

Kickstart 2012

Day 1

Intro and Basics

Stephanie Rogers and Amy Pavel



Welcome 😊

- Who are we?

Cal



What is Computer Science?

- Problem Solving
- Building things
- CS is everywhere
 - Internet
 - Phone/Web Applications
 - Vehicles
 - Genetics
 - And more!



What is Computer Science? (cont)

- Programming
 - Art and science of constructing artifacts that perform computations
 - Programming languages

What is Kickstart?

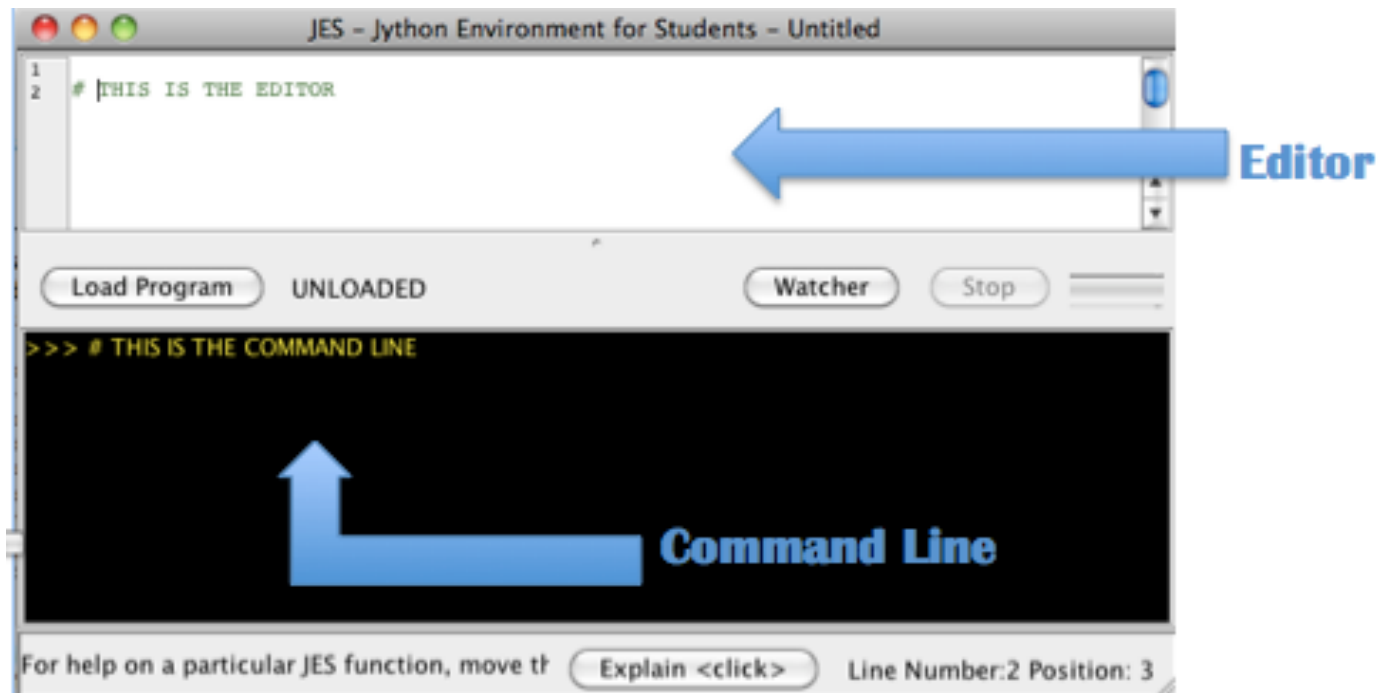
- Not 1's and 0's
- Implementing programs
- Producing a tangible result!
 - **PICTURES**
- An Intro to Jython

Programming Languages

- Communication with computers
- Different encodings of instructions for machines
- The language we are using: Jython
 - Jython is Python!
 - *Java-based Python*
- Ice Breaker – Partner in common (talent)
- Logins!

