**HW05 - Challenge**

* [Description](https://labs.vocareum.com/web/1587618/534154.0/ASNLIB/public/docs/README.html#1)
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**Description**

For this Homework, you will be writing a program called PatternMatcher that allows a user to play a pattern game. The user will select the level of difficulty and enter a starting digit for the sequence. The program will respond by printing the first four numbers in the pattern and requesting the next three. There are three possible levels of difficulty.

Note: 5 points of your Challenge grade is based on Coding Style.  You will need to follow the standards described on Brightspace. Use the "Run" button to check your Coding Style without using a submission.

**Instructions**

Given user input, generate a pattern matching game of the appropriate difficulty. The user will then attempt to enter the next three numbers in the sequence generated by the program. The game repeats until the user decides to exit.

If the user enters all three numbers correctly, print the congratulations prompt. Otherwise, print the sorry prompt. Then ask the user if they want to play again. If the user inputs y or Y, go back to the beginning of the game. If the user inputs anything other than y or Y, the program should end.

Note: You may assume that all pattern values will be integers

**Level 1**

Pattern: Add 2 each time.

**Example**

Initial Number: 1

1, 3, 5, 7, 9, 11, 13

Sample Output

Choose Level Difficulty:  
1. Easy  
2. Medium  
3. Hard  
[1]  
Enter a number to start the pattern:  
[1]  
Enter the next 3 numbers in the pattern:  
1 3 5 7   
[9]  
[11]  
[13]  
Congrats! Your answer was correct!  
Play Game Again? (y/n)  
[n]  
Ending Pattern Matcher...

**Level 2**

Pattern: Multiply by 4 each time.

**Example**

Initial Number: 5

5, 20, 80, 320, 1280, 5120, 20480

Sample Output

Choose Level Difficulty:  
1. Easy  
2. Medium  
3. Hard  
[2]  
Enter a number to start the pattern:  
[5]  
Enter the next 3 numbers in the pattern:  
5 20 80 320   
[1280]  
[5120]  
[20480]  
Congrats! Your answer was correct!  
Play Game Again? (y/n)  
[n]  
Ending Pattern Matcher...

**Level 3**

Pattern: Square each number and then add 1. The next input number for the calculation is the previous calculation input + 1.

**Example**

Initial Number: 3

10, 17, 26, 37, 50, 65, 82

Explanation:

32 + 1 = 10

42 + 1 = 17

52 + 1 = 26

62 + 1 = 37

72 + 1 = 50

… (and so on)

Sample Output

Choose Level Difficulty:  
1. Easy  
2. Medium  
3. Hard  
[3]  
Enter a number to start the pattern:  
[3]  
Enter the next 3 numbers in the pattern:  
10 17 26 37  
[50]  
[65]  
[82]  
Congrats! Your answer was correct!  
Play Game Again? (y/n)  
[n]  
Ending Pattern Matcher...

**Notes**

* Brackets [] are used to indicate input.
* You are not permitted to use System.exit in this program (or any other CS 18000 assignment).
* The menu must repeat until the user indicates they want to exit.
* If the user enters an invalid option while selecting the level, print the menu again.
* After the user enters anything other than y or Y when prompted to continue, print an exit message and end the program.
  + "Ending Pattern Matcher..."

**Valid Assumptions**

* You can assume that no user will enter a value that is not an integer.
* You can assume that no user will enter a value that is mathematically impossible to use within the calculations.
* You can assume that no operation will result in a non-integer value during any stage of calculation.
* You can assume that no input will result in values that overflow the integer data type.
* You can assume that users will always enter the correct number of integers.

**Testing**

Sample Output Test

Choose Level Difficulty:  
1. Easy  
2. Medium  
3. Hard  
[4]  
Choose Level Difficulty:  
1. Easy  
2. Medium  
3. Hard  
[5]  
Choose Level Difficulty:  
1. Easy  
2. Medium  
3. Hard  
[1]  
Enter a number to start the pattern:  
[80]  
Enter the next 3 numbers in the pattern:  
80 82 84 86   
[88]  
[90]  
[92]  
Congrats! Your answer was correct!  
Play Game Again? (y/n)  
[y]  
Choose Level Difficulty:  
1. Easy  
2. Medium  
3. Hard  
[3]  
Enter a number to start the pattern:  
[5]  
Enter the next 3 numbers in the pattern:  
26 37 50 65  
[82]  
[101]  
[0]  
Sorry! Your answer was incorrect!  
Play Game Again? (y/n)  
[n]  
Ending Pattern Matcher...

Note: Brackets [] indicate input.

Note:  Match this output exactly.  Spelling mistakes will result in lost points.

**Public Test Cases Note**

For many homeworks and projects, we will give you test cases that correspond to several of the ways we will be testing your program. But, we will not give you test cases for ALL of the ways we will be testing your program. You should think of other test cases to use that will fully test every aspect of every feature of your program. Just because your program passes all the test cases we give you does not mean that it is fully correct and will receive a score of 100.

We encourage you to review and modify the public test cases to verify your program works as expected for other input values!

**Submit**

After testing your solution and verifying that it meets the requirements described in this document, you can submit on Vocareum.  You have 10 submission attempts to achieve full points.