

# Variables, Expressions, and Statements

Oh my



# User Input

```
userName = input('What is your name?')  
print('Hello ' + userName)
```

Worked OK

# You Try It

## Calculate Circumference of Circle

```
radius = input('Enter the radius: ')
```

```
circumference = 2 * 3.14 * radius
```

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```

```
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```

Traceback (most recent call last):

```
File "circ.py", line 2, in <module>
```

```
    circumference = 2 * 3.14 * radius
```

```
TypeError: can't multiply sequence by non-  
int of type 'float'
```

# Variables

- Store Something
- Have a type
- Have a name
- Have a value

# Variables

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- Store Something
- Have a type
  - string (str)
  - integer (int)
  - Pay Attention
- know what type your variables are

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  - Pay Attention**

- know what type your variables are**

# Variables

- Store Something
- Have a type
- Have a name
  - Case sensitive
    - Bruce != bruce
  - Must begin with a letter (or underscore)
  - Can contain letters and digits
    - area, area51, \_100thMonkey
    - 12days
  - NO spaces

# Variables

- Store Something

- Have a type

- Have a name

- Have a value

  - userName = input('What is your name?')

  - PI = 3.14

  - radius = 12

  - circumference = 2 \* PI \* radius

# How to Fix

```
radius = input('Enter the radius: ')  
circumference = 2 * 3.14 * radius
```

Traceback (most recent call last):

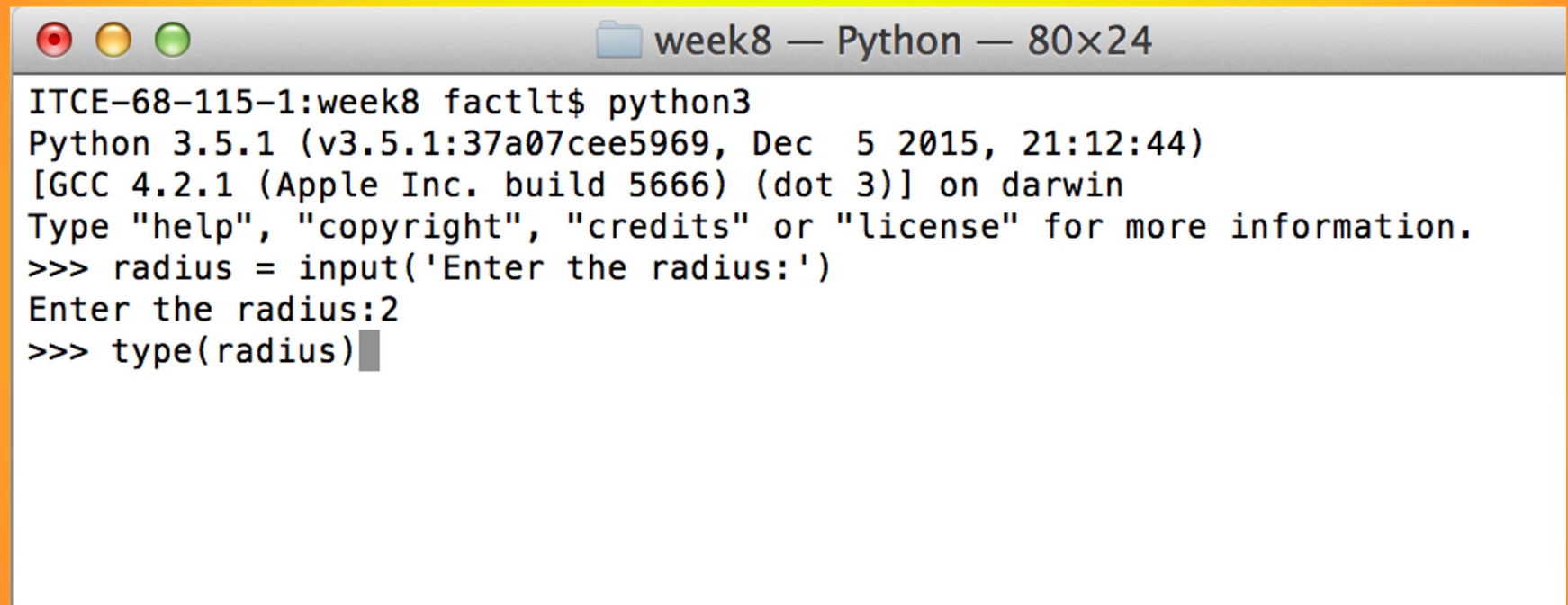
```
File "circ.py", line 2, in <module>
```

