CSC 4-151 Discrete Mathematics for Computer Science
Quiz 2 December 2, 2014

Solution
name

1. (4 pts) a. First introduce two appropriate predicates, W(x) and J(x), then add quantifier(s) **as needed** to express the given statements. Assume the domain for W and J is all people.

W(x): x is a web developer

J(x): x knows Javascript

a. Tina is a web developer.

W(Tina)

b. Not everyone knows Javascript.

$\neg \forall x\, (J(x))$

c. All web developers know Javascript.

$\forall x\, (W(x) \rightarrow J(x))$

2. (4 pts) Introduce predicates and use quantifiers to express the following statements in predicate logic:

Predicate and domain: F(x,y): x can fool y domain: people

a. Everybody can fool Todd.

$\forall x\, (F(x, \text{Todd}))$

b. Nobody can fool everybody.

$\neg \exists x \forall y\, (F(x,y))$

c. There is someone whom Lydia cannot fool.

$\exists x \neg F(\text{Lydia}, x)$

3. (4 pts.) Give an argument using rules of inference to show that the conclusion follows from the hypothesis. (Please introduce the obvious predicate(s); the domain will be students in this class).

A student in this class has not read the book. Everyone in this class passed the first quiz. Therefore, someone who passed the first quiz did not read the book.

$B(x)$: x has read the book.

$Q(x)$: x passed the first quiz

1. $\exists x (\neg B(x))$	premise
2. $\forall x (Q(x))$	premise.
3. $\neg B(c)$ for some c	1, EI.
4. $Q(c)$	2, UI.
5. $\neg B(c) \wedge Q(c)$	3, 4, conj.
6. $\exists x (\neg B(x) \wedge Q(x))$	5, EG.