

CS 110

Ints, String Multiplication

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Announcements

- Groups and seating
- Videos for online component
- Prep Problems

The Goal: House printing

- Write a program that allows us to print out a house of various widths
- The user can tell the program how wide of a house to print
- For example...

The Goal: House printing

What size house should be printed? 3

$$\begin{array}{c} \wedge \\ \text{---} \quad \text{---} \\ / \quad \backslash \\ | \quad \text{H} \quad | \\ | \quad \text{H} \quad | \\ \text{---} \quad \text{---} \end{array}$$

The Goal: House printing

What size house should be printed? 12

```
      ^
_____/_____\
|           |
|           |
|           |
|_____|_____|
```

The Goal: House printing

What size house should be printed? 0

^

/ \

|H|

|H|

The Goal: House printing

What size house should be printed? 7

```
      ^
  _____
 /         \
|           |
|      H    |
|           |
|_____H____|
```

The Goal: House printing

What size house should be printed? 3

$$\begin{array}{c} \wedge \\ \text{---} \quad \text{---} \\ / \quad \quad \backslash \\ | \quad \text{H} \quad | \\ | \quad \text{H} \quad | \\ \text{---} \quad \text{---} \end{array}$$

What size house should be printed? 7

$$\begin{array}{c} \wedge \\ \hline / \quad \backslash \\ | \quad \text{H} \quad | \\ | \quad \text{H} \quad | \\ \hline \end{array}$$

What size house should be printed? 12

$$\begin{array}{c} \wedge \\ \hline / \qquad \backslash \\ | \qquad \text{H} \qquad | \\ | \qquad \text{H} \qquad | \\ \hline \end{array}$$

What size house should be printed? 0

$$\begin{array}{c} \wedge \\ / \quad \backslash \\ |H| \\ |H| \end{array}$$

The Goal: House printing

What size house should be printed? 7

```
      ^
  _____
 /           \
|             |
|      H      |
|             |
|_____H_____|
```

Do we know enough to create this?

The Goal: House printing

What size house should be printed? 7

```
      ^
  _____
 /         \
|           |
|      H    |
|      H    |
|_____     |
```

Do we know enough to create this?

***... let's revisit after you
learn a *few* more things***

Which program prints something different than the others?

```
first_name = 'Kevin'  
last_name = 'McCallister'  
print(first_name, last_name)
```

