Groups 1 and 2

Pre-Study Questionnaire

Profession (or Degree/Year if student): _____

Area of Specialization: _____

Level of experience with UML (circle one):

1	2	3	4	5
None	Rare use	Moderate use	Frequent use	Expert

Level of experience with Partial models, MAVO annotations:

1	2	3	4	5
None	Rare use/familiar	Moderate exposure	Knowledgeable	Expert

Describe (e.g. “I read one paper on it”, “I research the topic”):

_____

Instructions

We are examining ways of expressing uncertainty in software modeling using *Partial Modeling* techniques.

We focus on three types of uncertainty:

Abs	The element might not be unique; may expand to a set of elements
Var	An element might not have a distinct identity; may be merged in to other elements.
May	An element may (or may not) exist in the model. *May Groupings*: There may be different possible combinations of elements.

The purpose of this experiment is to evaluate the syntax used to denote these uncertainties in a model.

- You will first freely express uncertainty for a given model
- Then you will perform reading and writing tasks for two types of syntaxes: annotation-based and graphical.
- At the end there will be a post-study questionnaire.

Feel free to mark up diagrams.
Please note the recommended maximum times per section.

Free-Form : Writing

Time start:

The following is a basic model for a Blog.

Please use any comments and notations you feel appropriate to denote the following uncertainties to the model. Feel free to invent them!

Point of Uncertainty (PoU)1: Add a new element **BlogEntry**

Indicate that it may be an *Entity* with a relationship ("links to") with **Blog**, or an *Attribute* within **Blog**

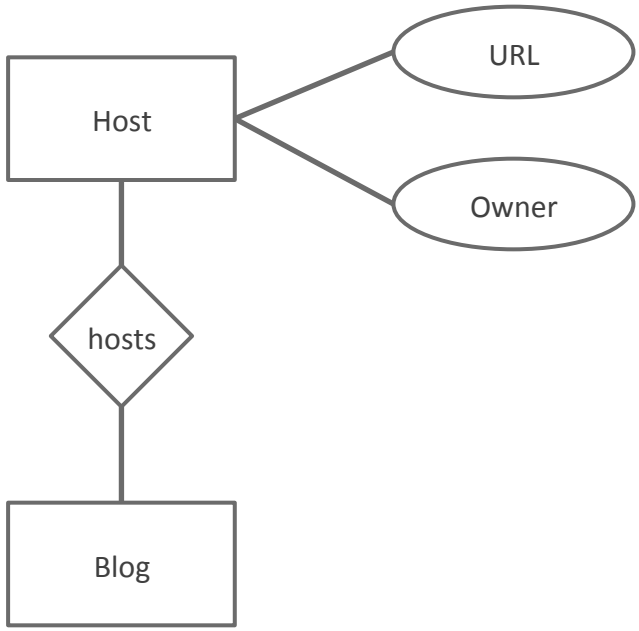
[if Blog Entry is an Entity]

PoU2: Add a new *Attribute* element **Author**

Indicate that you are uncertain about which entity has this attribute.

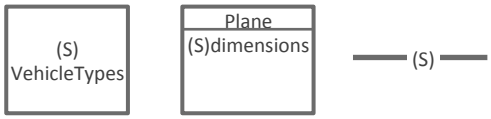
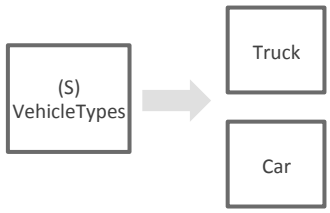
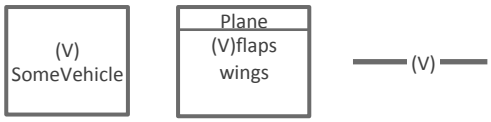
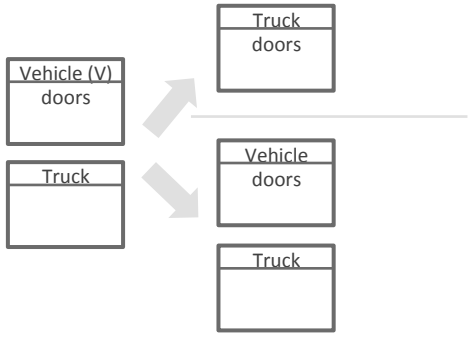
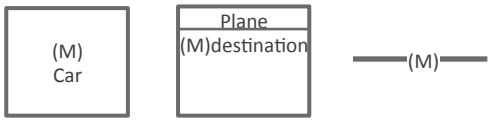
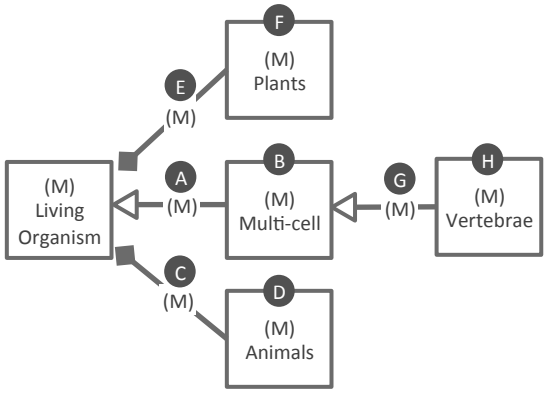
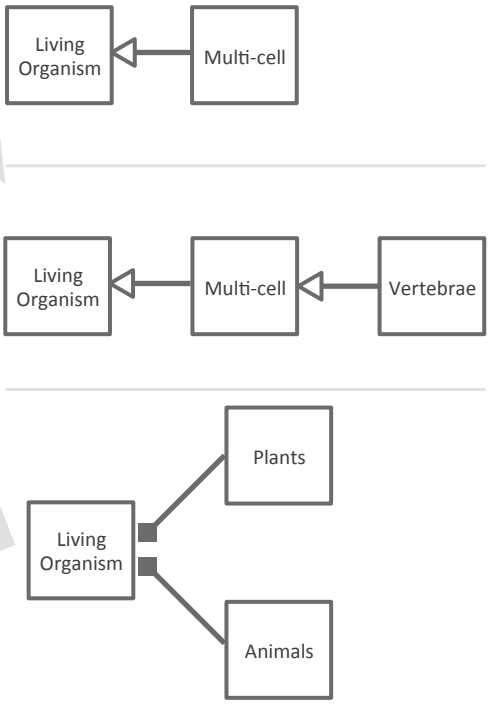
e.g. Do we track author of Blog or author of Blog Entry?

