

CS1117 – Introduction to Programming

Dr. Jason Quinlan,
School of Computer Science and Information Technology

**A TRADITION OF
INDEPENDENT
THINKING**



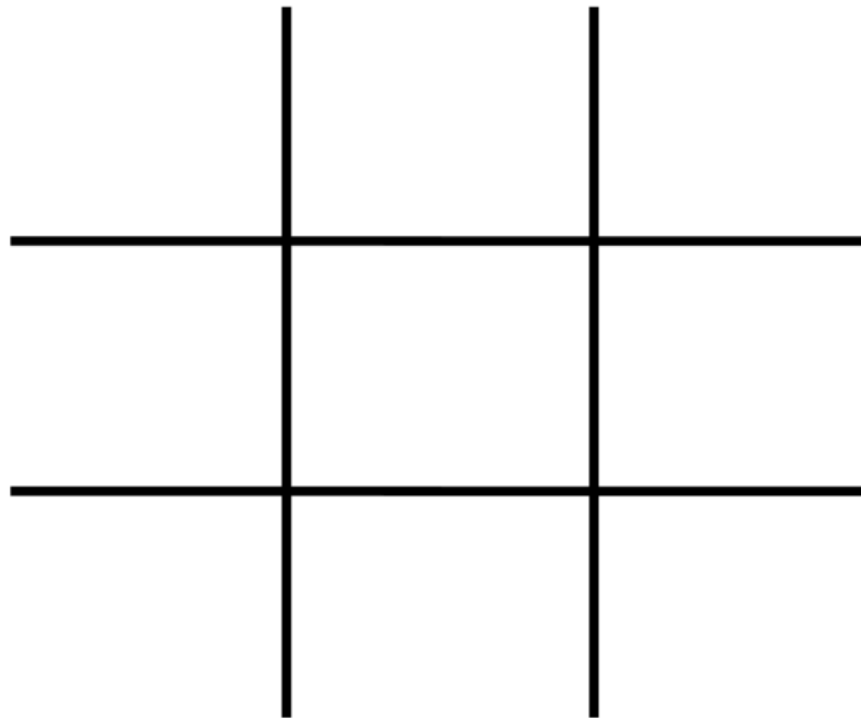
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Matrices



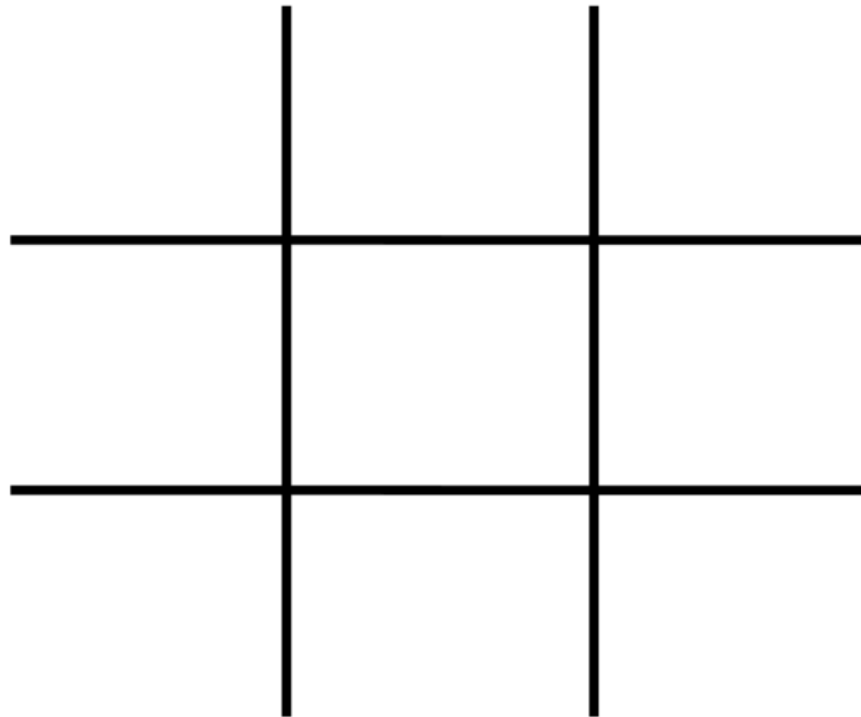
Matrix: a 2-dimensional data structure
where values are arranged in rows and columns



