1-PythonReview

December 9, 2014

```
In [5]: # enter goes to new line in same cell
        a = 10
        b = 20
        c = a + b
        print(a, b, c)
        # shift-enter executes cell
```

```
10 20 30
```

```
In [11]: def f(x):
             ' my simple single variable function '
             y = -5 + 2*x + 0.6*x**2
             return y
```

```
In [7]: f(7)
```

```
Out[7]: 38.4
```

```
In [9]: %pylab inline
```

```
Populating the interactive namespace from numpy and matplotlib
```

```
WARNING: pylab import has clobbered these variables: ['f']
`%matplotlib` prevents importing * from pylab and numpy
```

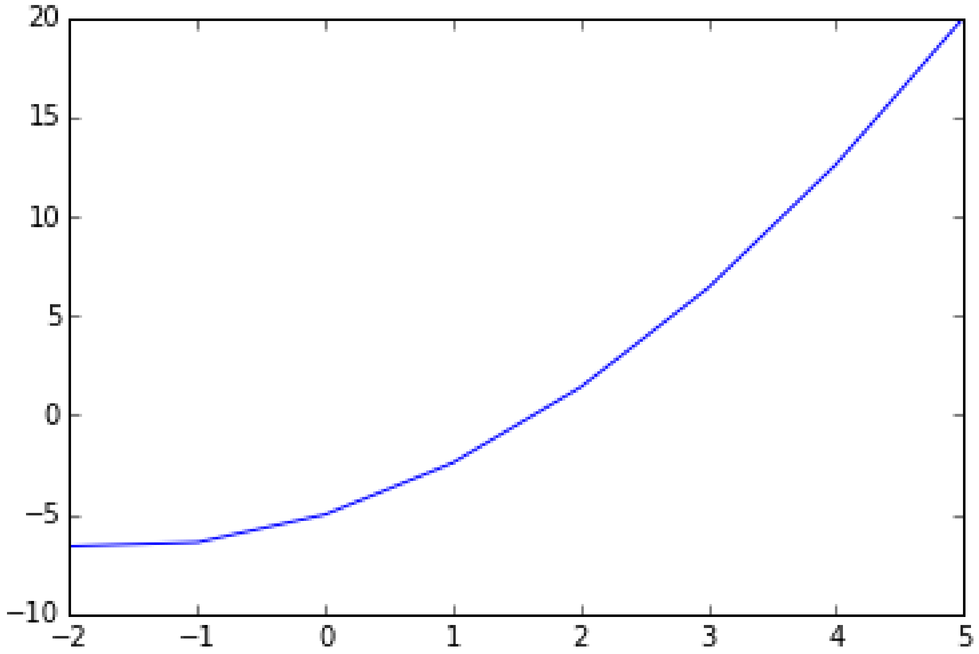
```
In [12]: x = [-2, -1, 0, 1, 2, 3, 4, 5]
         y = [f(i) for i in x]
```

```
In [13]: import matplotlib as mpl
```

```
In [14]: mpl.pylab.plot(x, y)
```

```
ERROR! Session/line number was not unique in database. History logging moved to new session 1079
```

```
Out[14]: [<matplotlib.lines.Line2D at 0x108ed6c88>]
```



```
In [15]: pwd

Out[15]: ’/Users/ijstokes/Dropbox/Public/python-mastery-isr19/python-mastery-isr19-code’

In [16]: ls

0-PythonMastery.ipynb  demo-python-math*      ianmath.py
1-PythonReview.ipynb   demopythonmath.py*     ianmath.pyc
README.md              demopythonmath.pyc     nbs/

In [18]: name = ’Ian Stokes-Rees’

In [20]: print(’%40s’ % name)

Ian Stokes-Rees

In [26]: val = 3.8365
         print(’%07.2g’ % val)

00003.8

In [29]: print(’float: %07.2g name= %20s int# %3i’ % (val, name, 34))

float: 00003.8 name=      Ian Stokes-Rees int#  34

In [30]: pwd

Out[30]: ’/Users/ijstokes/Dropbox/Public/python-mastery-isr19/python-mastery-isr19-code’

In [31]: cd ../student/Data/ # NOT PYTHON!