A

```
first_name = 'Kevin '  
print(first_name, ' McCallister')
```

B

```
print('Kevin', 'McCallister')
```

C

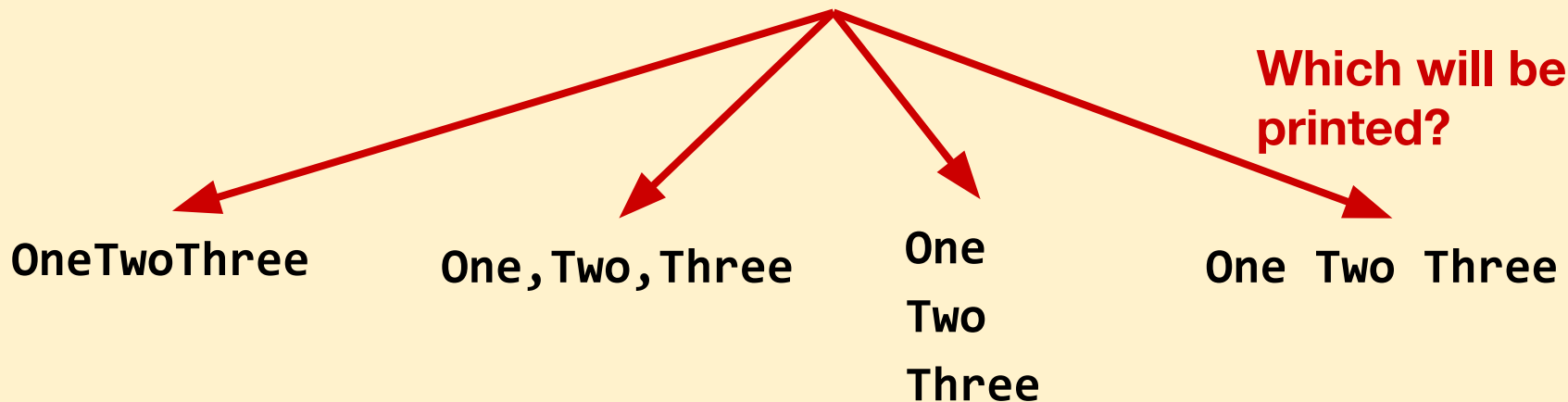
```
print('Kevin McCallister')
```

D

Using the Comma

- You can put multiple strings in a single call to the print function
- One way to do this is by separating them with commas
- For example:

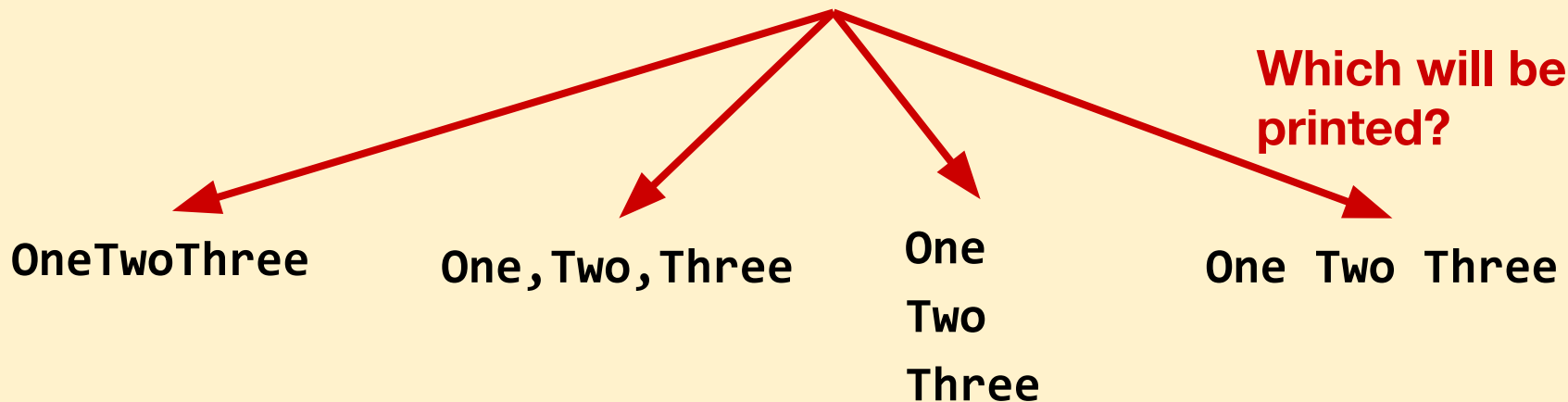
```
print('One', 'Two', 'Three')
```



Using the plus (concatenation)

- Can also combine strings with the plus symbol
- This is referred to as ***string concatenation***
- For example:

```
print('One' + 'Two' + 'Three')
```



What will this print out?

```
name = 'Jim'
```

```
age = '35'
```

```
print('Hello ' + name)
```

```
print('you are', age, 'years old')
```

The `input()` function

- The `input()` function is the second function introduced
 - The first one being `print()`
- The input function allows the programmer to read in a value from the user
- Now, we can make an interactive program!

Change so that the user can customize the input

```
name  = 'Jim'  
age   = '35'  
print('Hello ' + name)  
print('you are', age, 'years old')
```


Change so that the user can customize the input

```
name  = input('What is your name? ')
age   = input('How old are you? ')
print('Hello ' + name)
print('you are', age, 'years old')
```

Escape Sequences

- We've seen several **escape sequences** so far
- An escape sequence is a sequence of characters that produces a particular character within a string
 - `\'` `\"` What do these produce?

