Problems

1. Write a food class
   - Input state is the name, nutrition value, and good-until time.
   - Additional state is the age of the food, initially 0.
   - Methods are:
     - NAME - returns the name of the food
     - AGE - returns the age of the food
     - SIT-THERE - takes an amount of time, and increases the age of the food by the amount.
     - EAT - return the nutrition if the food is still good; 0 otherwise.

2. Write an aged-food class
   - Input state is the same as the food class, with an additional parameter, which is the good-after time.
   - Should inherit from the food class.
   - Methods are:
     - SNIFF - returns #t if it has aged enough to be good.
     - EAT - returns 0 if the food is not good yet; otherwise behaves like normal food.

3. Extend the object system to support dynamic mixin classes. A “mixin” is when one class, after being defined, can be modified to include methods definitions from some other class. This effectively allows a class to inherit from multiple classes, and is also sometimes called a role or an abstract base class.

4. Further extend the system to support mixins on instances, in addition to classes. That is, some particular instance of aged-food (a stinky-cheese-wheel, for instance) might mix in the methods of the round trait to get the ROLL method.

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1 Technically, since this is only adding the methods of the other class, and not its state, this is a “trait” and not a mixin.

2 Mixins actually first appeared in an object system for Lisp Machine Lisp in 1982; the name was inspired by Steve’s Ice Cream Parlor in Somerville, which allowed toppings to be mixed into their ice cream.