Environment - JES

- **J**ython **E**nvironment for **S**tudents
- Programming area: the editor, writing programs
- Command area: Entering commands



Meet Jython - Data

Data: stuff we manipulate

- integers: 2 -1 13
- strings: "hello world"
- booleans: true, false
- lists [1, 2, 3]
- More later

```
>>> 2
```

```
2
```

```
>>> "hello world"
```

```
'hello world'
```


Meet Jython - Functions

Functions: rules for manipulate data

- Primitive expressions: `+, -, *, /, ...`
- Built-in functions: `sum, abs, ...`
- Self-defined function: `def square(x): ...`

Can take any number of arguments

Meet Jython - Expressions

Expressions

- Combining functions with data
- Jython evaluates these expressions for you

```
>>> 2+3
```

```
?
```

```
>>> sum(2, 3)
```

```
?
```

```
>>> abs(-2)
```

```
?
```

```
>>> print('hello world')
```

```
?
```

Calling functions

- **Remember**

- Functions: rules for manipulating data
- Can take any number of arguments

```
>>> x = sum(4, 3)
```

```
>>> y = abs(-9)
```

```
>>> max(x, y)
```

```
9
```

```
>>> Can we do all this in one line?
```

Calling functions

- **Remember**

- Functions: rules for manipulating data
- Can take any number of arguments

```
>>> x = sum(4, 3)
```

```
>>> y = abs(-9)
```

```
>>> max(x, y)
```

```
9
```

```
>>> Can we do all this in one line?
```

Nesting

Calling functions

- **Remember**

- Functions: rules for manipulating data
- Can take any number of arguments

```
>>> x = sum(4, 3)
```

```
>>> y = abs(-9)
```

```
>>> max(x, y)
```

```
9
```

```
>>> max( sum(4, 3) , abs(-9) )
```

```
?
```

Meet Jython - Numbers

+, -, *, /, %, >, >=, ==, !=, <, <=

```
>>> 2 + 3
```

```
5
```

```
>>> (5 * 8) + 2
```

```
42
```

```
>>> 40 / 5
```

```
8.0
```

```
>>> 11 % 3
```

```
2
```

```
>>> 4 > 3
```

```
True
```

```
>>> 6 <= 5
```

```
False
```

```
>>> 6 == (3+3)
```

```
True
```

```
>>> 6 != 5
```

```
True
```

Meet Jython – Logic

Booleans: True, False

Logical operators: and, or, not, >, >= ...

and

```
>>> (4 > 3) and (4 < 5)
True
>>> True and False
False
>>> True and True
True
```

or

```
>>> (4 > 3) or (4 > 5)
False
>>> False or False
False
>>> True or False
True
```

Meet Jython - Assignment

Variables

Name our data and functions for use later

```
>>> x = 3
```

```
>>> print x + 1
```

```
4
```


Meet Jython - Strings

Indexing + concatenation

```
>>> "hi " + "stephanie"
```

```
??
```

```
>>> print("hello, world")
```

```
??
```

```
>>> name = "stephanie"
```

```
>>> name[0]
```

```
??
```

Meet Jython - Lists

Indexing & concatenation

```
>>> [1, 2, 3, 4]
```

?

```
>>> [1, 2] + [3, 4]
```

?

```
>>> alphabet = ['a', 'b', 'c']
```

```
>>> alphabet[2]
```

??

Administrivia

- Website: inst.eecs.berkeley.edu/~cs98-tr
- Lab Structure
 - Lecture
 - Interactive practice - labs
 - Projects
- Send us your pictures daily!