Escape Sequences

- We've seen several **escape sequences** so far
- An escape sequence is a sequence of characters that produces a particular character within a string
 - `\'` `\"` What do these produce?
 - And now: `\n`

What is the difference?

```
name = input('What is your name? ')\nage = input('How old are you? ')\nprint('Hello ' + name)\nprint('you are', age, 'years old')
```

```
name = input('What is your name?\n')\nage = input('How old are you?\n')\nprint('Hello ' + name)\nprint('you are', age, 'years old')
```

Integers and Variables

- We can also assign a name to a numeric value, instead of a string of characters
- For the time being, we will be using **integers**
 - **Integer:** a number with no fractional or decimal representation

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- For the time being, we will be using **integers**
 - **Integer:** a number with no fractional or decimal representation
- For example:

```
age = 32
```

```
years_in_service = 17
```

```
wing_width = 25
```

What will this print out?

```
name = 'Joe'
```

```
age = 35
```

```
inches = 72
```

```
print('Hello', name)
```

```
print('you are', age, 'years old')
```

```
print('and', inches, 'inches tall')
```

Multiplying a string

- You can use the asterisk (*) to repeat a string any number of times

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- For example

```
name = 'CSc' * 3  
print(name)
```

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- For example

```
name = 'CSc' * 3
```

```
print(name)
```



CScCScCSc

Multiplying a string

- You can use the asterisk (*) to repeat a string any number of times
- For example

```
name = 'CSc' * 10
```

```
print(name)
```



CScCScCScCScCScCScCScCScCSc

String Multiplication question

What will this print out? Don't use your computer, use the whiteboard!

```
print( '#' * 2)
```

```
print( '#' * 4)
```

```
print( '#' * 6)
```

```
print( '#' * 8)
```

String Multiplication question

What will this print out. Use your white board - no computers!

```
print(' ' * 5, 'A' * 1)
print(' ' * 4, 'B' * 3)
print(' ' * 3, 'C' * 5)
print(' ' * 2, 'D' * 7)
print(' ' * 1, 'E' * 9)
print(' ' * 0, 'F' * 11)
```

Revisiting House printing

- Write a program that allows us to print out a house of various widths
- The user can tell the program how wide of a house to print

What size house should be printed? 3

```
  ^
 /  \
|    |
|  H  |
|__H__|
```

What size house should be printed? 7

```
      ^
 /      \
|        |
|   H   |
|____H____|
```

What size house should be printed? 12

```
          ^
 /          \
|              |
|           H  |
|____H____|
```

What size house should be printed? 0

```
  ^
 / \
|H|
|H|
```

Revisiting House printing

Let's write it!

- Write a program that allows us to print out a house of various widths
- The user can tell the program how wide of a house to print

What size house should be printed? 3

```
  ^
 /   \
|   H   |
|_H_|
```

What size house should be printed? 7

```
      ^
 /         \
|           |
|   H       |
|_H_|
```

What size house should be printed? 12

```
          ^
 /             \
|               |
|       H       |
|_H_|
```

What size house should be printed? 0

```
  ^
 / \
|H|
|H|
```

Step 1

- Write a program that just prints out one house size:

Here's a size 3 house:

```
      ^
    ____
   /      \
  |    H    |
  |    H    |
  |_____|
```


Step 1

```
1  print("Here's a size 3 house:")
2  print("  ____^____")
3  print("/          \ ")
4  print("|      H      |")
5  print("|____H____|")
```

Step 2

- Next, change the program to grab an input value
 - (Can still print just the size 3 house)

What size house should be printed? **X**

```

      ^
    ____
   /      \
  |    H    |
  |    H    |
  |_____|
  
```

```

1  print("Here's a size 3 house:")
2  print("  ____^____")
3  print("/          \ ")
4  print("|    H    |")
5  print("|___H___|")
  
