# Answers to the Dog Translations

1. $\exists x(Dog(x) \wedge \forall y(Dog(y) \rightarrow x=y) \wedge Happy(x))$
2. $\exists x(Dog(x) \wedge Large(x) \wedge \forall y((Dog(y) \wedge Large(y)) \rightarrow x=y) \wedge Happy(x))$
3. The happy dog is large.
4. The dog, which is large, is happy. (I.e. the dog is large and happy)
5. $\exists x(Dog(x) \wedge \forall y((Dog(y) \wedge x \neq y) \rightarrow Larger(x, y)) \wedge Happy(x))$
6. $\exists x(Dog(x) \wedge Bit(x, felix) \wedge \forall y((Dog(y) \wedge Bit(y, felix) \wedge x \neq y) \rightarrow Larger(x, y)) \wedge Happy(x))$
7. $\exists x(Dog(x) \wedge \forall y((Dog(y) \wedge x \neq y) \rightarrow Larger(x, y)) \wedge Bit(x, felix) \wedge Happy(x))$
8. $\exists x(Dog(x) \wedge \forall y((Dog(y) \wedge x \neq y) \rightarrow Larger(x, y)) \wedge \forall z(Cat(z) \rightarrow Bit(x, z)))$
9. $\exists x \exists y \exists z(Cat(x) \wedge Cat(y) \wedge Cat(z) \wedge x \neq y \wedge x \neq z \wedge y \neq z)$
10. In addition to Felix, there are at least two cats. (I.e. there are at least 2 cats that aren't Felix.)
11. There are at most two happy cats.
12. There are exactly two dogs that are larger than all of the cats.
13. $Cat(felix) \wedge Bit(felix, rover) \wedge \forall x((Cat(x) \wedge Bit(x, rover)) \rightarrow x = felix)$
14. $Cat(felix) \wedge Bit(felix, rover) \wedge \forall x((Cat(x) \wedge Bit(x, rover) \wedge x \neq mother(felix)) \rightarrow x = felix)$
15. $\forall x[(Dog(x) \wedge Bit(x, felix)) \leftrightarrow (Dog(x) \wedge Larger(x, rover))]$