Matrices



Matrix: a 2-dimensional data structure
where values are arranged in rows and columns

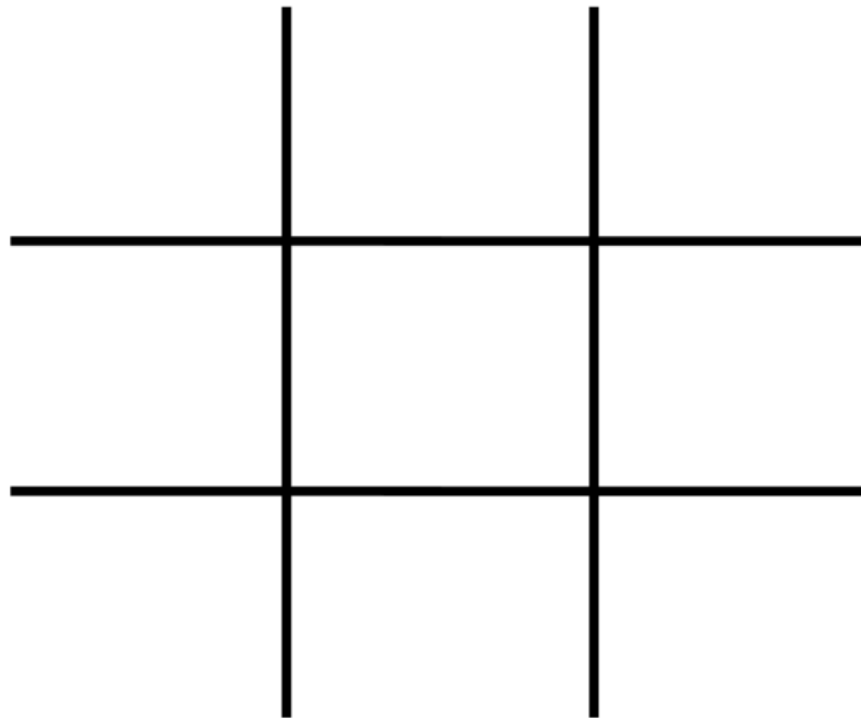


Python does not have a built-in type for matrices

Matrices



Matrix: a 2-dimensional data structure
where values are arranged in rows and columns

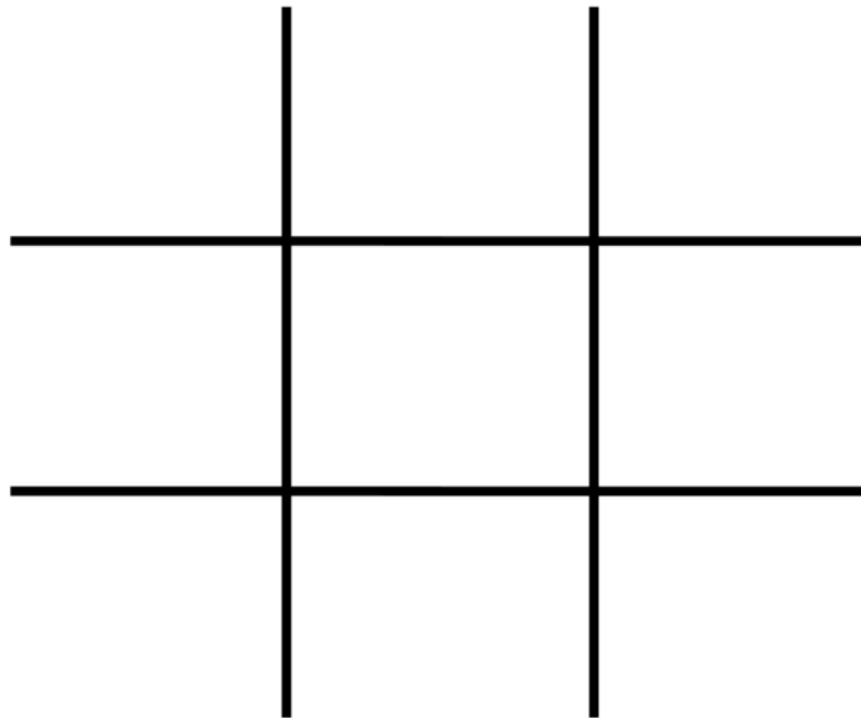


So how do we code this???

Matrices



Matrix: a 2-dimensional data structure
where values are arranged in rows and columns



Let's play a game first...

