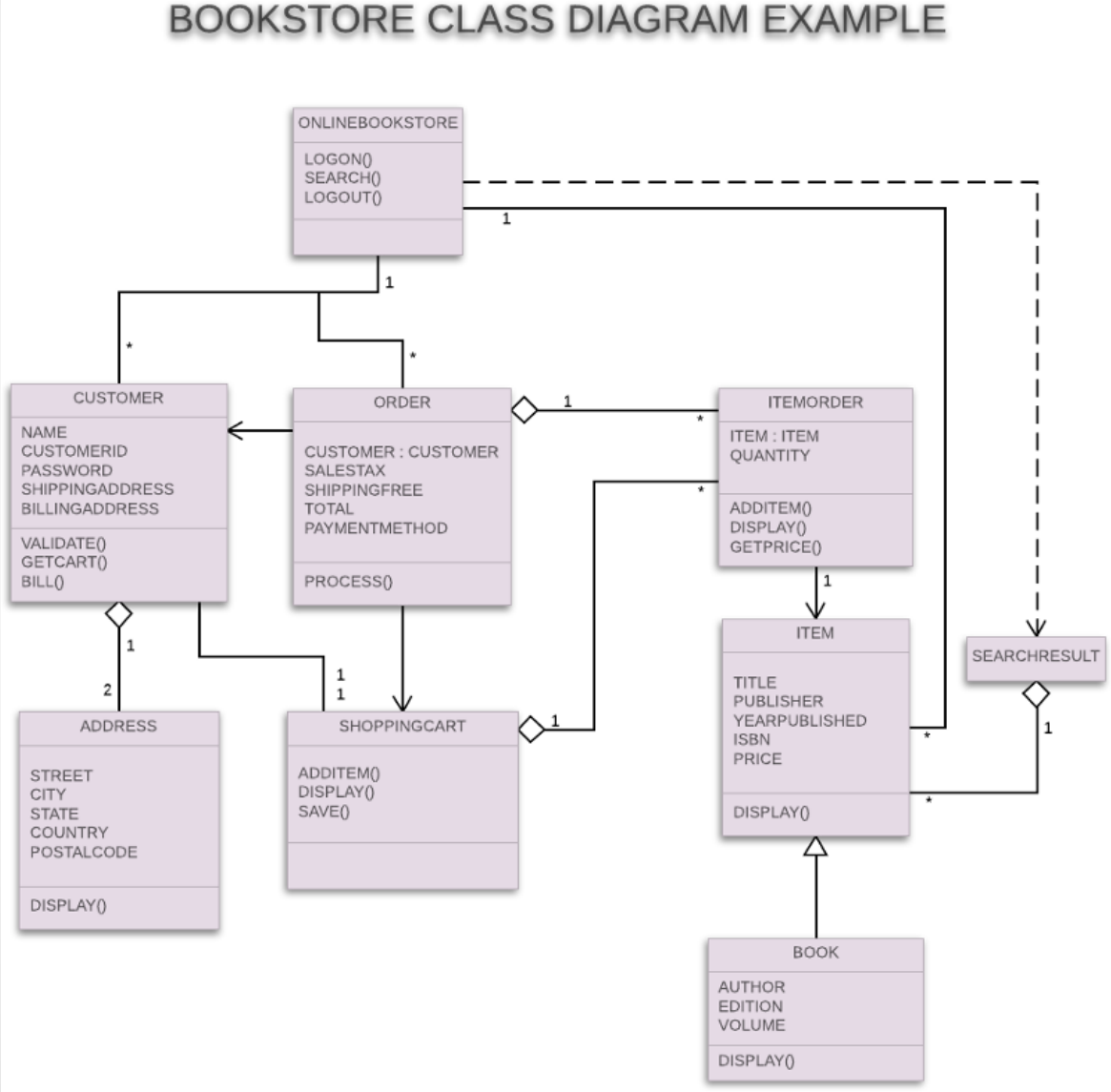
UML Fundamentals

Stands for **U**nified **M**odeling **L**anguage

UML is a Notation for diagramming (mainly)
a) Class Structure
b) Object Interaction

UML Class diagram is similar to ER Diagram

How does UML look?