PoU3: Indicate that **BlogEntry** has some **VisitorStatistics** *Attributes*; you have not yet determined exactly how many and what they will be.



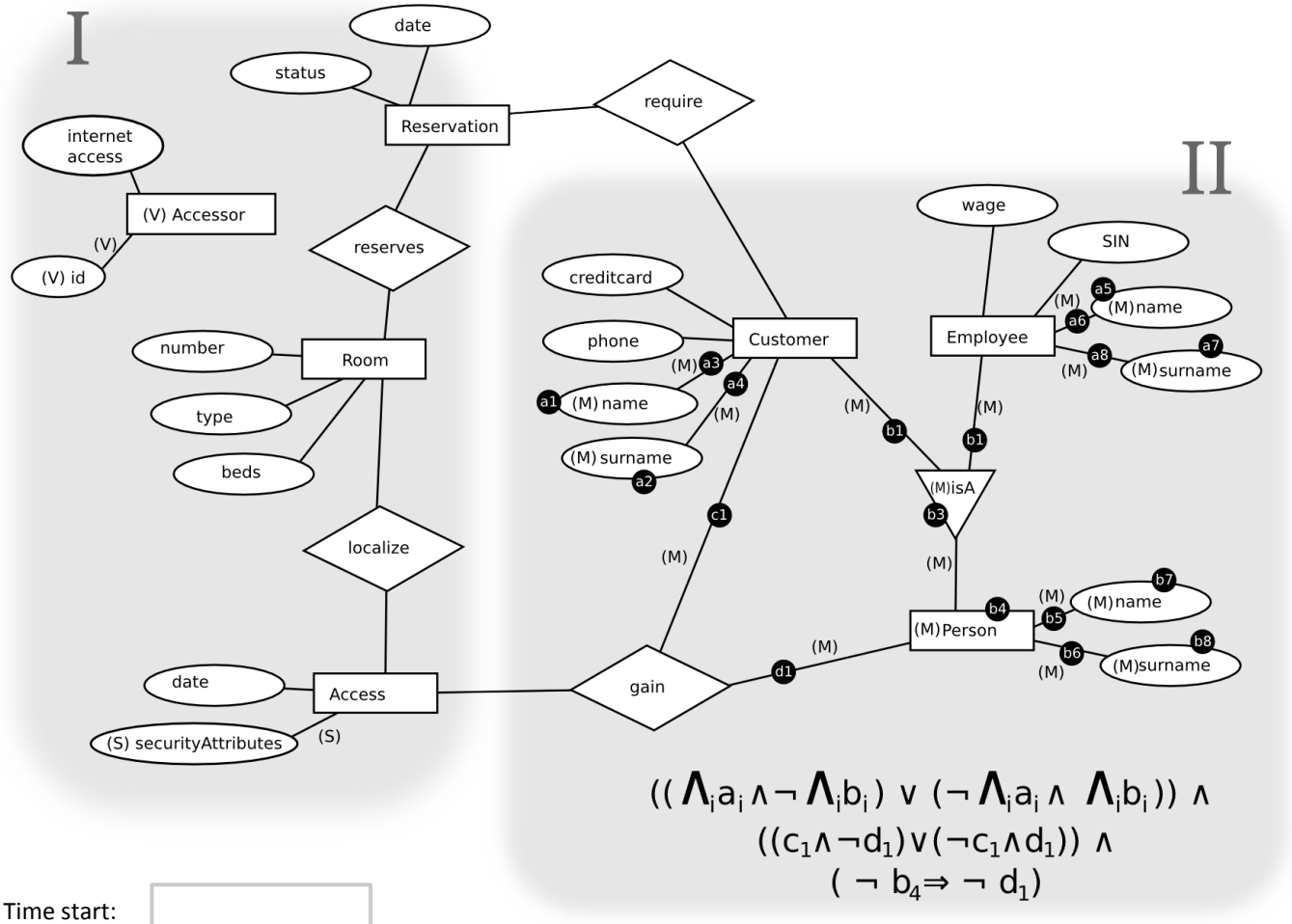
Time complete:

Annotation

Uncertainty	Syntax	Example + Concretizations
Abs The element might not be unique; may expand to a set of elements	(S) annotation denotes a set of elements 	
Var An element might not have a distinct identity; may be merged in to other elements.	(V) annotation denotes a variable element 	
May An element may (or may not) exist in the model. *May Groupings*: There may be different possible combinations of elements.	(M) annotation denotes a may element  May formula: All May elements are enumerated. Propositional formula accompanying the model is used to indicate possible combinations (specifies the alternatives).  $(\neg A \wedge \neg B \wedge C \wedge D \wedge E \wedge F \wedge \neg G \wedge \neg H) \vee$ $(A \wedge B \wedge \neg C \wedge \neg D \wedge \neg E \wedge \neg F \wedge G \wedge H) \vee$ $(A \wedge B \wedge \neg C \wedge \neg D \wedge \neg E \wedge \neg F \wedge \neg G \wedge \neg H)$	

Annotation : Reading (1)

The following is a basic model for a hotel.



Time start:

In Region I:

Circle the points of uncertainty on the diagram and **briefly** indicate what the designer is uncertain about.

For each point of uncertainty, draw **ONE** example concretization (only need to draw the relevant fragment of the model).

Time complete:

Annotation : Reading (2)

Time start:

In Region II:
Circle the points of uncertainty on the diagram and **briefly** indicate what the designer is uncertain about.
For each point of uncertainty, draw **ALL** possible concretizations (only need to draw the relevant fragment of the model).

Time complete:

Annotation : Writing (1)

Time start:

Look at the model on the following page. We have resolved the uncertainties for you. In region I, we have attached "**InternetAccess**" to "**Room**" and we have expanded "**securityAttributes**" to two new attribues: "**NSA_ClearanceID**" and "**CIA_ClearanceID**". In region II, we have selected to have **Employee**s and **Customer**s sub-classes of "**Person**".

But now you have even more uncertainty!! Use the textual annotations to express the following points of uncertainty. (Note: don't make uncertainty-removing decisions.)

Region I:

You got a cryptic email from an undisclosed location.
"Your hotel will either be used by the CIA or the NSA. The White House is still debating which, so we'll get back to you. All we know for now is that if it's used by the CIA (i.e. you'll have the "**CIA_ClearanceID**") you must also keep track of the reservation dates (Entity: **Reservation**, Attribute: **date**).
However, if it is used by the NSA (i.e. you'll have the "**NSA_ClearanceID**"), the date information is secret: your model should not record it!.
PS. This message will self-destruct in 5 seconds."

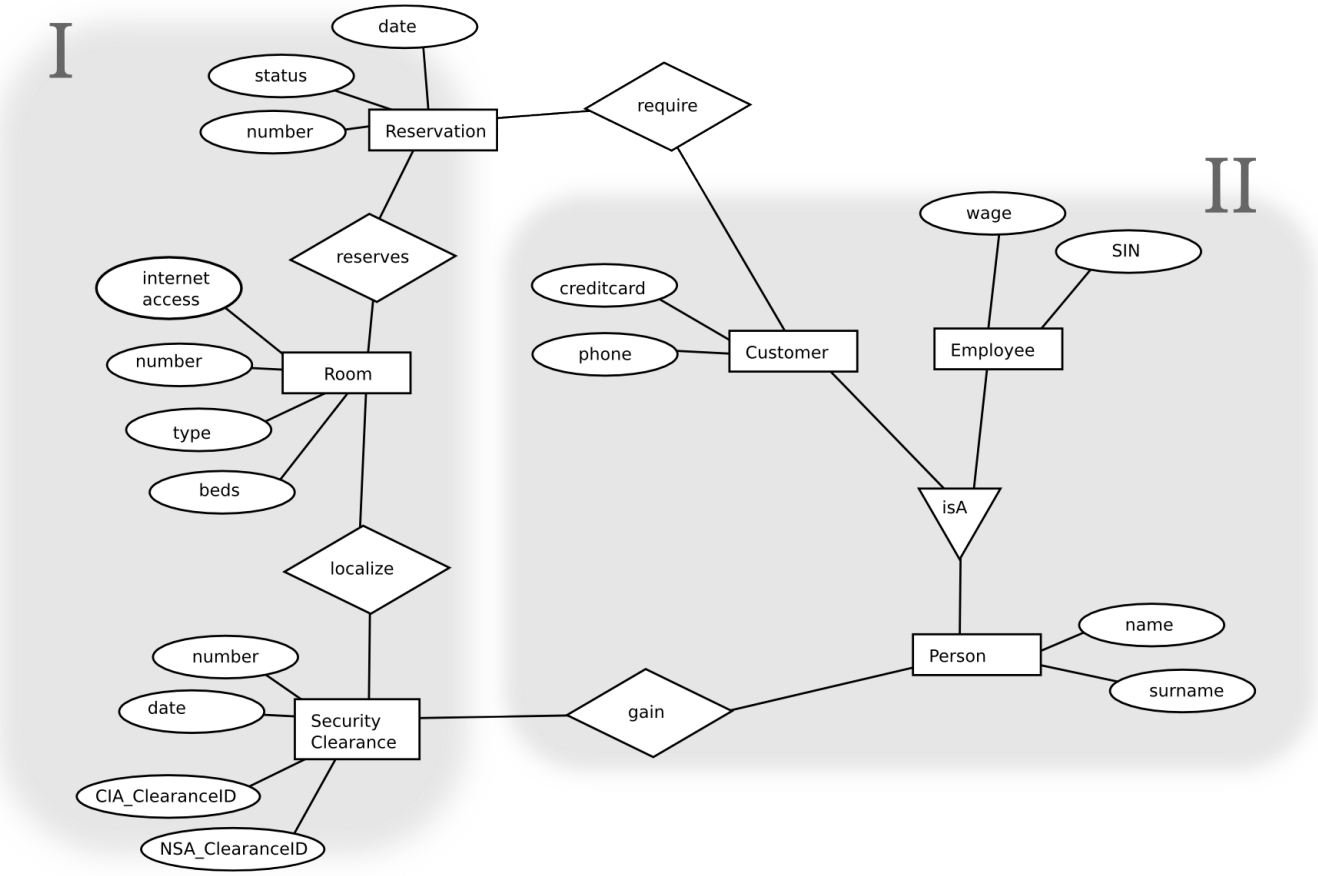
Express the two alternatives by marking up the model using only *May uncertainty* and *May groupings*.