Matrices



Matrix: a 2-dimensional data structure
where values are arranged in rows and columns



Matrices



Matrix: a 2-dimensional data structure
where values are arranged in rows and columns



Matrices

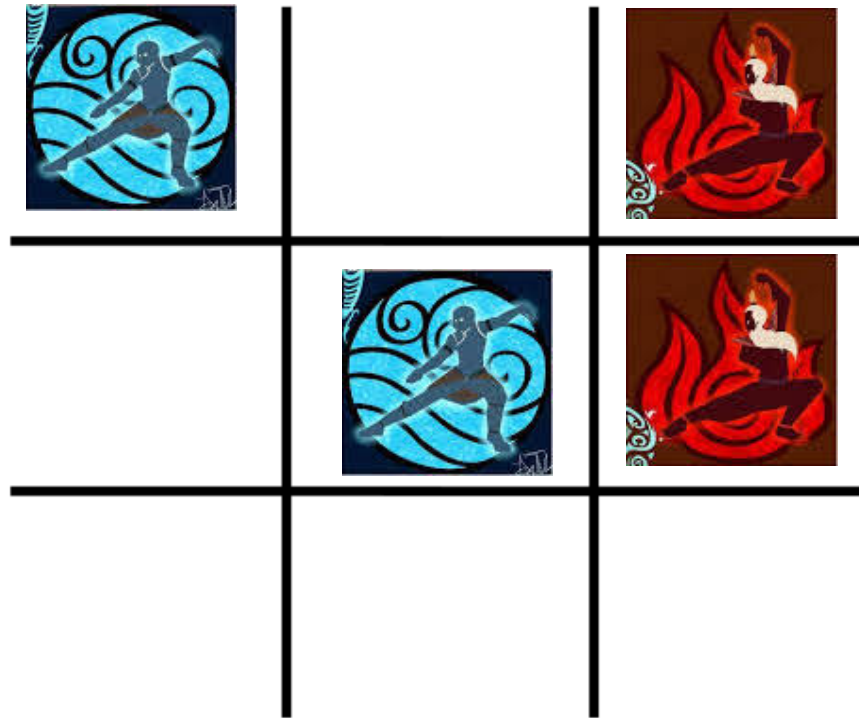


Matrix: a 2-dimensional data structure
where values are arranged in rows and columns



Matrices

Matrix: a 2-dimensional data structure
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Matrices

Matrix: a 2-dimensional data structure
where values are arranged in rows and columns



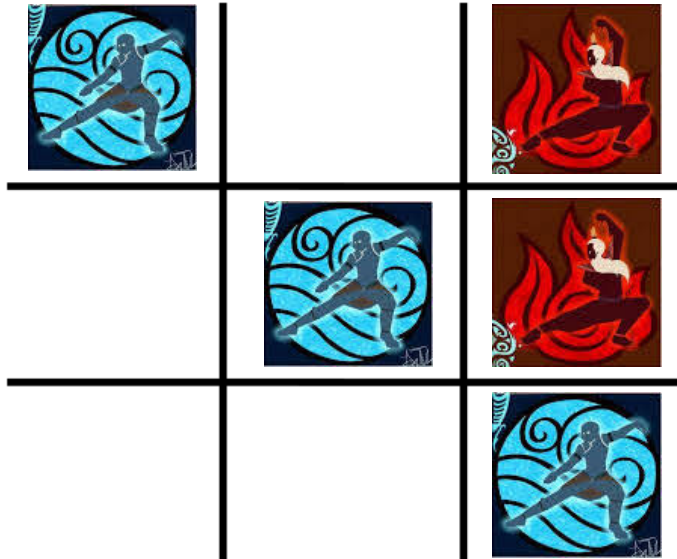
Matrices

Matrix: a 2-dimensional data structure
where values are arranged in rows and columns



So how might we code this...

Matrices



Variables?

Tuples?

Lists?

Dictionaries?