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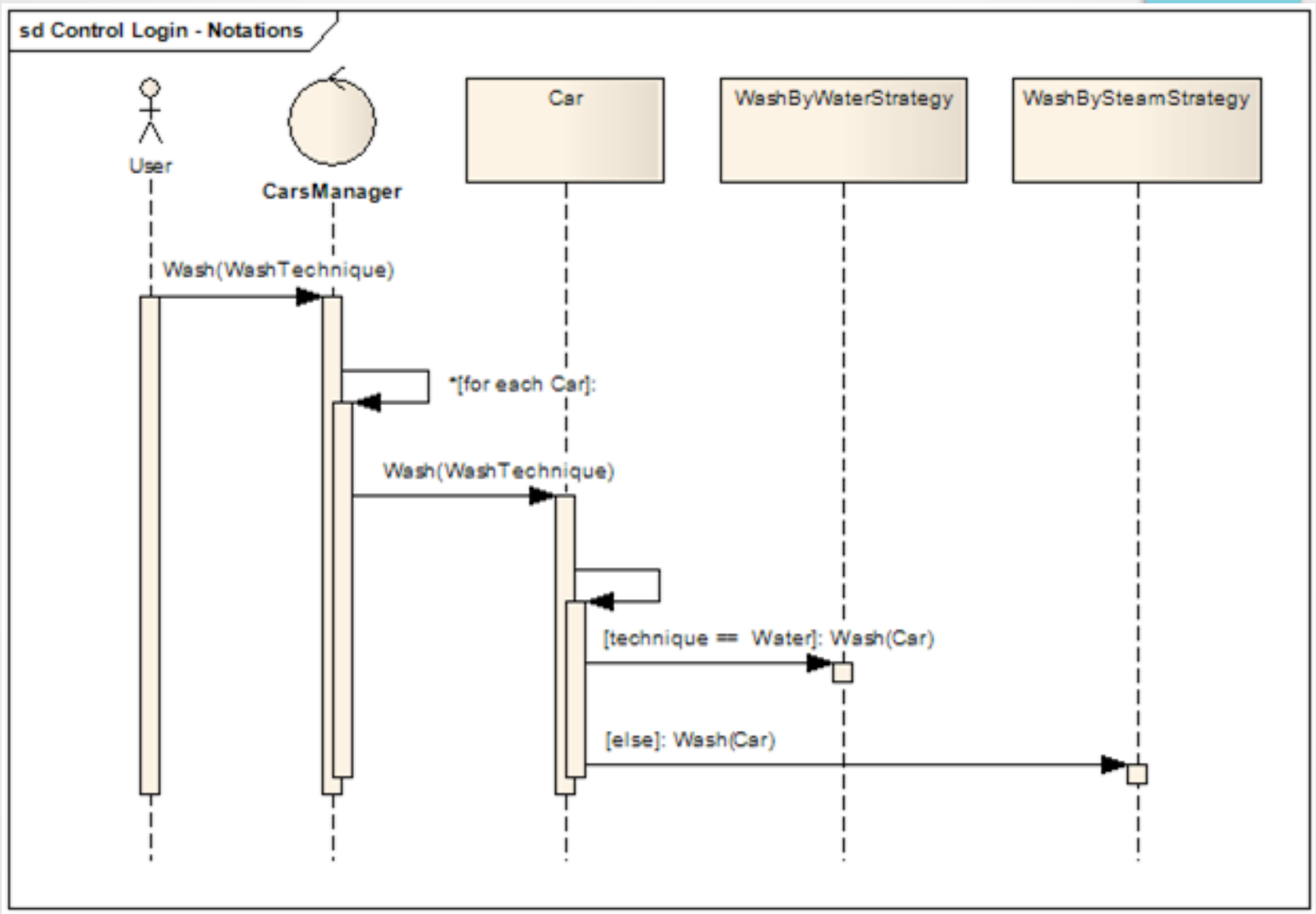
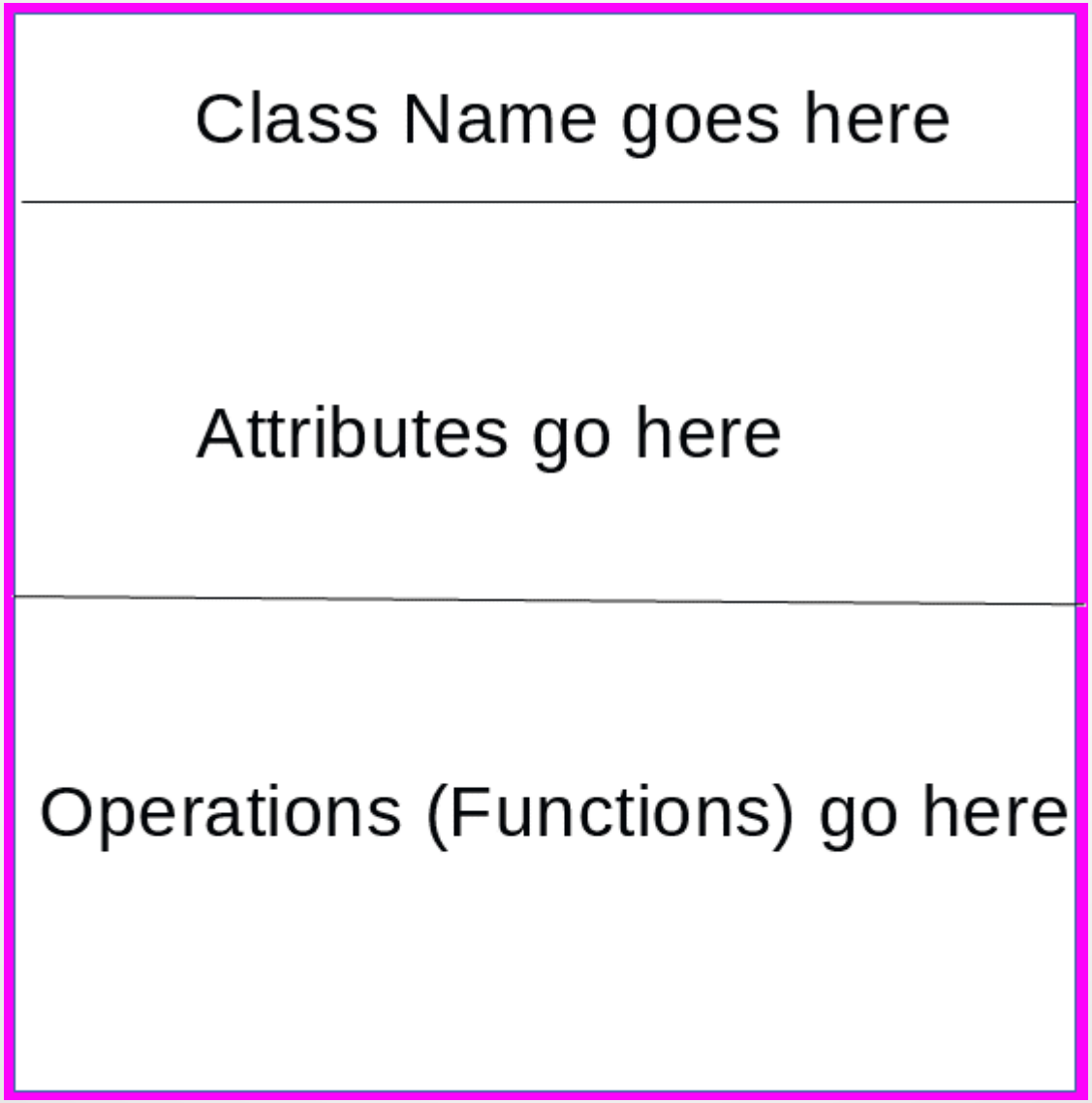


Why UML?

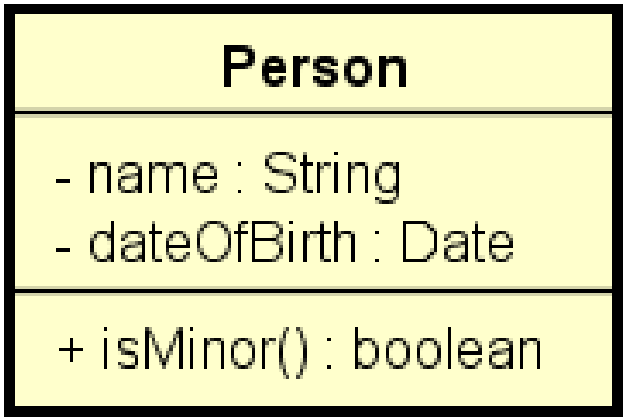
- Understanding Domain Model
- Understand working of a system
-
- Analyse Requirements
- Design
- Plan Code & Review
- Communication (in a team)
-
- Precise & Concise (at the same time)

