Fall 2024 CS 110: Computer Science Fundamentals
HW4 due on 11/06/2024 11:59 PM

1) Download the Python file Homework4-Exercises.py and work directly in this file only.
2) Please write your name, ID, and initial to the Honor Code statement.
3) Submit the python file as yourname_cs110_hw4.py and submit it to Canvas. Submit only this .py file.
4) Any late submission will be penalized 25% of the earned points per 24 hours.
5) Submissions must follow the instructions. Any incorrect format of submission (e.g., file, errors, etc.) is subject to be penalized.
6) Specific to homework 4:
    a. Test each condition once.
    b. Add comments pasting your input/output for testing each condition beneath your code.
    c. Example is provided in Homework4-Exercises.py.

Exercises

[20 PTS] QUESTION 1

Write a Python program that prints the numbers from 1 to 5 using a `while` loop.

- **Your program should initialize a variable `n` to 1 and print numbers from 1 to 5.**
- **After the loop completes, print a message indicating that the loop has ended.**

[20 PTS] QUESTION 2

Write a Python program that prompts the user to input a positive integer and prints the numbers from that value down to 1 using a `while` loop.

- **The program should ask the user for a positive integer and print numbers in descending order from that value to 1.**

[20 PTS] QUESTION 3

Write a Python program that asks the user for a number and prints whether each number from 1 to that value is odd or even using a `for` loop.

- **Use the `range()` function to iterate through numbers from 1 to the user's input.**
- **For each number, print whether it is odd or even.**

[20 PTS] QUESTION 4

The given string generator function, string_generator(N), will return a string with N many characters, both upper and lower cases combined. Write a program that generates a string by the length of the input value of N and counts the number of vowels in the string.

Repeat the vowel counting M times. Calculate the probability of vowel occurrences in the total M strings (=total count of vowels / total number of characters generated). For example, if N = 50 and M = 11, the program should generate a string with 50 characters 11 times and there are a total of 550 generated characters. Show that the chance of vowel occurrences will converge to 0.1923 when N and M increase by testing with N = 50 and M changes from 1 to 1000 (inclusive) in intervals of 50.

Print the total number of generated strings, the total number of characters, and the probability.

[20 PTS] QUESTION 5

Write a Python program that prints the first `n` numbers of the Fibonacci sequence. The Fibonacci sequence is a series of numbers where each number is the sum of the two preceding ones, starting from 0 and 1.

The program should:

1. **Ask the user to input a positive integer `n` (greater than or equal to 2).**
2. **Print the first `n` numbers of the Fibonacci sequence.**

For example, if the user inputs `5`, the program should print:

```
0, 1, 1, 2, 3
```

Hint: Use a `for` loop and maintain two variables to track the previous two numbers in the sequence.