/Users/ijstokes/Dropbox/Public/python-mastery-isr19/student/Data
```

```
In [32]: pwd # ALSO NOT PYTHON!

Out[32]: '/Users/ijstokes/Dropbox/Public/python-mastery-isr19/student/Data'

In [33]: ls # AGAIN, NOT PYTHON!

ctabus.csv      portfolio.dat*  portfolio3.dat* words.txt
dowstocks.dat*  portfolio1.dat* prices.csv
portfolio.csv*  portfolio2.dat* stocksim.py*

In [34]: !wc words.txt

6      29     142 words.txt

In [35]: !cat words.txt

look into my eyes
look into my eyes
the eyes the eyes the eyes
not around the eyes
don't look around the eyes
look into my eyes you're under

In [36]: # back to Python!
         fh = open('words.txt')

In [37]: !ls ..

Data                    PythonMasteryBinder.pdf Solutions
Exercises               README.html             pythonmaster.zip
Optional                RunIDLE.pyw

In [38]: !pwd

/Users/ijstokes/Dropbox/Public/python-mastery-isr19/student/Data

In [39]: !ls

ctabus.csv     portfolio.csv  portfolio1.dat portfolio3.dat stocksim.py
dowstocks.dat  portfolio.dat  portfolio2.dat prices.csv     words.txt
```

0.1 Exceptions

Python 3.4 builtin Exceptions: https://docs.python.org/3.4/library/exceptions.html

```
In [1]: words = 'foo bar zip zap ping pong'.split()

In [2]: words

Out[2]: ['foo', 'bar', 'zip', 'zap', 'ping', 'pong']

In [3]: words[3]

Out[3]: 'zap'

In [4]: words[-1]

Out[4]: 'pong'
```

```
In [5]: words[5]

Out[5]: 'pong'

In [6]: words[10] # what is going to happen with this index?


        ---------------------------------------------------------------------------
    IndexError                                Traceback (most recent call last)

        <ipython-input-6-9ffc748e089c> in <module>()
    ----> 1 words[10] # what is going to happen with this index?


        IndexError: list index out of range


In [20]: # Python raises an exception!
         index = 3
         try:
             print("Getting word from index:", index)
             print("word:", words[index])
             print("Phew, loooks like it was OK")
             words.upper()
             print("And now words:", words)
         except (IndexError, AttributeError) as ex:
             print("Oh dear, an exception occurred!", ex)
         except TypeError as ex:
             print("Looks like the index wasn't an int:", ex)
         finally:
             print("This ALWAYS gets invoked")

Getting word from index: 3
word: zap
Phew, loooks like it was OK
Oh dear, an exception occurred! 'list' object has no attribute 'upper'
This ALWAYS gets invoked

In [28]: import string
         for attr in dir(__builtins__):
             if attr[0] in string.ascii_uppercase:
                 print(attr)

ArithmeticError
AssertionError
AttributeError
BaseException
BlockingIOError
BrokenPipeError
BufferError
BytesWarning
ChildProcessError
ConnectionAbortedError
ConnectionError
ConnectionRefusedError
ConnectionResetError
```

```
DeprecationWarning
EOFError
Ellipsis
EnvironmentError
Exception
False
FileExistsError
FileNotFoundError
FloatingPointError
FutureWarning
GeneratorExit
IOError
ImportError
ImportWarning
IndentationError
IndexError
InterruptedError
IsADirectoryError
KeyError
KeyboardInterrupt
LookupError
MemoryError
NameError
None
NotADirectoryError
NotImplemented
NotImplementedError
OSError
OverflowError
PendingDeprecationWarning
PermissionError
ProcessLookupError
ReferenceError
ResourceWarning
RuntimeError
RuntimeWarning
StopIteration
SyntaxError
SyntaxWarning
SystemError
SystemExit
TabError
TimeoutError
True
TypeError
UnboundLocalError
UnicodeDecodeError
UnicodeEncodeError
UnicodeError
UnicodeTranslateError
UnicodeWarning
UserWarning
ValueError
Warning
```

```
