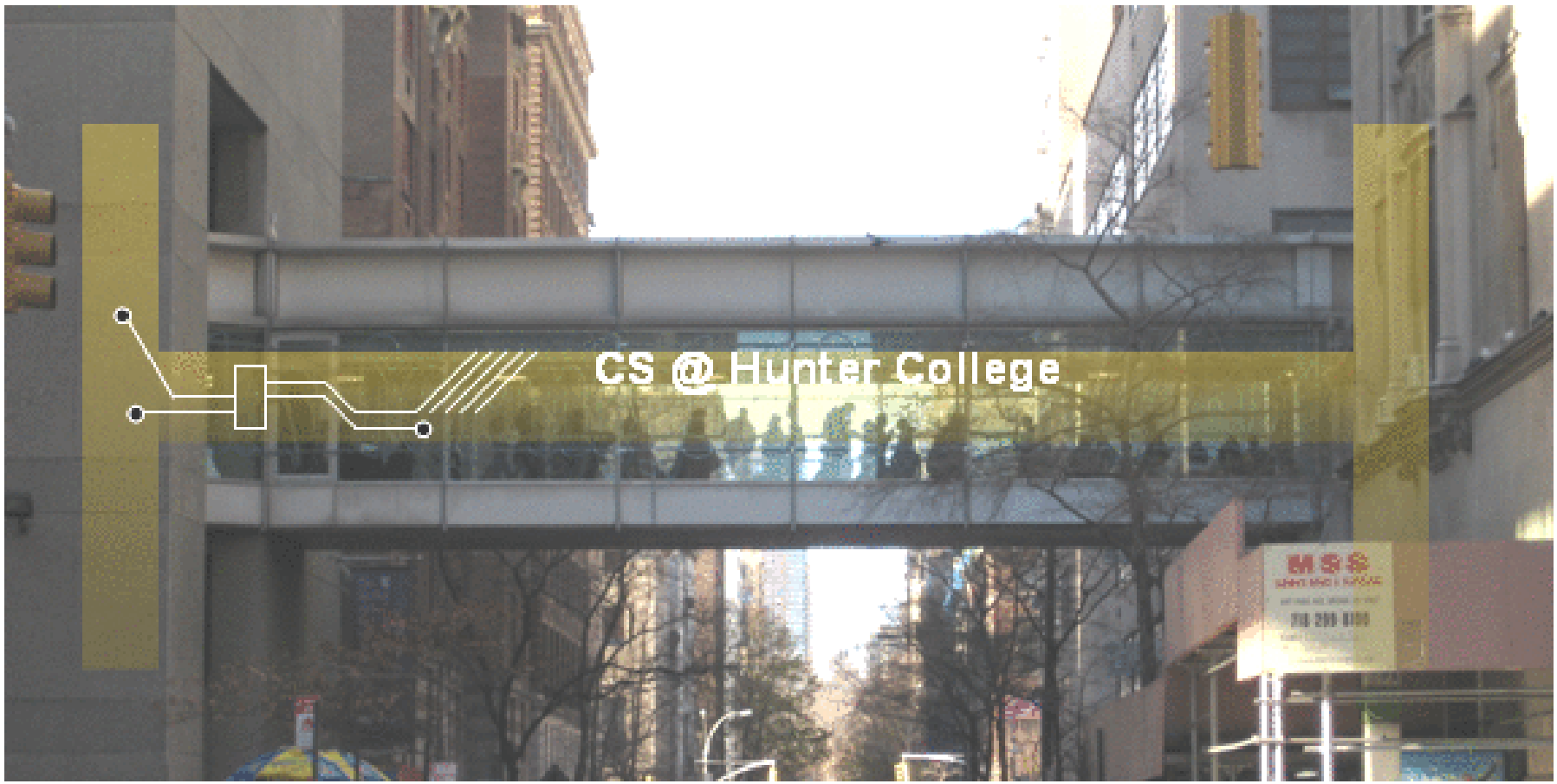
CSci 127: Introduction to Computer Science



hunter.cuny.edu/csci

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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