UML Class Representation



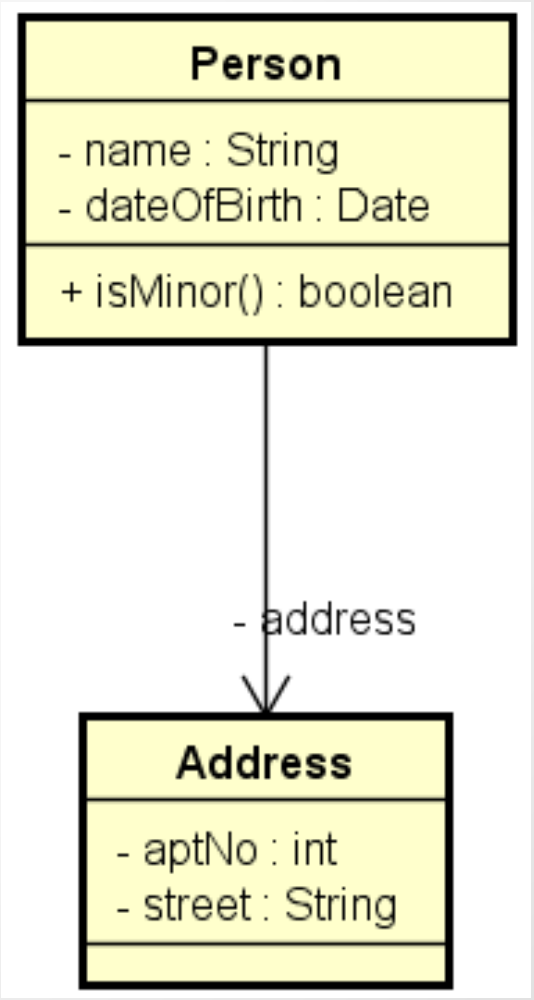
UML Class example

```
public class Person {
   private String name;
   private Date dateOfBirth;
   public boolean isMinor() { ...}
}
```



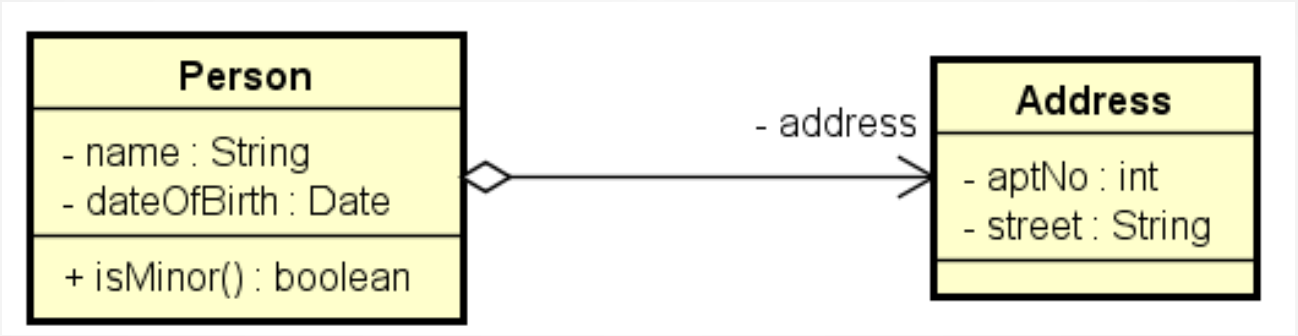
UML Class with Relationships

```
public class Person {
   private Address address;
}
public class Address {
   private int aptNo;
   private String street
   ....
}
```

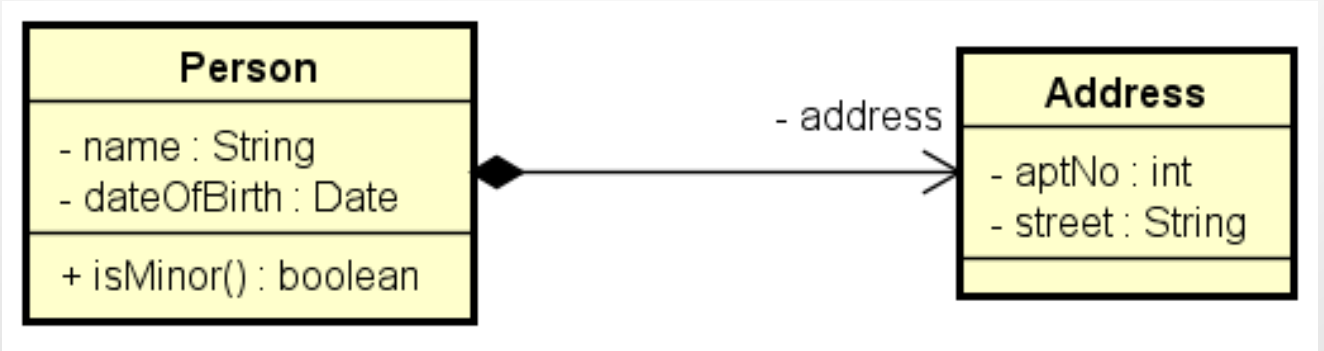


Ownership

- Aggregate (Weak ownership)

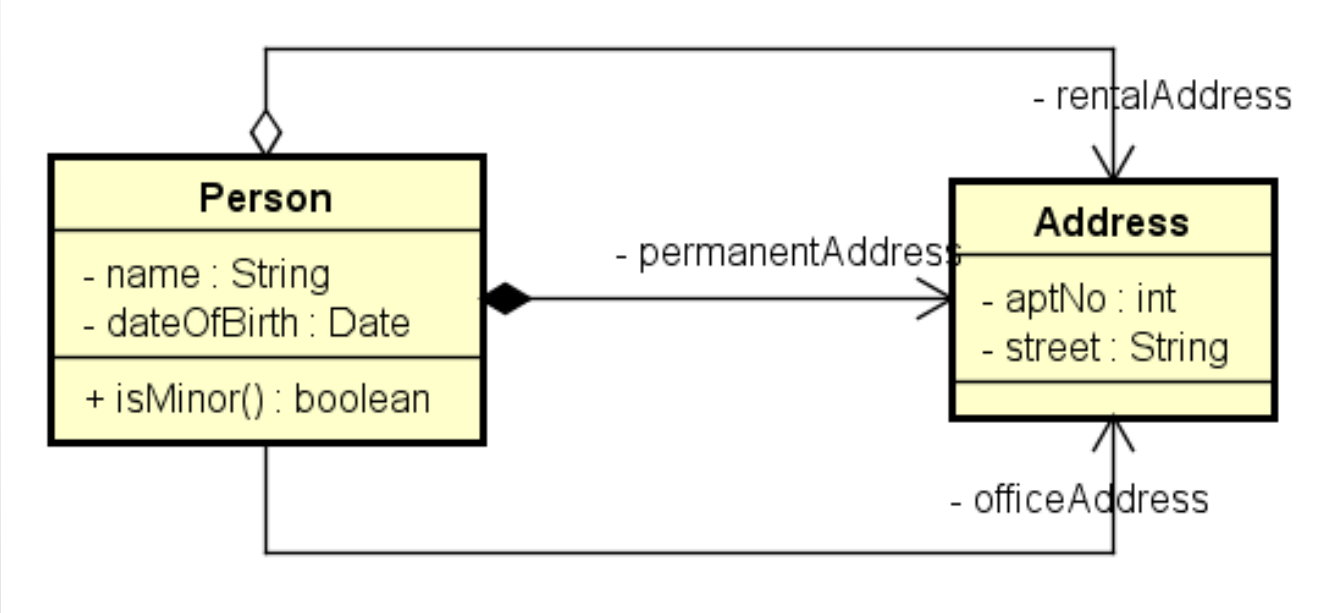


- Composite (Strong ownership)



