

# CS 141, Lecture 3

**Warmup:** You are driving along an empty highway in South Carolina, keeping up with the flow of traffic, but going 74 miles-per-hour in a 60 miles-per-hour zone\*. Assume that the fine is \$15 for every mile per hour over the limit. On a piece of paper, use two variables to store the speed you were going and the speed limit. Then use some combination of more variables, math, and a print statement to print out the fine you will receive.

\* This in no way reflects any recent events that have happened to your professor.

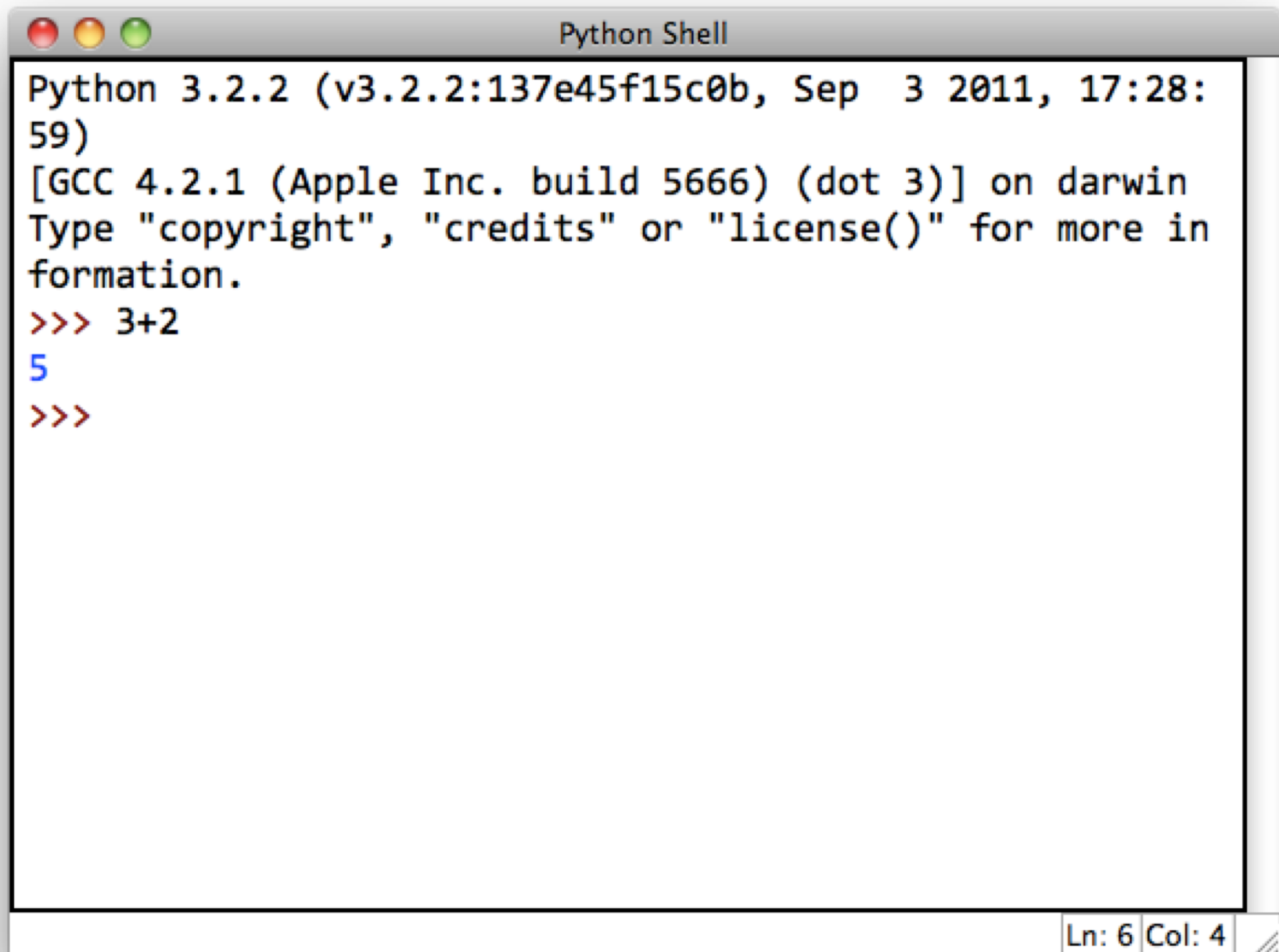
You are caught going 74 miles/hour in a 60 miles/hour zone. The fine is \$15 for every mile per hour over the limit. Which of the following programs correctly prints your fine?

```
speed = 74
limit = 60
print(fine)
fine = (speed - limit) * 15
```

```
speed = 74
limit = 60
fine = over * 15
over = (speed - limit)
print(fine)
```

```
limit = 60
speed = 74
fine = (speed - limit) * 15
print(fine)
```

