

Welcome !



2024 Fall CS101 Introduction to Programming



Week 4



Math with Python
(Functions with parameters and return values)

**Functions with
parameters!!**

Define functions

- Take **parameters** in your new functions.

```
def print_double(v):  
    print(v * 2)
```

```
>> print_double(2)  
4
```

```
def print_sum(a, b):  
    print(a + b)
```

```
>> print_sum(3, 4)  
7
```

Week 4

Today's Tasks

Tasks for Today!

One task with Hubo to practice using **variables**

- Variables

Four tasks without Hubo

- Being Euclid
- Being Edmund Gunter
- Being Gunter Reloaded (#2)
- Being Gunter Reloaded (#3)

- When you have completed all the tasks, let a TA mark you off

Task 1 | Variables - Addition

- Teach Hubo how to add two numbers
 - There are two numbers in base 10 on the row 1 and 2
 - Add two numbers and put the result on the row 1

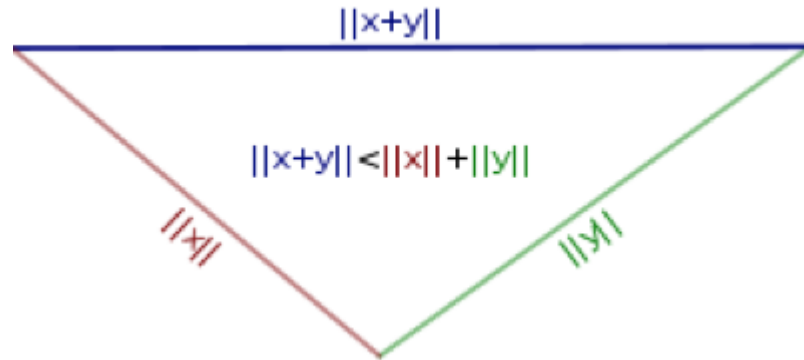
NOTE: Your program must work for **add1.wld**, **add2.wld**, and **add34.wld**

HINT: Use variables in order to remember two numbers



Task 2 | Being Euclid

- Given three numbers **a**, **b**, and **c**, it is possible to form a triangle whose sides have length a, b, and c if and only if the triangle inequality holds.
- That is, every side must be shorter than the sum of the other two sides.



Task 2 | Being Euclid (continued)

- Define a function '**is_triangle()**' which
 - takes three float values (three parameters)
 - **returns True or False** (Do **NOT** print anything in the function) depending on whether three values can form a triangle
- Write a program which
 - asks the user to enter three float values
 - evaluates input numbers using function '**is_triangle()**'
 - outputs YES or NO depending on the result of '**is_triangle()**' function

HINT: You must call the function '**input**' and use '**print**' outside of the function.

- Sample input and output

Side a: 2.3

Side b: 4.3

Side c: 5.6

YES

Task 3 | Being Edmund Gunter

- Following program prints out the sine values of:
 $0, (1/30)*2\pi, (2/30)*2\pi, \dots, 2\pi$
- Modify the program to **ask user the number of steps** to print out values between 0 and 2π (instead of **31** fixed steps)

```
import math

sin = math.sin
pi = math.pi

for i in range(31):
    x = float(i) / 30.0 * 2
    * pi
    print( sin(x) )
```

NOTE: Why do you think `range(31)` is used to print out $0, (1/30)*2\pi, (2/30)*2\pi, \dots, 2\pi$?

