CS 101
Fall 2017
Algorithm Due : **Sept 24, 2017**
Program Due : **Oct 1, 2017**
All work submitted must be your own.
Deliverables : You only need to submit your solution. You must create and use functions functions.

Evens and Odds

Evens and Odds is a classic games used to determine who goes to lunch, or takes out the trash, or buys the next round. It is similar to Rock, Paper, Scissors. You play against a single opponent, one player declares Even or Odd, and then both players shoot. Shooting is the act of showing the other player how many fingers are in play. You can decide to show 1-5 fingers, and your total plus the other persons is used to determine even or odd. If I declare Odd, and I throw 3, and the other person throws 1, then the total is 4, and even number. Since I chose odd I lost.

Our program will allow user to play multiple rounds in a row. They will also have the option to consider a round a group of best 2 out of 3. Single play is when a single trial of even or odd determines the round. Best 2 out of 3 awards the round to whoever, wins 2 trials first.

Functional Decomposition

You are going to be required to create functions in this program. Functions will help you break down the program into smaller portions. You will be required to implement and use the following functions as given, with the arguments given. These are to help you get started and give you an idea of what to do. Remember, functions can also make it easier to test.

`choose_number()` - This function returns an integer from 1 to 5 inclusive (1, 5). It will continually ask the user for a number. We don't expect the user to give anything other than an integer, but this function should continually ask for input until they finally provide a valid integer. If they do not enter valid input it will continually ask them until they do.

Example

```
>>> value = choose_number()
Enter a number from 1 to 5 ( inclusive ) ==> 10
You must choose a value between 1 and 5 only
Enter a number from 1 to 5 ( inclusive ) ==> 0
You must choose a value between 1 and 5 only
Enter a number from 1 to 5 ( inclusive ) ==> 6
You must choose a value between 1 and 5 only
Enter a number from 1 to 5 ( inclusive ) ==> 5
>>> value
```

```
5
>>>
```

`Choose_even_or_odd()` - This function takes no arguments and returns a boolean (True or False). It returns True if the user choses even, and False if they do not.

`is_match(even : boolean, user1_number : int, user2_number : int)` - This function has 3 arguments and returns a boolean. Even indicates if the player choose the result to be even or odd. It's True if they choose even, False if they had chosen odd. The function returns True if the result matches their prediction. If the numbers add up to an even number and the even is True, then the function returns true.

`choose_number_of_rounds()` - This function takes no arguments and returns an integer. It will continually ask the user for an integer input from 3 - 15, inclusive. (3, 15). Very much like the function above. (Since these functions are so similar, you may want to think of a way to make one function that does the work of both. What would you pass to this function?)

You'll want to implement more functions and will be graded on those that you provide. You MUST provide at LEAST 2 more functions. In reality keep breaking problems down into smaller sections until you know how to write that portion. Make it a function, and then you can simply call it to do the work you have created and understood.