Try it yourself

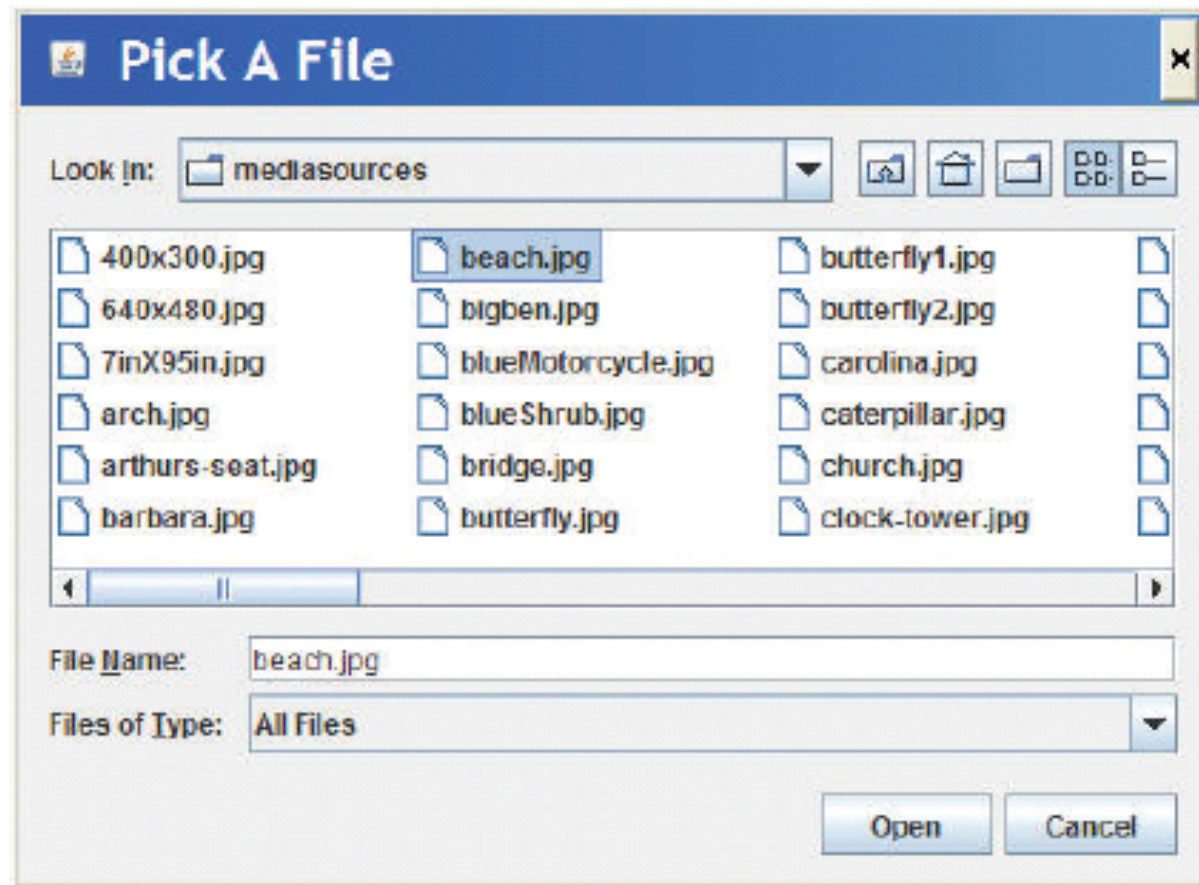
- Lab Exercise 0 & 1

Pictures

Picture Functions

- pickAFile()
 - Allows the user to pick a file
 - Takes no argument!

pickAFile() leads to... The File Picker! - UI



Picture Functions

- pickAFile()
- makePicture(filename)
 - creates and returns a picture object
- show(picture)
 - displays a picture in a window

Showing a picture

- Steps

1. Choose a file
2. Make it into a “picture”
3. Show the picture

```
myFile = pickAFile()
```

```
pic = makePicture(myFile)
```

```
show(pic)
```

