CS 1520: Recitation 4

Python – Data Structures and Installations

Python Tuples

- Immutable
- Tuple of first 5 natural numbers.
  - a = (1, 2, 3, 4, 5);
- Write a tuple having only element “CS1520”
  - b = (“CS1520”,);
- Accessing tuple elements
  - Access the 1st element of tuple using a[0]

Exercise 1

- Swap two Numbers a and b

  temp = a

  a = b

  b = temp

- Pythonic way to swap two numbers a and b?

  (a,b) = (b,a)

http://interactivepython.org/runestone/static/pip2/Tuples/TupleAssignmentwithunpacking.html

Exercise 2

- What will be the output of the following code snippet?

```
def add(x, y):
    return x + y

print (add(3, 4))
z = (5, 4)
print (add(*z))
print (add(z))
```

http://interactivepython.org/runestone/static/pip2/Tuples/TupleAssignmentwithunpacking.html

Exercise 2

print (add(*z)) unpacks the tuple z

- Output:

```
7
9
Traceback (most recent call last):
  File "test.py", line 21, in <module>
    print add(z)
TypeError: add() takes exactly 2 arguments (1 given)
```

http://interactivepython.org/runestone/static/pip2/Tuples/TupleAssignmentwithunpacking.html

Python Lists

- Mutable

- Updating list elements
  - a = [1, 2, 3, ‘a’]
  - Updating the 2nd element to 10
    - a[1] = 10

- Delete the 2nd element of list a
  - del a[1]

Slicing

- x[startAt:endBefore:skip]

- b = [100, 101, 102, 103, 104, 105, 106, 107, 108, 109]

- Give output of the following:
  - print (b[1:5])
  - print (b[-5])
  - print(b[-5:-2])
  - print(b[5:])
  - print(b[0:10:2])

Slicing

- b = [100, 101, 102, 103, 104, 105, 106, 107, 108, 109]

- Give output of the following:
  - print (b[1:5]) = [101, 102, 103, 104]
  - print (b[-5]) = 105
  - print(b[-5:-2]) = [105, 106, 107]
  - print(b[5:]) = [105, 106, 107, 108, 109]
  - print(b[0:10:2]) = [100, 102, 104, 106, 108]

Python Dictionary

- Code Snippet

```
d = {'Name’: ‘Mark', 'Age': 30}
print (“d['Name']: ", d['Name'])
print (“d['Age']: ", d['Age’])
```

- Output

```
d['Name']:  Mark
d['Age']:  30
```

Exercise 3

- Give Output of the following:

```
d = {'Name’: ‘Mark', 'Age’: 20, 'Name’: ‘John’}
print (“d['Name']: ", d['Name’])
```

- Output

```
d['Name']:  John
```

Exercise 4

- Give output of the following:

```
d = {['Name']: ‘Mark', 'Age’: 25}
print (“d['Name']: ", d['Name’])
```

- Output:

```
Traceback (most recent call last):
  File "test.py", line 3, in <module>
    d = {['Name’]: ‘Mark', 'Age’: 25}
TypeError: list objects are unhashable
```

- Dictionary keys must be immutable

List Comprehensions

- [expression for item in list if conditional]

is equivalent to

- for item in list:
    if conditional:
        expression

https://www.pythonforbeginners.com/basics/list-comprehensions-in-python

Exercise 5

- Create a list of squares of numbers from 0-9 using:
  - for loop
  - List comprehension

- Using for loop”

```
squares = []
for x in range(10):
    squares.append(x**2)
```

- Using list comprehension
  - squares = [x**2 for x in range(10)]

https://www.pythonforbeginners.com/basics/list-comprehensions-in-python

Exercise 6

- Give output of the following:

```
t = [s for s in [1, 2, 3] if s % 2]
print (t)
```

- Output: [1,3]

- Give output of the following:

```
t = [(m, n) for n in range(2) for m in range(3, 5)]
print (t)
```

- Output: [(3, 0), (3, 1), (4, 1), (4, 0)]

https://python-reference.readthedocs.io/en/latest/docs/comprehensions/set_comprehension.html

Installations

- Download and Install Python 3.7
  - https://www.python.org/downloads/

- Install virtualenv and virtualenvwrapper
  - For Windows:
    - http://timmyreilly.azurewebsites.net/python-pip-virtualenv-installation-on-windows/
  - For Mac and Linux:
    - http://exponential.io/blog/2015/02/10/install-virtualenv-and-virtualenvwrapper-on-mac-os-x/
    - http://roundhere.net/journal/virtualenv-ubuntu-12-10/
- Install Jupyter Notebook
  - http://jupyter.org/install