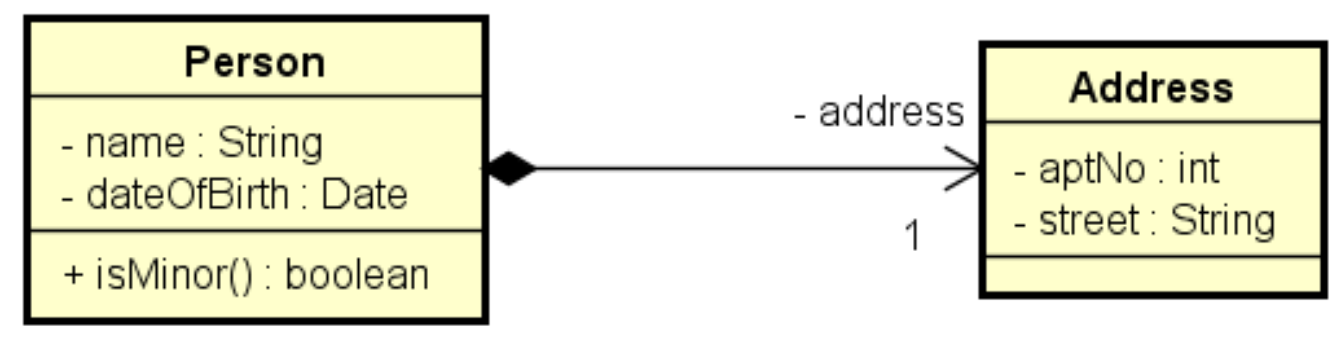
Person with many address

```
public class Person {
   private Address rentalAddress;
   private Address permanentAddress;
   private Address officeAddress;
}
```

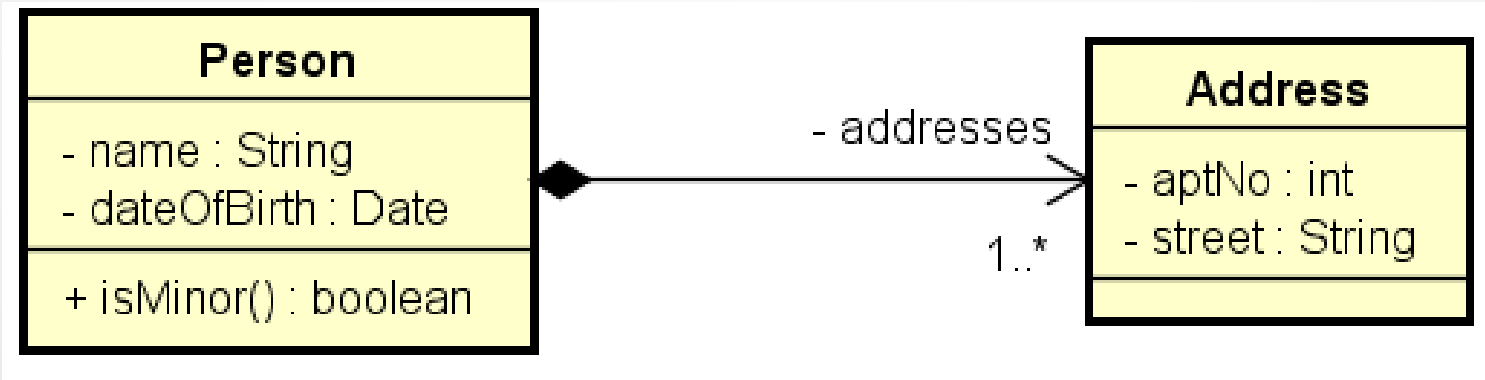


Multiplicity

- A Person as exactly ONE address
-

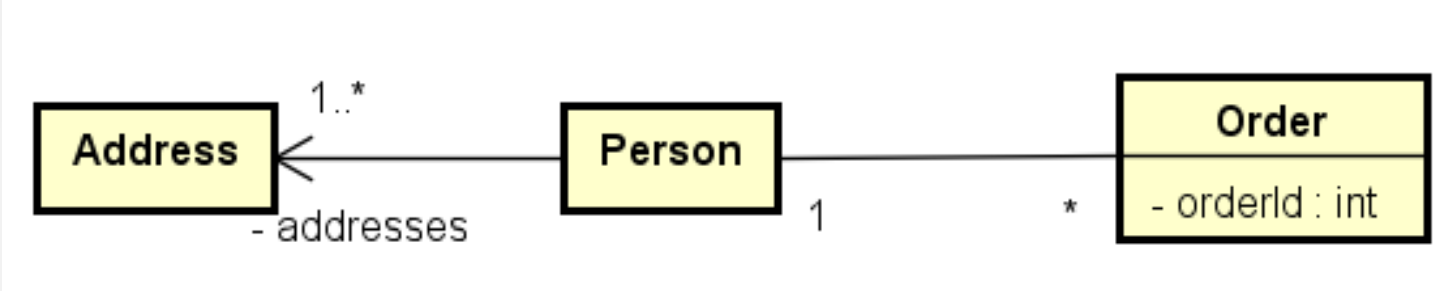


Multiplicity

- A Person has MANY addresses (1 OR MANY in e.g.)
- `public class Person {`
- `  private List<Address> addresses;`
- `}`
- 