```
    circumference = 2 * 3.14 * radius
```

```
TypeError: can't multiply sequence by non-  
int of type 'float'
```

# You Try It

## Shell Mode

A terminal window with a title bar that reads "week8 — Python — 80x24". The window contains the following text:

```
ITCE-68-115-1:week8 factlt$ python3
Python 3.5.1 (v3.5.1:37a07cee5969, Dec  5 2015, 21:12:44)
[GCC 4.2.1 (Apple Inc. build 5666) (dot 3)] on darwin
Type "help", "copyright", "credits" or "license" for more information.
>>> radius = input('Enter the radius:')
Enter the radius:2
>>> type(radius)
```

# How to Fix

```
radius = input('Enter the radius: ')
```

```
circumference = 2 * 3.14 * radius
```

```
<class 'str'>
```

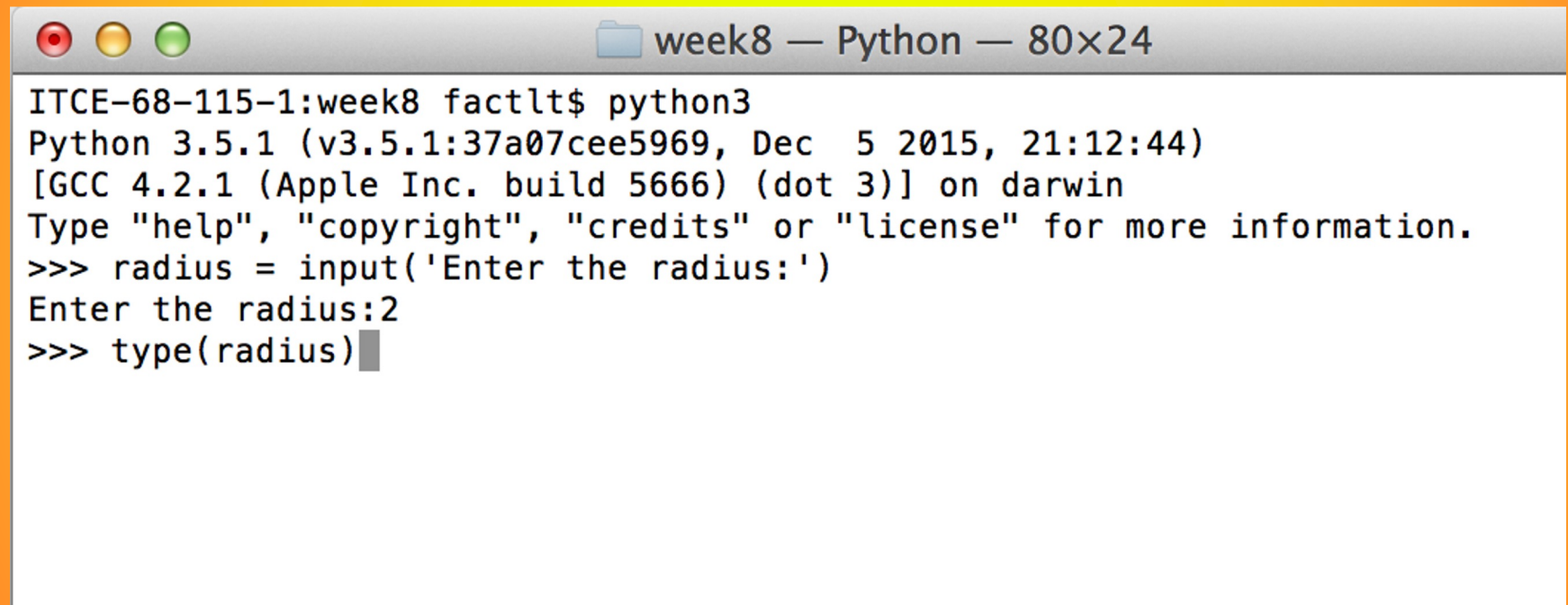
```
input statement  
returns a string
```

# Type Conversion

```
radius = int( input('Enter the radius: ') )
```

```
circumference = 2 * 3.14 * radius
```

# You Try It Shell Mode

A terminal window with a title bar that reads "week8 — Python — 80x24". The window contains the following text:

```
ITCE-68-115-1:week8 factlt$ python3
Python 3.5.1 (v3.5.1:37a07cee5969, Dec  5 2015, 21:12:44)
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Type "help", "copyright", "credits" or "license" for more information.
>>> radius = input('Enter the radius:')
Enter the radius:2
>>> type(radius)
```

# What Happened?

```
radius = int( input('Enter the radius: ') )
```

```
circumference = 2 * 3.14 * radius
```

# What Happened?