Region II:

It's Friday, 4.30. Your pointy-haired boss just decided that you should "take the hotel to the era of the internet!". He thinks that to do that you should be collecting "online contact information" . He didn't clarify whose contact information.
He then left for the weekend, expecting a full report on Monday morning.
You know that "**onlineContactInformation**" will end up being a bunch of attributes that characterize "**SomeEntity**", but you don't what and you don't know who SomeEntity is.

Express the uncertainty in the model so that your boss can make a decision on Monday. Use only *Abs* and *Var* uncertainty. Feel free to add new model elements.

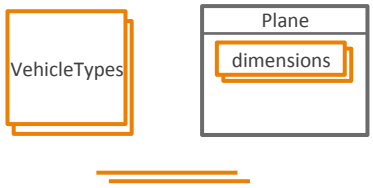
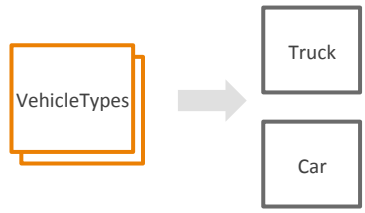
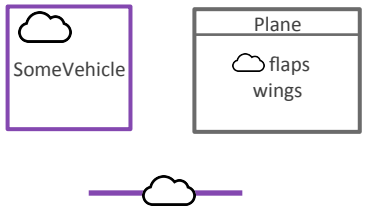
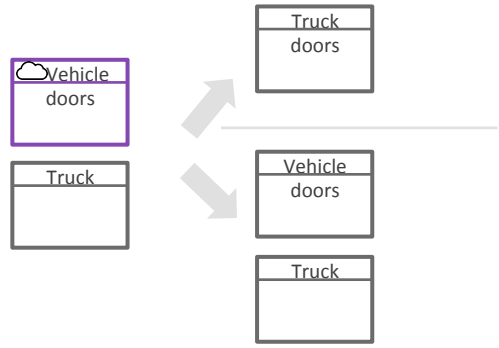
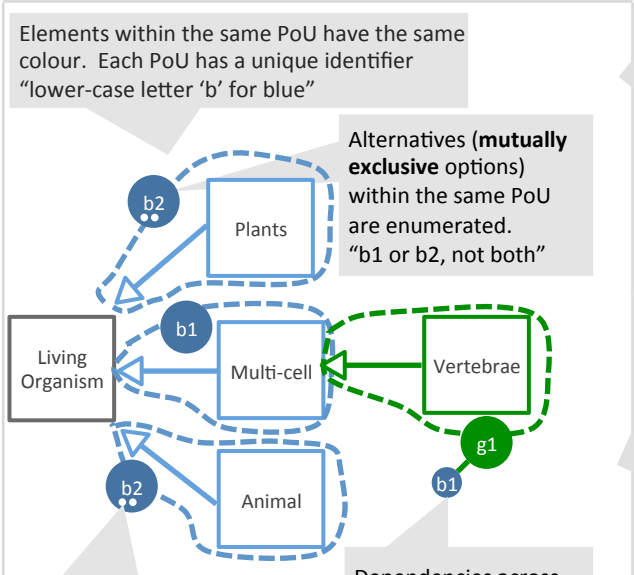
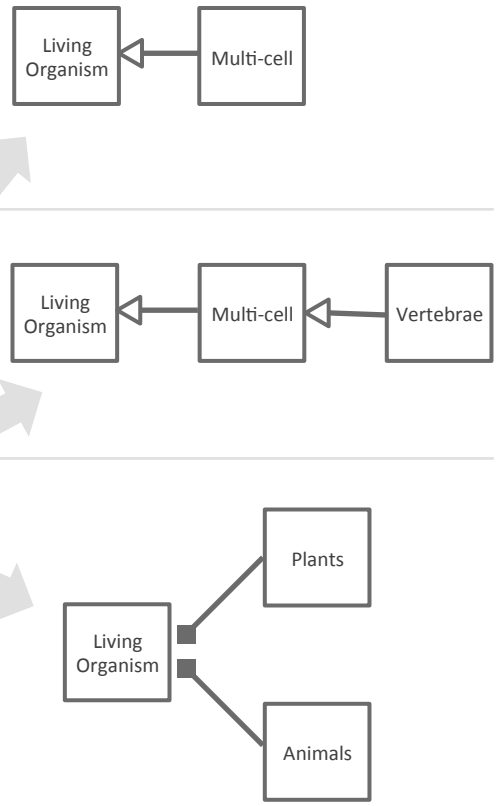
Annotation : Writing (2)



