# 111A Introduction to Computer and Computer Science

## Homework Assignment #9

## Due: 12/12 12:00:00

In this homework assignment, you will practice how to apply the concept of object-oriented programming to solve a practical issue. As you have learned all the related knowledge during the lectures, you should have the ability to accomplish this.

### Problem #1: A Dice Game

You have already created a "**Dice**" and "**Person**" object in the homework#8. This time, we are going to use those two objects to create a **game**. Here are the rules of this **game**:

1. At the beginning of this game, every player has the same amount of cube dices.
2. There is a banned list with at least one integer in the range of [1,6].
3. Each round, every player will roll their dices and then remove the corresponding dices whose point is equal to the element in the banned list.
4. If the dice box of the player is empty, she/he is eliminated from this game.
5. Repeat step 3 and 4 until only one person left.

Please accomplish this homework with an organized code (e.g., with main script and function script). For example, you can package your scripts that related to the "**Dice**" and "**Person**" object in a module "**func.py**" and remain the main content of the game in the main script "**main_hw9.py**". In addition, you should use "**argparse**" to set all related parameters of this game. Here is a template for your code structure:

```
111A_hw#9_0123456789
      ├─ func.py          # Functions
      ├─ obj.py           # Objects
      └─ main_hw9.py      # Main scripts of hw9
```

You don't need to follow this structure, just keep your main script clean.

## FRIENDLY REMINDER

There must be a method attribute in your "**Person**" to "**remove**" the dice.

For simplicity, let us consider we only have 2 players in this homework. Assuming the amount of dices for each player is 2 and the banned list is (1,2,3). Your code might get this result:

```
                                \Homeworks\HW9>python main_hw9.py
 --name1 "Biden" --name2 "Trump" --num 2 --ban 1 2 3
Round 1:
     Current state of Biden: [4, 2]
     Current state of Trump: [6, 2]
================ Removing dices ================
     Current state of Biden: [4]
     Current state of Trump: [6]
End of round 1.
================================================
Round 2:
     Current state of Biden: [3]
     Current state of Trump: [5]
================ Removing dices ================
     Current state of Biden: []
     Current state of Trump: [5]
End of round 2.
================================================
Trump wins!
Result:
     Current state of Biden: []
     Current state of Trump: [5]
```

Here is the sample code:

```python
    def game(player1, player2, numDices=10, ban=(1,4)):
        p1 = Person(player1, numDices=numDices)
        p2 = Person(player2, numDices=numDices)

        banlist = ban

        ???
```

## (Bonus) Problem #2: Statistics of $N$ Games

So far, we have created enough functions and objects to do the next experiment, the statistics of $N$ games. Please write a function called "**gameStats**" which aims to return the corresponding result of $N$ games. For example, it should show this message:


**FRIENDLY REMINDER**

You should use "**argparse**" to add additional argument for number of games.

**!!!NOTICE!!!**

In this homework, you are only allowed to
import the module to implement the uniform probability.
(the random module as shown in the first sample code)

**Hand in procedure:**

As we had mentioned in the lecture, you should list all your collaborators in your programs. Here is the template:

```
"""
Created on Sun Aug 7 01:23:45 2022

@author: Xi Winnie, student ID

@collaborators: Jane Doe, her student ID
                John Doe, his student ID
"""
```

Please save your code as a "**.zip**", "**.7z**", or "**.rar**" file, where the file name should follow this format:

111A_hw#9_ID.zip

For example,

111A_hw#9_0123456789.zip

Please be aware. **We are not going to accept any homework file with wrong file name or without signature**. Please double check the content of your file.

Once you have accomplished your works, you can upload your homework to the "E3@NYCU" system. There will be a section for uploading your homework.