Python Workshop
 Process Flow 

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Outline

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Background Information

- Example python script `ProcessFlowExamples.py`
- Process flow control resources:
  `http://docs.python.org/tutorial/controlflow.html`

while, continue, and break

Import data from an external file and iterate over data using **while** and **print** last entry.

```
1   import numpy as np
2   #--load flow data
3   q = np.genfromtxt( '..\\data\\ProcessFlow.dat', skip_header=1 )
4   #--determine sizes
5   ntimes, ncol = q.shape[0], q.shape[1]
6   print 'Number of times:   {0:10d}\nNumber of entries: {1:10d}'.format( ntimes, ncol )
7   #--while iteration with break and continue
8   ipos = 0
9   while True:
10      #--only print last line
11      if ipos+1 < ntimes:
12          #--increment ipos by one
13          ipos += 1
14          continue
15      #--print data
16      print '{0:25s}: {1}, {2}, {3}'.format( 'while iteration', ipos+1, q[ipos,0], q[ipos,1] )
17      #--terminate after printing last element
18      break
```

`range` iterator and `continue`

Import data from an external file and iterate over data using **`range`** and **`print`** last entry.

```
1   import numpy as np
2   #--load flow data
3   q = np.genfromtxt( '..\\data\\ProcessFlow.dat', skip_header=1 )
4   #--determine sizes
5   ntimes, ncol = q.shape[0], q.shape[1]


19  #--range iterator - range creates a list
20  for ipos in range(0,ntimes):
21      #--only print last line
22      if ipos+1 < ntimes:
23          continue
24      #--print data
25      print '{0:25s}: {1}, {2}, {3}'.format( 'range iteration', ipos+1, q[ipos,0], q[ipos,1] )
```

`xrange` iterator and `continue`

Import data from an external file and iterate over data using **`xrange`** and **`print`** last entry.

```
1   import numpy as np
2   #--load flow data
3   q = np.genfromtxt( '..\\data\\ProcessFlow.dat', skip_header=1 )
4   #--determine sizes
5   ntimes, ncol = q.shape[0], q.shape[1]


26  #--xrange iterator - xrange is a generator
27  for ipos in xrange(0,ntimes):
28      #--only print last line
29      if ipos+1 < ntimes:
30          continue
31      #--print data
32      print '{0:25s}: {1}, {2}, {3}'.format( 'xrange iteration', ipos+1, q[ipos,0], q[ipos,1] )
```

`in` iterator and `continue`

Import data from an external file and iterate over data using **`in`** iterator and **`print`** last entry.

```
1   import numpy as np
2   #--load flow data
3   q = np.genfromtxt( '..\\data\\ProcessFlow.dat', skip_header=1 )
4   #--determine sizes
5   ntimes, ncol = q.shape[0], q.shape[1]


33  #--element iterator
34  ipos = 0
35  for t in q:
36      #--increment ipos by one
37      ipos += 1
38      #--only print last line
39      if ipos < ntimes:
40          continue
41      #--print data
42      print '{0:25s}: {1}, {2}, {3}'.format( 'element iteration', ipos, t[0], t[1] )
```

`enumerate` iterator and **`continue`**

Import data from an external file and iterate over data using `enumerate` iterator and **`print`** last entry.

```
1   import numpy as np
2   #--load flow data
3   q = np.genfromtxt( '..\\data\\ProcessFlow.dat', skip_header=1 )
4   #--determine sizes
5   ntimes, ncol = q.shape[0], q.shape[1]


43  #--enumeration iterator
44  for ipos,t in enumerate(q):
45      #--only print last line
46      if ipos+1 < ntimes:
47          continue
48      print '{0:25s}: {1}, {2}, {3}'.format( 'enumeration iteration', ipos+1, t[0], t[1] )
```