Sample Program

```
>>> ================================ RESTART ================================
>>>

Even Odd game of wits

1. Play singles
2. Play two out of 3 rounds
Q. Quit

==> e
Invalid choice, you must select 1, 2, Q

Even Odd game of wits

1. Play singles
2. Play two out of 3 rounds
Q. Quit

==> 9
Invalid choice, you must select 1, 2, Q

Even Odd game of wits

1. Play singles
2. Play two out of 3 rounds
```

```
Q. Quit

==> 1

How many rounds would you like to play? (3-15) ==> 2
You must choose a number from 3-15 inclusive.

How many rounds would you like to play? (3-15) ==> 16
You must choose a number from 3-15 inclusive.

How many rounds would you like to play? (3-15) ==> 4

        Round 1 of 4.  Score 0 to 0
Enter a number from 1 to 5 ( inclusive ) ==> 0
You must choose a value between 1 and 5 only
Enter a number from 1 to 5 ( inclusive ) ==> 6
You must choose a value between 1 and 5 only
Enter a number from 1 to 5 ( inclusive ) ==> 4
Enter E for even or O for odd ==> i
You must enter E or O only.  No other characters.
Enter E for even or O for odd ==> 5
You must enter E or O only.  No other characters.
Enter E for even or O for odd ==> o
The computer chose 4. 4+4 is even.  You lost

        Round 2 of 4.  Score 0 to 1
Enter a number from 1 to 5 ( inclusive ) ==> 3
Computer chose even
The computer chose 1. 1+3 is even.  You lost

        Round 3 of 4.  Score 0 to 2
Enter a number from 1 to 5 ( inclusive ) ==> 4
Enter E for even or O for odd ==> e
The computer chose 2. 2+4 is even.  You won

        Round 4 of 4.  Score 1 to 2
Enter a number from 1 to 5 ( inclusive ) ==> 2
Computer chose odd
The computer chose 5. 5+2 is odd.  You lost
Sorry you lost.  You only won 1 of 4 or 25.00% of the games

Even Odd game of wits

1. Play singles
2. Play two out of 3 rounds
Q. Quit

==> 2

How many rounds would you like to play? (3-15) ==> 3

        Round 1 of 3.  Score 0 to 0
Enter a number from 1 to 5 ( inclusive ) ==> 3
Computer chose even
The computer chose 1. 1+3 is even.  You lost
Enter a number from 1 to 5 ( inclusive ) ==> 2
Enter E for even or O for odd ==> e
```

```
The computer chose 4. 4+2 is even.  You won
Enter a number from 1 to 5 ( inclusive ) ==> 4
Computer chose even
The computer chose 4. 4+4 is even.  You lost
You won 1 to the computer 2

        Round 2 of 3.  Score 0 to 1
Enter a number from 1 to 5 ( inclusive ) ==> 3
Enter E for even or O for odd ==> e
The computer chose 2. 2+3 is odd.  You lost
Enter a number from 1 to 5 ( inclusive ) ==> 1
Computer chose even
The computer chose 5. 5+1 is even.  You lost
You won 0 to the computer 2

        Round 3 of 3.  Score 0 to 2
Enter a number from 1 to 5 ( inclusive ) ==> 3
Computer chose odd
The computer chose 4. 4+3 is odd.  You lost
Enter a number from 1 to 5 ( inclusive ) ==> 5
Enter E for even or O for odd ==> e
The computer chose 3. 3+5 is even.  You won
Enter a number from 1 to 5 ( inclusive ) ==> 2
Computer chose odd
The computer chose 5. 5+2 is odd.  You lost
You won 1 to the computer 2
Sorry you lost.  You only won 0 of 3 or 0.00% of the games

Even Odd game of wits

1. Play singles
2. Play two out of 3 rounds
Q. Quit

==> q

Thanks for playing
>>>
```

Specification

- Remember to document your code with comments and a header.
- Display the main game menu and validate the entry. If the user chooses anything other than the options 1, 2, q or Q then warn them and prompt for input again.
- You can assume the user will enter only valid numeric values for the number of rounds. We are still assuming the user will enter an int and not a string. However, we do expect a number between 3 and 15 inclusive. You will keep asking the user for input until they provide an integer between the required range.
- If playing a 2 out of 3, then the first player to win 2 matches first will win the round.
- When choosing a number to throw the valid options are 1-5 inclusive. If the input is outside of this range then warn the user and ask until you get proper input. You don't have to worry about the user entering a non-integer.

- The user can choose to throw even or odd, so valid choices for input are E, e, O, or o. Any other inputs will prompt the user until they give valid input.
- The player who chooses even or odd is randomly determined before playing a set of rounds. It will then alternate between the user and the computer. The computer might win to start choosing even or odd first, so they will choose. Next round the player chooses even or odd, etc.
- The player may win lose or draw.
    - If they win then the final output will look as follows. "Congrats you won. You won <blank> of <blank> or <percentage> of the games"
    - If they lose the text will be "You Lost. You only won <blank> of <blank> or <percentage> of the games"
    - If they tie, then the text will be "You tied. Winning <blank> of <blank> games"
- At the end of a set of rounds it should again display the menu.
- Make sure you submit a working program not lines from the shell copied into a document. It must run as a Python program file.

Point Breakdown - May be modified as needed

Points	**Requirement**
5	Header
20	Readability, variable naming, comments
3	Display and respond properly to the menu input.
2	If the user chooses to quit exit the main loop of the program and end.
4	When choosing the # of rounds, validate the entry. Can only enter 3-15 inclusive, otherwise warn the user and keep prompting until you get proper input.
6	When playing 2 out of 3, each round will be the first player to win 2 matches of Even Odds.
4	Each match the user must choose the number of fingers to use. 1-5. Validate the input appropriately.
4	When the user chooses even or odd, validate the input appropriately. Must be E, e, O, or o.
3	Randomly choose the player who will choose even or odd before the first round. Alternate who chooses it after that.
3	Properly keep track of winners

6	Show end results for winning, losing, and ties along with the required statistics

30 points off for programs that crash on expected input.

References

1. https://docs.python.org/3.6/library/random.html Random Module