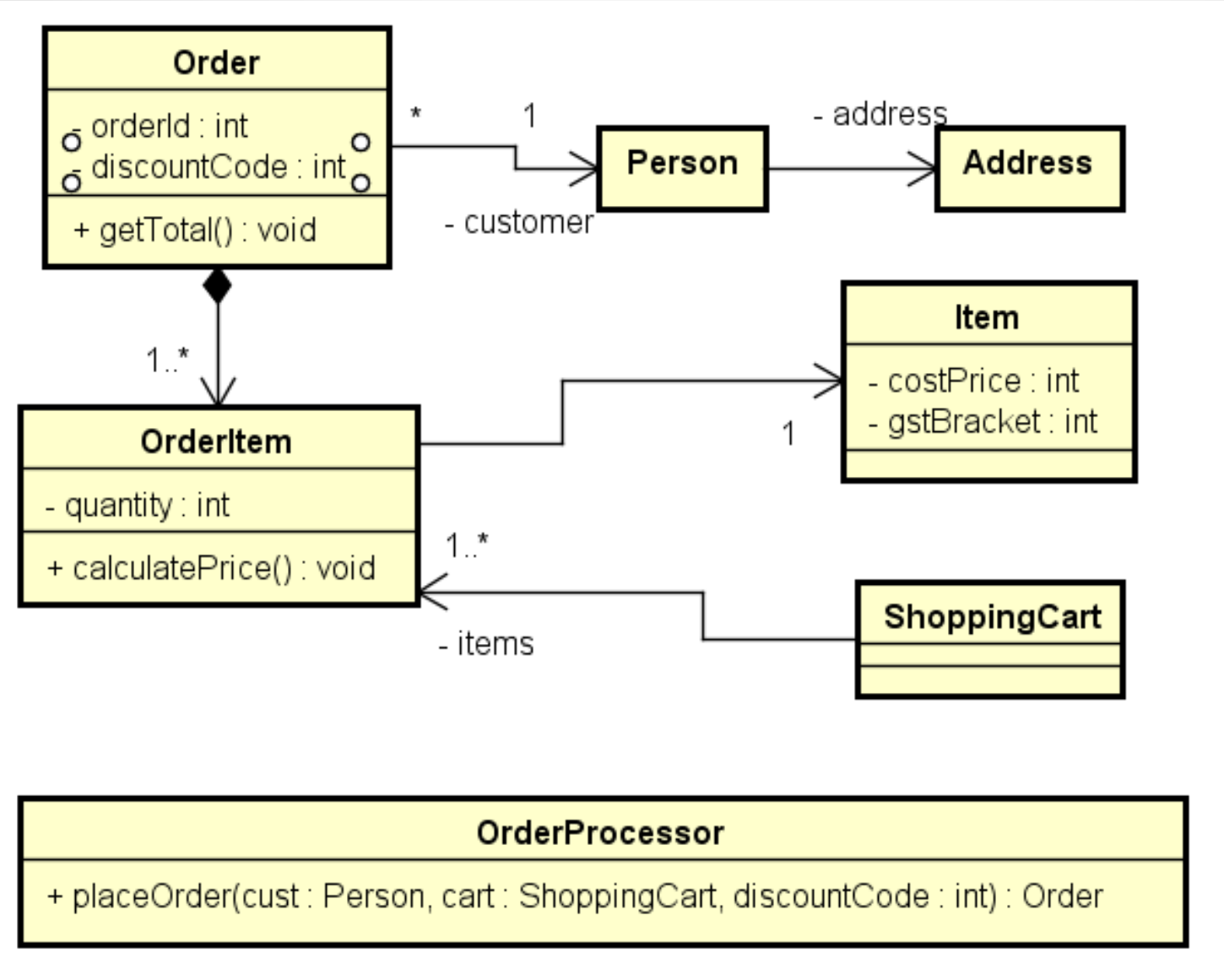
Unspecified Navigability

- Conceptual Model

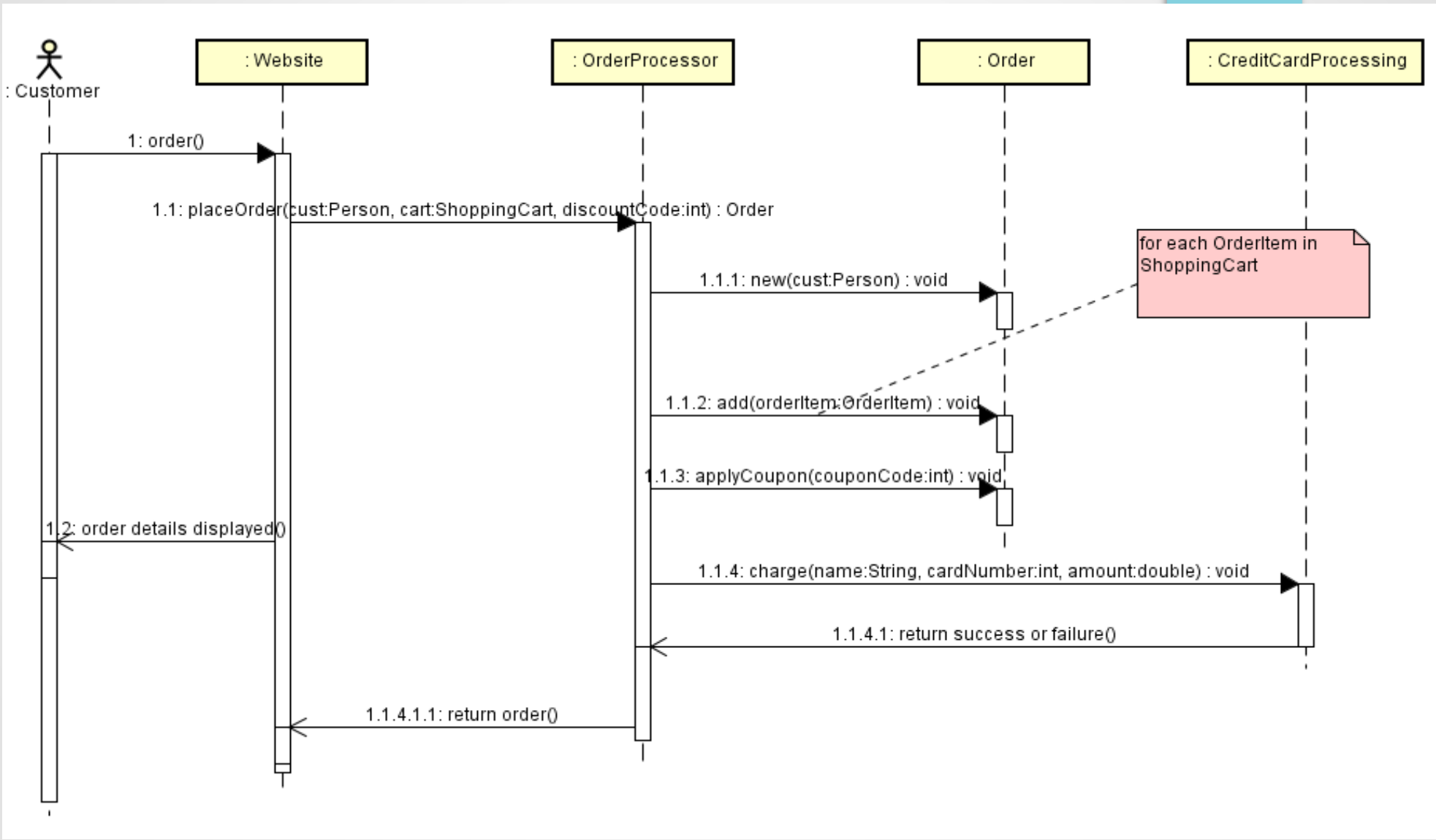


- Design Model
- Implementation Model

Online Ordering - Example