Matrices



Define our List:
[0,0,0,0,0,0,0,0,0]

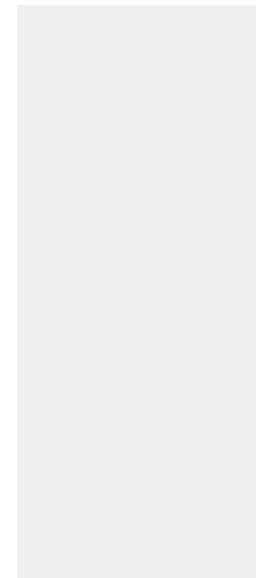
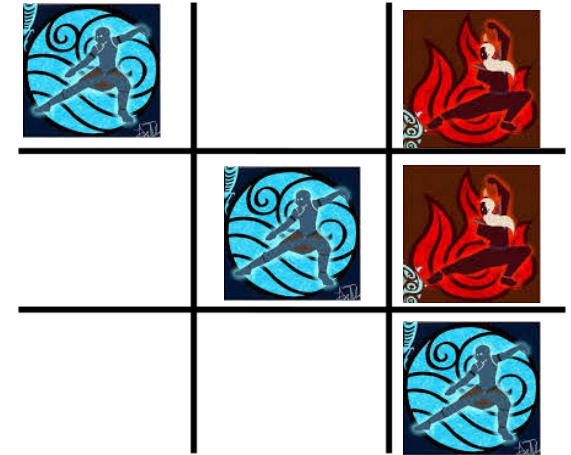
0	0	0
0	0	0
0	0	0

Matrices



Define our List:
[0,0,0,0,0,0,0,0,0]

0	0	0
0	0	0
0	0	0

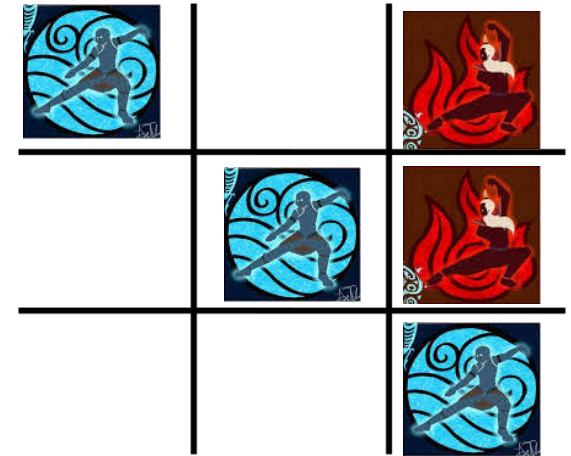


Matrices

Fire Nation (Zuko) = 1

Air Nation (Ang) = 2 List: [0,0,0,0,0,0,0,0,0]

