ISTA 130: Spring 2014
Programming Assignment 10
(100 points)
Classes

Assigned: Thursday, April 24th
Due: Thursday, May 1st by 11:59 pm
(submit via D2L dropbox)

Collaboration is not allowed on Programming Assignments

- You **must** work **alone** on **all** Programming Assignments.

- You are of course welcome to ask the section leaders and instructor for help.

Please read the instructions below carefully and follow them closely. All problems (and parts of problems) are required except as noted in the instructions below.

Important: Your filenames *must* be identical to the filenames given below. For any functions you are asked to write, the function signature (header) *must* be *exactly* as described in the instructions. That is, you *must* use the *exact* function names given in the instructions, you *must* have the parameters the instructions ask for, and the parameters *must* be in the order the instructions give.

Also Important: Make sure you *always* save a backup of your work somewhere safe (such as dropbox.com).

This too is important: You are not just graded on whether your code produces the same result as the examples show. You should be using what you've learned to do your best to write good code. For example, things like poorly named variables/functions, duplicating code where you could instead use a loop, and missing documentation will cost you points.

1 RPG Combat (100 points)

1.1 Details

In this assignment you will write a program to simulate combat for a simple Role Playing Game (RPG).

The game will have a single type of character, the Fighter. Each individual Fighter will have an integer value called "hit points" that represents his/her current health (the amount of damage he/she can sustain before death).

The program will simulate combat between two Fighters. Combat will be divided into rounds. During each round each combatant will make one attempt to strike the other. Determining which Fighter attacks first in a round is important because the first attacker might kill his opponent before the opponent has a chance to attack him.

In table top RPGs the order of attacks is often determined by rolling dice. For example, each combatant rolls a six-sided die. The higher roller attacks first. The lower roller attacks second *if* he is still alive. We'll use random numbers to simulate the rolling of dice. In the event of a tie, we'll consider the attacks to occur simultaneously (i.e. the Fighters attempt to strike each other at the exact same moment). During a simultaneous attack both Fighters will get to attack even if one (or both) is (are) killed during that round.

We'll use a random number to determine whether an attack attempt is successful or not. Each successful attack will inflict damage on the opponent. To simulate damage, we'll reduce the opponent's hit points by another random number. When a Fighter's hit points are reduced to 0 (or less than 0) he is considered to be dead.

Combat rounds will continue until one (or both) combatants are dead.

Create a new file called "rpg.py". In the file:

1.) Write a **class** called **Fighter**. Inside the class:

  A.) Write a initializer method called **init** that takes 2 parameters: **self** (all of your *methods* will have this as the first parameter), and **name** (a string, the name of a fighter). The initializer method will:

   • set a name *attribute* to the value of the name parameter.
   • set a hit points *attribute* to 10 (i.e. all fighters begin life with 10 hit points.)

  B.) Write a method called **repr** that takes one parameter: **self**. The method returns a string showing the name and hit points of the instance in the following format:

     Bonzo (HP: 9)

   • In this example "Bonzo" is the Fighter's name and he currently has 9 hit points.

  C.) Write a method called **take_damage** that takes two parameters: **self** (the Fighter instance that calls the method), and damage_amount (an integer representing the number of hit points of damage that have just been inflicted on this Fighter):

   i.) The method should first decrease the hit point attribute by the damage_amount.
   ii.) It should next check to see if the Fighter has died from the damage:
       • A hit points value that is zero or less indicates death. In that case print a message as shown in the following example:
         Alas, Bonzo has fallen!
         – In this example the Fighter's name is "Bonzo"
       • Otherwise print a message as shown in the following example:
         Bonzo has 5 hit points remaining.
         – In this example the Fighter's name is "Bonzo" and he has 5 hit points left over after the damage.
   iii.) This method returns nothing.

  D.) Write a method called **attack** that takes two parameters: self (the Fighter instance that calls the method), and other (another Fighter instance being attacked by self)

   i.) The method will print the name of the attacker and attacked in the following format:
       Bonzo attacks Chubs!

ii.) Next determine whether the attack hits by generating a random integer between 1 and 20. A number that is 12 or higher indicates a hit[1]:

  - For an attack that hits:

  a.) Generate a random integer between 1 and 6 to represent the amount of damage inflicted by the attack.

  b.) Print the amount of damage inflicted as in the following example:

    Hits for 4 hit points!

  c.) Invoke the take_damage method on the victim (i.e. on other), passing it the amount of damage inflicted.

  - For an attack that misses, just print the following message:

    Misses!

iii.) This method returns nothing

2.) Outside of the class write a function called **combat_round** that takes two parameters. The first is an instance of Fighter. The second is another instance of Fighter.

  i.) The function determines which of the two fighters attacks first for the round by generating a random integer between 1 and 6 for each fighter:

  - If the numbers are equal:

  a.) Print the following message:

    Simultaneous!

  b.) Have each fighter instance call his attack method on the other fighter (the order of the two method calls doesn't matter since we're considering these to be simultaneous attacks)

  - If one number is larger:

  a.) The fighter with the larger roll attacks first (by calling his attack method and passing it the fighter being attacked)

  b.) If the second fighter survives the attack, he then attacks the first.

  ii.) This function returns nothing.

3.) In **main**:

  i.) Create two instances of the Fighter class (you can choose the names of your Fighters)

  ii.) Next repeat the following process until one (or both) fighters have been slain (remember, a Fighter is dead when it has less than 1 hit point):

  a.) Print the combat round number (start with 1) as shown in the following example:

    ===================== ROUND 1 =====================

  b.) Print each Fighter's information (remember how the repr method works). E.g.:

    Bonzo (HP: 4)
    Chubs (HP: 7)

  c.) Use the input function to pause the program (like we did in our turtle graphics programs) until the user presses enter. Prompt the user with the following message:

    Enter to Fight!

  d.) Use your combat_round function to simulate a single round of combat.

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[1] For the curious: The numbers are from Advanced Dungeons & Dragons in which you roll a 20 sided die to determine a hit. They assume the attacker is a 1st level Fighter swinging a club and the defender is wearing leather armor.

iii.) Finally print a message indicating the battle has ended, followed by the information for each of the Fighters, as shown in the following example:

```
The battle is over!
Bonzo (HP: 3)
Chubs (HP: -2)
```

4.) Adjust all of your output so that it looks pretty. See the example output below.

5.) Verify that your documentation makes sense and that you've added documentation to each of your functions.

6.) Verify that your program works

7.) Upload your file to the Program 10 dropbox folder on D2L

1.2 Example Output

The following is an example of the output you might see when running this program:

```
=================== ROUND 1 ===================
Bonzo (HP: 10)
Chubs (HP: 10)
Enter to Fight!
Simultaneous!
Bonzo attacks Chubs!
        Hits for 1 hit points!
        Chubs has 9 hit points remaining.
Chubs attacks Bonzo!
        Misses!

=================== ROUND 2 ===================
Bonzo (HP: 10)
Chubs (HP: 9)
Enter to Fight!
Chubs attacks Bonzo!
        Hits for 4 hit points!
        Bonzo has 6 hit points remaining.
Bonzo attacks Chubs!
        Hits for 3 hit points!
        Chubs has 6 hit points remaining.

=================== ROUND 3 ===================
Bonzo (HP: 6)
Chubs (HP: 6)
Enter to Fight!
Bonzo attacks Chubs!
        Hits for 3 hit points!
        Chubs has 3 hit points remaining.
Chubs attacks Bonzo!
        Hits for 1 hit points!
        Bonzo has 5 hit points remaining.
```

```
================== ROUND 4 ==================
Bonzo (HP: 5)
Chubs (HP: 3)
Enter  to  Fight!
Simultaneous!
Bonzo attacks Chubs!
        Hits  for  5  hit  points!
        Alas, Chubs has fallen!
Chubs  attacks  Bonzo!
        Hits  for  2  hit  points!
        Bonzo  has  3  hit  points  remaining.

The  battle  is  over!
Bonzo (HP: 3)
Chubs  (HP:  -2)
```

Here is a second example of running the program:

```
================== ROUND 1 ==================
Bonzo  (HP:  10)
Chubs (HP: 10)
Enter  to  Fight!
Bonzo attacks Chubs!
        Hits  for  3  hit  points!
        Chubs  has  7  hit  points  remaining.
Chubs  attacks  Bonzo!
        Hits  for  3  hit  points!
        Bonzo  has  7  hit  points  remaining.

================== ROUND 2 ==================
Bonzo (HP: 7)
Chubs (HP: 7)
Enter  to  Fight!
Bonzo attacks Chubs!
        Misses!
Chubs  attacks  Bonzo!
        Hits  for  4  hit  points!
        Bonzo  has  3  hit  points  remaining.

================== ROUND 3 ==================
Bonzo (HP: 3)
Chubs (HP: 7)
Enter  to  Fight!
Simultaneous!
Bonzo attacks Chubs!
        Misses!
Chubs attacks Bonzo!
        Misses!

================== ROUND 4 ==================
Bonzo (HP: 3)
```

Chubs (HP: 7)
Enter to Fight!
Chubs attacks Bonzo!
        Hits for 4 hit points!
        Alas, Bonzo has fallen!

The battle is over!
Bonzo (HP: -1)
Chubs (HP: 7)