# Python Shell



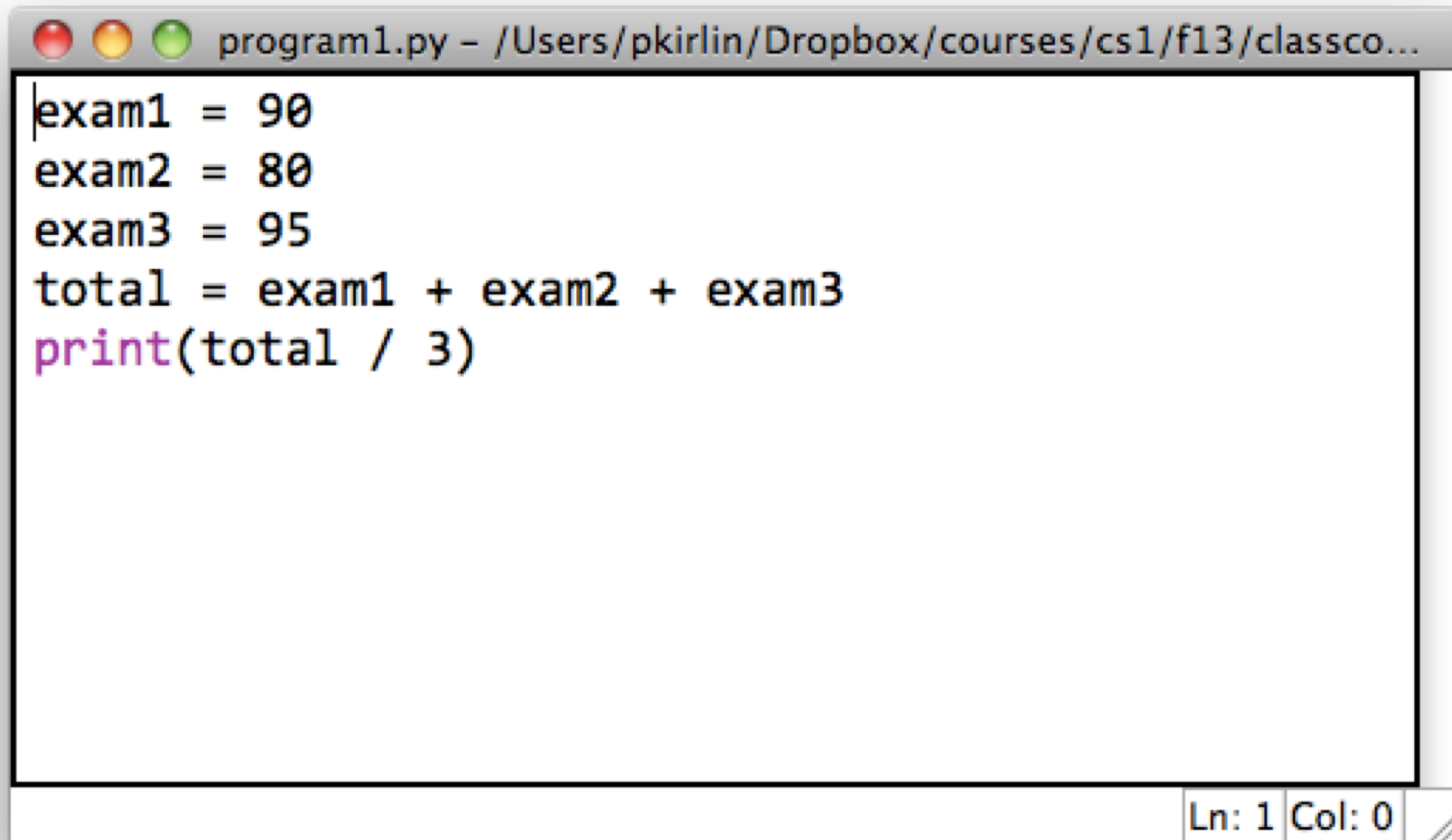
```
Python 3.2.2 (v3.2.2:137e45f15c0b, Sep  3 2011, 17:28:59)
[GCC 4.2.1 (Apple Inc. build 5666) (dot 3)] on darwin
Type "copyright", "credits" or "license()" for more in
formation.
>>> 3+2
5
>>>
```

Ln: 6 Col: 4

# Python Shell

- Runs single-line "mini-programs"
- Runs each line after you type it and press enter.
- Results of computations are automatically *printed* (displayed) back to you.