Time complete:

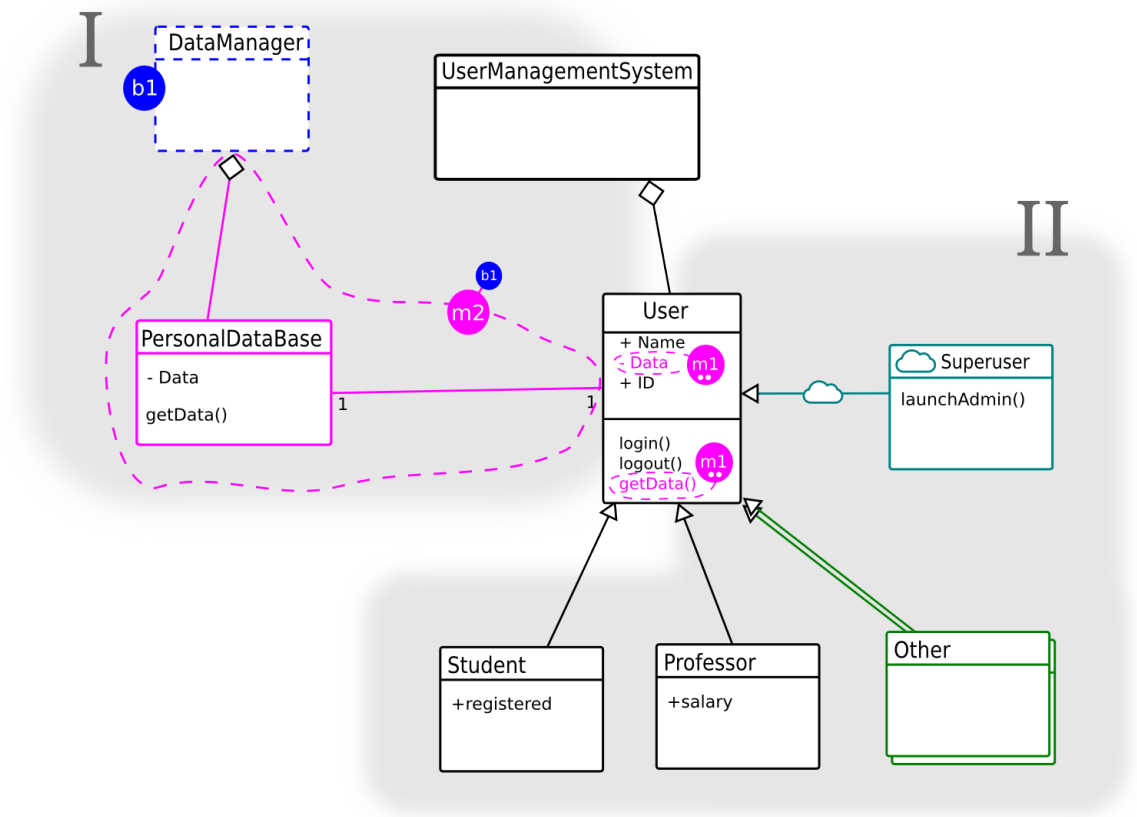
Graphical

*Note: points of uncertainty are grouped by colour

Uncertainty	Syntax	Example + Concretizations
Abs The element might not be unique; may expand to a set of elements	A pile denotes a set of elements 	
Var An element might not have a distinct identity; may be merged in to other elements.	A cloud icon denotes a variable element 	
May An element may (or may not) exist in the model. *May Groupings*: There may be different possible combinations of elements.	Dashed lines or enclosures denote may elements  	

Graphical : Reading (1)

The following is a basic model for school personnel.



Time start:

In Region I:

Circle the points of uncertainty on the diagram and **briefly** indicate what the designer is uncertain about.

For each point of uncertainty, draw **ALL** possible concretizations (only need to draw the relevant fragment of the model).

Time complete:

Graphical : Reading (2)

Time start:

In Region II:

Identify the points of uncertainty and briefly indicate what the designer is uncertain about. Feel free to mark up the diagram. For each point of uncertainty, draw **ONE** example concretization (only need to draw the relevant fragment of the model).