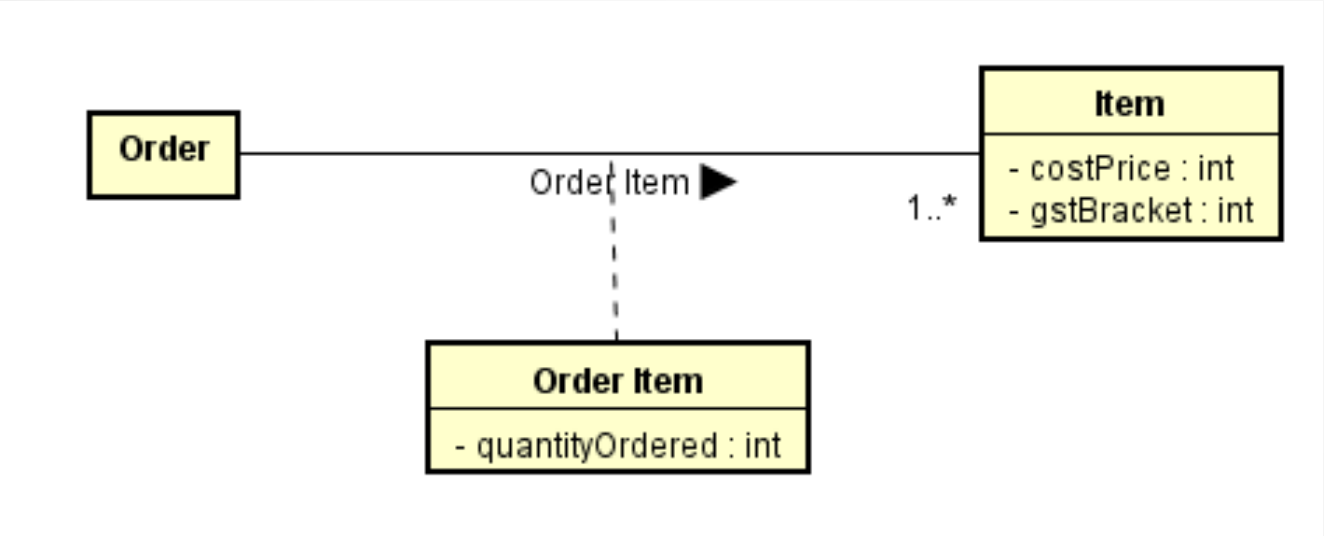


Sequence Diagram

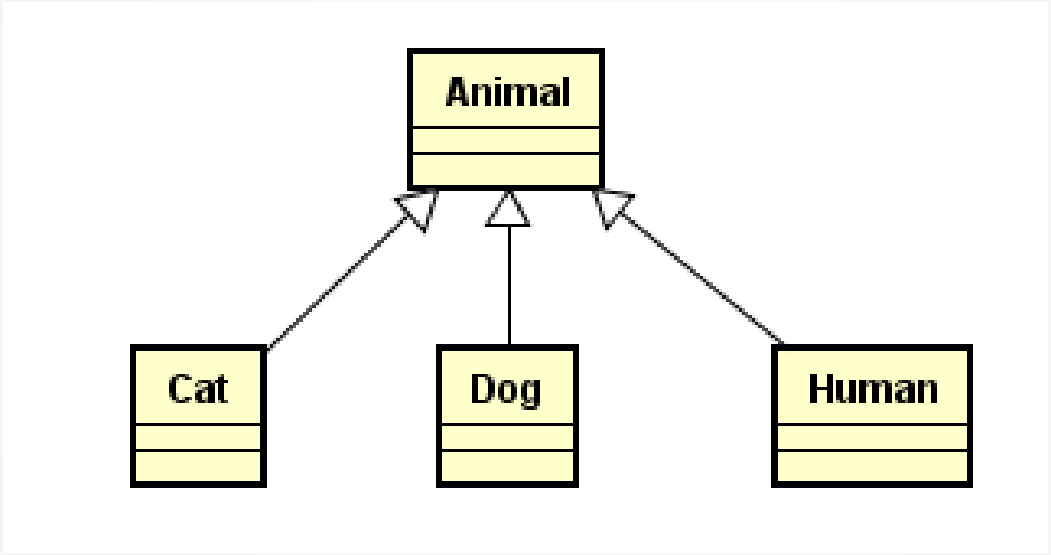


Class Diagram - Advanced

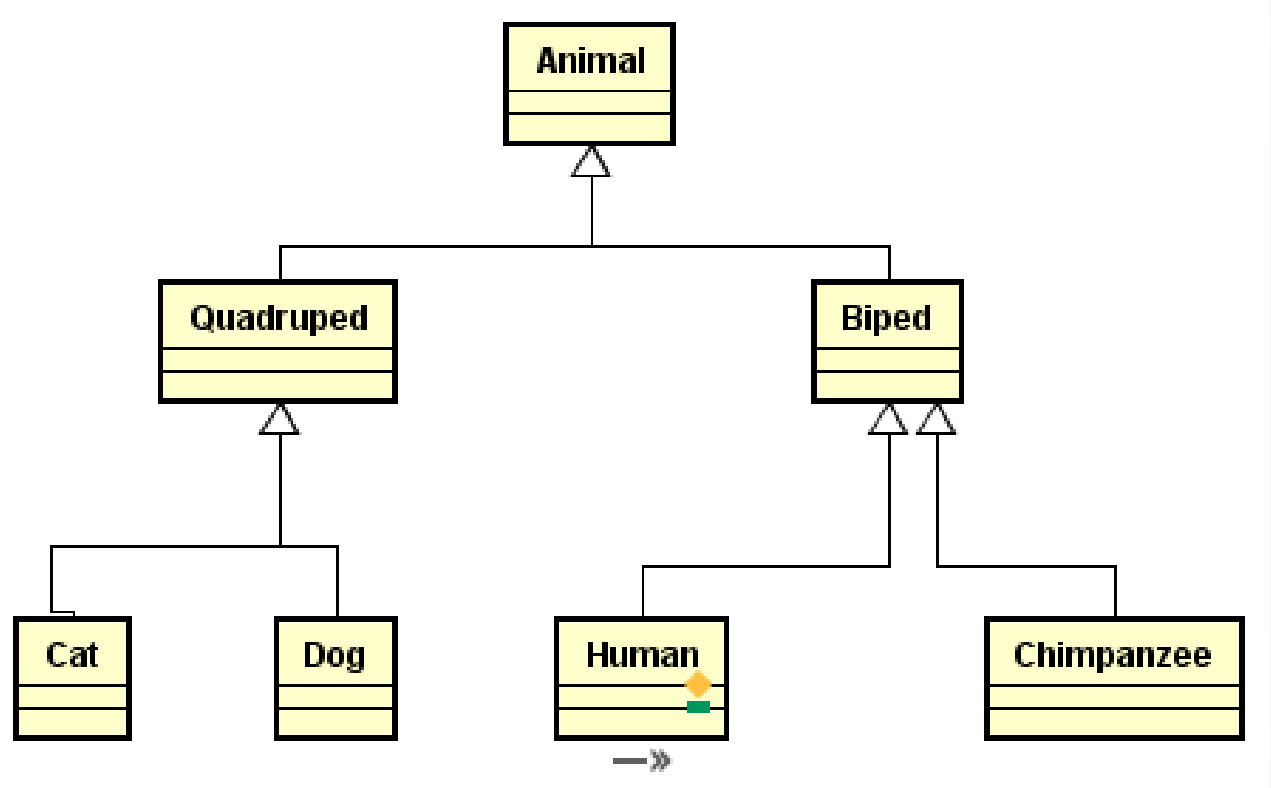
- Conceptual Association with Association Class



