In-Class - October 22 - SOLUTIONS

Please complete the following two programs in class and submit them online via NYU Classes before you leave. Make sure you submit them as separate .py files and include your name, the assignment, and the problem number in a comment at the top of the program.

1. Write a program that asks the user for two numbers, $r$ and $n$, and outputs the number

$$1 + r + r^2 + r^3 + \cdots + r^n$$

For example, if the user inputs $r = 2$ and $n = 5$ then the program would output 63 since

$$1 + 2 + 2^2 + 2^3 + 2^4 + 2^5 = 1 + 2 + 4 + 8 + 16 + 32 = 63.$$ 

You don’t have to turn this part in, but what happens if you put in $r = 1/2$ and $n = 100$? What about if $r = 1/2$ and $n = 200$? What if $r = 1/2$ and $n = 1000$?

```python
# In-Class Assignment, October 22, #1

print("This program calculates the sum")
print("1 + r + r^2 + \ldots + r^n")
print("where r is a rational number and n an integer.")

r = float(input("Please enter the number r : "))
n = int(input("Please enter the number n: "))
total = 0 # A running total
for i in range(n + 1):
    total = total + r**i
print("The sum is ", total, ".", sep="")
```

2. Write a function `are_earlier_in_alphabet(w, list_of_words)` that takes a word (w) and a list of words (list_of_words) as arguments, and returns the sub-list of words from list_of_words that come earlier in the alphabet than w. Use this function to write a program that asks the user for a word and tells them in response which of the words in the following list are alphabetically smaller:

```
cashew, apple, winebago, app, taco, spider, chalk, window, tornado, masquerade
```

For example, if the user entered 'boy' then the program would return only the words 'apple' and 'app.' If the user entered 'taco,' the program would return the words 'cashew', 'apple', 'app', 'spider', 'chalk', and 'masquerade'.
# In-Class Assignment, October 22, #2

def are_earlier_in_alphabet(w, list_of_words):
    new_list = []
    for x in list_of_words:
        if x < w:
            new_list = new_list + [x]
    return new_list

c = ["cashew", "apple", "winebago", "app", "taco", "spider",
    "chalk", "window", "tornado", "masquerade"]

word = input("Please enter a word: ")
smaller_words = are_earlier_in_alphabet(word, c)
print("The words in our list that come before", word, "are",
    smaller_words)