1. 采用自底向上的方式

其中类型上下文表示：$f: A \to A \quad x: A$

$$\dfrac{\dfrac{\dfrac{\dfrac{}{\Gamma \vdash f: A \to A} \quad \dfrac{}{\Gamma \vdash x: A}}{\Gamma \vdash f: A \to A \quad \Gamma \vdash fx: A}}{\Gamma \vdash f: A \to A \quad \Gamma \vdash f(fx): A}}{\dfrac{\dfrac{}{\Gamma \vdash x: A} \quad \dfrac{}{\Gamma \vdash f(f(fx)): A}}{\dfrac{\dfrac{}{\Gamma \vdash f: A \to A} \quad \dfrac{}{\Gamma \vdash \lambda x^{A}.\, f(f(f(x))): A \to A}}{\Gamma \vdash \lambda f^{A \to A} x^{A}.\, f(f(f(x))): (A \to A) \to A \to A}}}$$

2.

```
Inductive fruit: Type:=
  |apple
  |pear.

Inductive food: Type:=
  |rice
  |steak
  |dessert (f: fruit).

Definition vegetarian (f: food): bool:=
  match f with
  |steak => false
  |rice => true
  |dessert f => true
  end.

Example test1: (vegetarian rice) = true.
Proof. simpl. reflexivity. Qed.
Example test2: (vegetarian steak) = false.
Proof. simpl. reflexivity. Qed.
Example test3: (vegetarian (dessert apple)) = true.
Proof. simpl. reflexivity. Qed.
Example test4: (vegetarian (dessert pear)) = true.
Proof. simpl. reflexivity. Qed.
```