1321 Programming Practice

Disclaimer: the questions here do not focus so much on problem solving as they do about programming.

Variables, I/O, operators

- Declare a variables of type integers, float, string, etc…
- Write a program that asks the user for his/her name, then prints "I don't care"
- Write code to swap the values in two variables
- Write code to find the average of three variables
- Write code that asks the user for a value and prints the square of that value
- Write a program that asks for the base and height of a triangle and prints the area

Conditionals

- Write code to find the largest of three variables
- Write code to determine if a number is positive or negative (or neither)
- Write a program that asks the user for her/his name and greets them pleasantly if his/her name is "Kanye" or "Alicia". Otherwise, greet them rudely.
- Write code that asks the user her/his age to determine if they are legally allowed to buy alcohol. If the user is less than 21, print "You're not of legal age!". Otherwise, print "Please drink responsibly"
- Ask the user for a letter. Then, write code that uses a case statement to determine if the letter the user typed in is in the name "Voldemort".

Loops

- Write a loop that prints the numbers between 1 and 1 billion
- Write a loop that prints the odd numbers between 51 down to 13 (inclusive)
- Write a loop that sums up all the values between (and including) two numbers
- Write a program that asks the user "Gimme a cookie" and keeps asking them to do that until the user types the word "cookie"
- Write a guessing game that picks a random number between 1-100, asks the user for a number, and prints out if the number is too high or too low. This should repeat until the user has guessed the correct number.
- (Medium) Write a loop to determine if a number is a power of 2 or not
- (Harder) Write a loop that determines if a number is a prime number

Nested Loops

- Write a program that prints multiplication tables up to 8x8

1D Arrays

- Declare an array of 1000 characters
- Write the code to initialize an array such that each element gets two times the value of its index (e.g. 0, 2, 4, 6, …)

- Write code to search an array for a given number
- Write code that sums up the values in the array
- Write code that averages up the values in the array
- Write code that determines if the content of two equal-sized arrays are identical
- Write code that replaces all occurrences of the value 17 with the value -43
- (Medium) Reverse the content of an array
- (Medium) Find the *second* largest number in an array
- (Medium) Write a program asks the user for a string and converts/prints it as Morse code. You will need to look up Morse code using the Googles.
- (Harder) Determine if an array of characters contains the word "dog"
- (Harder) Determine if an array of numbers has any duplicates. Hint, this will require an additional array, and multiple passes
- (Harder) Determine if any numbers are missing between 1-100 for an array of 2000 random numbers

2D Arrays

- Declare an 8x8 array of strings. This could represent a chess board.
    - Given an 8x8 2D array of strings called *board*, initialize it with empty strings.
    - Based on the array above, initialize *board* with the starting configuration of the game of chess. Note, this question is not very efficient.
    - Write the code to move one of the pawns either up or down.

- Declare an array of 25x25 Booleans. This might represent the game of Battleship.
    - Initialize all Booleans as FALSE
    - Set 10 of the values that are immediate adjacent to (next to) one another to TRUE. This might represent an aircraft carrier.
    - Ask the user for two numbers between 1-25. Then determine if those two numbers represent a "hit" of the aircraft carrier, or a "miss".

Methods/functions

- Write a method that prints "Methods are my friend!"
- Write a method that takes in a number as a parameter and, based on that number, prints out "Methods are my friend" that number of times.
- Write a method that takes in a letter and returns whether or not that letter is a vowel.
- Write a method that takes in a number that represents a high school GPA and determines if that value is greater than 3.0
- Write a method that takes in the age of a person and <u>prints out</u> (not returns) whether they are over 65 years of age.
- Write a method that takes in the age of a person and returns the number of "Dog years" they are. For this, the persons age will be divided by 7.

Classes

- Write the smallest possible class you can. Then, create two variables of that type.

- A friend wants you to start writing a video game. Write a class called "Player" that includes the location of the player, her/his current score, and the ancestry of the player (e.g. "Elf", "Goblin", "Giant", "Human"). A player will always start at location (0, 0) and have a score of 0. Always.

  Write accessors/modifiers (or "setters/getters") for each of those characteristics.

  Write an "appropriate" constructor for the class (based on what's described above).

  Write methods *moveNorth*(), *moveSouth*(), *moveEast*() and *moveWest*() that increment/decrement the x and y position of the player, respectively.

  Write a method called *addToScore*() that takes in an integer and adds it to the players score.

- A battery company wants you to build in inventory system for their stocks of batteries. However, they want you to start by designing a class to hold battery information. Batteries have a current voltage and a maximum voltage. Batteries can only do two things: drain – which decreases the battery voltage by 0.1 volts, or charge – which takes the voltage to the battery's maximum voltage. Design this class, with an appropriate constructor, accessors and modifiers.

- Create two objects/variables of type Player and initialize them correctly according to the constructor. Then, make the first player move South.