

Survey: Modularization strategies for UML conceptual models

Dear participant,

Thank you for agreeing to participate in our study. Our study is about managing the complexity of conceptual models, in particular how modularization of conceptual models (i.e., presenting a model as a set of modules) could help to manage the complexity of understanding models.

You will first be asked to answer four general questions. Next, the task to be performed will be explained. You will see, this is a simple task which will not take much of your time (15 – 20 minutes). Try to perform this task to the best of your abilities, relying on your knowledge of and expertise in conceptual modelling.

Your answers and results of the task performance will be anonymized and your identity will not be revealed.

Thanks again for your willingness to participate in our study. We appreciate your effort a lot!

Kind regards,
The research team

***Campo obbligatorio**

Step 1: General questions

1. How many years of experience do you have in conceptual modelling? *

Contrassegna solo un ovale.

- ☐ 0 to 4 years
- ☐ 4 to 8 years
- ☐ More than 8 years

2. Which conceptual modelling languages have you studied or worked with? *

Seleziona tutte le voci applicabili.

- ☐ (Extended) Entity Relationship (ER)
- ☐ Unified Modeling Language (UML)
- ☐ OntoUML
- ☐ SysML
- ☐ Object-Role Modeling (ORM)

Altro: ☐ _____

3. How would you describe your expertise in conceptual modelling? *

Contrassegna solo un ovale.

- ☐ Novice
- ☐ Intermediate
- ☐ Expert
- ☐ Altro: _____

4. What is your current position? *

Contrassegna solo un ovale.

- ☐ BSc-level student
- ☐ MSc-level student
- ☐ PhD-level student
- ☐ Post-doctoral researcher
- ☐ Professor
- ☐ Business analyst / architect
- ☐ System analyst / expert
- ☐ Software engineer
- ☐ Other IT staff position
- ☐ Other business function
- ☐ Middle or senior level manager
- ☐ Altro: _____

On the next screen, you will see a UML class diagram that is used as conceptual model of a business domain: the renting of cars. The diagram shows important concepts relevant to renting cars, the relations between those concepts, and conditions that apply to those relations.

Business domain models like this are used to acquire an understanding of the domain. They show what happens in the domain, who is involved in what happens, under what circumstances or conditions something can happen, under what circumstances or conditions someone/something can be involved in what happens, etc.

Step 2: Explanation of the task

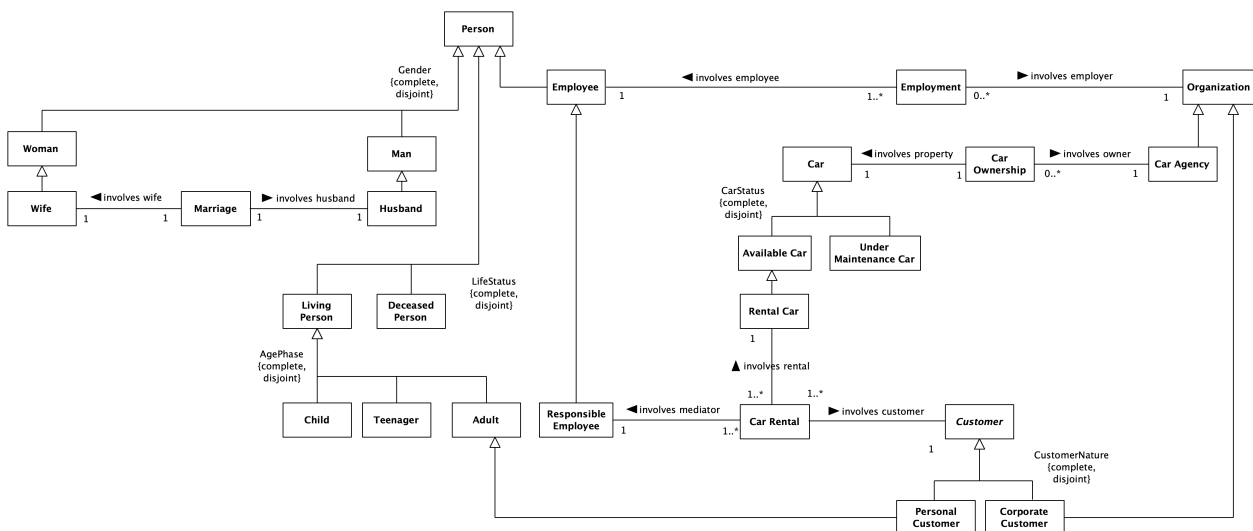
Following the UML class diagram, you will see on separate pages, three alternative modularizations of the model: ALT-I, ALT-J and ALT-K. Remember that the purpose of showing the model as a set of modules is to facilitate understanding (i.e., a divide and conquer strategy).

