National University of Singapore
School of Computing
CS1010X: Programming Methodology
Semester II, 2016/2017

Mission 14
Hungry Games Training, Part II

Release date: 24 April 2017
Due: 21 May 2017, 23:59

Required Files

- mission14-template.py
- hungry_games.py

Background

Grandwizard Ben is extremely pleased that you managed to successfully model the objects that would be present in the Hungry Games. Following your success in the previous mission, he has now tasked you with the responsibility of preparing our volunteers to take part in the Hungry Games.

You will have to teach our sheltered mages the skills necessary to survive in a hostile environment. They will have to learn how to hunt, satisfy their hunger, and manage their inventory efficiently.

You have to mould them to become worthy tributes of District M.

Introduction

In this mission, we will create a new `Tribute` class, extended from the `Person` class in the `hungry_game.py` file. Our `Tribute` class would be the base object that would participate in the Hungry Games, and as such, we would need to implement additional methods and properties so as to satisfy the requirement of the games.

The template file `mission14-template.py` has been provided for your use. Do not copy the test code onto coursemology.

This mission consists of **five** tasks.

Task 1: Hunger (7 marks)

We have not modelled hunger in the `Person` class, as we have previously assumed that food is always abundant and that one would always have access to food. That assumption is not true in the Hungry Games - it is quite possible that one would die of starvation. We will need to model this in our Tribute object.

a. Augment the `Tribute` class by adding a new property, `hunger`, which will describe the level of hunger for the Tribute. The initial value for hunger should be 0, as all the Tributes will start the game with full stomach.

b. Create a method, `get_hunger()`, which return the current hunger level of the tribute.

```
>>> cc = Tribute("Chee Chin", 100)
>>> cc.get_hunger()
0
```

c. Create a method, `add_hunger(hunger)`, which will add a hunger value to the Tribute's hunger. When the hunger of a Tribute is equal or more than 100, he/she will `go_to_heaven()`.

```
>>> Base = Place("base")
>>> cc = Tribute("Chee Chin", 100)
>>> Base.add_object(cc)
>>> cc.get_place().get_name()
base
>>> cc.get_hunger()
0
>>> cc.add_hunger(50)
>>> cc.get_hunger()
50
>>> cc.add_hunger(50)
Chee Chin went to heaven!
>>> cc.get_hunger()
100
>>> cc.get_place().get_name()
Heaven
```

d. Create a method, `reduce_hunger(hunger)`, which will minus a hunger value to the Tribute's hunger. Your function should ensure that the hunger of the Tribute is always greater or equal to 0.

```
>>> cc = Tribute("Chee Chin", 100)
>>> cc.add_hunger(10)
>>> cc.get_hunger()
10
>>> cc.reduce_hunger(20)
>>> cc.get_hunger()
0
```

Task 2: Eat (3 marks)

As a natural extension from the previous Task, we will need a way for our `Tribute` object to reduce their hunger.

Create a method `eat(food)`, which takes in a `Food` object. It will reduce the hunger of the player by the `food.get_food_value()`. In addition, if the object passed to the `eat` method is of the type `Medicine`, it will increment the player's `health` by `medicine.get_medicine_value()`.

There are several rules you need to take note. Firstly, your function should ensure that the health of the player never exceeds 100 and hunger of the player never less than 0. Secondly, the player cannot eat food that is out of his/her inventory. If he/she tries to eat something that is not in the inventory, there's simply no effect. Thirdly, after eating the food, your player should remove the Food or Medicine object from the inventory, even if the Food/Medicine didn't help increase health or reduce hunger.

```
>>> cc = Tribute("Chee Chin", 100)
>>> chicken = Food("chicken", 5)
>>> aloe_vera = Medicine("aloe vera", 2, 5)

>>> Base = Place("base")
>>> Base.add_object(cc)
>>> Base.add_object(chicken)
>>> Base.add_object(aloe_vera)

>>> cc.reduce_health(10)
>>> cc.add_hunger(4)
>>> named_col(cc.get_inventory())
[]

# Note that hunger did not decrease because
# chicken is not in Chee Chin's inventory
>>> cc.eat(chicken)
>>> cc.get_hunger()
4

>>> cc.take(chicken)
Chee Chin took chicken
>>> cc.take(aloe_vera)
Chee Chin took aloe vera

>>> named_col(cc.get_inventory())
['chicken', 'aloe vera']

>>> cc.eat(aloe_vera)
>>> cc.get_health()
95
>>> cc.get_hunger()
2
```

```
>>> named_col(cc.get_inventory())
['chicken']
>>> cc.eat(chicken)
>>> cc.get_hunger()
0

>>> named_col(Base.get_objects())
['Chee Chin']
```

