1. 定义函数gtb， 使得gtb nm 返回布尔值 true当且仅当n＞m。至少用两种方法定义这个函数。

方法1

```
Fixpoint gtb (n m: nat) : bool :=
  match n, m with
  | O, _     => false
  | _, O     => true
  | S n', S m' => gtb n' m'
  end.

Example test_gtb1:              gtb 2 2 = false.
Proof. simpl. reflexivity.  Qed.
Example test_gtb2:              gtb 2 4 = false.
Proof. simpl. reflexivity.  Qed.
Example test_gtb3:              gtb 4 2 = true.
Proof. simpl. reflexivity.  Qed.
```

方法2

```
Fixpoint eqb (n m : nat) : bool :=
  match n with
  | O => match m with
         | O => true
         | S m' => false
         end
  | S n' => match m with
            | O => false
            | S m' => eqb n' m'
            end
  end
```

```
  end.

Fixpoint geb (n m : nat) : bool :=
  match m with
  | O => true
  | S m' =>
      match n with
      | O => false
      | S n' => geb n' m'
      end
  end.

Definition negb (b:bool) : bool :=
  match b with
  | true => false
  | false => true
  end.


Definition andb (b1:bool) (b2:bool) : bool :=
  match b1 with
  | true => b2
  | false => false
  end.

Definition gtb' (n m : nat) : bool :=
  andb (negb (eqb n m)) (geb n m).


Example test_gtb1':                  gtb' 2 2 = false.
Proof. simpl. reflexivity.  Qed.
Example test_gtb2':                  gtb' 2 4 = false.
Proof. simpl. reflexivity.  Qed.
```

```
Example test_gtb3':          gtb' 4 2 = true.
Proof. simpl. reflexivity.  Qed.
```

2. 证明如下性质。`Theorem plus_1_l': forall n m o: nat, n=m->m =0->1+n =So.`

```
Theorem plus_1_l' : forall n m o : nat, n = m -> m = o -> 1 + n = S o.
Proof.
  intros n m o Hn Hm.
  rewrite -> Hn.
  rewrite <- Hm.
  reflexivity.
Qed.
```

```
1 subgoal
______________________________________(1/1)
forall n m o : nat, n = m -> m = o -> 1 + n = S o
```

```
1 subgoal
n, m, o : nat
Hn : n = m
Hm : m = o
______________________________________(1/1)
1 + n = S o
```

```
1 subgoal
n, m, o : nat
Hn : n = m
Hm : m = o
______________________________________(1/1)
1 + m = S o
```

```
1 subgoal
n, m, o : nat
Hn : n = m
Hm : m = o
______________________________________(1/1)
1 + m = S m
```

```
No more subgoals.
```