

CSci 127: Introduction to Computer Science



hunter.cuny.edu/csci

Announcements

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 - ▶ Excellent job and keep up the good work!

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Today: Prof. Jia Xu (machine translation)

- We've passed the halfway mark of the semester (Lecture 8 of 14).
 - ▶ Excellent job and keep up the good work!
 - ▶ Upcoming: More variety in lecturers as more CSci 127 Teaching Staff will be covering class segments.

Frequently Asked Questions

From lecture slips & recitation sections.

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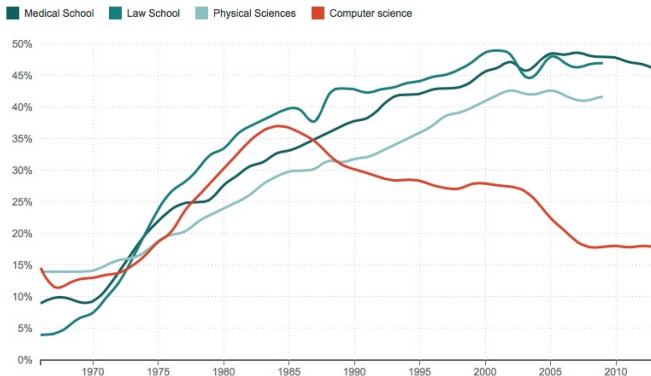
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What Happened To Women In Computer Science?

% Of Women Majors, By Field



Source: National Science Foundation, American Bar Association, American Association of Medical Colleges

Credit: Quoc Trung Bui/NPR

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- Okay, but why the visitors?
Their support has made this possible.

Today's Topics



- Functions
- Prof. Xu
- Github
- Final Exam Overview

Functions

- Functions are a way to break code into pieces, that can be easily reused.

```
#Name: your name here
#Date: October 2017
#This program, uses functions,
#    says hello to the world!

def main():
    print("Hello, World!")

if __name__ == "__main__":
    main()
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- Many languages require that all code must be organized with functions.

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Example: `print("Hello", "World")`

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- Many languages require that all code must be organized with functions.
- The opening function is often called `main()`
- You **call** or **invoke** a function by typing its name, followed by any input parameters, surrounded by parenthesis:
Example: `print("Hello", "World")`
- Can write, or **define** your own functions, which are stored, until invoked or called.

In Pairs or Triples:

Predict what the code will do:

#Greet loop example

```
def greetLoop(person):  
    print("Greetings")  
    for i in range(5):  
        print("Hello", person)
```

`greetLoop("Thomas")`

From "Teaching with Python" by John Zelle

```
def happy():  
    print("Happy Birthday to you!")  
  
def sing(P):  
    happy()  
    happy()  
    print("Happy Birthday dear " + P + "!")  
    happy()
```

```
sing("Fred")  
sing("Thomas")  
sing("Hunter")
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In Pairs or Triples:

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greetLoop("Thomas")
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```
def prob4():  
    verse = "jam tomorrow and jam yesterday,"  
    print("The rule is,")  
    c = mystery(verse)  
    w = enigma(verse,c)  
    print(c,w)  
def mystery(v):  
    print(v)  
    c = v.count("jam")  
    return(c)  
def enigma(v,c):  
    print("but never", v[-1])  
    for i in range(c):  
        print("jam")  
    return("day.")  
prob4()
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#Fall 2013 Final Exam, 5
```

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def kuwae( inLst ):  
    tot = 1  
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    return tot  
  
def foo( inLst ):  
    if ( inLst[-1] > inLst[0] ):  
        return kuwae( inLst )  
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foo( [2, 4, 6, 8] )  
  
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(Demo with pythonTutor)

Input Parameters & Return Values

- Functions can have **input parameters**.

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def totalWithTax(food,tip):  
    total = 0  
    tax = 0.0875  
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lunch = float(input('Enter lunch total: '))  
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- Functions can also **return values** to where it was called.

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Input Parameters

- When called, the actual parameter values are copied to the formal parameters.

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- All the commands inside the function are performed on the copies.

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Formal Parameters

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- When called, the actual parameter values are copied to the formal parameters.
- All the commands inside the function are performed on the copies.
- The actual parameters do not change.

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- All the commands inside the function are performed on the copies.
- The actual parameters do not change.
- The copies are discarded when the function is done.
- The time a variable exists is called its **scope**.

Python Tutor

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(Demo with pythonTutor)

Input Parameters: What about Lists?

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#Fall 2013 Final Exam, 5
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    tot = 1  
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def foo( inLst ):  
    if ( inLst[-1] > inLst[0] ):  
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foo( [2, 4, 6, 8] )  
  
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- What is copied with a list?

Input Parameters: What about Lists?

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foo( [4002, 328, 457, 1] )
```

- When called, the actual parameter values are copied to the formal parameters.
- What is copied with a list?
- The address of the list, but not the individual elements.