ZeroDivisionError
```

```
In [29]: # list comprehension version
         [attr for attr in dir(__builtins__) if attr[0] in string.ascii_uppercase]
```

```
Out[29]: ['ArithmeticError',
          'AssertionError',
          'AttributeError',
          'BaseException',
          'BlockingIOError',
          'BrokenPipeError',
          'BufferError',
          'BytesWarning',
          'ChildProcessError',
          'ConnectionAbortedError',
          'ConnectionError',
          'ConnectionRefusedError',
          'ConnectionResetError',
          'DeprecationWarning',
          'EOFError',
          'Ellipsis',
          'EnvironmentError',
          'Exception',
          'False',
          'FileExistsError',
          'FileNotFoundError',
          'FloatingPointError',
          'FutureWarning',
          'GeneratorExit',
          'IOError',
          'ImportError',
          'ImportWarning',
          'IndentationError',
          'IndexError',
          'InterruptedError',
          'IsADirectoryError',
          'KeyError',
          'KeyboardInterrupt',
          'LookupError',
          'MemoryError',
          'NameError',
          'None',
          'NotADirectoryError',
          'NotImplemented',
          'NotImplementedError',
          'OSError',
          'OverflowError',
          'PendingDeprecationWarning',
          'PermissionError',
          'ProcessLookupError',
          'ReferenceError',
          'ResourceWarning',
          'RuntimeError',
          'RuntimeWarning',
          'StopIteration',
          ’SyntaxError’,
          ’SyntaxWarning’,
          ’SystemError’,
          ’SystemExit’,
          ’TabError’,
          ’TimeoutError’,
          ’True’,
          ’TypeError’,
          ’UnboundLocalError’,
          ’UnicodeDecodeError’,
          ’UnicodeEncodeError’,
          ’UnicodeError’,
          ’UnicodeTranslateError’,
          ’UnicodeWarning’,
          ’UserWarning’,
          ’ValueError’,
          ’Warning’,
          ’ZeroDivisionError’]
```

```
In [25]: name = ’Ian Stokes-Rees’
```

```
In [26]: name[5]
```

```
Out[26]: ’t’
```

```
In [27]: name[0]
```

```
Out[27]: ’I’
```

```
In [46]: def check_value(val):
             if val < 0:
                 raise ValueError(’Negative Value: ’ + str(val))
             elif val > 9:
                 raise NameError(’Too big! Only 0-9 allowed: ’ + str(val))
             else:
                 print("Ah, just right: " + str(val))

         n = 15
         try:
             check_value(n)
         except ValueError as ex:
             print("Something is wrong with n:", n, "ex:", ex)
```

```
        ---------------------------------------------------------------------------
    NameError                                 Traceback (most recent call last)

        <ipython-input-46-c26a4286de36> in <module>()
          9 n = 15
         10 try:
    ---> 11     check_value(n)
         12 except ValueError as ex:
         13     print("Something is wrong with n:", n, "ex:", ex)


        <ipython-input-46-c26a4286de36> in check_value(val)
```

```
          3         raise ValueError('Negative Value: ' + str(val))
          4     elif val > 9:
    ----> 5         raise NameError('Too big! Only 0-9 allowed: ' + str(val))
          6     else:
          7         print("Ah, just right: " + str(val))


        NameError: Too big! Only 0-9 allowed: 15
```

```
In []:
```

```
In []: if val < 0:
           raise ValueError('Negative Value: ' + str(val))
       elif val > 9:
           raise NameError('Too big! Only 0-9 allowed: ' + str(val))
       else:
           print("Ah, just right: " + str(val))
```