

# CompSci 101

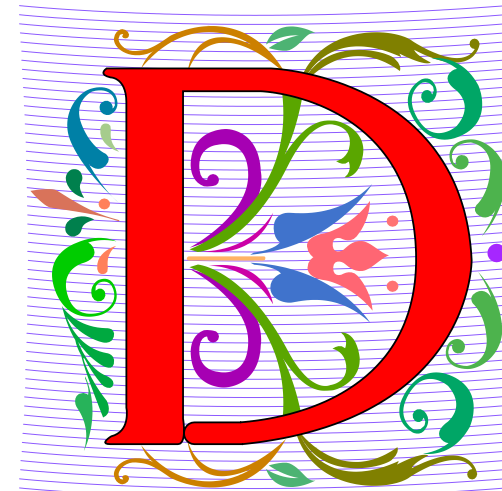
## Main, Functions, Import, Random, Conditionals

# Announcements

- Upcoming due dates
  - Sakai quizzes 1-4: 2/4 @145pm.
    - All future quizzes due @145pm day of lecture
  - Assignment 0-TODAY @1130pm
  - Assignment 1-released today (due 2/11 @1130pm)
  - Last day to register (TODAY)-can't change labs without permission #
    - <https://www.cs.duke.edu/undergrad/registration>
- Consulting hours vs. office hours
- Piazza channel

# D is for ...

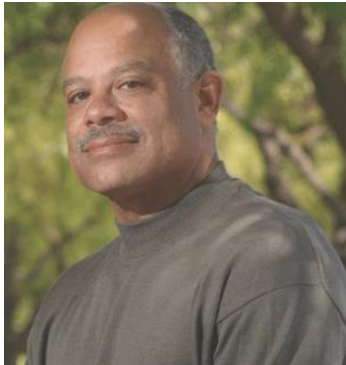
- Design
  - Great programs are the result of great designs. (KISS principle)
- Decomposition
  - Breaking down a problem/task into smaller subproblems/subtasks
- Debugging
  - A key skill in making your programs run
- Data (Science)
  - Creating information from 0's and 1's



# Computer Scientists to Know

- Dr. Mark Dean

- Dean of Engineering, University of Tennessee
- Former chief engineer (IBM)



- Mrs. Angie Jones

- Principal Automation Architect
  - Applitools (Test Automation Univ)
- Master Inventor-25 patents



# PFTD

- Main
  - Functions
  - Import
  - Conditionals
- 
- “The mere imparting of information is not education.”
    - Dr. Carter G. Woodson

# Why do we need this statement?

"""

Created 1/25/2021

@author: anw

"""

```
if __name__ == '__main__':
```

WOTO 1: <http://bit.ly/101s21-0202-1>

```
if __name__ == '__main__':  
    name == "Jeff"  
    hours = 15  
    rate = 15  
  
    # Calculate and output total pay  
    totalPay=hours*rate  
    print("Total Pay for " + name + "=$" + str(total_Pay))
```

# Functions-Why Do We Need Them?

All the single ladies (all the single ladies)  
All the single ladies (all the single ladies)  
All the single ladies (all the single ladies)  
All the single ladies  
Now put your hands up

Up in the club, we just broke up  
I'm doing my own little thing  
You decided to dip but now you wanna trip  
'Cause another brother noticed me  
I'm up on him, he up on me  
Don't pay him any attention  
'Cause I cried my tears  
For three good years  
Ya can't be mad at me

'Cause if you like it then you should have put a ring on it  
If you like it then you should've put a ring on it  
Don't be mad once you see that he want it  
If you like it then you should've put a ring on it

Whoa uh oh uh uh oh oh uh oh uh uh oh  
Whoa uh oh uh uh oh oh uh oh uh uh oh

If you like it then you should have put a ring on it  
If you like it then you should've put a ring on it  
Don't be mad once you see that he want it  
If you like it then you should've put a ring on it

I got gloss on my lips, a man on my hips  
Hold me tighter than my Dereon jeans  
Acting up, drink in my cup  
I can't care less what you think  
I need no permission, did I mention  
Don't pay him any attention  
'Cause you had your turn  
And now you gonna learn  
What it really feels like to miss me

'Cause if you like it then you should have put a ring on it  
If you like it then you should've put a ring on it  
Don't be mad once you see that he want it  
If you like it then you should've put a ring on it

Whoa uh oh uh uh oh oh uh oh uh uh oh  
Whoa uh oh uh uh oh oh uh oh uh uh oh

If you like it then you should have put a ring on it  
If you like it then you should've put a ring on it  
Don't be mad once you see that he want it  
If you like it then you should've put a ring on it

Whoa uh oh uh uh oh oh uh oh uh uh oh  
Whoa uh oh uh uh oh oh uh oh uh uh oh



# What's the Difference?

All the single ladies (all the single ladies)  
All the single ladies (all the single ladies)  
All the single ladies (all the single ladies)  
All the single ladies  
Now put your hands up

Up in the club, we just broke up  
I'm doing my own little thing  
You decided to dip but now you wanna trip  
'Cause another brother noticed me  
I'm up on him, he up on me  
Don't pay him any attention  
'Cause I cried my tears  
For three good years  
Ya can't be mad at me