What we ask you to do is to express your preference for these alternative modularizations. Which alternative would you rather use to explain the considered business domain with separate diagrams? Please bear in mind that the purpose of modularization is to facilitate your understanding of what is modelled, in terms of typical questions that a user of business domain models can have.

Concretely, after the different modularizations, you will find a page with a few questions regarding your preferences and perception of the alternative modularizations.

Step 3: Car Rental - Complete UML Model

You can zoom in on the model or open it by clicking at <https://bit.ly/3uvufSZ>



This modularization strategy yielded 6 modules, as shown below.

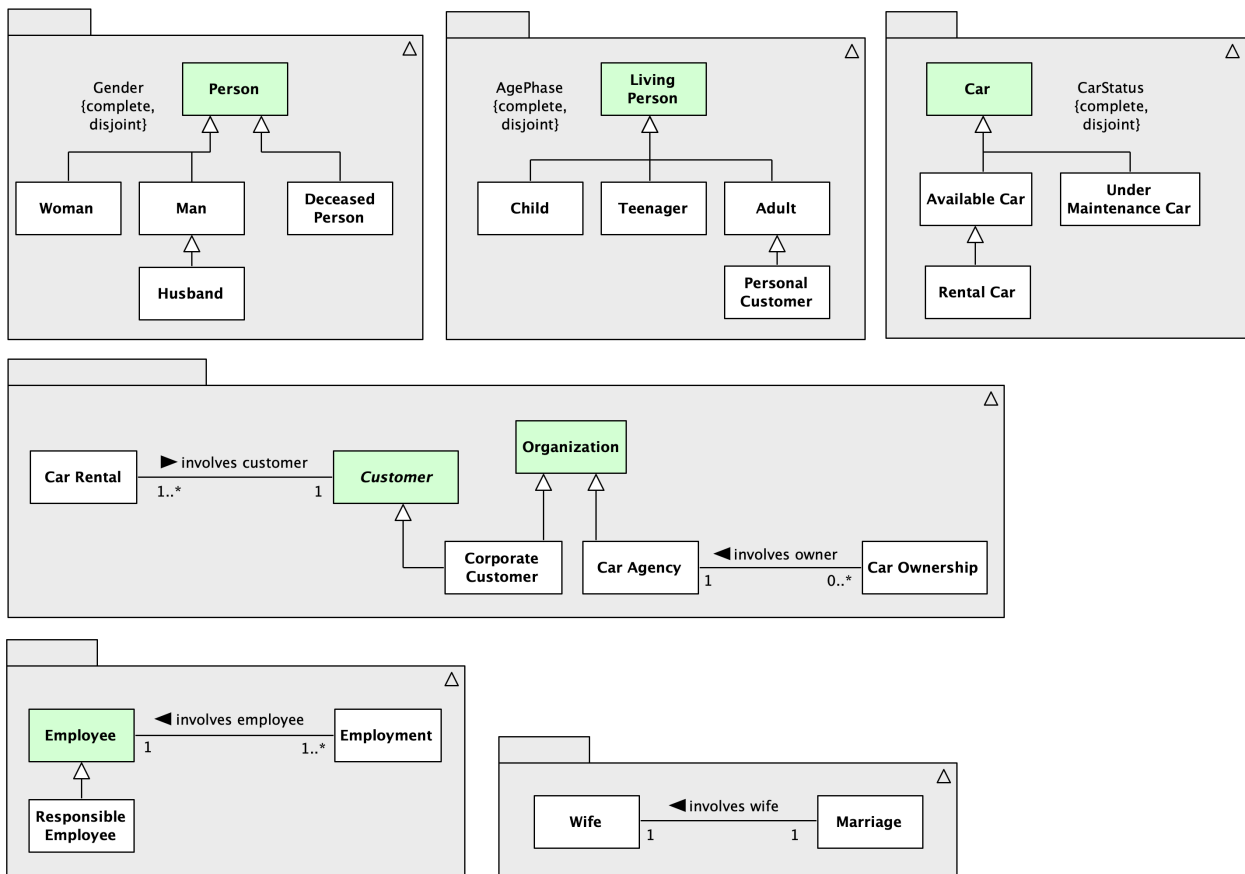
You can zoom in on the image or open it in another tab by clicking at <https://bit.ly/3bHcaJ3>