Time complete:

Graphical : Writing (1)

Time start:

Look at the model on the following page. We have resolved the uncertainties for you. In region I, we have selected to drop **PersonalDataBases** and store **Data** in the **User** class. In region II, we have opted to create two new subclasses of **User** ("**AdminStaff**" and "**CaretakingStaff**"). We also opted to actually keep **Superuser** as a separate class.

But now you have more uncertainty!! Use the graphical syntax to express the following points of uncertainty. (Note: don't make uncertainty-removing decisions.)

Region I:

You consider the possibility of creating an entirely separate class hierarchy for students. Instead of subclassing the existing **User** class, maybe **Student**s should be directly contained by the **UserManagementSystem**? That would mean that **Students** would have all attributes that **Users** have (**name**,**data**, **id**, **login**, etc). If you do that, you can focus the existing **User** class to be about employees, so you can move the "**salary**" attribute from **Professor** to **User**.

Try explicating the two scenarios (i.e. original system and your proposed system) in the model. Express the two alternatives by marking up the model using only *May uncertainty* and *May groupings*.

Region II:

Task 1: The admin calls you up. He wants to be able to save an (as yet unspecified) number of "**adminOptions**" at the **UserManagementSystem** class. He says will get back to you later with the particulars. Having worked with this guy for 4 years now, you know that "later" could mean next spring...

For now, try explicating his request in the Class Diagram.

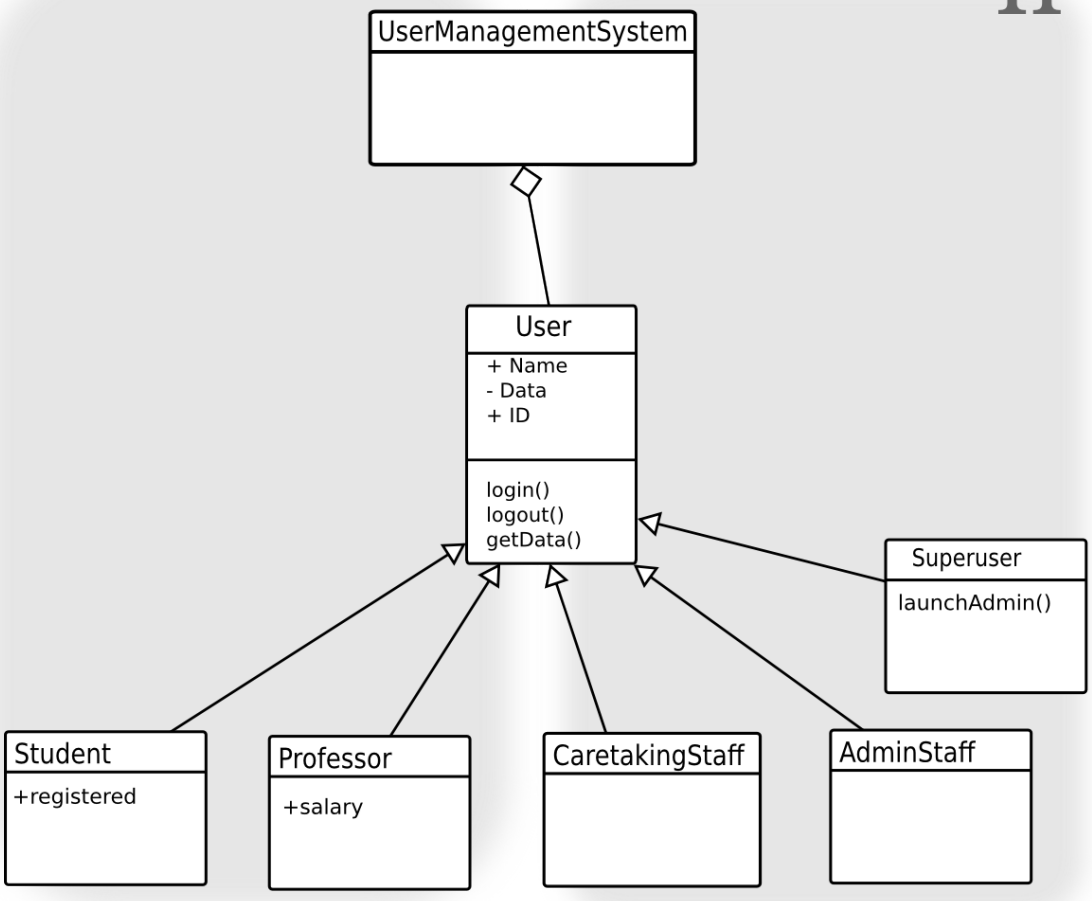
Task 2: But at the same time, you think that it's high time someone stepped in to deal with this slacker. You are certain that a method "**chastizeSuperuser()**" should exist, but you don't know yet who should be **BossOfSuperuser**, containing that method.

Express your idea in the class diagram, without resolving the uncertainty about the identity of **BossOfSuperuser.**

For Tasks 1 and 2, use only *Abs* and *Var* uncertainty. Feel free to add new model elements.

Graphical : Writing (2)

I II



Time complete:

Post-Study Questionnaire

Abs Uncertainty

I understood this concept well.	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree

The (S) annotation was:

Intuitive	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
Easy to remember	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
Efficient for reading	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
Efficient for writing	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree

The graphical syntax for Set was:

Intuitive	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
Easy to remember	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
Efficient for reading	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
Efficient for writing	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree

Which syntax did you prefer and why?

