Exercises for next session

1. The following sentences are semantically ambiguous. Give paraphrases that precisely describe the different readings.

   (a) *John and Mary are married.*
   (i) MARRY({j,m}) $\overset{Rule}{\Rightarrow}$ MARRY(j,m) $\overset{Rule}{\Rightarrow}$ MARRY(m,j)
   (ii) $\exists x$MARRY$(j, x) \wedge \exists y$MARRY(j, y)

   (b) *Five examiners marked six scripts.*
   (i) MARK$(\{e_1, e_2, ..., e_5\}, \{s_1, s_2, ..., s_6\})$
   (ii) MARK$(e_1, \{s_1, s_2, ..., s_6\}) \wedge$MARK$(e_2, \{s_1, s_2, ..., s_6\}) \wedge$MARK$(e_5, \{s_1, s_2, ..., s_6\})$
   $\overset{Rule}{\Rightarrow}$ MARK(e_1, s_1), MARK(e_1, s_6), ..., MARK$(5_1, s_6)$
   (iii) MARK$(\{e_1, e_2, ..., e_5\}, s_1)$, ..., MARK$(\{e_1, e_2, ..., e_5\}, s_6) \overset{Rule}{\Rightarrow}$ ...
   (iv) MARK(e_1, s_1), ... , MARK(e_5, s_6)
   Compare: *Five students connected six computers*, *Five terrorists gathered at six flats*

   (c) *John kissed his wife, and so did Sam.*
   (i) Sam kissed Sam's wife
   ii Sam kissed John's wife

   (d) *John paints Mary more often than Sam.* (i) ... than Sam paints Mary
   (ii) ... than John paints Sam

   (e) *Paul wants to buy a poodle.*
   (i) There is a certain poodle that Paul wants to buy
   (ii) Paul wants to buy a(ny) poodle

   (f) *Smith's murderer must be insane.*
   (i) The speaker doesn't know who Smith's murderer is, but the was Smith has been killed ...
   (ii) The speaker refers to a particular person.

   (g) *John often wins on Sunday.*
   (i) Next Sunday, John will often win. (ii) John gambles on several days per week. And often he wins on a Sunday.

   (h) *I love you too.*
   (i) I love you (just like you love me)
   (ii) I love you (just like someone else does)
   (iii) I love you (and I love someone else)
   (iv) I love you (as well as liking you)

2. The meanings of which natural language sentences do the following formulas represent?

   (a)

   $$\exists u \exists t \exists t' \exists s \exists e(\text{SING}(s, \text{LEA}) \wedge t \subseteq s \wedge t = n \wedge u = \text{LEA} \wedge \text{MEET}(e, u, \text{LUC}) \wedge t' < n \wedge e \subseteq t')$$

   Lea is singing and she met Luc.

   (b)

   $$\exists x \exists y \exists t \exists t' \exists s(\text{MAN}(x) \ \wedge \ t \subseteq s \ \wedge \ t = n \ \wedge \ \text{LOVE}(s, x, y) \ \wedge \ t' = n \wedge \text{WOMAN}(y) \ \wedge \ \neg(\exists s'(\text{LOVE}(s', y, y) \ \wedge \ t' \subseteq s')))$$

   A man loves a woman who doesn't love herself.

3. The meaning of the sentence *Next week, Paul will come.* may be represented by the following formula.

   $$\exists t \exists t' \exists e(\text{COME}(e, \text{PAUL}) \ \wedge \ e \subseteq t \ \wedge \ n < t \ \wedge \ \text{WEEK}(t) \ \wedge \ \text{WEEK}(t') \wedge n \subseteq t' \wedge \ t' < t \wedge \neg \exists t''(\text{WEEK}(t'') \ \wedge \ t' < t'' < t) \ )$$

   (a) Give a paraphrase for the meaning representation of *next week*.
   the week that immediately precedes the current week

   (b) Draw a time line with the temporal periods t and t' as well as the event e on it.

   (c) Give a similar representation for the sentence *Yesterday, Paul will come.* and show that this leads to an inconsistency by again drawing a time line. Which conjuncts of the formal are responsible for the inconsistency?

   $$\exists t \exists t' \exists e(\text{COME}(e, \text{PAUL}) \ \wedge \ e \subseteq t \ \wedge \ n < t \ \wedge \ \text{DAY}(t) \ \wedge \ \text{DAY}(t') \wedge n \subseteq t' \wedge \ t < t' \wedge \neg \exists t''(\text{WEEK}(t'') \ \wedge \ t < t'' < t') \ )$$

   $$e \subseteq t \ \wedge \ n < t \ \wedge \ n \subseteq t' \wedge \ t < t'$$