Task 3: Managing Inventory (6 marks)

In the `Person` object, there is already a support for an inventory, and when the Person object takes a `Weapon` object or `Food` object, the object would go to the inventory. For our `Tribute` object, we want a way for us to retrieve the `Weapon` and `Food` objects from the inventory.

a. Create a new method in the `Tribute` class, `get_weapons()`, which would return a tuple of `Weapon` objects that the Tribute currently has in his inventory.

b. Create a new method in the `Tribute` class, `get_food()`, which would return a tuple of `Food` objects that the Tribute currently has in his inventory.

c. Create a new method in the `Tribute` class, `get_medicine()`, which would return a tuple of `Medicine` objects that the Tribute currently has in his inventory.

```
>>> cc = Tribute("Chee Chin", 100)
>>> bow = RangedWeapon("bow", 4, 10)
>>> sword = Weapon("sword", 2, 5)
>>> chicken = Food("chicken", 5)
>>> aloe_vera = Medicine("aloe vera", 2, 5)

>>> Base = Place("base")
>>> Base.add_object(cc)
>>> Base.add_object(bow)
>>> Base.add_object(sword)
>>> Base.add_object(chicken)
>>> Base.add_object(aloe_vera)

>>> cc.take(bow)
Chee Chin took bow
>>> cc.take(sword)
Chee Chin took sword
>>> cc.take(chicken)
Chee Chin took chicken
>>> cc.take(aloe_vera)
Chee Chin took aloe vera

>>> named_col(cc.get_inventory())
['bow', 'sword', 'chicken', 'aloe vera']

>>> named_col(cc.get_weapons())
```

```
('bow', 'sword')

>>> named_col(cc.get_food())
('chicken', 'aloe vera')

>>> named_col(cc.get_medicine())
('aloe vera',)
```

Task 4: Attack!! (4 marks)

Our Tribute must definitely be able to attack other objects in the Hungry Games - it is the essence of the Hungry Games. In order to attack something, we will need to know the object that we are attacking, as well as the Weapon that the Tribute will use to attack. We will assume that we can only attack `LivingThing` objects.

Create a new method in the `Tribute` class, `attack(living_thing, weapon)`, which would take in 2 parameters, a `LivingThing` object, and a `Weapon` object. It should determine the damage that should be dealt to the `LivingThing`, and reduce the health of the `LivingThing` by that amount.

NOTE: The `attack` method needs check if the Tribute currently has the weapon object in his/her inventory and whether the target is in the same location. Otherwise it has no effect!

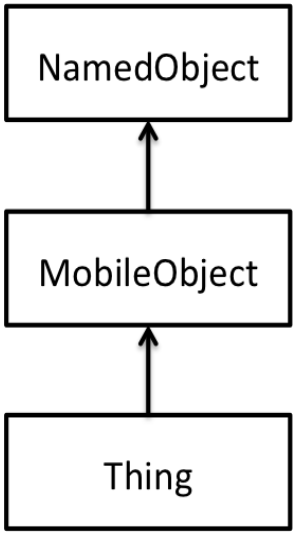
```
>>> Base = Place("base")
>>> cc = Tribute("Chee Chin", 100)
>>> bear = Animal("bear", 20, 10)
>>> sword = Weapon("sword", 10, 10)

>>> Base.add_object(cc)
>>> Base.add_object(sword)
>>> Base.add_object(bear)

>>> bear.get_health()
20

# Attack has no effect, because Chee Chin don't have the sword
# in his inventory
>>> cc.attack(bear, sword)
>>> bear.get_health()
20

>>> cc.take(sword)
Chee Chin took sword
>>> cc.attack(bear, sword)
>>> bear.get_health()
10
>>> cc.attack(bear, sword)
bear went to heaven!
>>> named_col(Base.get_objects())
['Chee Chin', 'bear meat']
```

Task 5: Object Hierarchy (5 marks)

Draw a simple inheritance diagram showing all the objects (classes) defined in the complete Hungry Games simulation and the inheritance relations between them, and the methods defined for each class.

You may include your inheritance diagram as an attachment when you submit the mission.

Hint: There should be a total of 13 classes. Did you get all of them?



A partial class diagram of some of the classes defined in the Hungry Games