

Programming Assignment 3

*University of Wisconsin – La Crosse**Due Date: March 12*

Description: For this assignment, you will write a Python version of the Mastermind game. Mastermind is a two-player logic game and what passed for fun before the internet existed.

Details: A game of Mastermind begins with one player choosing a hidden pattern of 4 pegs, each of which is one of 6 colors. Colors may be repeated in the pattern. The other player then tries to deduce the pattern through a series of “guesses.” Each guess consists of a pattern of 4 pegs. If a guess is correct, the guessing player wins and the game is over. Otherwise, the player is told how many colors and positions he/she has right. This is done with white and black pegs. A white peg indicates that a color is correct while a black pegs indicates that a color and position are correct. However, the position is not identified. The guesser’s goal is, of course, to deduce the pattern in as few guesses as possible.

In our version of the game, the computer will always be the player that chooses the pattern and a human player will be the guesser. Thus, the pattern will be determined at random. The six colors are: black, white, red, green, purple, and orange. Note that each begins with a unique first letter so that they can be concisely represented on the board as a single upper-case letter. The pegs indicating the quality of the guess, will be represented using a single lower-case ‘b’ or ‘w’.

You will write a number of Python functions to solve this problem. They include: `create_new_game`, `get_guess`, `evaluate_guess`, and `print_board`. Each is specified below. You may have additional functions as well but those listed must be part of your implementation. Note that `print_board` prints the current guess and result as well as all previous guesses and results in the game.

You will choose your representation of the data. Think carefully about this before you begin coding.

Your implementation must include a boolean flag called `GRADING`. When this is set to `true`, the target pattern must be set to `W G W O` rather than determined at random.

Function Specifications:

- `create_new_game`
 - Parameters: optional parameter `target`, the target pattern for the game
 - Returns: a valid game pattern in your chosen representation
- `get_guess`
 - Parameters: none
 - Returns: a valid game pattern, indicating the user's guess, in your chosen representation
- `evaluate_guess`
 - Parameters: a valid game pattern – guess, a valid game pattern – target
 - Returns: sequence of pegs indicating correctness of the guess, in your chosen representation
- `print_board`
 - Parameters: a valid game board
 - Returns: none

Adhere to common coding conventions and **comment your code**.. Include a comment at the top that looks like this:

```
#
# CS 224 Spring 2020
# Programming Assignment 3
#
# Your wonderful, pithy, erudite description of the assignment.
#
# Author: Your name here
# Date: March 12, 2020
#
```

Submission: Be sure to thoroughly comment your code. If in doubt, add more comments. The name of your program must be `mastermind.py`. Submit your solution as a compressed directory by 11:59 PM on the due date.