# Longer Programs



```
program1.py - /Users/pkirlin/Dropbox/courses/cs1/f13/classco...  
exam1 = 90  
exam2 = 80  
exam3 = 95  
total = exam1 + exam2 + exam3  
print(total / 3)
```

Ln: 1 Col: 0

# Longer Programs

- Code doesn't run until you ask Python to run it.
- Each line executes in order, top to bottom, line by line.
- Lets you run the code over and over without retyping.
- Nothing is automatically printed; to do so you must call the print function.

# Math

- $+$ ,  $-$ ,  $*$ ,  $/$ ,  $**$
- Normal order of operations.
- Use parentheses to change order of operations.



# Variables

program1.py - /Users/pkirlin/Dropbox/courses/cs1/f13/classco...

```
exam1 = 90  
exam2 = 80  
exam3 = 95  
total = exam1 + exam2 + exam3  
print(total / 3)
```

The variables in this program are exam1, exam2, exam3, and total.

Variables are assigned *values* by using an **assignment statement**:

*variable = value*

Ln: 1 Col: 0

# Print function

- In a "real program" (not the Python Shell), nothing is displayed when you run the program unless you ask.
- Use the print function to do so.

```
print(_____, _____, _____, ...)
```

- Replace the blank spaces above with the name of a variable, or a math expression.
- You can print any number of things at once.
  - Separate each thing you want to print with a comma.
  - Each thing will be displayed with a space in between.
  - If you want to print words, surround the words with double quotes.

```
print-statement.py - /Users/pkirlin/Dr...
x = 3
y = 5
print(x)
print(y)
print(x, y)
print("Here are x and y", x, y)
|
```

Ln: 7 Col: 0

```
>>> ===== RESTART
T =====
>>>
3
5
3 5
Here are x and y 3 5
>>>
```

Ln: 5 Col: 1

```
x = 3  
print(x)  
x = 6  
print(x)
```

Computer Memory

Program Output

```
x = 3
print(x)
x = 6
print(x)
```

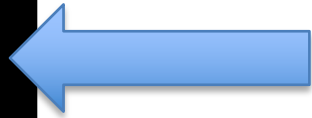


## Computer Memory

<u>Name</u>	<u>Value</u>
x	3

## Program Output

```
x = 3
print(x)
x = 6
print(x)
```



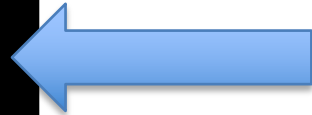
## Computer Memory

<u>Name</u>	<u>Value</u>
x	3

## Program Output

3

```
x = 3
print(x)
x = 6
print(x)
```



## Computer Memory

<u>Name</u>	<u>Value</u>
x	6

## Program Output

3



```
x = 3
print(x)
x = 6
print(x)
```



## Computer Memory

<u>Name</u>	<u>Value</u>
x	6

## Program Output

3  
6

```
a = 4
b = 5
print(a, b)
a = 3
b = a
print(a, b)
a = b + 1
a = a + 1
print(a, b)
```

```
a = 1
b = 2
a = b
b = a
print(a, b)
```

- Variable names must be all one word (no spaces).
- Must consist of letters, numbers, or `_`.
  - Start with a letter.
- Choose a name that indicates the meaning of the variable.
  - For your grade on an exam: good ideas: `exam`, `exam_score`, `grade`,
  - Bad ideas: `e`, `g`,  
`the_score_i_got_on_the_exam`

- You're working at a fast food restaurant where a burger costs \$3.99 and French fries cost \$1.99.
- Write a program (in a separate file, saved as `burger.py`) that uses two variables to store these two prices.
- Your program should then print out the cost of buying two burgers and three orders of fries.
- If you finish early, make your program add in 9.25% sales tax.

# Data types

- Integers (`int`)
  - Whole numbers; may be negative.
- Floating point numbers (`float`)
  - Any number with a decimal point; may be negative.
- Strings
  - Any sequence of letters, numbers, or punctuation.
  - String literals are always surrounded by quotation marks, single or double.

# Input from the keyboard

- Use a variation of a variable assignment:
- For integers:  
`variable = int(input("Prompt"))`
- For floats:  
`variable = float(input("Prompt"))`
- For strings:  
`variable = input("Prompt")`

- You're working at a fast food restaurant where a burger costs \$3.99 and French fries cost \$1.99.
- Write a program (in a separate file, saved as `burger.py`) that uses two variables to store these two prices.
- **CHANGE:** Make your program ask the user for how many burgers and orders of fries they want, and print the total cost.
- If you finish early, make your program ask the user for the costs of a burger and fries, and the sales tax rate.