'Cause (Chorus) if you like it then you should have put a ring on it  
If you like it then you should've put a ring on it  
Don't be mad once you see that he want it  
If you like it then you should've put a ring on it

(Refrain)

Whoa uh oh uh uh oh oh uh oh uh uh oh  
Whoa uh oh uh uh oh oh uh oh uh uh oh

Chorus

I got gloss on my lips, a man on my hips  
Hold me tighter than my Dereon jeans  
Acting up, drink in my cup  
I can't care less what you think  
I need no permission, did I mention  
Don't pay him any attention  
'Cause you had your turn  
And now you gonna learn  
What it really feels like to miss me

'Cause (Chorus)

Refrain

Chorus

Refrain

# Benefits of Functions

- Easier to
  - Read/understand
  - Modify
  - Test
  - Debug
- Pro tip: Look for any repetition in your programs

# Creating/Using Functions

1. Define the function (How it works)
2. “Call” the function (Using it)

```
def functionName(parameters):  
    block
```

```
if __name__ == '__main__':  
    variable=functionName(arguments)
```

```
def output(name):  
    print(name)  
  
if __name__ == '__main__':  
    student1="Keila"  
    output(student1)
```

# WOTO 2: <http://bit.ly/101s21-0202-2>

- Update this program to:
- Create function
  - *calculate\_pay*
  - Calculates/outputs pay for each student
- Use *calculate\_pay* in program to update this program

```
if __name__ == '__main__':  
    name = "Jeff"  
    hours = 15  
    rate = 15  
  
    totalPay = hours*rate  
    print("Total Pay for " + name + "=$" + str(totalPay))  
  
    name = "Sonia"  
    hours = 19.5  
  
    totalPay = hours*rate  
    print("Total Pay for " + name + "=$" + str(totalPay))
```

# Why Import??

import *module\_name*

```
import math

if __name__ == '__main__':
    print(math.floor(6.3333345))
```

if \_\_name\_\_ == '\_\_main\_\_':  
 print(*module\_name.function\_name(arguments)*)

Python Standard Library

- <https://tinyurl.com/kt4ogfu>

Programmer-defined modules

# Can we only import modules from the Python Standard Library?

```
def output_num(value):  
    print("The value from your main code was "+str(value))
```

*Module named mymodule.py*

```
def output(value):  
    print("Number=" + str(value))  
  
if __name__ == '__main__':  
    number = 20  
    output(number)
```

*Module named test.py*

*\*\*we want to import mymodule into here and use the output\_num function\*\**

```
import mymodule  
  
def output(value):  
    print("Number=" + str(value))  
  
if __name__ == '__main__':  
    number = 20  
    output(number)  
    mymodule.output_num(number)
```

*Updated test.py*

*\*\*imports mymodule to use output\_num() function\*\**

# Random numbers

- `random.random( )`
  - Return floating point number in range [0.0, 1.0)
- `random.randint(a, b)`
  - Return random integer N such that  $a \leq N \leq b$
- How would we simulate rolling dice?

```
import random

def output(value):
    print("Number=" + str(value))

if __name__ == '__main__':
    number = random.random()
    output(number)
```

# WOTO 3-<http://bit.ly/101s21-0202-3>

- Modify this code to simulate rolling two dice
- Requirements
  - Generate values for two dice
  - Output values of each die
  - Call function *output* to calculate and output sum of dice

```
import random

def output(value):
    print("Number=" + str(value))

if __name__ == '__main__':
    number = random.random()
    output(number)
```



# Selection/Conditionals: if...elif...else

```
if BOOLEAN_CONDITION:  
    CODE_BLOCK_A
```

```
if BOOLEAN_CONDITION:  
    CODE_BLOCK_A  
else:  
    CODE_BLOCK_B
```

```
if BOOLEAN_CONDITION:  
    CODE_BLOCK_A  
elif BOOLEAN_CONDITION:  
    CODE_BLOCK_B  
else:  
    CODE_BLOCK_C
```

```
if __name__ == '__main__':  
    num1 = 5  
  
    if num1 == 5:  
        print("The number is 5!")  
    else:  
        if num1 < 5:  
            print("The number is less than 5!")  
        else:  
            print("The number is greater than 5!")
```

```
if __name__ == '__main__':  
    num1 = 2  
  
    if num1 == 5:  
        print("The number is 5!")  
    elif num1 < 5:  
        print("The number is less than 5!")  
    else:  
        print("The number is greater than 5!")
```

# WOTO 4: <http://bit.ly/101s21-0202-4>

- Extending your program from WOTO 3
- Simulate rolling two dice
  - “Roll” two dice
  - Results of the rolls sent to function named *sum*
    - Sum dice values
    - If sum is 7 or 11, then output “You win!”
    - Otherwise, output “Next time!”

# Remember

- Work smarter, not harder
- Design first
- Try to identify where you are stuck
  - Identify resources to help solve problem
- Leverage your design and PythonTutor to understand program flow of control
  - <http://pythontutor.com>