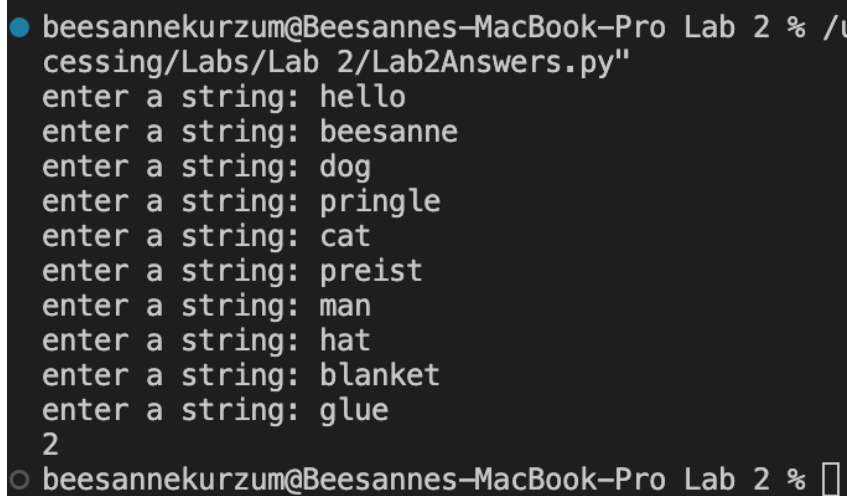# Lab 2 - Answers

Thursday, September 1, 2022   2:24 PM

```python
# 10. Write a program that reads in 10 strings from the keyboard.
# Count the number of strings that start with 'pr'. Display this
count. Use a loop.
i=0
pr = 0
while i <10:
    x = input("enter a string: ")
    i+=1
    if 'pr' in x:
        pr += 1
print(pr)
```

```
beesannekurzum@Beesannes-MacBook-Pro Lab 2 % /u
cessing/Labs/Lab 2/Lab2Answers.py"
enter a string: hello
enter a string: beesanne
enter a string: dog
enter a string: pringle
enter a string: cat
enter a string: preist
enter a string: man
enter a string: hat
enter a string: blanket
enter a string: glue
2
beesannekurzum@Beesannes-MacBook-Pro Lab 2 %
```

```python
# 11. Write a program that reads in a positive integer into n.
# Your program should then display True if n is a perfect number,
and False
# otherwise A perfect number is a number whose positive divisors
excluding itself sum up to the given number.
# For example, the positive divisors of 6 excluding 6 are 1, 2,
and 3. Because 1 + 2 + 3 = 6, 6 is a perfect number.

num = int(input('enter a number: '))
i = 1
sum = 0
if num > 0:
```

For example, the positive divisors of 6 excluding 6 are 1, 2,
and 3. Because 1 + 2 + 3 = 6, 6 is a perfect number.

```python
num = int(input(" enter a number: "))
i = 1
sum = 0
if num > 0:
    while (i < num):
        if num % i == 0:
            sum = sum + i
        i += 1
    if sum == num:
        print("true")
    else:
        print("false")
```