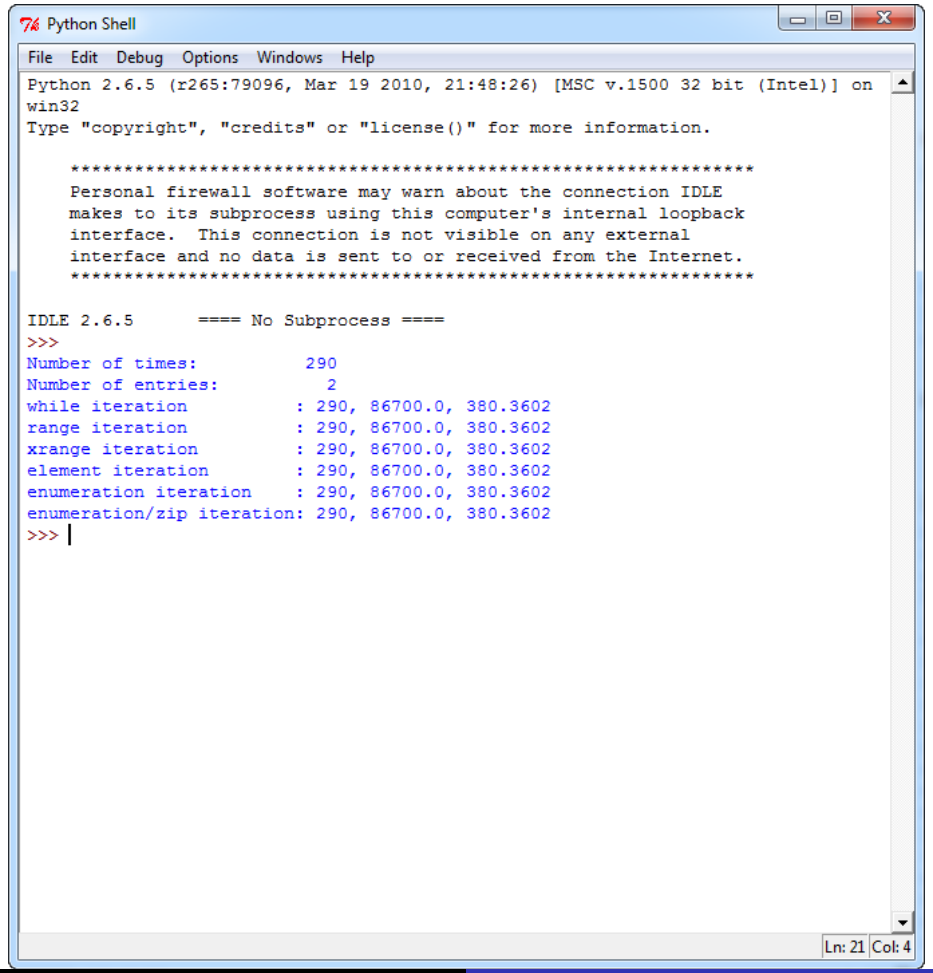
`enumerate` iterator with `zip` and **`continue`**

Import data from an external file and iterate over data using `enumerate` iterator with `zip` and **`print`** last entry.

```
1   import numpy as np
2   #--load flow data
3   q = np.genfromtxt( '..\\data\\ProcessFlow.dat', skip_header=1 )
4   #--determine sizes
5   ntimes, ncol = q.shape[0], q.shape[1]


55  #--enumeration iterator with zip
56  v0, v1 = np.copy( q[:,0] ), np.copy( q[:,1] )
57  for ipos,( t0, t1 ) in enumerate( zip( v0,v1 ) ):
58      #--only print last line
59      if ipos+1 < ntimes:
60          continue
61      print '{0:25s}: {1}, {2}, {3}'.format( 'enumeration/zip iteration', ipos+1, t0, t1 )
```

ProcessFlowExamples.py output



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Run a simple example

- open the command line
- type `python`
- enter the text listed below

```
import numpy as np
t0 = np.arange(0,11,1)
t1 = -np.arange(0,11,1)
for ipos in range(0,10):
    print t0[ipos], t1[ipos]
```

- then try

```
for ipos,(v1,v2) in enumerate( zip(t0,t1) ):
    print v1, v2
```