CSE 8A: Intro to Programming in Python

Fall 2021

Lecture 16 - 2D list, tuples

UC San Diego

Topics

- Nested loop review
- 2D list
- Tuple

Review: Nested For Loops

How many times will `"Live today!"` be printed?

```
for i in range(2):
    for j in range(3):
        print("Live today!")
```

A) 2	B) 3	C) 5	D) 6

Review: Nested For Loops

How many times will `"Live for others!"` be printed?

```
for i in range(2):
    print("Live for others!")
    for j in range(3):
        print("-------------")
```

A) 2	B) 3	C) 5	D) 6

Review: Nested For Loops

How many times will `"Live for others!"` be printed?

```
for i in range(2):
    for j in range(3):
        print("-------------")
print("Live for others!")
```

A) 2

B) 3

C) 1

D) 6

2D List

- 1D list can be viewed as a collection of things
- 2D list can be viewed as a grid of things
  - Table
  - Picture (what we focus on)

Example: 5 labs per student for 3 students

grades = [[90, 91, 92, 93, 100], [20, 0, 0, 100, 100], [100, 100, 100, 0, 0]]

```
grades = [[90, 91, 92, 93, 100],
          [20, 0, 0, 100, 100],
          [100, 100, 100, 0, 0]]
```

Indexes	0	1	2	3	4
0	**90**	**91**	**92**	**93**	**100**
1	**20**	**0**	**0**	**100**	**100**
2	**100**	**100**	**100**	**0**	**0**

Exercise: 2d Lists

What will be printed?

```
data = [[10, 20, 30, -1], [40, 50, 60, -2], [70, 80, 90, -3]]
print(data[1])
```

A) 20	B) [10, 20, 30, -1]	C) [40, 50, 60, -2]	D) Error: list index out of range

Exercise: 2d Lists

What will be printed?

```
data = [[10, 20, 30, -1], [40, 50, 60, -2], [70, 80, 90, -3]]
print(data[0][1])
```

A) 10	B) 20	C) 40	D) Error: list index out of range

Exercise: 2d Lists

What will be printed?

```
data = [[10, 20, 30, -1], [40, 50, 60, -2], [70, 80, 90, -3]]
print(data[3][4])
```

A) -1

B) -2

C) -3

D) Error: list index out of range

```
grades = [[90, 91, 92, 93, 100],
          [20, 0, 0, 100, 100],
          [100, 100, 100, 0, 0]]
```

Indexes	0	1	2	3	4
0	**90**	**91**	**92**	**93**	**100**
1	**20**	**0**	**0**	**100**	**100**
2	**100**	**100**	**100**	**0**	**0**

Exercise: Accessing 2d Lists using Nested For Loops

What will be printed?

```
data = [[10, 20],
        [30, 40]]

for i in range(len(data)-1):
    for j in range(len(data[i])):
        print(data[i][j])
```

A)
10
20

B)
30
40

C)
10
20
30
40

D) Error: list index out of range

Exercise: Accessing 2d Lists using Nested For Loops

What will be printed?

```
data = [[10, 20],
        [30, 40]]

for i in range(len(data)):
    for j in range(len(data[i])):
        print(data[j][i])
```

A)
10
20
30
40

B)
10
30
20
40

C)
10
30
40
20

D) Error: list index out of range

Coding Challenge: Variable Updates in Nested For Loops

Write a function that given a day of the week (0 - 4), returns the weather in the three cities (Miami, Cleveland, San Diego) on that day as a list.

```
data = [[23, 24, 25, 27, 26],
        [0, -1, 1, -3, -2],
        [9, 10, 11, 12, 11]]

def get_a_days_weather(wdata, day):
    # write code here
```

```
>>> get_a_days_weather(data, 0)
[23, 0, 9]
>>> get_a_days_weather(data, 2)
[25, 1, 11]
>>> get_a_days_weather(data, 4)
[26, -2, 11]
>>> get_a_days_weather(data, 5)
'day 5 is invalid!'
>>> get_a_days_weather(data, -1)
'day -1 is invalid!'
>>>
```

Tuples

An easy way to group a small number of things together

Example: weight, age, and height of a person

maria = [141.5, 42.0, 5.5] jose = (180.5, 37.5, 6.1)

Q: why not 3 independent variables?

Q: why not using a list?

Exercise: Tuples

What will happen when we run this code below?

```
loc = (12.83, 11.93)
a = loc[0]
b = loc[1]
b = 0
b = a
print(loc)
```

A) `(12.83, 11.93)` will be printed

B) `(12.83, 0)` will be printed

C) (0,0) will be printed

D) (12.83, 12.83) will be printed

E) Error: Tuples are immutable

Exercise: Tuples

What will happen when we run this code below?

```
loc = (12.83, 11.93)
loc[1] = 13.61
print(loc)
```

A) `(13.61, 11.93)` will be printed

B) `(12.83, 0)` will be printed

C) (0,0) will be printed

D) (12.83, 13.61) will be printed

E) Error: Tuples are immutable

Exercise: Tuples

What will happen when we run this code below?

```
loc = (12.83, 11.93)
(a, b) = loc
(b, a) = (a, b)
print(loc)
```

A) `(11.93, 12.83)` will be printed

B) `(12.83, 11.93)` will be printed

C) (11.93, 11.93) will be printed

D) Error: syntax error

E) Error: Tuples are immutable