Input Parameters: What about Lists?

```
#Fall 2013 Final Exam, 5
```

```
def kuwae( inLst ):
    tot = 1
    for item in inLst:
        tot = tot * item
    return tot

def foo( inLst ):
    if ( inLst[-1] > inLst[0] ):
        return kuwae( inLst )
    else:
        return -1

foo( [2, 4, 6, 8] )

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- When called, the actual parameter values are copied to the formal parameters.
- What is copied with a list?
- The address of the list, but not the individual elements.
- The actual parameters do not change, but the inside elements might.
- Easier to see with a demo.

Python Tutor

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#Fall 2013 Final Exam, 5
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foo( [4002, 328, 457, 1] )
```

(Demo with pythonTutor)

In Pairs or Triples:

```
def bar(n):  
    if n <= 8:  
        return 1  
    else:  
        return 0  
  
def foo(l):  
    n = bar(l[-1])  
    return l[n]
```

- What are the formal parameters for the functions?

- What is the output of:

```
r = foo([1,2,3,4])  
print("Return: ", r)
```

- What is the output of:

```
r = foo([1024,512,256,128])  
print("Return: ", r)
```

Python Tutor

```
def bar(n):  
    if n <= 8:  
        return 1  
    else:  
        return 0
```

(Demo with pythonTutor)

```
def foo(l):  
    n = bar(l[-1])  
    return l[n]
```

CS Survey Talk



Prof. Jia Xu
(machine translation)

Github

- Like Google docs for code...



Octocat

Github

- Like Google docs for code...
- Used to share code, documents, etc.



Octocat

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- More formally: `git` is a version control protocol for tracking changes and versions of documents.

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- Used to share code, documents, etc.
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- Github provides hosting for repositories (**'repos'**) of code.
- Also convenient place to host websites (i.e. `stjohn.github.io`).

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Octocat

- Like Google docs for code...
- Used to share code, documents, etc.
- More formally: `git` is a version control protocol for tracking changes and versions of documents.
- Github provides hosting for repositories (**'repos'**) of code.
- Also convenient place to host websites (i.e. `stjohn.github.io`).
- In lab, we will set up github accounts and copy (**'clone'**) documents from the class repo. (More in future courses.)

In Pairs or Triples:

```
def prob4(amy, beth):  
    if amy > 4:  
        print("Easy case")  
        kate = -1  
    else:  
        print("Complex case")  
        kate = helper(amy,beth)  
    return(kate)
```

```
def helper(meg,jo):  
    s = ""  
    for j in range(meg):  
        print(j, ": ", jo[j])  
        if j % 2 == 0:  
            s = s + jo[j]  
            print("Building s:", s)  
    return(s)
```

- What are the formal parameters for the functions?
- What is the output of:

```
r = prob4(4,"city")  
print("Return:  ", r)
```

- What is the output of:

```
r = prob4(2,"university")  
print("Return:  ", r)
```

Python Tutor

```
def prob4(any, beth):
    if any > 4:
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    else:
        print("Complex case")
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(Demo with pythonTutor)

Exit Slip for Lecture 8

1

Of the first 15 programs, on which did you spend the most time?

- ☐ 1. Hello, World!
- ☐ 2. Octagon
- ☐ 3. Tilted Square
- ☐ 4. Motto
- ☐ 5. 5-pointed Star
- ☐ 6. ASCII/Unicode
- ☐ 7. Growing Spiral
- ☐ 8. GC Content of DNA Strings
- ☐ 9. Caesar Cipher (shift left)
- ☐ 10. Every Other Character
- ☐ 11. Spiral
- ☐ 12. Color by Name
- ☐ 13. Shades of Blue
- ☐ 14. Color by Hex
- ☐ 15. Image Blues
- ☐ Other: _____

Why?

Recap: Functions

- Functions are a way to break code into pieces, that can be easily reused.

```
#Name: your name here
#Date: October 2017
#This program, uses functions,
#    says hello to the world!

def main():
    print("Hello, World!")

if __name__ == "__main__":
    main()
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Example: `print("Hello", "World")`

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Example: `print("Hello", "World")`
- Can write, or **define** your own functions, which are stored, until invoked or called.
- Functions can have **input parameters** that bring information into the function,
- and **return values** that send information back.
- Both input parameters and return values are optional.

Exit Slip for Lecture 8

1

Of the first 15 programs, on which did you spend the most time?

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