CS 114 Tutorial 3

Sept 26 2025

Goals for this Week:

- ❏ Submit Assignment 01 (due tonight at 5:30 pm)

- ❏ Look at assignment 02 (releases tonight at 5:30pm)

- ❏ Understand how to write while and for loops

- ❏ Be on the lookout for infinite loops

- ❏ Know how to use functions as parameters (callables)

- ❏ Remember to use import typing

Warm Up Questions

Create a function sum_odd that takes an integer n and returns the sum of odd numbers from 1,...,n. For n < = 0, return 0.

assert sum_odd(5) == (5+3+1)

Write this question using a while loop then with a for loop.

Solutions found in Jupyter Notebook

Write a function do_math(x: float, y: float, operator:typing.Callable). The function will return the integer value after operator is performed on x and y.

Assert do_math(3.1, 5.0, max) == 5, "operator is max"

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While Loops

```python
def loops(x: int) -> int:
    while x > 3:
        x = x // 2
    return (x)


print(loops(15))
```

What would this print?

A. 5   B. 3   C. 2   D. 1

While Loops

```
x = 5
while x <= 5:
    if x < 5:
        x += 1
print(x)
```

How many times will this print a number?

A. 1   B. infinite   C. 0   D. 5

While Loops

```python
var1 = -2
var2 = 0
while var1 != 0:
    var1 = var1 + 1
    var2 = var2 - 1
print("var1:", var1, "var2:", var2)
```

What will var1 and var2 be in the print statement?

A.   -2 and 0   B.   0 and -1   C.   0 and -2   D.   nothing! ∞ loop

For Loops

```
sum = 0
for counter in range (1,7,2):
    sum = sum + counter
print (sum)
```

What will sum be after running?

A.   21   B.   16   C.   8   D.   9

For Loops

```
for number in range (11):
    print ("Number:", number)
```

What will be the last thing printed?
A.   Number: 10   B.   Number: number   C.   Number: 0   D.   Number: 11

Annotations

```
import typing

def function(x, n1):
    return (n1*x)
```

```
import typing

def function(x, n2):
    return (n2(x))
```

How would you annotate n in each function?

A.   n1: float   B. n1: typing.Callable   C. n1: float

     n2: float   n2: float   n2: typing.Callable

Write a function called exponent(x) that takes an integer value x and approximates the value of e^x using the taylor series expansion below. The taylor series will stop when it reaches a term smaller than 0.001.

Note: You can use math.factorial() in your code and math.e to test your code. You will also need to use a loop, is while or for a better fit?

Solutions found in Jupyter Notebook

$$e^x \approx 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \ldots + \frac{x^k}{k!}$$

Example:

$e^1 \sim 1 + 1 + 1/2! + 1/3! + 1/4! + 1/5! + 1/6!$
2.71828 ~ 2.7180