Introduction to
Python For Data Science

March, 2018

GSA

D2D
DATA TO DECISIONS

Questions?

Variables

Operators

Assignment

Lists

Functions

Methods

imports

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Exercise 1

What is the type of the following variables?

X=4

Y=5.4

N=X+Y

Z="Some Text"

G=Z*3

A=Z+X

F=True

W=[X,Y,Z,F]

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Exercise 1

What is the type of the following variables?

(Use the type() function)

X=4 ← Int

Y=5.4 ← Float

N=X+Y ← Float

Z="Some Text" ← Str

G=Z*3 ← Str

A=Z+X ← Error! (How can it be fixed?)

F=True← Bool

W=[X,Y,Z,F] ← List

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Exercise 2

Which of the following code segments are valid?

Block 1:

```
A='I am a developer'
print(a)
```

Block2:

```
x,y=4,7
print(x+y)
```

Exercise 2

Which of the following code segments are valid?

Block 1:

A=‘I am a developer’

print(a)

INVALID: Variable names are case sensitive

Block2:

x,y=4,7

print(x+y)

VALID: You can assign multiple variables at the same time

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Exercise 2

Which of the following code segments are valid?

Block 3:

```
2ValueList=[4,8]
print(2ValueList[0])
```

Block4:

```
Text="Hello GSA"
print(Text[4])
```

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Exercise 2

Which of the following code segments are valid?

Block 3:

```
2ValueList=[4,8]
print(2ValueList[0])
```

INVALID: A Variable Name cannot start with a number

Block4:

```
Text="Hello GSA"
print(Text[4])
```

VALID: A String is a sequence object, closer to a tuple

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Exercise 3

What is the output of the following?

```
x='3'
y=17
print(int(x)+int(x+str(y)))
print(int(x)+int(str(y)))
```

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Exercise 3

What is the output of the following?

```
x='3'
y=17
print(int(x)+int(x+str(y)))
print(int(x)+int(str(y)))
```

Output:

320

20

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Checkpoint

- Variables
  - No type declaration necessary (Python figures out the type)
  - first assignment creates the variable
  - Assignment is done using “=“
- Operations
  - Operator can behave differently based on the data type
    - + Adds Integers, concatenates Strings
  - Strongly-Typed is the way! (No implicit type conversions)
- Multiple Assignment
  - x,y=4,6
- Variable names are:
  - **Case Sensitive!**
  - Can **NOT** start with a number
  - Can contain underscores, letters, numbers
  - Can **NOT** be a reserved word (if, elif, global, return, pass, import …..etc.)

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Exercise 4

Given the following list:

mylist=[1,17.4,’Text’,6,89,’GSA’]

Write a python program to print the first 3 elements of the list

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Exercise 4

Given the following list:

mylist=[1,17.4,'Text',6,89,'GSA']

Write a python program to print the first 3 elements of the list

```
print(mylist[0:3])
print(mylist[:3])
print([mylist[0],mylist[1],mylist[2]])
print(mylist[:-3])
print(mylist[0:-3])
print(mylist[-6:-3])
```

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Exercise 5

Given the following list:

mylist=[1,17.4,'Text',6,89,'GSA']

Write a python program to copy the list into a new variable and replace the first and last elements with the text 'None' only in the new variable. print both lists

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Exercise 5

Given the following list:

mylist=[1,17.4,’Text’,6,89,’GSA’]

Write a python program to copy the list into a new variable and replace the first and last elements with the text ‘None’ only in the new variable. print both lists

```
mylist=[1,17.4,'Text',6,89,'GSA']
temp = mylist[:] #OR list(mylist) #OR  mylist.copy()
temp[0]='None'
temp[-1]='None' #or temp[len(temp)-1] = 'None'
print(mylist)
print(temp)
```

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Exercise 6

Given the following list:

mylist=[1,17.4,'Text',6,89,'GSA']

Write a python program to replace the first occurrence of 'GSA' with 'General Services Administration'

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Exercise 6

Given the following list:

mylist=[1,17.4,’Text’,6,89,’GSA’]

Write a python program to replace the first occurrence of ‘GSA’ with ‘General Services Administration’

```
mylist=[1,17.4,'Text',6,89,'GSA']

mylist[mylist.index('GSA')] = 'General Services Administration'
print(mylist)
```

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Checkpoint

- Lists
  - A collection of “Elements”
  - Can be sliced
    - Elements Accessible individually using [n] or [-n]
    - Ranges [1:2], [:2], [2:], [1:-1], [:]
  - Elements can be inserted, appended, removed, deleted, “popped” and changed
    - mylist.insert(3,'a')
    - mylist.append('b')
    - mylist.remove('Text')
    - del(mylist[0])
    - print(mylist.pop())
    - Mylist[0]=‘Nothing’
- Use **len(x)** to find length, **x.index(n)** on lists to “know your way”
- **Remember**: A string is also a sequence type
- You can “**Add**” (concatenate) Lists, or “**Multiply**” a List and an integer
  - [1,2,3]+[4,5,6]
  - [1,2,3]*3

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Exercise 7

Write a Python program to print today's date

(Hint: use the datetime module)

Exercise 7

Write a Python program to print today's date
(Hint: use the datetime module)

```
import datetime

print(datetime.date.today())
```

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Checkpoint

- Modules and Packages provide a way of code reuse
- Python comes with a library of standard modules/packages
  - ➢Such as datetime
  - ➢…or the statistics module
    - Import statistics
    - print(statistics.mean([1,2,3,4,5,6]))
- A package is a collection of modules
- You can import an entire package, or a module within the package
  - ➢Import matplotlib
  - ➢Import matplotlib.pyplot
- Additional packages can be installed using **pip**
  - ➢***To install a new package:*** pip install < package_name >
  - ➢***To uninstall a package:*** pip uninstall < package_name >
  - ➢***To list all installed packages:*** pip list
  - ➢***To see information about a package:*** pip show <package_name>
- **Anaconda has another package management system**: conda

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Questions?

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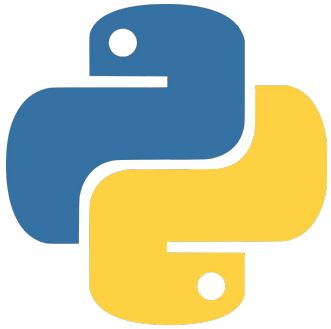
Thank You



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