

CS 101 - Algorithms & Programming I

Fall 2021 - Lab 4

Due: Week of October 25, 2021

Remember the **honor code** for your programming assignments.

For all labs, your solutions must conform to the CS101 style **guidelines!**

All data and results should be stored in variables (or constants where appropriate) with meaningful names.

The objective of this lab is to learn how to use a while loop to implement automated repetition. Remember that analyzing your problems and designing them on a piece of paper before starting implementation/coding is always a best practice.

In this particular lab, only **use the while loop**, do *not* use the for or do-while loops.

0. Setup Workspace

Start VSC and open the previously created workspace named `labs_ws`. Now, under the `labs` folder, create a new folder named `lab4`.

In this lab, you are to have four Java classes/files (under `labs/lab4` folder) as described below. A fifth and sixth Java file containing the revisions should go under this folder as well. We expect you to submit a total of 6 files including the revisions. Do *not* upload other/previous lab solutions in your submission. The user inputs in the sample runs are shown in [blue](#).

For all parts of this assignment, you may assume that the user enters valid types and number of values (e.g. a positive integer when asked for a positive integer).

1. Fibonacci

Write a program that takes a value n from the user and finds the n th Fibonacci number.

Tip: In mathematics, the Fibonacci numbers, commonly denoted F_n , form a sequence called the Fibonacci sequence, such that each number is the sum of the two preceding ones, starting from $F_0 = 0$ and $F_1 = 1$.

Sample runs:

```
Please input n: 5
Fib(5) is 5
```

```
Please input n: 12
Fib(12) is 144
```

2. Palindrome Check

Write a program that checks if the input string is a palindrome. Your program should take the string from the user and report if it is a palindrome or not.

Tip: A palindrome is a word, number, phrase, or other sequence of characters which reads the same backward as forward, such as “*madam*” or “*racecar*”. Utility method [charAt](#) of the [String class](#) is of particular use for this problem.

Fun Fact: *aibohphobia* is the unofficial name of the fear of palindromes.

Sample runs:

```
Please input the string: aibohphobia
It is a palindrome.
```

```
Please input the string: not a palindrome
It is not a palindrome.
```

3. Average, Minimum and Maximum Finder

Write a program that takes a number (positive integer) n and reads n **positive** integer values from the user, and finds the minimum and maximum values as well as the average of these integers.

Tip: Maximum and minimum values an integer can take are respectively `Integer.MAX_VALUE` and `Integer.MIN_VALUE`.

Sample run:

```
Please input n: 5
Now input 5 positive integers:
5
4
1
3
2
Min: 1
Max: 5
Average: 3.0
```

4. Text Art

Write a program that takes an integer number n and prints the asterisk symbol (*) for n lines where in each line, there are line number of Asterisks aligned left.

Sample run:

```
Enter number of lines: 5
*
**
***
****
*****
```