cessing/Labs/Lab 2/Lab2Answers.py"
enter a number: 6
true
beesannekurzum@Beesannes-MacBook-Pro Lab 2 % /
cessing/Labs/Lab 2/Lab2Answers.py"
enter a number: 13
false
beesannekurzum@Beesannes-MacBook-Pro Lab 2 %

```python
# 12. Write a program that reads in a text file that consists of
some standard English text.
# Your program should count the number of occurrences of each
letter of the alphabet,
# and display each letter with its count, in the order of
increasing count.
# What are the six most frequently used letters?

infile = open('lab2.txt', 'r')
source = infile.read()
d={}
for char in set(source):
    if char.isalpha():
        d[char]=source.count(char)
sorted_d = sorted(d.items(), key = lambda kv: kv[1])
print('\nLetter count' + str(sorted_d))
x = 6
most_freq = sorted_d[-x:]
print('\nthe most frequent letters are: ' + str(most_freq))
```

```
most_freq = sorted_d[-x:]
print('\nthe most frequent letters are: ' + str(most_freq))
```

```
# # 13. Write a program that reads in a string and determines if
it is a palindrome (
# #       i.e., a string that reads the same backwards as forwards).
def isPal(word):
    return word == word[::-1]
word = str(input("enter a word: "))
if isPal(word):
    print('yes!')
else:
    print('no')
```

```
# 14. Write a program that computes the following sum: 2 + 1/2! +
```

```
# Is the sum equal to an important constant in mathematics? "!"
denotes the factorial function.
# n! is the product of the integers from 1 to n. For example, 5! =
```
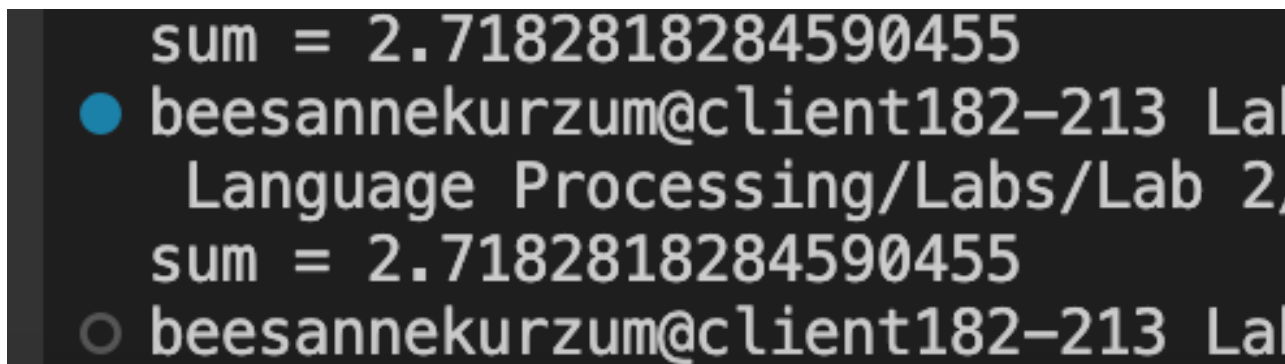
```
1/3! + ⋯ + 1/100!
# Is the sum equal to an important constant in mathematics? "!"
denotes the factorial function.
# n! is the product of the integers from 1 to n. For example, 5! =
1×2×3×4×5 = 120.

import math
n=2
sum = 2
while n<=100:
    sum = sum + (1/math.factorial(int(n)))
    n+=1
print("sum = " + str(sum))
```