Step 4: Alternative ALT-I

Please take into account that:

- The choice of classes to highlight in green are part of this modularization strategy.
- The visual disposition of the elements is accidental.

ALT-I



This modularization strategy yielded 5 modules, as shown below.

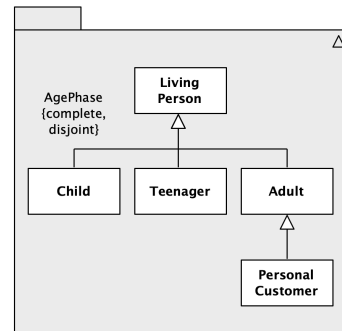
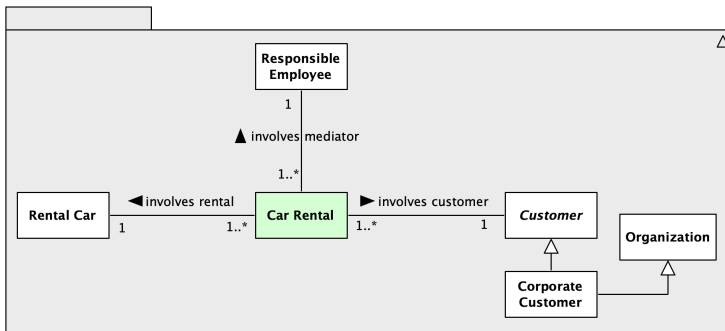
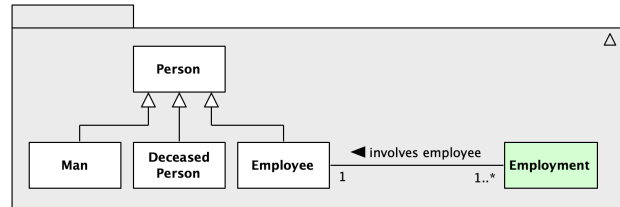
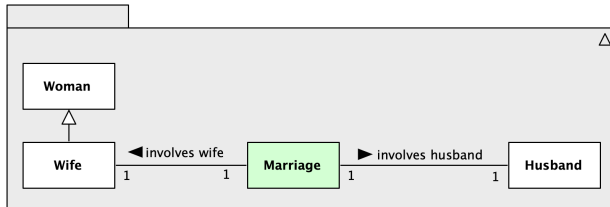
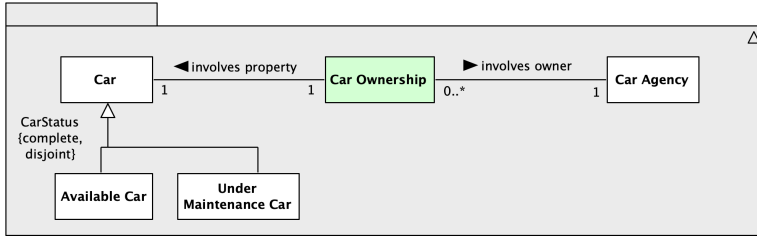
You can zoom in on the image or open it in another tab by clicking at <https://bit.ly/3dQ1sTP>

Step 5: Alternative ALT-J

Please take into account that:

- The choice of classes to highlight in green are part of this modularization strategy.
- The visual disposition of the elements is accidental.

ALT-J



This modularization strategy yielded 4 modules, as shown below.