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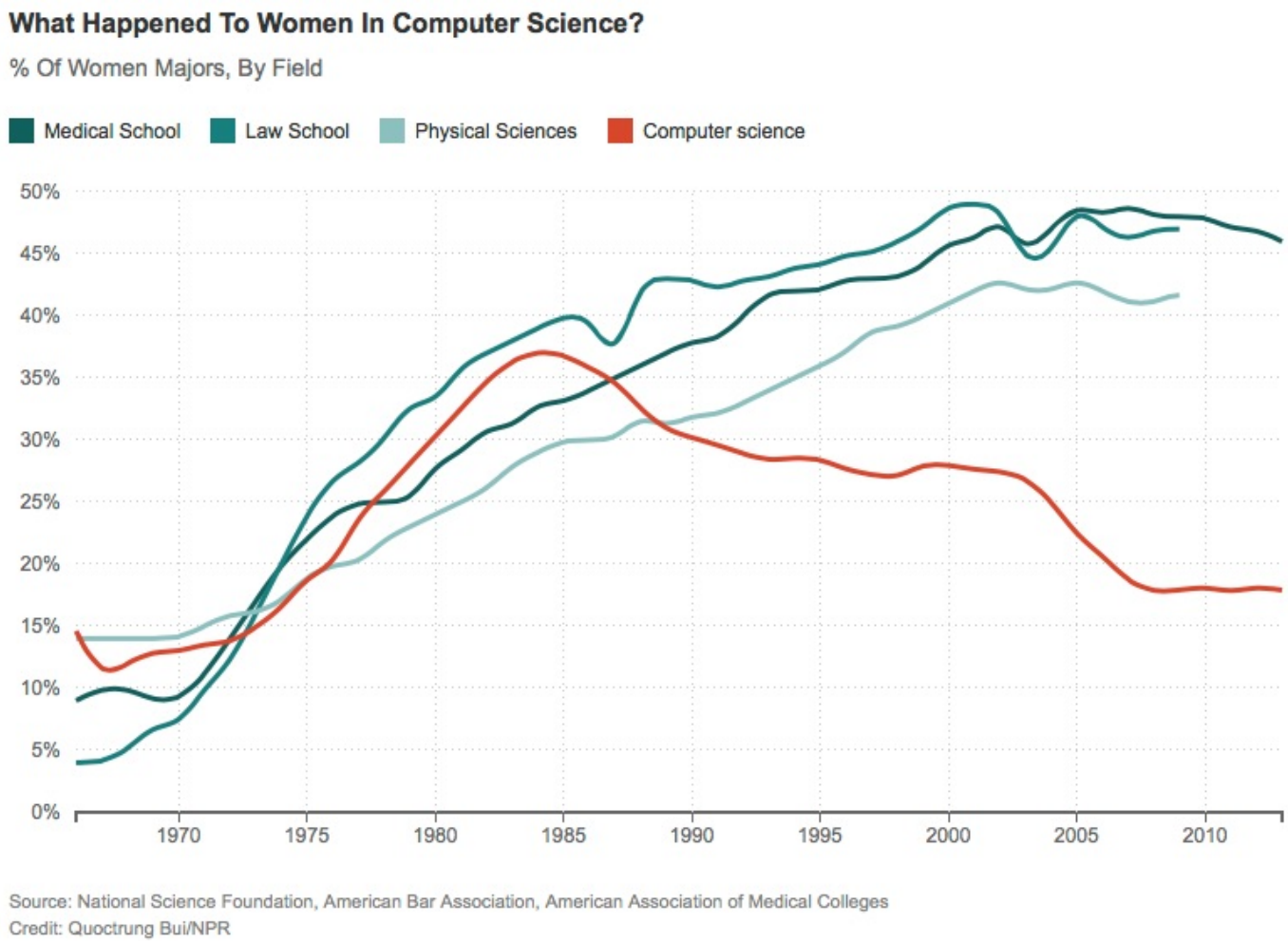

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- Okay, but why the visitors?
  Their support has made this possible.

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!")

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- 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 + "!")
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sing("Fred")
sing("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

def kuwae( inLst ):
    tot = 1
    for item in inLst:
        tot = tot * item
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def foo( inLst ):
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(Demo with `pythonTutor`)

Input Parameters & Return Values

- Functions can have **input parameters**.

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- The actual parameters do not change.

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- The time a variable exists is called its **scope**.

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Input Parameters: What about Lists?

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#Fall 2013 Final Exam, 5

def kuwae( inLst ):
    tot = 1
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    else:
        return -1

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

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.
- The actual parameters do not change, but the inside elements might.
- Easier to see with a demo.