The answer is e


```
# TODO: 15. Write a program that reads in 10 numbers, placing each
one on a linked list.
# Your program should then display each number by traversing the
linked list using a loop and using recursion.
class Node:
    def __init__(self, data):
        self.data = data
        self.next = None

def newNode(new_data):
    new_node = Node(new_data)
    new_node.data = new_data
    new_node.next = None
    return new_node

def insertEnd(head, new_data):
    if (head == None):
        return newNode(new_data)
    else:
        head.next = insertEnd(head.next, new_data)
    return head
```

```python
def insertEnd(head, new_data):
    if (head == None):
        return newNode(new_data)
    else:
        head.next = insertEnd(head.next, new_data)
    return head

def traverserec(head):
    if (head == None):
        return
    print(head.data, '->', end = " ")
    traverserec(head.next)

def traverseloop(head):
    while(head != None):
        print(head.data, '->', end = " ")
        head = head.next
    return

if __name__=='__main__':
    head = None
    i=1
    while(i<=10):
        head = insertEnd(head, int(input("Enter a number: ")))
        i+=1
    traverserec(head)
    print()
    traverseloop(head)
```

```
sum = 2.718281828459045S
Enter a number: 1
Enter a number: 2
Enter a number: 3
Enter a number: 4
Enter a number: 5
Enter a number: 6
Enter a number: 7
Enter a number: 8
Enter a number: 9
Enter a number: 10
1 -> 2 -> 3 -> 4 -> 5 -> 6 -> 7 -> 8 -> 9 -> 10 ->
1 -> 2 -> 3 -> 4 -> 5 -> 6 -> 7 -> 8 -> 9 -> 10 ->
beesannekurzum@client182-213 Lab 2 %
```
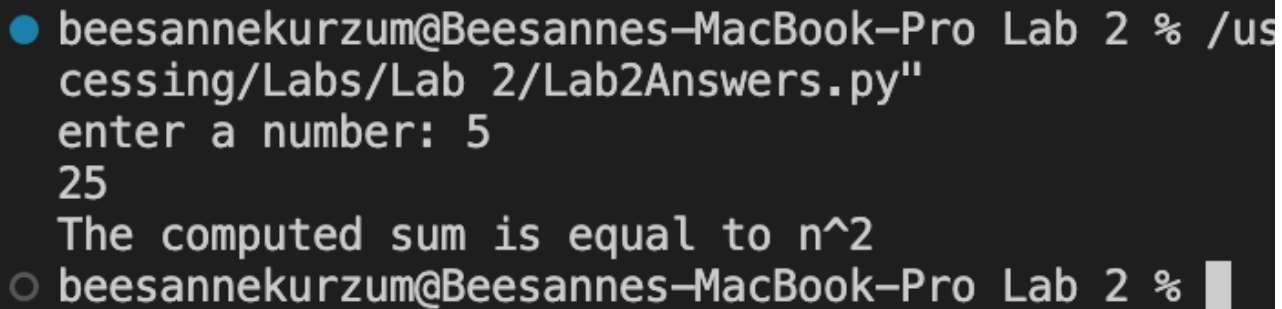
```python
# 16. Write a program that reads in a positive integer into n.
# Your program should then sum up the first n positive odd numbers,
# and display the sum. What is the relation between the value of n
```

```python
# 16. Write a program that reads in a positive integer into n.
Your program should then sum up the first n positive odd numbers,
# and display the sum. What is the relation between the value of n
and the computed sum?
def oddSum(n) :
    sum = 0
    curr = 1
    i = 0
    while i < n:
        sum = sum + curr
        curr = curr + 2
        i = i + 1
    return sum
n = int(input('enter a number: '))
print (oddSum(n) )
print('The computed sum is equal to n^2')
```



```
beesannekurzum@Beesannes-MacBook-Pro Lab 2 % /us
cessing/Labs/Lab 2/Lab2Answers.py"
enter a number: 5
25
The computed sum is equal to n^2
beesannekurzum@Beesannes-MacBook-Pro Lab 2 %
```

```python
# 17. Read in a positive number into x. Then execute the following
statement
# 100 times: x = math.sqrt(x)
# Does the value of x converge on a particular number, regardless
of its initial value?
# Try values both less than and greater than 1. To use sqrt(),
import the math module.
import math
x = float(input("enter a positive number: "))
if x<0:
    print('number must be positive')
else:
    i = 1
    while i <= 100:
        x = math.sqrt(x)
        i += 1
    print(x)
```

```
    i — i
    while i <= 100:
        x = math.sqrt(x)
        i — i
    print(x)
```

x converges on 1 no matter what the initial value is.

```
● beesannekurzum@Beesannes-MacBook-Pro Lab 2 % /usr/loca
  cessing/Labs/Lab 2/Lab2Answers.py"
  enter a positive number: 80
  1.0
● beesannekurzum@Beesannes-MacBook-Pro Lab 2 % /usr/loca
  cessing/Labs/Lab 2/Lab2Answers.py"
  enter a positive number: 3
  1.0
● beesannekurzum@Beesannes-MacBook-Pro Lab 2 % /usr/loca
  cessing/Labs/Lab 2/Lab2Answers.py"
  enter a positive number: .02
  0.9999999999999999
● beesannekurzum@Beesannes-MacBook-Pro Lab 2 % /usr/loca
  cessing/Labs/Lab 2/Lab2Answers.py"
  enter a positive number: .0007
  0.9999999999999999
○ beesannekurzum@Beesannes-MacBook-Pro Lab 2 % ▊
```

```python
# 18. Write a program that reads in a positive integer into n.
Your program should then display n rows.
# Each row should have consecutive integers starting from 1, and
have one more integer than the preceding row.
# The first row should should contain only 1. For example, if 3 is
entered, then your program should display
# 1
# 1 2
# 1 2 3
num = int(input("enter a number: "))
for i in range(1, num + 1):
    for j in range(1, i + 1):
        print(j, end=' ')
    print('')
```

```
● beesannekurzum@Beesannes-MacBook-Pro Lab 2 % /usr/loca
```

```
        print(j, chu=   )
    print('')
```

```
beesannekurzum@Beesannes MacBook Pro Lab 2 % /usr/loca
cessing/Labs/Lab 2/Lab2Answers.py"
enter a number: 5
1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
beesannekurzum@Beesannes-MacBook-Pro Lab 2 %
```