```
radius = int( input('Enter the radius: ') )
```

```
circumference = 2 * 3.14 * radius
```

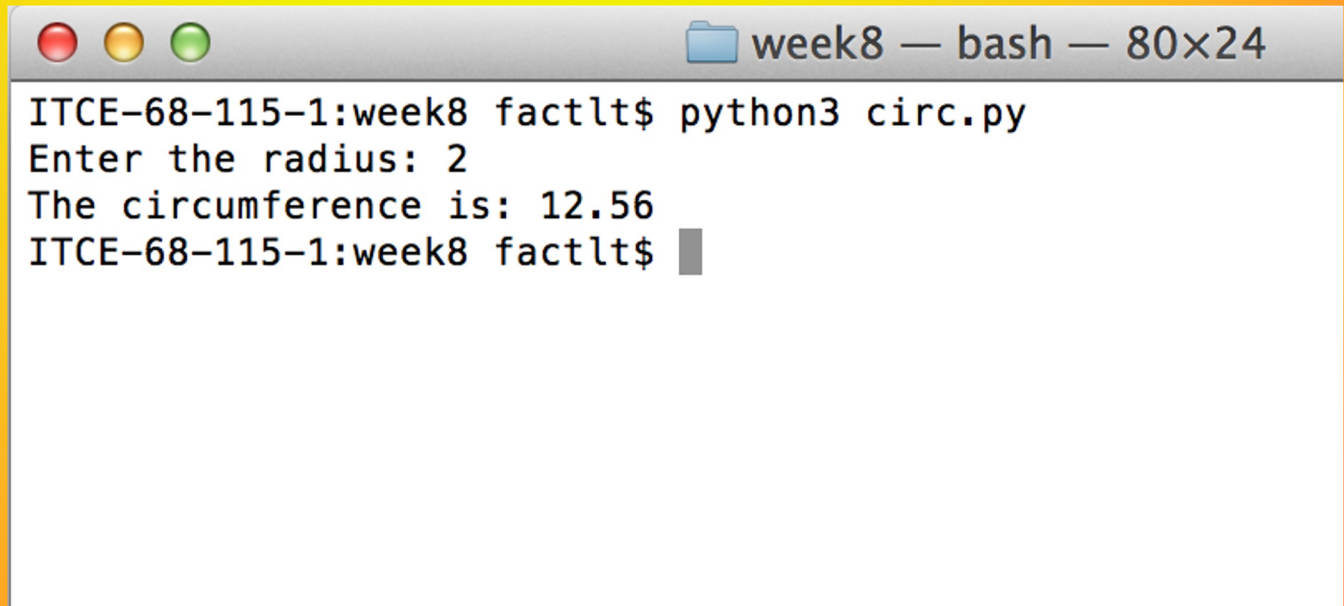
```
print('The circumference is:', circumference)
```

# What Happened?

```
radius = int( input('Enter the radius: ') )
```

```
circumference = 2 * 3.14 * radius
```

```
print('The circumference is:', circumference)
```

A terminal window titled "week8 — bash — 80x24" with three window control buttons (red, yellow, green) on the left. The terminal content shows the execution of a Python script named "circ.py". The prompt is "ITCE-68-115-1:week8 factlt\$". The user enters "python3 circ.py". The program prompts "Enter the radius: 2". The program outputs "The circumference is: 12.56". The prompt returns to "ITCE-68-115-1:week8 factlt\$".

```
ITCE-68-115-1:week8 factlt$ python3 circ.py
Enter the radius: 2
The circumference is: 12.56
ITCE-68-115-1:week8 factlt$
```

# Variables, Expressions, and Statements

- Variables – store something
- Expressions – are something
- Statements – do something

# Expressions

- Evaluation of an Expression
  - produces a value

# Expressions

- Evaluation of an Expression
  - produces a value

'Hello ' + userName

$2 * 3.14 * \text{radius}$

# Variables, Expressions, and Statements

- Variables – store something
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- Statements – do something

# Statements

```
userName = input('What is your name?')  
print('Hello ' + userName)  
radius = input('Enter the radius: ')  
circumference = 2 * 3.14 * radius
```

# Statements