Class Inheritance

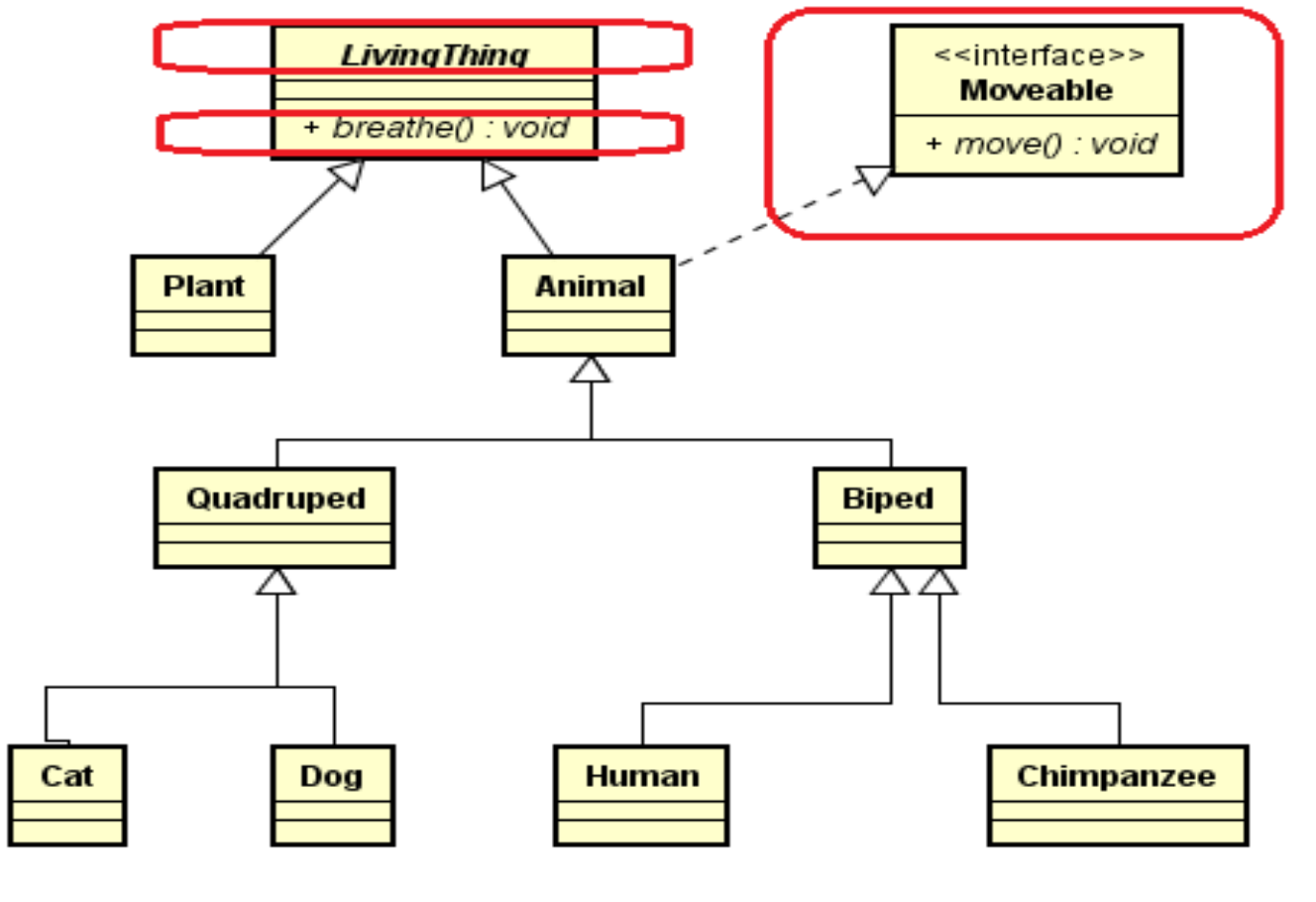


Inheritance

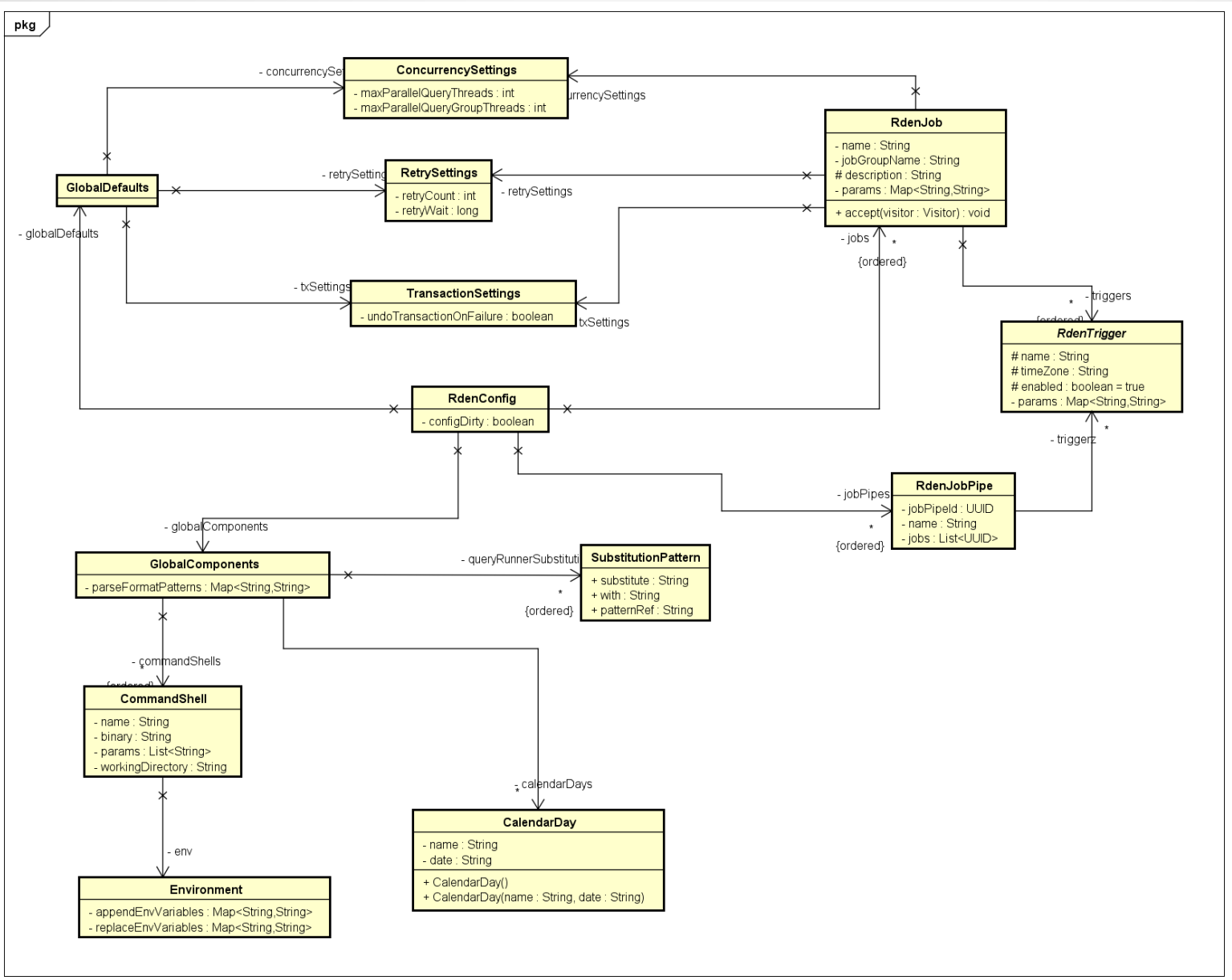


Inheritance with Interface

- Implementation Specific Details



Real life Samples



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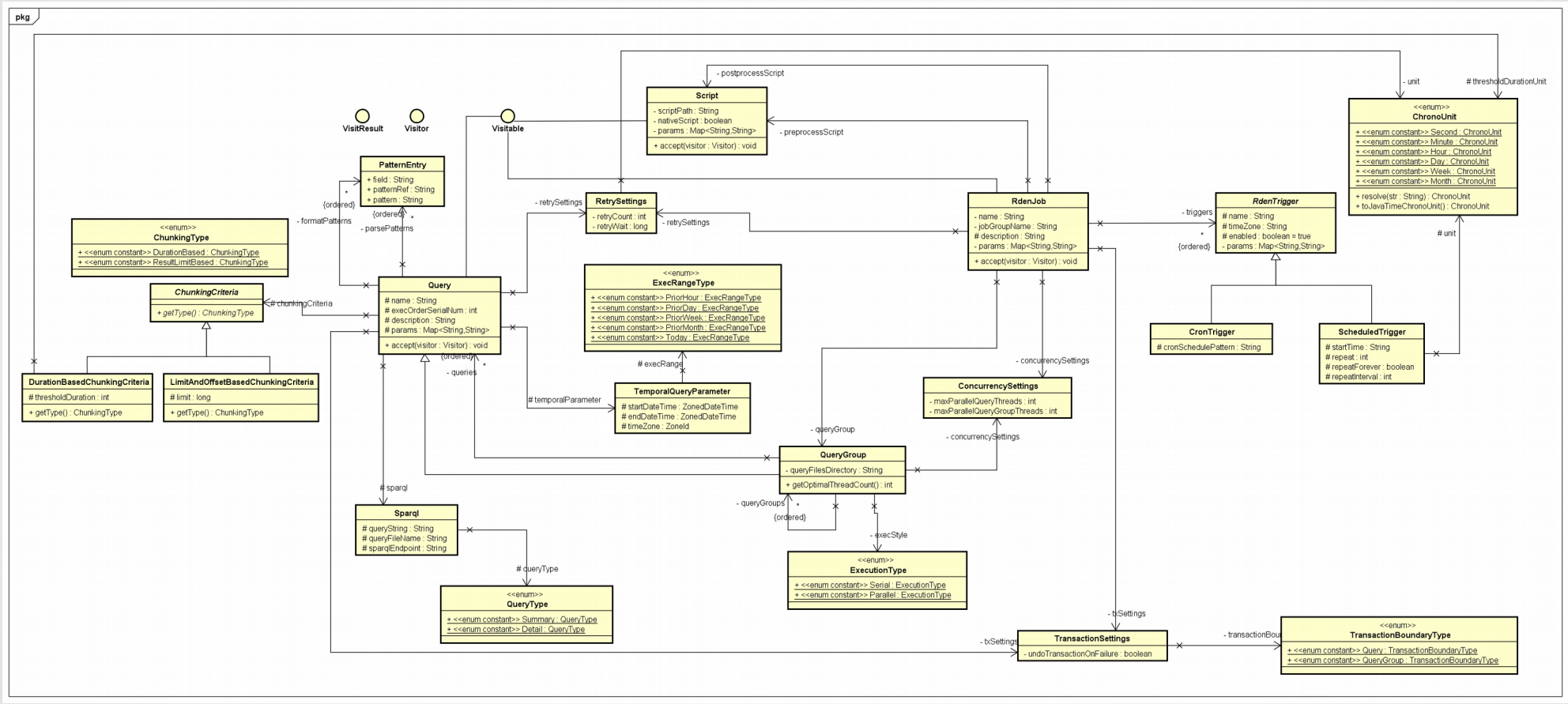

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Try it out with Free Tools

- Astah Professional (Reverse Engineer Java. Generate Java, C++ code from diagram) - http://astah.net/
- Bouml (http://www.bouml.fr/) - Reverse Engineer C++, Java
- UML Designer (Eclipse Integrated Roundtrip Tools)
- Visual Studio Integrated Tools
- LucidChart (Online) - http://www.lucidchart.com/

What’s Next?

- Questions ??
-
-
-
- Discuss assignment
- Draw UML for the assignment candidate classes