

## Homework

### S.1. Translate the following scenario into FOPL.

*Fred is a collie and a trained dog. Sam is Fred's master. It's Saturday and it's cold outside. Spaniels are good dogs and so are trained collies. If a dog is a good dog and has a master, then he will be with his master. Sam is at the park on Saturdays when it's not cold outside. Otherwise, he is at the museum. Where is Fred?*

### S.2. Use Modus Ponens to show the location of Fred.

### S.3. Convert the FOPL expressions obtained in S.1. above into clause form.

### S.4. Use resolution refutation to prove that Fred is at the museum.

### S.5. Convert the following sentences into clause form:

i)  $\forall X p(X) \rightarrow (a(X) \wedge b(X)) \vee \neg c(X, d)$

ii)  $\exists Y q(Y, c) \wedge (\forall Z a(Z) \rightarrow \neg b(Y))$