Junior Knights Function Program: Yahtzee, Simplified

Objectives

1. To fill in functions given pre-conditions and post-conditions.
2. To test those functions separately.
3. To integrate the working functions into a full program

Problem: Yahtzee, Simplified (yahtzee.py)

Yahtzee is a popular dice game with five dice. For this program, we are going to implement a greatly simplified version of Yahtzee between two players that uses 3 dice.

The main code that runs the game has already been written for you. The assignment is simply to fill in five functions according to the given pre-conditions and post-conditions. If these functions are filled in properly the game should work.

The two players will alternate taking turns. On each turn the player roll three fair standard six-sided dice. The scoring of a turn is as follows:

(1) Three of a Kind - if all three dice show the same value, then the score is 30 plus the sum of the dice. So, if a player rolls 4, 4, 4, her score is 30 + 12 = 42, for the turn.

(2) Two of a Kind - if exactly two of the dice show the same value and a third die shows a different value, then the score is simply the sum of the two matching dice. For example, if a player rolls 6, 3 and 6, her score is 6 + 6 = 12, for the turn.

(3) Straight - if the three dice rolls form a consecutive sequence of integers, then the score is 15 plus the sum of the dice. So, if a player rolls 5, 3 and 4, her score is 15 + 5 + 3 + 4 = 27, for the turn.

At the beginning of the game, the two players will be asked how many turns they want to play and then the game will proceed. At the end, the winner and final scores will be printed.

Auxiliary Functions to Fill In

Although Python has min and max functions, it's good practice to write your own, and they come in handy for this program, so two helper functions you will write are as follows:

```
# Pre-condition: a, b, and c are ints
# Post-condition: The smallest of a, b and c is returned.
def mymin(a,b,c):

    '''  FILL IN THIS CODE '''

# Pre-condition: a, b, and c are ints
# Post-condition: The largest of a, b and c is returned.
def mymax(a,b,c):

    '''  FILL IN THIS CODE '''
```

Scoring Functions to Fill In

The "meat" of the logic left for you to fill in are the scoring functions for the three types of scores a player can make. If a player achieves the desired type of dice roll, then the appropriate score is returned. If the dice passed to the function don't qualify for that type of dice roll, then a score of 0 is returned. Here are the three scoring functions you must fill in:

```
# Pre-condition: a, b, and c represent dice rolls, all ints
#                in between 1 and 6.
# Post-condition: Returns the three of a kind score for
#     these dice. Specifically, if all 3 are equal, the sum
#     of the dice plus 30 is returned, otherwise 0 is
#     returned.
def threeOfAKind(a,b,c):

    ''' FILL IN THIS CODE '''

# Pre-condition: a, b, and c represent dice rolls, all ints
#                in between 1 and 6.
# Post-condition: Returns the two of a kind score for these
#     dice. Specifically, if 2 dice are equal and the third
#     is not, then the sum of the two equal dice are
#     returned. Otherwise, 0 is returned.
def twoOfAKind(a,b,c):

    ''' FILL IN THIS CODE '''
```

```
# Pre-condition: a, b, and c represent dice rolls, all ints
#                in between 1 and 6.
# Post-condition: Returns the straight score for these
#     dice. Specifically, if the three dice rolls form a
#     sequence of 3 consecutive integers, then 15 plus the
#     sum of the rolls is returned. Otherwise, 0 is
#     returned.
def straight(a,b,c):

    ''' FILL IN THIS CODE '''
```

Note: There are NO print statements in any of these functions!!! All prints are handled elsewhere. The functions ONLY carry out the desired calculations and return the appropriate integer.

Hints: The first function is straight-forward. For the second function, simply check three separate cases of exactly 2 numbers matching. Please ALSO make sure that the third number doesn't match. For the last function, here are some traits of a straight that differentiate it from not being a straight:

(a) The maximum value of the three cards minus the minimum value of the three cards must equal 2. If it does not, it's not a straight.

(b) The three cards are unique, which means that they do NOT satisfy 3 of a kind or two of a kind.

Note: Even though I call the functions three of a kind or two of a kind BEFORE calling the straight function, do NOT rely on this fact. **Make sure you ONLY return a positive score from this function if the three values passed to it are distinct.**

Directions

Download the file yahtzee_framework.py and start filling out the functions. If you want to unit test, copy the function into a new file and create your own unit tests. Adjust your function in the main file as necessary. **When you are confident that you have written the functions properly, change the file name to yahtzee.py and submit it!**

Sample Run

```
How many turns do both of you want for the game?
5
Player 1 it is your turn.
You have rolled 2, 4 and 5
Hit enter to continue.
Sorry, unfortunately, this turn isn't worth any points.

Player 2 it is your turn.
You have rolled 2, 5 and 3
Hit enter to continue.
Sorry, unfortunately, this turn isn't worth any points.
```

```
Player 1 it is your turn.
You have rolled 6, 6 and 6
Hit enter to continue.
Great you got a three of a kind worth 48 points.

Player 2 it is your turn.
You have rolled 6, 2 and 1
Hit enter to continue.
Sorry, unfortunately, this turn isn't worth any points.

Player 1 it is your turn.
You have rolled 3, 2 and 6
Hit enter to continue.
Sorry, unfortunately, this turn isn't worth any points.

Player 2 it is your turn.
You have rolled 5, 2 and 5
Hit enter to continue.
You got a two of a kind worth 10 points.

Player 1 it is your turn.
You have rolled 3, 5 and 1
Hit enter to continue.
Sorry, unfortunately, this turn isn't worth any points.

Player 2 it is your turn.
You have rolled 5, 5 and 5
Hit enter to continue.
Great you got a three of a kind worth 45 points.

Player 1 it is your turn.
You have rolled 6, 5 and 6
Hit enter to continue.
You got a two of a kind worth 12 points.

Player 2 it is your turn.
You have rolled 6, 4 and 6
Hit enter to continue.
You got a two of a kind worth 12 points.

Player 2 wins 67 to 60.
```