Simple Example in Coq Proof
Environment: Double Negation

Valerie Chen
May 2018
Figure 1: Declare a theorem `negation_fn_applied_twice` which states that given a relation `f`, if `f` negates all booleans, applying `f` to any boolean `b` twice is equivalent to `b`. The proof is outlined.

Figure 2: Submit the theorem to the Coq interpreter. The proof state outlines one subgoal, which at this point is just the theorem itself.
Figure 3: Use the tactic intros, which names left-side propositions (hypotheses). Note \[\square\] is shorthand for deconstructing \(b\), of inductive type bool.

Figure 4: Given the hypothesis \(H\), we rewrite the subgoal. This presents us with an easily provable statement, \(\text{negb} (\text{negb} \text{ true}) = \text{true}\).
Figure 5: The tactic reflexivity solves such a simple goal.

Figure 6: Apply the same tactics for $b = \text{false}$. 
Figure 7: Qed.