Shut the Box

For the surrounding details regarding this programming assignment, refer to the lesson titled *A Review of Python: Multi-Sided Die*.

Specification

Using the final `MSDie` class that we developed in the lesson, write a Python program that plays the game Shut the Box[1]. Although there are many variations of the game, we will implement the one that uses the following rules:

- There are nine tiles, numbered 1 through 9.
- A player rolls two regular 6-sided dice and notes the sum (unless all tiles greater than 6 are already flipped – then the player rolls only a single die).
- Using a strategy of his/her choice, the player then chooses to flip one or more tiles that sum to the same result.
- The player continues to roll the dice until it's no longer possible to flip tiles that sum to the same result (or until all of the tiles have been flipped).
- The player's score is the sum of the remaining tiles left (i.e., those that were not flipped).

Your program should prompt the user for the number of players. It should then have each player play the game automatically. Finally, it should display the results.

Constraints and notes

Note the following constraints and notes (see the rubric below for more detail):

- Structure your output so that it is similar to the sample runs shown below;
- You must use good coding style (which includes things such as including an informative header at the top of your program, commenting your source code appropriately, using meaningful variable and (if applicable) constant identifiers, and so on);
- Prompt the user for the number of players;
- Implement a strategy of your choice (e.g., always flip the most tiles, prefer flipping larger tile values, just flip random tiles that sum to the dice result, etc) for the players; and

[1] See: https://en.wikipedia.org/wiki/Shut_the_box.

- At the end, display the results (i.e., player scores, who won or tied, etc).

Deliverable

Submit a Python 3 source file that can be executed through an IDE (such as Thonny) or via the command line (e.g., `python3 ShutTheBox.py`).

Sample output

Here is some sample output of various runs of a **correct** solution. Note that values in **bold red** are those entered by the user:

Sample 1

```
How many players? 10
Player 1: 5
Player 2: 4
Player 3: 21
Player 4: 14
Player 5: 27
Player 6: 18
Player 7: 25
Player 8: 4
Player 9: 10
Player 10: 0
*Player 10 wins!
```

Sample 2

```
How many players? 9
Player 1: 24
Player 2: 17
Player 3: 19
Player 4: 9
Player 5: 11
Player 6: 35
Player 7: 25
Player 8: 9
Player 9: 14
*Players 4, 8 tie!
```

Hints

Here are some hints to help get you started:

- Of course, feel free to Google things and/or discuss high-level ideas with your classmates. As always, do not Google solutions and make sure to **cite sources** (including your classmates).
- You can install the various library files that are used in this course (including those that are used in this programming assignment) by executing the following in a terminal: `pip install git+https://github.com/jgourd/CSC201UT`
- Then, import the library files for this programming assignment in your Python program as follows: `from CSC201UT import MSDie`
- Feel free to extend the existing `MSDie` class to support adding two dice. In this case, you would define a new function, `__add__()`, in your program (**not the `MSDie` class**) and add it to the `MSDie` class as follows: `MSDie.__add__ = __add__`.
- To determine all of the possible ways to flip tiles that add to the sum of the two dice, consider taking a look at the **power set**. The power set contains all of the subsets of a set. When a player rolls the dice, all of the ways in which the tiles can be flipped to sum to the result can be thought of as all of the subsets of the set containing the numbered tiles (1 through 9) that sum to the result.

Rubric

Please note the following rubric for this programming assignment:

Shut the Box		
#	**Item**	**Points**
1	Good coding style	5
2	Output is appropriate	5
3	Input prompts implemented	2
4	Playing strategy implemented	8
5	Results correct	10
TOTAL		**30**