Assignment 5

Due date: Monday May 9 @ 10:00 pm

Grace Date: Thursday Dec 12 @ 10:00 pm

Points: 30

Note:

This assignment is a Team assignment – groups of two students per team are formed.

You are not allowed to communicate in any form with other classmates (other than your teammate) on this assignment or use inappropriate internet sites, which may provide solution code. A grade of zero may be given if any communication takes place.

Goals

1. To understand how to construct a class
2. To write constructors, accessor methods, mutator methods, and special methods
3. To understand the concept of self
4. To explore instance data

Game of Nimm

Nimm is an ancient game of strategy that is named after the old German word for "take."
It is also called Tiouk Tiouk in West Africa and Tsynshidzi in China. In this game, players take turns removing (or “nimming”) stones from one or more heaps until there are zero left. The game of Nimm goes as follows:

1. The game starts with one or more heaps of stones between the two or more players
2. The players alternate turns
3. On a given turn, a player may take any number of stones from the any heap
4. The players continue until all of the heaps have run out of stones.
5. The game starts over and repeats until the user ends the game.

We will play this as a normal game, where the last player to take a stone wins.

Your Task

I provide a template to work from. Upon completion of the template, a fully functional game will be created (made of two or more players). You must use the template provided and not modify any function signatures. Use the four files provided. A list of functions is given below and more details are provided in the template comments. Some have been implemented and some have not. You may test your functions individually, by calling them in the main method with fake input to see if they produce the correct output.

Python file List

In PyCharm, create a package named solution and add the following files to that folder:

1. Driver file: assignment5.py
2. Classes: game.py, heap.py, player.py

Submission

Submit the four files listed above to Gradescope. To receive any credit, your source code must compile.

Grading (files with the lowest values are assumed to be most difficult)

Criteria	Possible Points
Specifications followed	6
Conventions followed	4
assignment5.py	3
game.py	12
heap.py	3
player.py	2
Total	30

Sample Run 1:

```
Enter the number of players: 2
Enter the number of heaps: 2
Enter a name for player 1: Donna
Enter a name for player 2: Hank
Enter a size for heap 1: 20
Enter a size for heap 2: 20
Heap 1 size: 20
Heap 2 size: 20
Donna: Choose a heap number: 1
Donna: Choose an amount to remove from heap 1: 5
Donna takes 5 from heap 1
Heap 1 size: 15
Heap 2 size: 20
Hank: Choose a heap number: 2
Hank: Choose an amount to remove from heap 2: 8
Hank takes 8 from heap 2
Heap 1 size: 15
Heap 2 size: 12
Donna: Choose a heap number: 2
Donna: Choose an amount to remove from heap 2: 7
Donna takes 7 from heap 2
Heap 1 size: 15
Heap 2 size: 5
Hank: Choose a heap number: 1
Hank: Choose an amount to remove from heap 1: 4
Hank takes 4 from heap 1
```

```
Heap 1 size: 11
Heap 2 size: 5
Donna: Choose a heap number: 1
Donna: Choose an amount to remove from heap 1: 10
Donna takes 10 from heap 1
Heap 1 size: 1
Heap 2 size: 5
Hank: Choose a heap number: 2
Hank: Choose an amount to remove from heap 2: 3
Hank takes 3 from heap 2
Heap 1 size: 1
Heap 2 size: 2
Donna: Choose a heap number: 1
Donna: Choose an amount to remove from heap 1: 0
0 is not a valid heap amount.
Donna: Choose a heap number: 2
Donna: Choose an amount to remove from heap 2: 0
0 is not a valid heap amount.
Donna: Choose a heap number: 2
Donna: Choose an amount to remove from heap 2: 1
Donna takes 1 from heap 2
Heap 1 size: 1
Heap 2 size: 1
Hank: Choose a heap number: 1
Hank: Choose an amount to remove from heap 1: -6
-6 is not a valid heap amount.
Hank: Choose a heap number: 1
Hank: Choose an amount to remove from heap 1: 1
Hank takes 1 from heap 1
Heap 1 size: 0
Heap 2 size: 1
Donna: Choose a heap number: 2
Donna: Choose an amount to remove from heap 2: 5
5 is not a valid heap amount.
Donna: Choose a heap number: 2
Donna: Choose an amount to remove from heap 2: 1
Donna takes 1 from heap 2
Heap 1 size: 0
Heap 2 size: 0
Player Donna has won this round!
Player 1 score: 1
Player 2 score: 0
Do you want to play another round? True or False: False
```

Sample Run 2:

```
Enter the number of players: 2
Enter the number of heaps: 2
Enter a name for player 1: Donna
Enter a name for player 2: Hank
Enter a size for heap 1: 1
```

```
Enter a size for heap 2: 3
Heap 1 size: 1
Heap 2 size: 3
Donna: Choose a heap number: 1
Donna: Choose an amount to remove from heap 1: 1
Donna takes 1 from heap 1
Heap 1 size: 0
Heap 2 size: 3
Hank: Choose a heap number: 2
Hank: Choose an amount to remove from heap 2: 3
Hank takes 3 from heap 2
Heap 1 size: 0
Heap 2 size: 0
Player Hank has won this round!
Player 1 score: 0
Player 2 score: 1
Do you want to play another round? True or False: True
Heap 1 size: 1
Heap 2 size: 3
Donna: Choose a heap number: 2
Donna: Choose an amount to remove from heap 2: 2
Donna takes 2 from heap 2
Heap 1 size: 1
Heap 2 size: 1
Hank: Choose a heap number: 1
Hank: Choose an amount to remove from heap 1: 1
Hank takes 1 from heap 1
Heap 1 size: 0
Heap 2 size: 1
Donna: Choose a heap number: 2
Donna: Choose an amount to remove from heap 2: 1
Donna takes 1 from heap 2
Heap 1 size: 0
Heap 2 size: 0
Player Donna has won this round!
Player 1 score: 1
Player 2 score: 1
Do you want to play another round? True or False: False
```

Rubric: