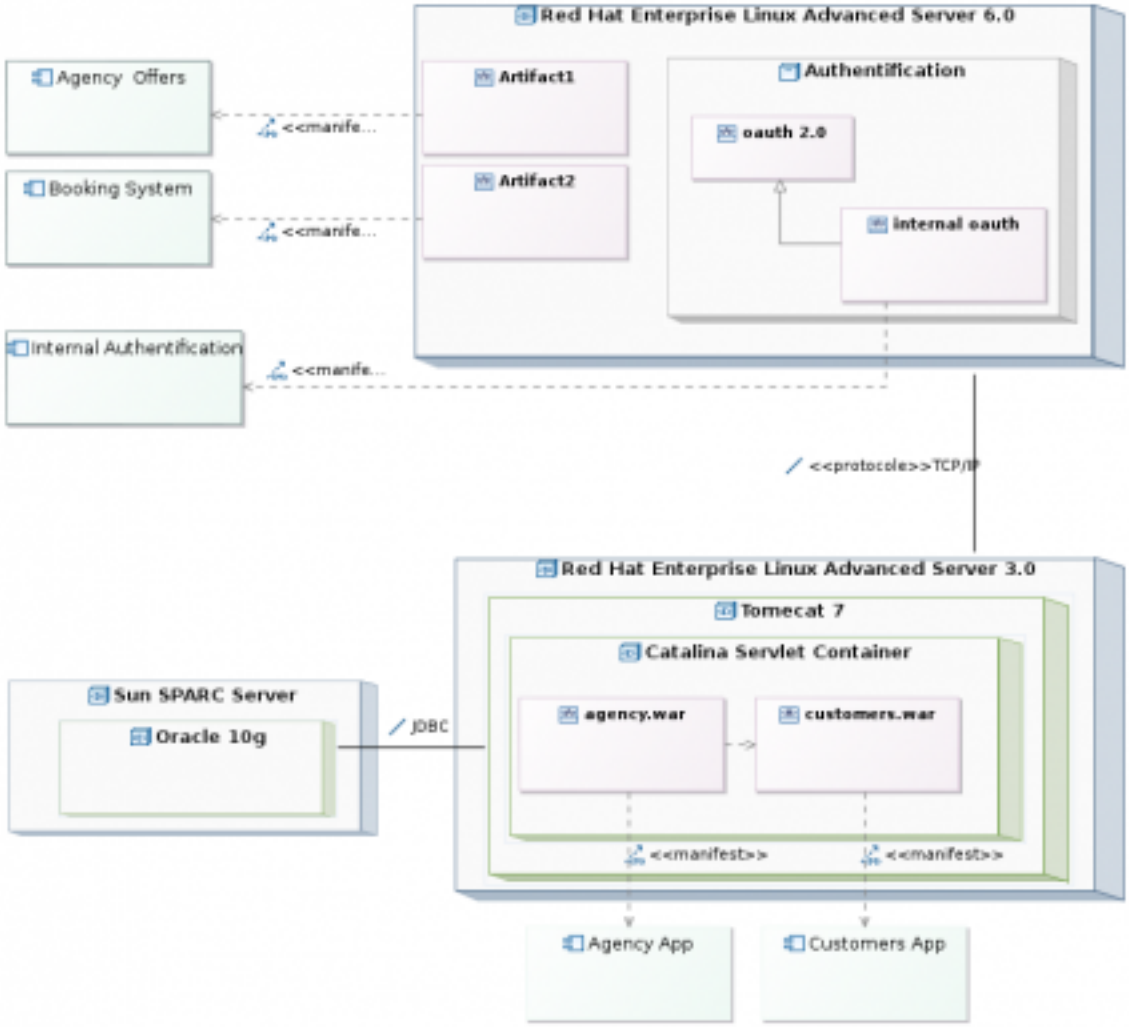
Class Diagram

Software …



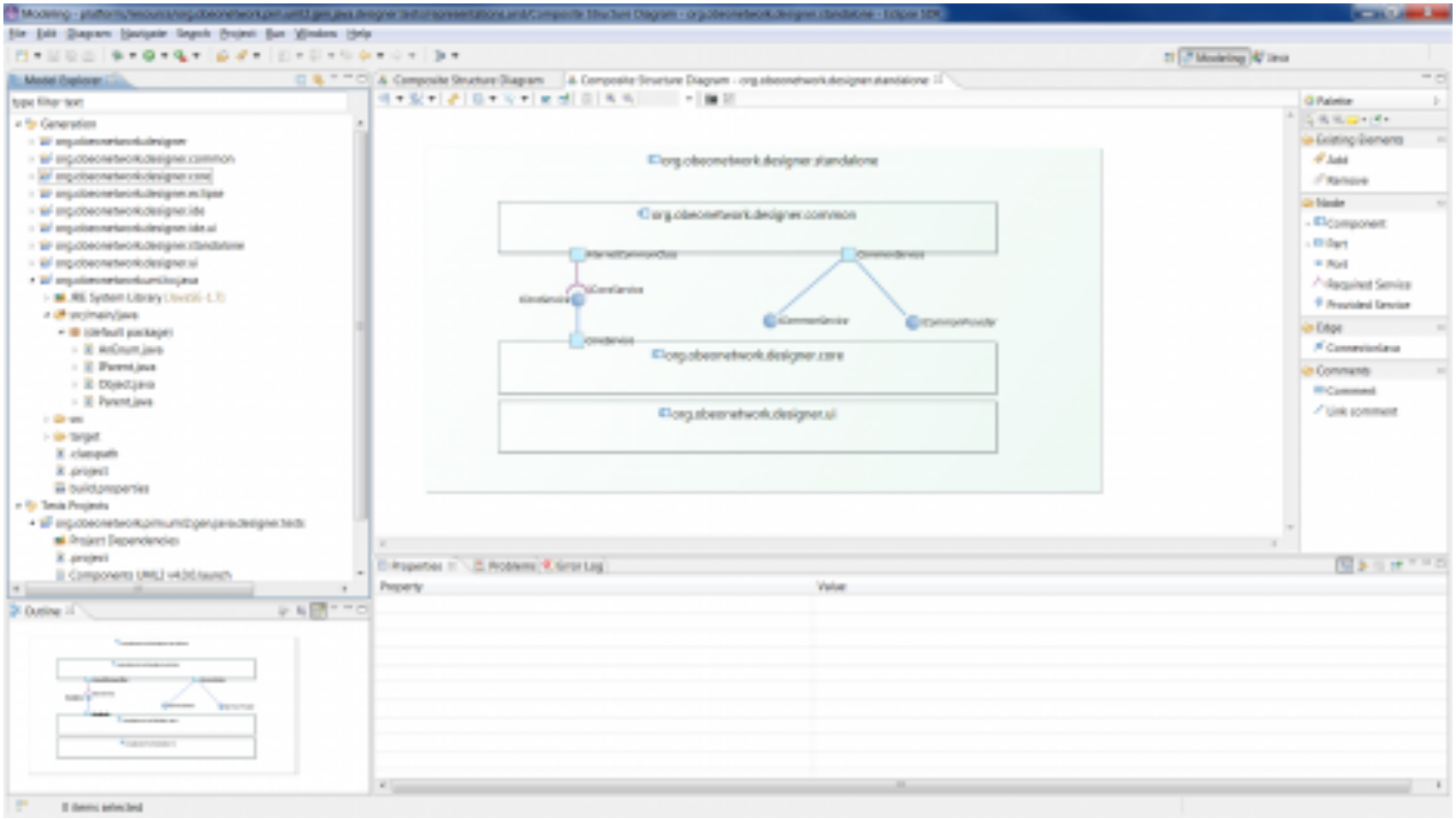
Case Use Diagram

Software …



Deployment Diagram

Software … UML to Java Generator



Software … UML to Java Generator