Other comments about either syntax (if any)

Post-Study Questionnaire

Var Uncertainty

I understood this concept well.	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree

The (V) annotation was:

Intuitive	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
Easy to remember	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
Efficient for reading	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
Efficient for writing	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree

The graphical syntax for Variable was:

Intuitive	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
Easy to remember	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
Efficient for reading	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
Efficient for writing	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree

Which syntax did you prefer and why?

Other comments about either syntax (if any)

Post-Study Questionnaire

May Uncertainty

I understood this concept well.	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree

The (M) annotation was:

Intuitive	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
Easy to remember	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
Efficient for reading	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
Efficient for writing	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree

The graphical syntax for May was:

Intuitive	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
Easy to remember	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
Efficient for reading	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
Efficient for writing	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree

Which syntax did you prefer and why?

Other comments about either syntax (if any)

Post-Study Questionnaire

May Groupings of Alternatives

I understood this concept well.	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree

The May Formula annotation was:

Intuitive	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
Easy to remember	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
Efficient for reading	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
Efficient for writing	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree

The graphical syntax for May groupings was:

Intuitive	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
Easy to remember	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
Efficient for reading	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
Efficient for writing	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree

Which syntax did you prefer and why?

Other comments about either syntax (if any)

Post-Study Questionnaire

General

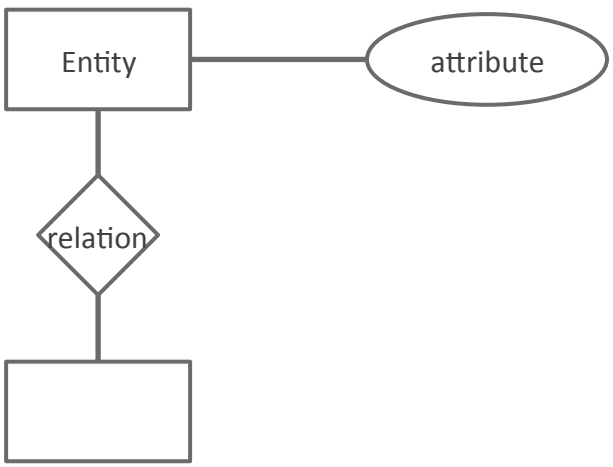
Overall, did you prefer annotation-based or graphical syntax? Why?

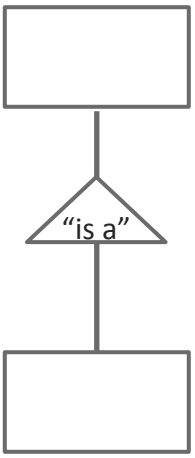
Other comments, if any:

Solutions

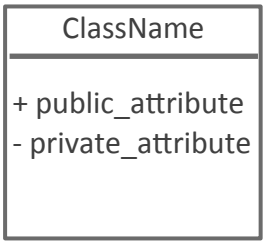
Base Syntax Reference

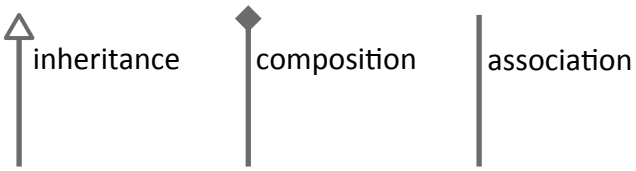
E-R Diagrams



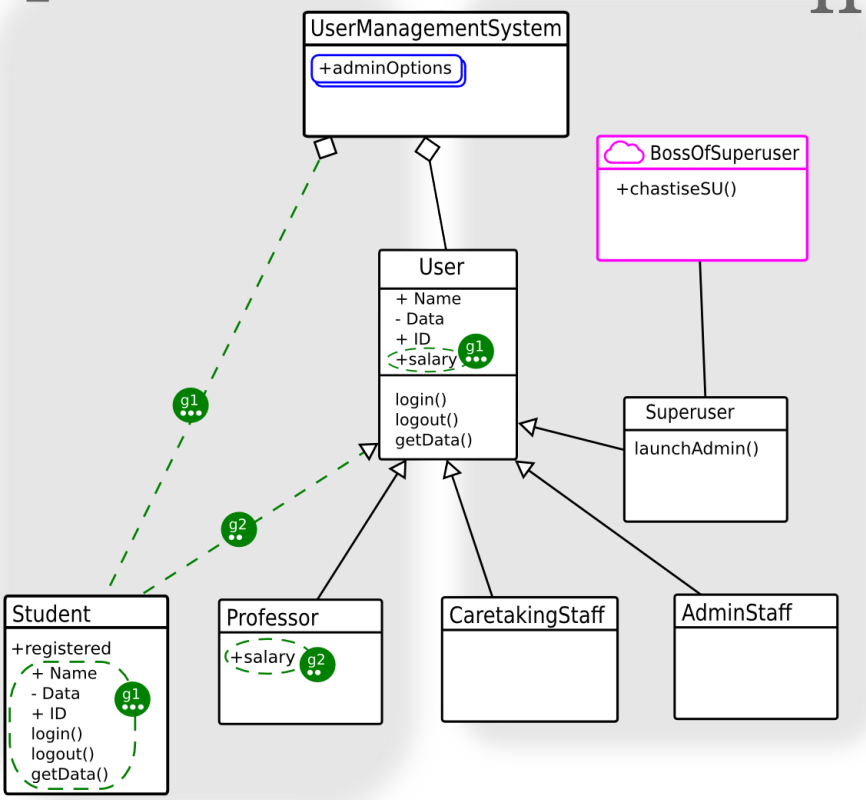


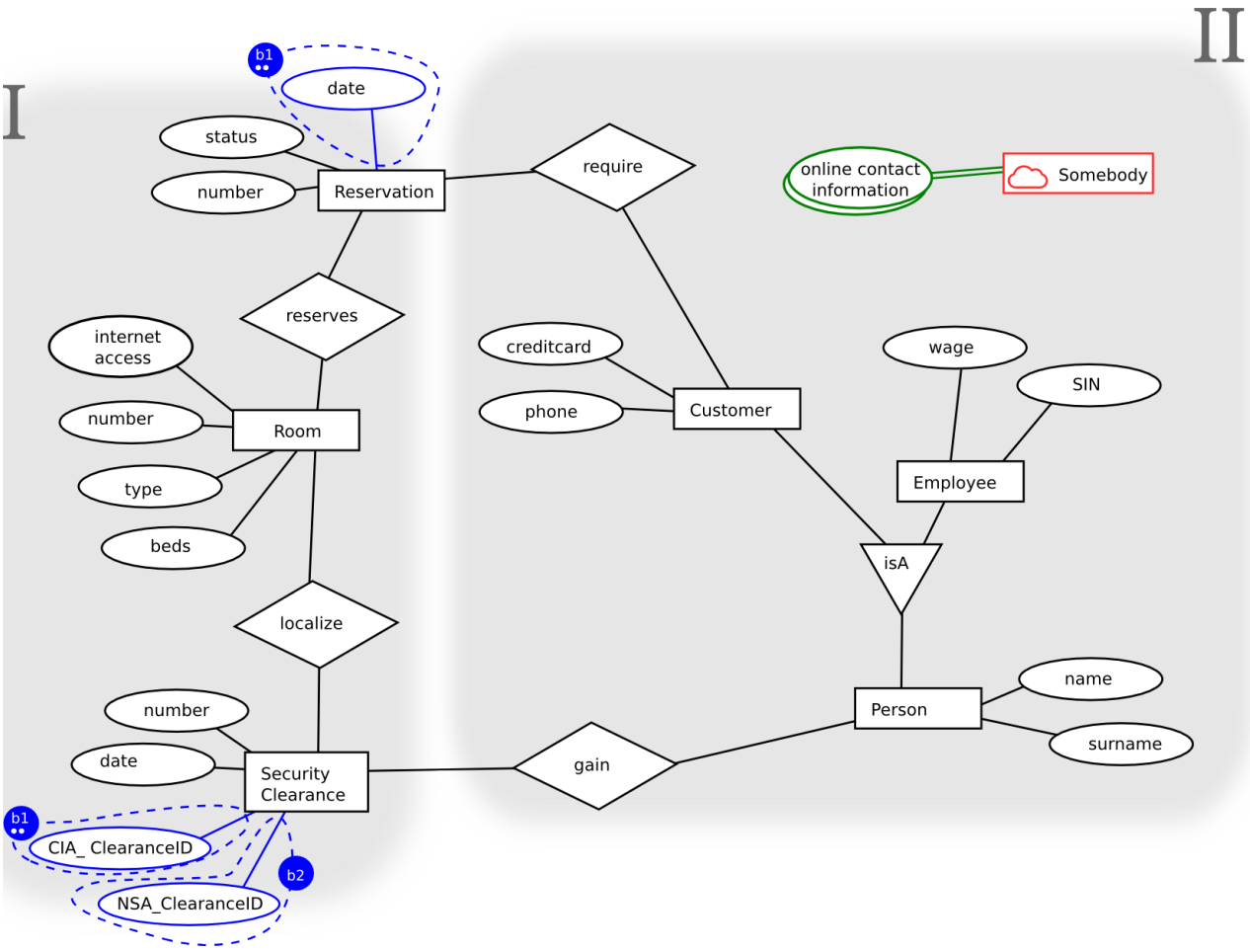
UML Class Diagrams





I II


UserManagementSystem
+adminOptions
BossOfSuperuser
+chastiseSU()
User
+ Name
- Data
+ ID
+salary
g1
login()
logout()
getData()
Superuser
launchAdmin()
g1
g2
Student
+registered
+ Name
- Data
+ ID
login()
logout()
getData()
g1
Professor
+salary
g2
CaretakingStaff
AdminStaff


I
II
b1
date
status
number
Reservation
require
online contact information
Somebody
reserves
internet access
number
Room
type
beds
localize
creditcard
phone
Customer
wage
SIN
Employee
isA
Person
name
surname
gain
number
date
Security Clearance
b1
CIA_ ClearanceID
b2
NSA_ClearanceID