Homework 5 for LING 571

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February 23 2014

1 Representations in first-order logic

1. John eats
$\exists x.John(x) \wedge eat(x)$

2. a student eats
$\exists x.student(x) \wedge eat(x)$

3. all students eat
$\forall x.student(x) \wedge eat(x)$

4. John eats a sandwich
$\exists x.John(x) \wedge \exists y.sandwich(y) \wedge eat(x, y)$

5. all students eat or drink
$\forall x.student(x) \wedge (eat(x)|drink(x))$

6. John drinks a soda or eats a sandwich
$\exists x.John(x) \wedge ((\exists y.soda(y) \wedge drink(x, y))|(\exists y.sandwich(y) \wedge eat(x, y)))$

7. John or Mary eats
$(\exists x.John(x)|\exists x.Mary(x)) \wedge eat(x)$

8. a student writes an essay or eats
$\exists x.student(x) \wedge (write(x, ESSAY)|eat(x))$

9. every student eats a sandwich or drinks a soda
$\forall x.student(x) \wedge \exists y.sandwich(y) \wedge \exists z.soda(z) \wedge (eat(x, y)|drink(x, z))$

10. John eats every sandwich
$\exists x.John(x) \wedge \forall y.sandwich(y) \wedge eat(x, y)$

11. John eats every sandwich or bagel
$\exists x.John(x) \wedge \forall y.sandwich(y) \wedge \forall z.bagel(z) \wedge eat(x, y) \wedge eat(x, z)$

12. nobody eats a bagel
$\neg(\forall x.person(x) \wedge \exists y.bagel(y) \wedge eat(x, y))$

13. a person does not eat
$\exists x.person(x) \wedge \neg(eat(x))$

14. Jack does not eat or drink
$(\exists x.Jack(x) \wedge \neg(eat(x)|drink(x)))$

15. no student eats a bagel
$\neg(\exists x.student(x) \wedge \exists y.bagel(y) \wedge eat(x, y))$

16. John eats in Seattle
$\exists x.John(x) \wedge eat(x) \wedge \exists y.Seattle(y) \wedge LocationOf(y)$