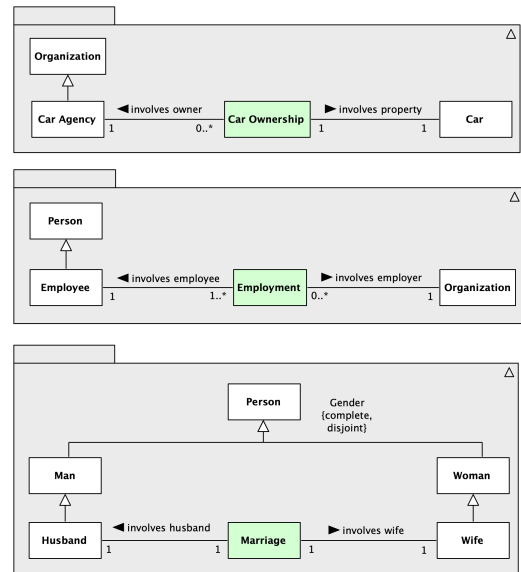
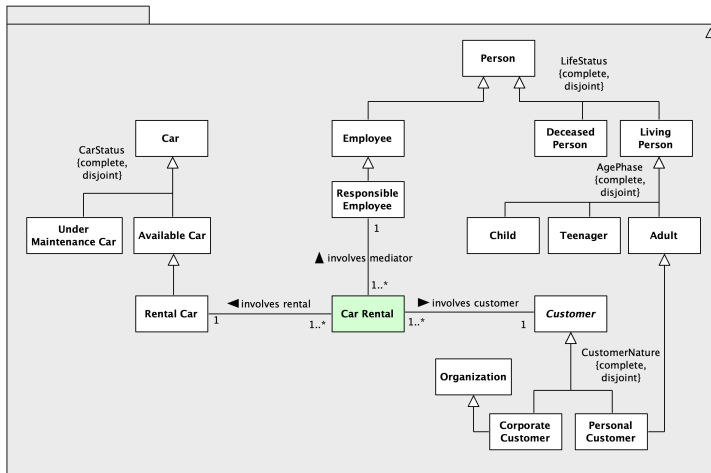
You can zoom in on the image or open it in another tab by clicking at <https://bit.ly/3bGrENy>

Step 6: Alternative ALT-K

Please take into account that:

- The choice of classes to highlight in green are part of this modularization strategy.
- The visual disposition of the elements is accidental.

ALT-K



Step 7: Your assessment

5. Rank below the 3 modularizations strategies according to your preference, where 1 means your most preferred modularization (i.e., the one you regard as best to explain the business domain in parts) and 3 your least preferred modularization. Please use each number exactly once, such that a total ordering of the three alternatives is obtained. *

Contrassegna solo un ovale per riga.

	1 (best)	2	3 (worst)
ALT-I	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ALT-J	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ALT-K	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. Motivate your ranking.

Why did you prefer a certain alternative to another? Sharing your reasoning will provide valuable insights to our study and help us tremendously.

Answer the questions below by ranking your level of agreement with each claim, where 0 means that you disagree entirely with it, and 4 means that you agree entirely with it.

In the following sentences, we use the term cohesion as the degree to which elements within a particular module can be said to belong together with stronger relations than with those in different modules.

7. The modules of ALT-I have a high cohesion. *

See ALT-I's modules at <https://bit.ly/3bHcaJ3>. Please do not change your previous ranking while reflecting about this question.

Contrassegna solo un ovale.

	0	1	2	3	4	
Disagree entirely	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Agree entirely

8. The modules of ALT-J have a high cohesion. *

See ALT-J's modules at <https://bit.ly/3d01sTP>. Please do not change your previous ranking while reflecting about this question.

Contrassegna solo un ovale.

	0	1	2	3	4	
Disagree entirely	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Agree entirely

9. The modules of ALT-K have a high cohesion. *

See ALT-K's modules at <https://bit.ly/3bGrENy>. Please do not change your previous ranking while reflecting about this question.

Contrassegna solo un ovale.

	0	1	2	3	4	
Disagree entirely	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Agree entirely

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