CSC 8-151 Discrete Mathematics for Computer Science
Quiz 2 April 20, 2018

solution
name

1. (4 pts) Introduce a two variable predicate and use quantifiers to express the following statements in predicate logic:

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

a. Everybody can fool Matt.

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

b. Nobody can fool everybody.

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

c. There is someone whom Tina cannot fool.

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

2. (5 pts) Give an argument using rules of inference for **propositional** logic to show that the conclusion follows from the hypothesis. Use a two column proof. Please introduce the obvious **propositions**. (No predicates! No quantifiers! No x's).

Dora was either going to go to Los Angeles or to Chicago (or both). If she went to Los Angeles, she would have to fly. She didn't want to fly. Conclude: Dora went to Chicago.

1. $L \vee C$	given
2. $L \rightarrow F$	given
3. $\neg F$	given
4 $\neg L$	3, 2, MT
5 C	1, 4, DS

L : Dora goes to LA
C : Dora goes to Ch.
F : Dora flies

3. (3 pts) Prove the following theorem: Let n be any natural number. If n^2 is odd then n is odd.

Pf| suppose n is even. So $n=2k$ for some k. Thus $n^2 = (2k)^2 = 4k^2 = 2(2k^2)$
Thus n^2 is even and the result follows.