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
    ^
 ___ ___
/       \
|   H   |
|___H___|
```

The Goal: House printing

```
What size house should be printed? 12
 ____________^____________
/                         \
|            H            |
|____________H____________|
```

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
 ___^___
/       \
|   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|
```

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

Activity

Which program prints something different than the others?

A

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

B

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

C

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

D

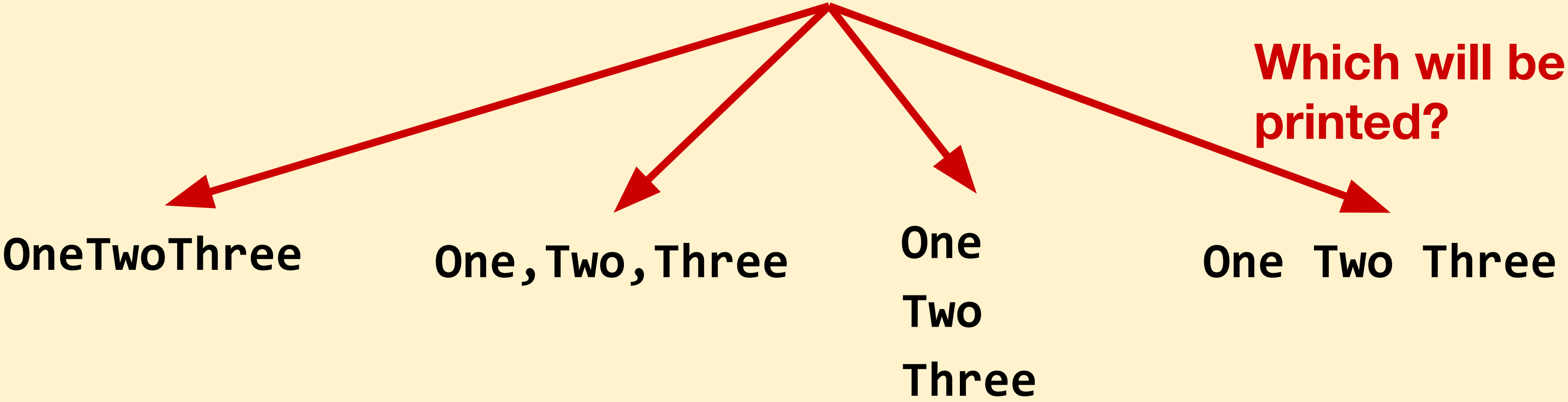
```
print('Kevin McCallister')
```

Activity

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')
```



Which will be printed?

```
OneTwoThree
```

```
One,Two,Three
```

```
One
Two
Three
```

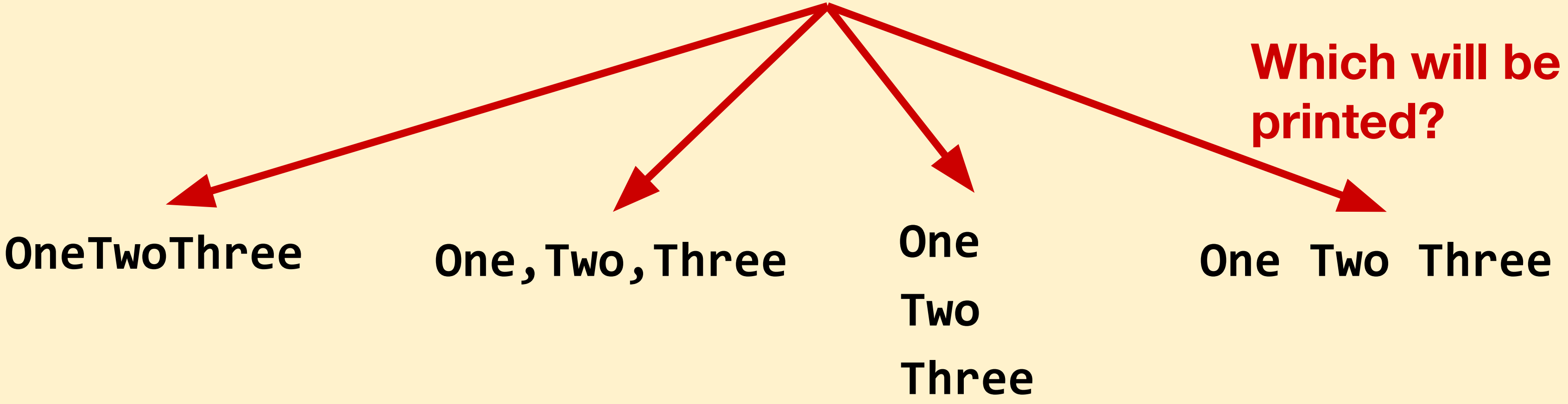
```
One Two Three
```

Activity

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')
```



Which will be printed?

```
OneTwoThree
```

```
One,Two,Three
```

```
One
Two
Three
```

```
One Two Three
```

Activity

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!

Activity

Change so that the user can customize the input

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

Change so that the user can customize the input

```python
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`

Activity

What is the difference?

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

```python
name  = input('What is your name?\n')
age  = input('How old are you?\n')
print('Hello ' + name)
print('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

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
- For example:

```
age = 32

years_in_service = 17

wing_width = 25
```

Activity

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

```python
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)
```

```
CScCScCScCScCScCScCScCScCScCSc
```

Activity

String Multiplication question

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

```
print('#' * 2)
print('#' * 4)
print('#' * 6)
print('#' * 8)
```

Activity

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|
```

Activity

Step 1

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

```
Here's a size 3 house:
 ___^___
/       \
|   H   |
|___H___|
```

Step 1

```python
print("Here's a size 3 house:")
print(" ___^___")
print("/       \ ")
print("|   H   |")
print("|___H___|")
```

Step 2

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

```
print("Here's a size 3 house:")
print(" ___^___")
print("/       \ ")
print("|   H   |")
print("|___H___|")
```

```
What size house should be printed? X
 ___^___
/       \
|   H   |
|___H___|
```

Step 2

```python
size = input('What size house should be printed? ')
print(" ___^___")
print("/       \ ")
print("|   H   |")
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: ')
print('-' * width)
```

Converting an input value to a string

Does not work:

```python
width = input('enter width: ')
print('-' * width)
```

Does work:

```python
width = int(input('enter width: '))
print('-' * width)
```

Commas and Concatenation

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

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

```
_____ ^ _____
```

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

```
_____^_____
```

Activity

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|
```

house.py

```python
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 . . .
#
```

Activity

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)
```

Activity

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)
```