CSC 110 – Programming Project

The Game of SET

Objective:
The objective of this project is to write a program in Python that will play the game of SET where the computer deals 12 cards and the user tries to make a set based on specified criteria..

The Game:
Rules
The object of the game is to identify a 'set' of three cards from 12 cards laid out on the table. Each card has a variation of the following four features:

(A) Color: Each card is *red*, *green*, or *purple*.

(B) Symbol: Each card contains *ovals*, *squiggles*, or *diamonds*.

(C) Number: Each card has *one*, *two*, or *three* symbols.

(D) Shading: Each card is *solid*, *open*, or *striped*.

A 'Set' consists of three cards in which each feature is EITHER the same on each card OR is different on each card. That is to say, any feature in the 'Set' of three cards is either common to all three cards or is different on each card.

For example, the following are 'Sets':

*All three cards are **red**; all are **ovals**; all have **two symbols**; and all have different **shadings**.*

*All have different **colors**; all have different **symbols**; all have different **numbers of symbols**; and all have the same **shading**.*

*All have different **colors**; all have different **symbols**; all have different **numbers of symbols**, and all have different **shadings**.*

The following are NOT 'Sets':

*All have different **colors**; all are **diamonds**; all have **one symbol**; however, two are **open and one is not.***

*All are **squiggles**; all have different **shadings**; all have **two symbols**; however, two are **red** and one is not.*

Coding the Game

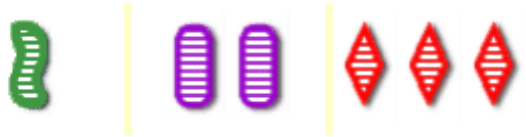
There are 81 cards in the deck – one of each combination of number, color, shading and shape. In each round, the computer will deal out 12 cards. In your program, you will represent the each with a four character sequence:

- Numbers: ('1', '2', '3')
- Colors: 'R', 'G','P' (red, green purple)
- Shading: 'S', 'O', 'P' (solid, outlined, striped)
- Shapes: 'O', 'S', 'D' (oval, squiggle, diamond)

So we could have the following cards:

1ROD – 1 red outlined diamond
2GPO – 2 green striped ovals
3PPS – 3 purple striped squiggles

The following SET:



will be represented in your program as:

1: 1GPS (1 green striped squiggle)
2: 2PPO (2 purple striped ovals)
3: 3RPD (3 red striped diamonds)

How to Play:

Your program will create a simple version of the game where the user is asked to try to identify a SET and the computer answers YES or NO whether it is a SET. The user will be given a chance to find more SETs or redeal the cards or quit.

Program Requirements:
Your program should meet the following requirements:

1) Your program should *work correctly*. Your program should do at least the following correctly:
    a. Generate all 81 cards
    b. Randomly choose 12 cards to deal.
    c. Ask the user to find a SET.
    d. Test to determine if the cards chosen by the user is a SET.
    e. Give the user an option to pick another SET or deal more cards.
    f. Only accept valid cards from a user.
    g. Do not allow user to choose the same card more than once.

2) Your program should use good *modular design*. It should use functions for each of the main tasks of the program.

3) Your program should be *well-documented*. This should include your name and an overall description of the program at the top of the file. It should also include a description of any algorithms that are used in the code.

4) Your program should use *well-named* functions and variables. The code should be simple to read and understand what is going on given the names of the functions, and variables along with the comments in the code.

Examples:

Here are some sample runs of what your program might look like:

```
Choose a SET from the following cards.
A SET consists of three cards where each feature is EITHER the same
on each card, or different on each card.

1RPO 2PPS 2ROS 3GOD
1ROD 3GOO 3PPS 3RSO
1GOO 3RPD 3RSS 2POO
Choose three cards that make a SET

1: 3GOD
2: 3PPS
3: 3RSO

YES that is a SET

What would you like to do next?
F - Find another SET
D - Deal another set of cards
Q - Quit
==>F
Choose three cards that make a SET

1: A
Not a valid choice, please choose again
1: 2GOO
Not a valid choice, please choose again
1: 3GOO
2: 3PPS
3: 3PPS
You have already chosen that card, please try again
3: 2PPO
Not a valid choice, please choose again
3: 2POO

Sorry, that is not a SET

What would you like to do next?
F - Find another SET
D - Deal another set of cards
Q - Quit
==>D
```

```
What would you like to do next?
F - Find another SET
D - Deal another set of cards
Q - Quit
==>D
3GOO 1GSO 3GPD 1ROD
2GSD 2GOO 2RPO 2PPS
2ROD 3PPO 2GPS 3RSD

Choose three cards that make a SET

1: 2GSD
2: 2GOO
3: 2GOO
You have already chosen that card, please try again
3: 2GPS

YES that is a SET

What would you like to do next?
F - Find another SET
D - Deal another set of cards
Q - Quit
==>Q

Game Over - Thanks for Playing...
>>>
```

Extra Credit:
If you complete all of the required elements of the program, you can attempt this extra credit.

Modify the program so that it creates a 2-Player game where:

1. Players alternate taking turns identifying a SET
2. A point is given for each unique SET identified
3. If a player chooses cards that do not make a SET, or chooses a SET that has already been identified, she loses her turn
4. Continue until all SETs are identified
5. The winner is the player with the most points

More Resources:
You can find more information about the game of SET and how to play here:

http://puzzles.setgame.com/set/rules_set.htm

https://www.setgame.com/set/puzzle_rules