```

Step 2

```
1 size = input('What size house should be printed? ')
2 print("  ____^____")
3 print("/          \ ")
4 print("|      H      |")
5 print("|____H____|")
```

Step 3

- Now, use this number to grow the width of the house

What size house should be printed? 3

```
  ^
  / \
 |   |
 | H |
 | H |
```

What size house should be printed? 7

```
      ^
      / \
 |       |
 |   H   |
 |   H   |
```

What size house should be printed? 12

```
          ^
          / \
 |               |
 |           H   |
 |           H   |
```

What size house should be printed? 0

```
  ^
 / \
 |H|
 |H|
```

Step 3

- Now, use this number to grow the width of the house

What size house should be printed? 3

```
  ^
 /   \
|     |
|  H  |
|_H_|
```

What size house should be printed? 7

```
      ^
     /   \
    |     |
    |  H  |
```

What size house

```
      ^
     /   \
    |     |
    |  H  |
    |_H_|
```

d be printed? 0

```
 / \
|H|
|H|
```

**Did you convert the input
value to an integer?**

Converting an input value to a string

Does not work:

```
width = input('enter width: ')\nprint('-' * width)
```

Converting an input value to a string

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```

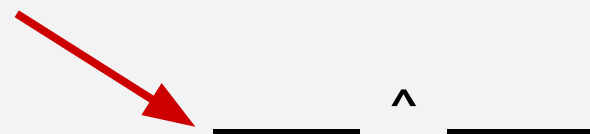
Does work:

```
width = int(input('enter width: '))\nprint('-' * width)
```

Commas and Concatenation

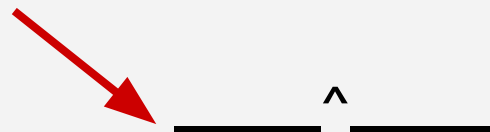
- Use **string concatenation** (+) instead of a **comma** (,)

```
print( '_' * 5, '^', '_' * 5 )
```



_____ ^ _____

```
print( '_' * 5 + '^' + '_' * 5 )
```



_____ ^ _____

Step 3

- Now, use this number to grow the width of the house

What size house should be printed? 3

$$\begin{array}{c} \wedge \\ \text{---} \quad \text{---} \\ / \quad \quad \backslash \\ | \quad \text{H} \quad | \\ | \quad \text{H} \quad | \\ \text{---} \quad \text{---} \end{array}$$

What size house should be printed? 7

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What size house should be printed? 12

What size house should be printed? 0

$$\begin{array}{c} \wedge \\ / \quad \backslash \\ | \text{H} | \\ | \text{H} | \end{array}$$

house.py

```
size = int(input('What size house should be printed? '))
print(' ' + '_' * size + '^' + '_' * size + ' ')
print('/' + ' ' * size + ' ' + ' ' * size + '\\')
print('|' + ' ' * size + 'H' + ' ' * size + '|')
print('|' + '_' * size + 'H' + '_' * size + '|')
```

Comments

- Lines starting in # are comments to the user
- You can leave comments for yourself, of future readers of your code!

```
# This is come code that will print out two lines of text  
print('He said, "What is up?")  
print("Joe's friend didn't reply.")
```

Comments

- It is typical to put a comment at the top of all code files
- This is called a **header comment** or **file comment**
- You should do this for all of your programs, including the **Movies** PA

```
#
```

```
# Author: Benjamin Dicken
```

```
# Class: CSc 110
```

```
# Description: A program that . . .
```

```
#
```

What does it print?

```
a = int(input('input a: '))    # 5
```

```
b = int(input('input b: '))    # 2
```

```
o = '#' * a + '\n'
```

```
t = '|' * a + '\n'
```

```
print(o * b + t * b)
```

What does this print?

```
a = int(input('input a: '))    # 10
```

```
b = int(input('input b: '))    # 1
```

```
o = '#' * a + '\n'
```

```
r = o * 2 + '\n\n'
```

```
print(o + r + o)
```