Python Tutor

```
#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] )

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)
```

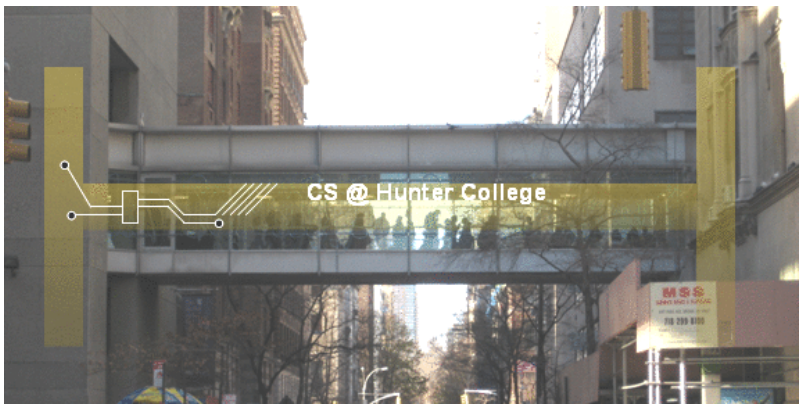
Python Tutor

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

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

(Demo with pythonTutor)

CS Survey Talk



Prof. Jia Xu
(machine translation)

Github

- Like Google docs for code...

Octocat

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- Github is a service that provides hosting for repositories ('repos') of code.
- Also convenient place to host websites (i.e. `stjohn.github.io`).

Github

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- 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 is a service that 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(4,"university")
print("Return:  ", r)
```

Python Tutor

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          kate = -1
     else:
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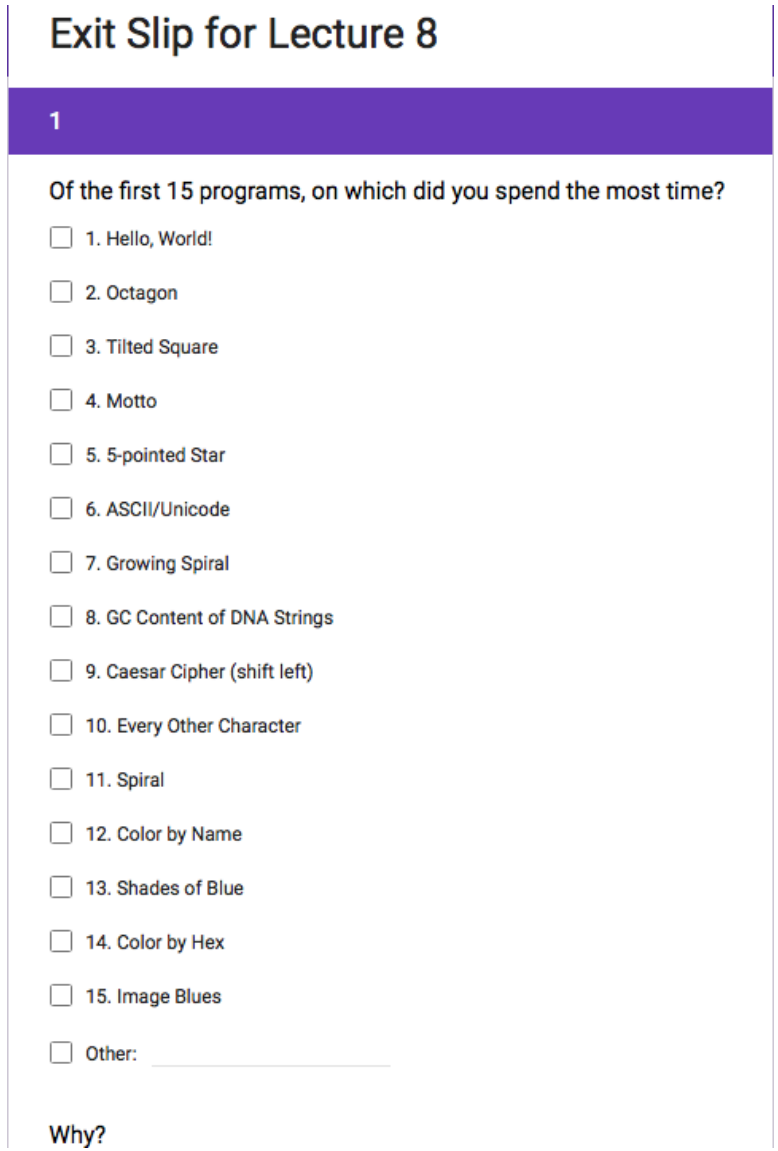
(Demo with pythonTutor)

Lecture Slips: `tinyurl.com/y84y38tq`



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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- You **call** or **invoke** a function by typing its name, followed by any inputs, surrounded by parenthesis:

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- 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.