```
userName = input('What is your name?')
```

# Statements

```
print('Hello ' + userName)
```

# Statements

```
radius = input('Enter the radius: ')
```

# Statements

circumference = 2 \* 3.14 \* radius

# You Try It

## Program Mode

Write a program that inputs the length and width of a rectangle and prints the area of the rectangle

- User Interface
- Algorithm
- Syntax

# Operator and Operand

$20 + 32$

hour - 1

hour \* 60 + minute

minute / 60

$5 ** 2$

$(5 + 9) * (15 - 7)$

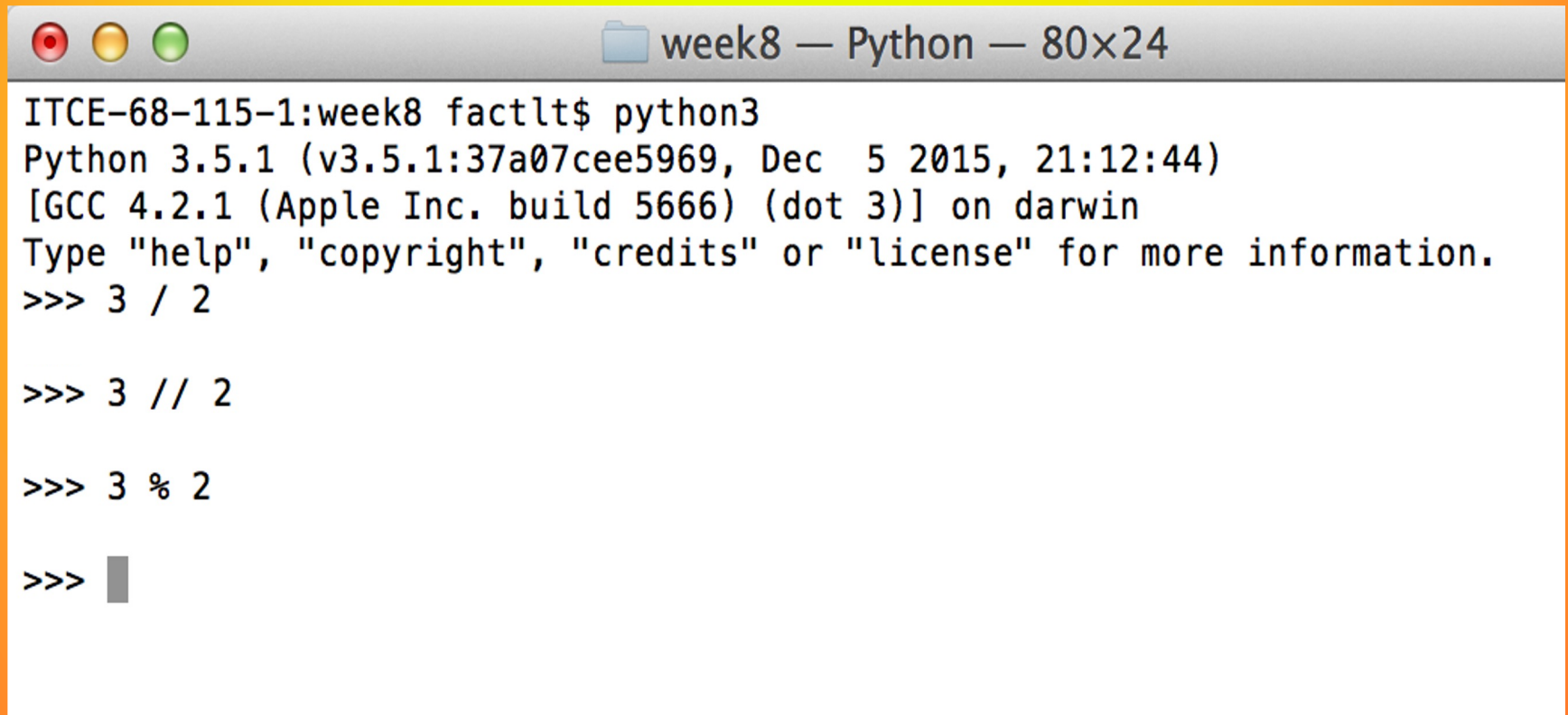
# Operator and Operand

$3 / 2$  Floating point division

$3 // 2$  Integer division

$3 \% 2$  Remainder

# You Try It Shell Mode



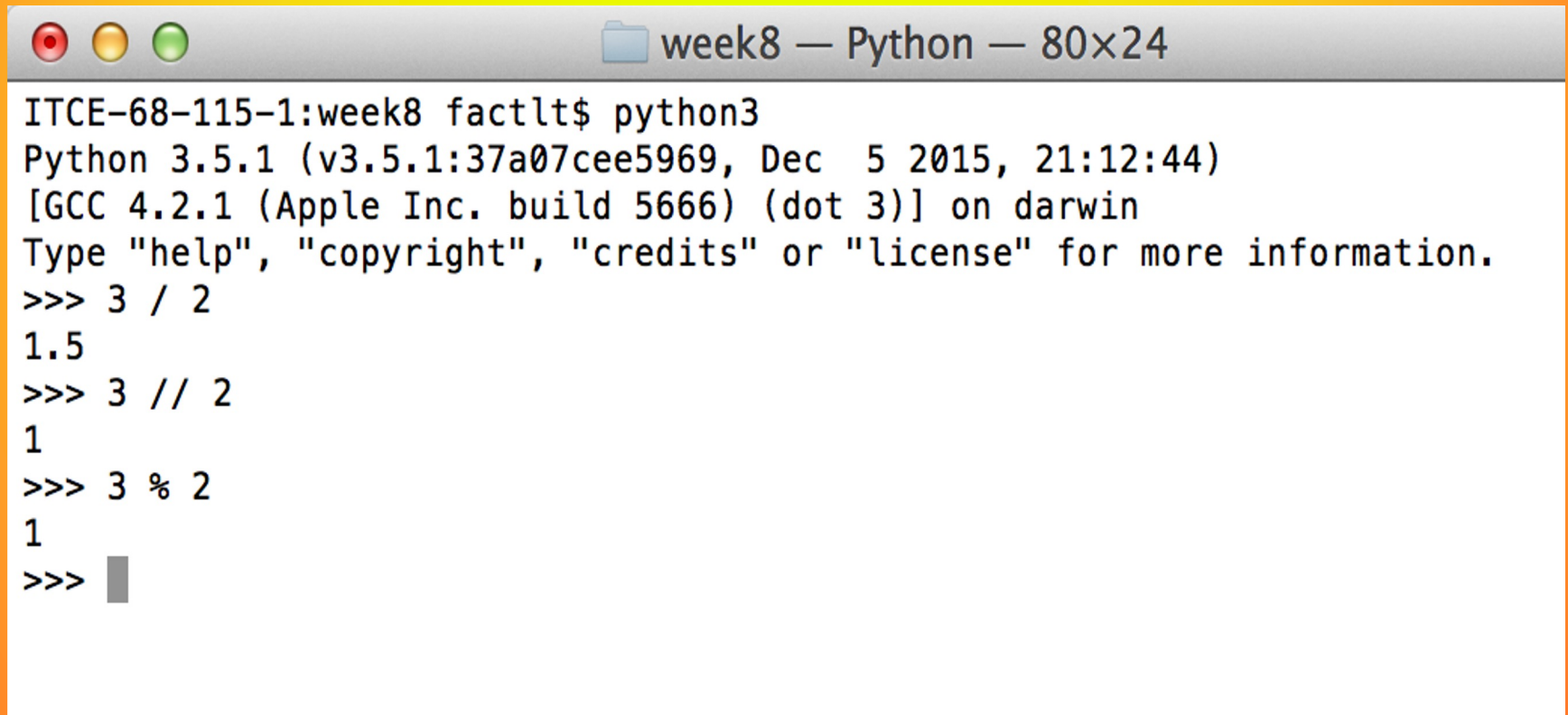
```
ITCE-68-115-1:week8 factlt$ python3
Python 3.5.1 (v3.5.1:37a07cee5969, Dec 5 2015, 21:12:44)
[GCC 4.2.1 (Apple Inc. build 5666) (dot 3)] on darwin
Type "help", "copyright", "credits" or "license" for more information.
>>> 3 / 2

>>> 3 // 2

>>> 3 % 2

>>> █
```

# You Try It Shell Mode



```
ITCE-68-115-1:week8 factlt$ python3
Python 3.5.1 (v3.5.1:37a07cee5969, Dec  5 2015, 21:12:44)
[GCC 4.2.1 (Apple Inc. build 5666) (dot 3)] on darwin
Type "help", "copyright", "credits" or "license" for more information.
>>> 3 / 2
1.5
>>> 3 // 2
1
>>> 3 % 2
1
>>> █
```

# Reassignment

```
a = 5
```

```
print a
```

```
a = 7
```

```
print a
```

```
b = a
```

```
print b
```

```
a = 1
```

```
print b
```

# Reassignment

```
a = 5
```

```
print a
```

```
a = a + 1
```

```
print a
```

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# Glossary Matching Game

Variables

Expressions

Statements

Type

Value

Operator

Operand

# Review

- Assign Variable a value

- circumference = 2

- circumference = circumference + 5

- Input statement

- userQuest = input('What is your Quest?')

- Print statement

- print('You quest for', userQuest)

- Type conversion

- int( '2' )

# Most Awesomely Excellent!