Alt: Nesting

```
show(makePicture(pickAFile()))
```

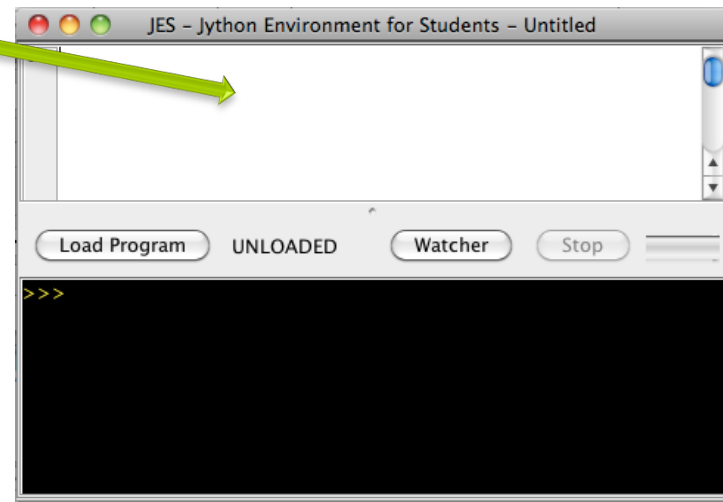


DEMO

Defining our own functions

```
def <name>(<arguments names>):  
    return <expression>
```

- Functions:
 - function name
 - input values
 - Body



Defining our own functions

Structure of a function

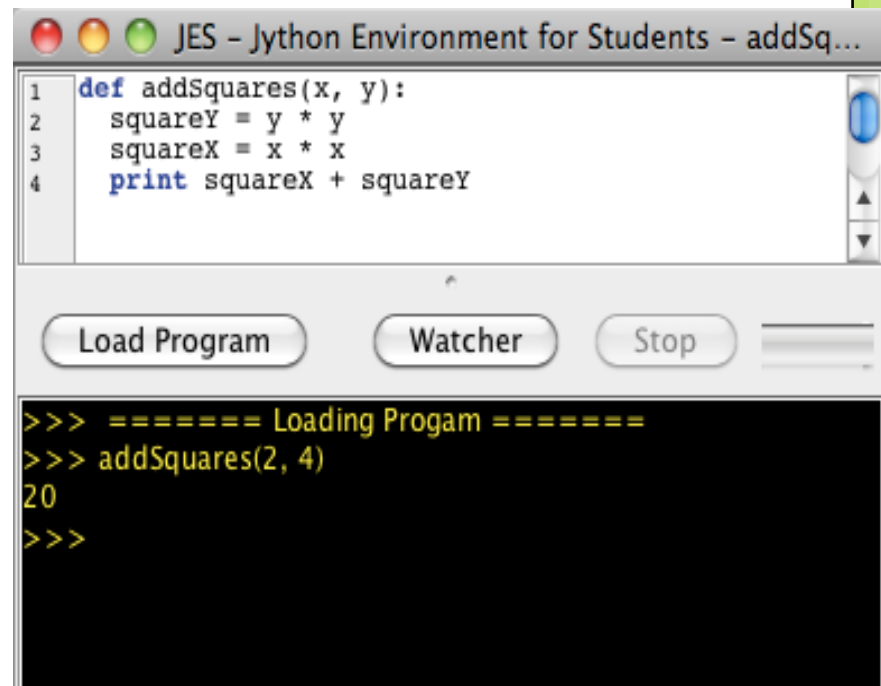
- **def**
- function name
- input values between parentheses
- colon
- **body** (indentation matters = 2 spaces)

```
def addSquares(x, y):  
    squareX = x*x  
    squareY = y*y  
    return squareX + squareY
```

Nesting?

Blocking is indicated for you in JES

- Statements with same indentation = same block
- same block is enclosed in a blue box
- DEMO**



```
JES - Jython Environment for Students - addSq...
1 def addSquares(x, y):
2     squareY = y * y
3     squareX = x * x
4     print squareX + squareY

Load Program  Watcher  Stop

>>> ===== Loading Program =====
>>> addSquares(2, 4)
20
>>>
```

Try it yourself

- Lab Exercise 2 & 3
- (~15-20 minutes)