

JT: Can't Decipher The Output?

- Modify the display code so it only outputs the r and c values.

<code>r = 0</code>	Output	
<code>while(r<numRows):</code>	<code>0 0</code>	
<code> c = 0</code>	<code>1 0</code>	<code>c = 0</code>
<code> while(c<numColumns):</code>	<code>2 0</code>	<code> r = 0</code>
<code> print(c,r)</code>	<code>3 0</code>	<code> r = 1</code>
<code> c = c + 1</code>	<code>0 1</code>	<code> r = 2</code>
<code> print()</code>	<code>1 1</code>	<code> r = 3</code>
<code> r = r + 1</code>	<code>2 1</code>	<code>c = 1</code>
	<code>3 1</code>	<code> r = 0</code>
	<code>0 2</code>	<code> r = 1</code>
	<code>1 2</code>	<code> r = 2</code>
	<code>2 2</code>	<code> r = 3</code>
	<code>3 2</code>	<code>Etc.</code>
	<code>0 3</code>	
	<code>1 3</code>	
	<code>2 3</code>	
	<code>3 3</code>	

JT's Explanation (If You Still "Don't Get It")

- 2D list

```
aList = [[1,1,1,1],
         [2,2,2,2],
         [3,3,3,3],
         [4,4,4,4]]
```

Normal traversal: row-
by-row

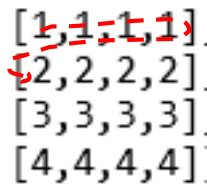
```
[1,1,1,1].
[2,2,2,2].
[3,3,3,3].
[4,4,4,4].
```

JT's Explanation (If You Still "Don't Get It")

- 2D list

```
aList = [[1,1,1,1],
          [2,2,2,2],
          [3,3,3,3],
          [4,4,4,4]]
```

Normal traversal: row-
by-row



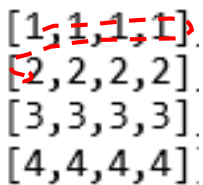
```
[1,1,1,1]
[2,2,2,2]
[3,3,3,3]
[4,4,4,4]
```

```
r = 0
c = 0
c = 1
c = 2
c = 3
r = 1
c = 0
c = 1
c = 2
c = 3
Etc.
```

JT's Explanation (If You Still "Don't Get It")

- 2D list

Normal traversal: row-
by-row

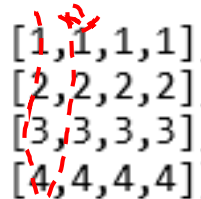


```
[1,1,1,1]
[2,2,2,2]
[3,3,3,3]
[4,4,4,4]
```

```
r = 0
c = 0
c = 1
c = 2
c = 3
r = 1
c = 0
c = 1
c = 2
c = 3
Etc.
```

```
r = 0
while(r<numRows):
    c = 0
    while(c<numColumns):
        print(aList[c][r], end=" ")
        c = c + 1
    print()
    r = r + 1
```

Above code: traverses
down each column
moving left to right



```
[1,1,1,1]
[2,2,2,2]
[3,3,3,3]
[4,4,4,4]
```

```
0 0    c = 0
1 0    r = 0
2 0    r = 1
3 0    r = 2
0 1    r = 3
1 1    c = 1
2 1    r = 0
3 1    r = 1
0 2    r = 2
1 2    r = 3
2 2    Etc.
3 2
0 3
1 3
2 3
3 3
```

Why Do People Write Such Code

- The course instructor is mean...just kidding folks!
- Typographical mistake `[c][r]` instead of `[r][c]`
- Math background:
 - Some students are used to traversing 'Quadrant' along the horizontal and then the vertical (x,y coordinates)
- Tam's lesson: mistakes can occur, this is one example of how you can employ debugging tools to trouble shoot logic errors (and even nasty syntax errors).