HINT: try the code below

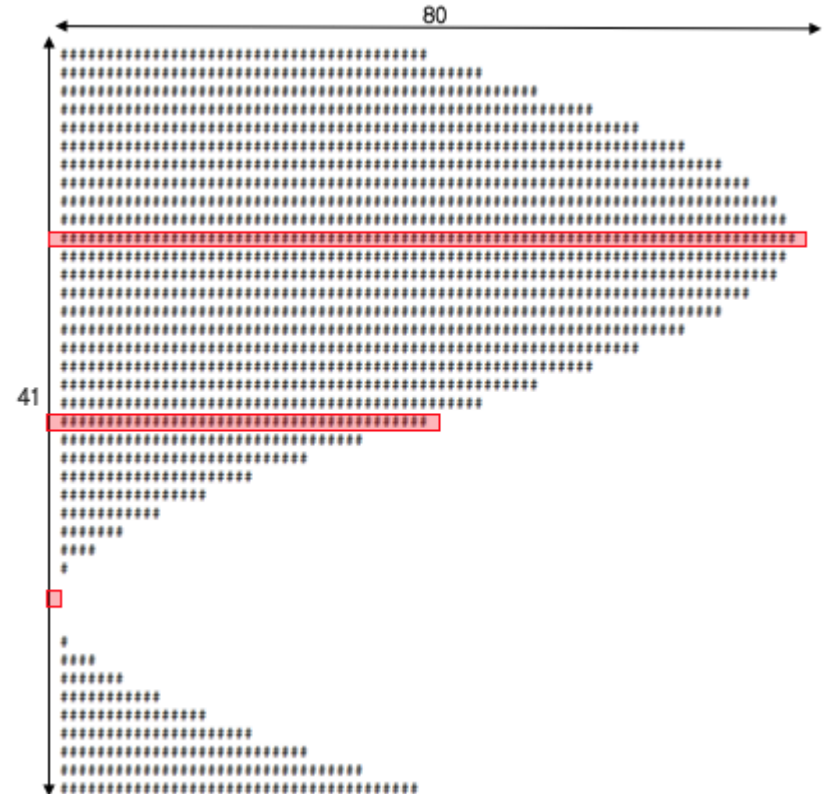
```
for i in range(3):
    print(i)
```

Task 4 | Being Gunter Reloaded (#2)

- Modify the program to print out a sine curve with '#' characters like this:

HINT: Convert the result of **sin** function to a required number of '#' characters.

$\sin(\pi/2) = 1 \rightarrow$ "####...####" (80 "#")s
 $\sin(\pi) = 0 \rightarrow$ "##...##" (40 "#")s
 $\sin(3\pi/2) = -1 \rightarrow$ "" (No #)

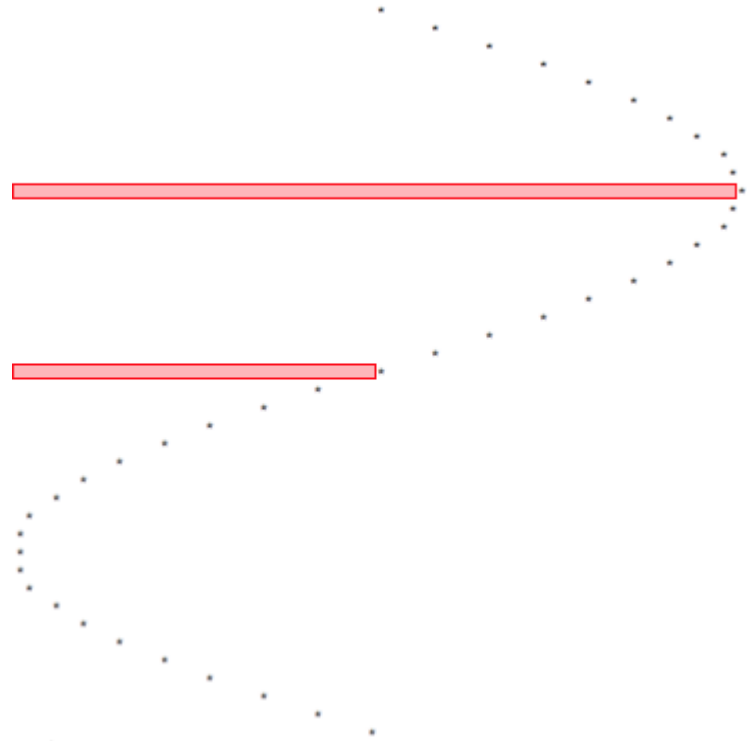
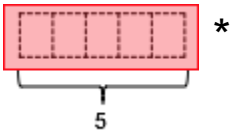


Task 5 | Being Gunter Reloaded (#3)

- Modify the program to print out a sine curve like this:

HINT: Convert the result of **sin** function to a required number of “ ”s (blank character)

```
>> print(" " * 5 + "*")
```



questions?