

CompSci 101

Main, Functions, Import, Random, Conditionals

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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

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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



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Computer Scientists to Know

- | | |
|--|--|
| <ul style="list-style-type: none"> • Dr. Mark Dean <ul style="list-style-type: none"> • Dean of Engineering, University of Tennessee • Former chief engineer (IBM) | <ul style="list-style-type: none"> • Mrs. Angie Jones <ul style="list-style-type: none"> • Principal Automation Architect <ul style="list-style-type: none"> • Appltools (Test Automation Univ) • Master Inventor-25 patents |
|--|--|



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PFTD

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

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Why do we need this statement?

"""

Created 1/25/2021

@author: anw

"""

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

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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))
```

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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

When uh uh uh uh uh uh uh uh uh uh
When uh uh uh uh uh uh uh uh uh uh
When uh uh uh uh uh uh uh uh uh uh

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 gotta 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

When uh uh uh uh uh uh uh uh uh uh
When uh uh uh uh uh uh uh uh uh uh
When uh uh uh uh uh uh uh uh uh uh

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

When uh uh uh uh uh uh uh uh uh uh
When uh uh uh uh uh uh uh uh uh uh
When uh uh uh uh uh uh uh uh uh uh

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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 wear it
 If you like it then you should've put a ring on it

(Refrain)
 Whoa uh oh uh uh oh uh oh uh uh uh oh
 Whoa uh oh uh uh oh uh oh uh uh uh oh

Chorus

I got gloss on my lips, a man on my hips
 Hold me tighter than my Deroon 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

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Benefits of Functions

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

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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="Rollin"
    output(student1)
```

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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 + " is $" + str(totalPay))

    name = "Sonia"
    hours = 19.5

    totalPay = hours*rate
    print("Total Pay for " + name + " is $" + str(totalPay))
```

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Why Import??

import **module_name**

```
import math
if __name__ == '__main__':
    print(math.floor(6.233245))
```

```
if __name__ == '__main__':
    print(module_name.function_name(arguments))
```

Python Standard Library

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

Programmer-defined modules

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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

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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 <= N <= b
- How would we simulate rolling dice?

```
import random
def output(value):
    print("number=" + str(value))
if __name__ == '__main__':
    number = random.random()
    output(number)
```

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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)
```

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

```
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")
    elif 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")
```

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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!"

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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>

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