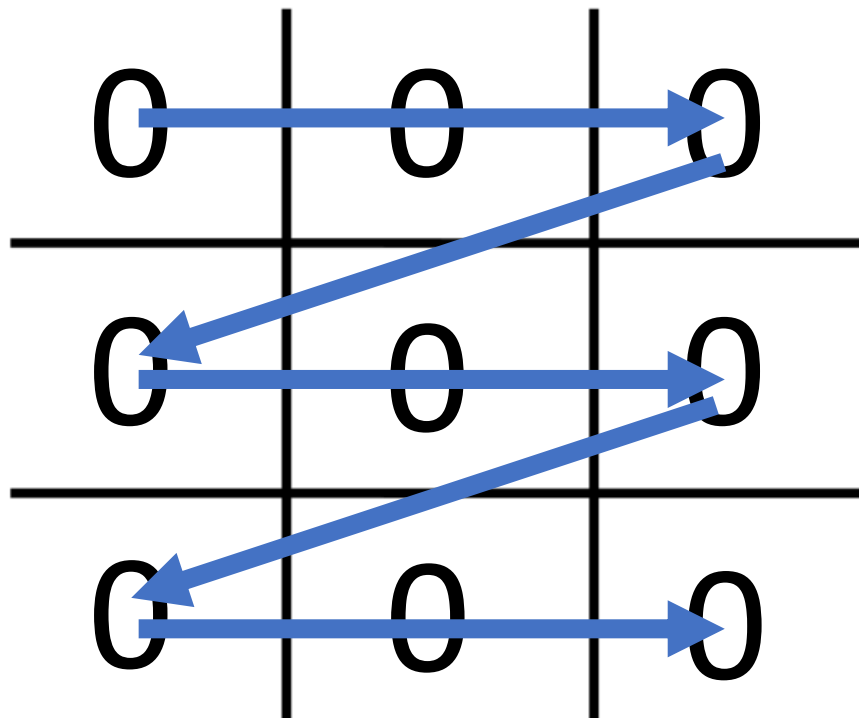
0	0	0
0	0	0
0	0	0



Matrices

Fire Nation (Zuko) = 1

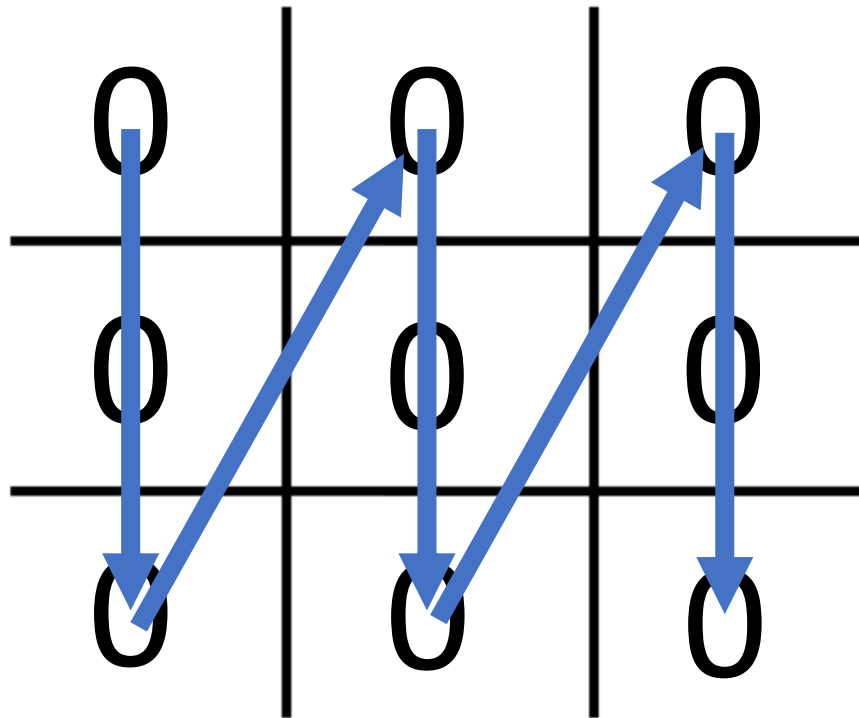
Air Nation (Ang) = 2 List: [0,0,0,0,0,0,0,0,0]



Matrices

Fire Nation (Zuko) = 1

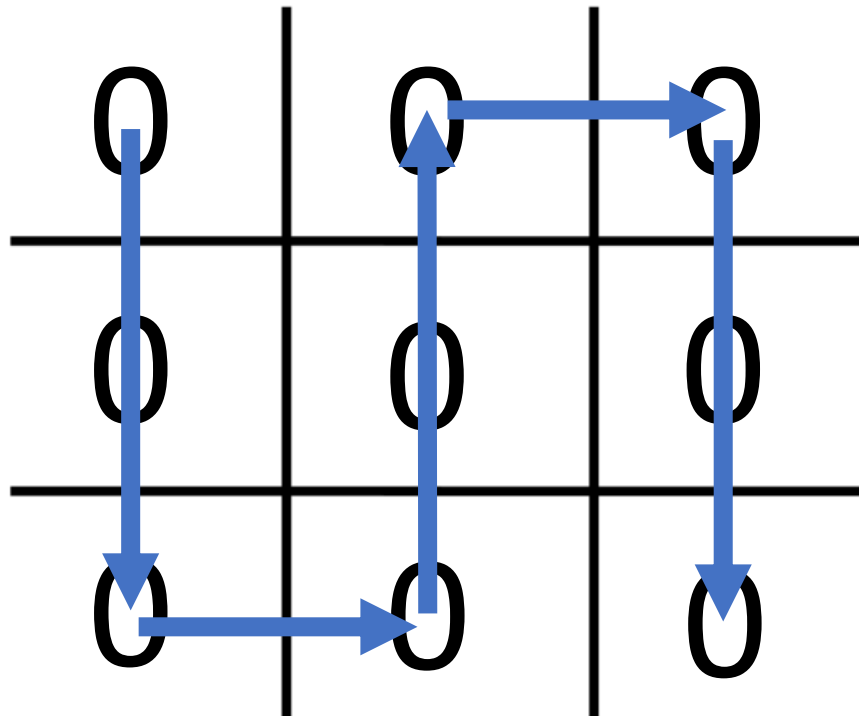
Air Nation (Ang) = 2 List: [0,0,0,0,0,0,0,0,0]



Matrices

Fire Nation (Zuko) = 1

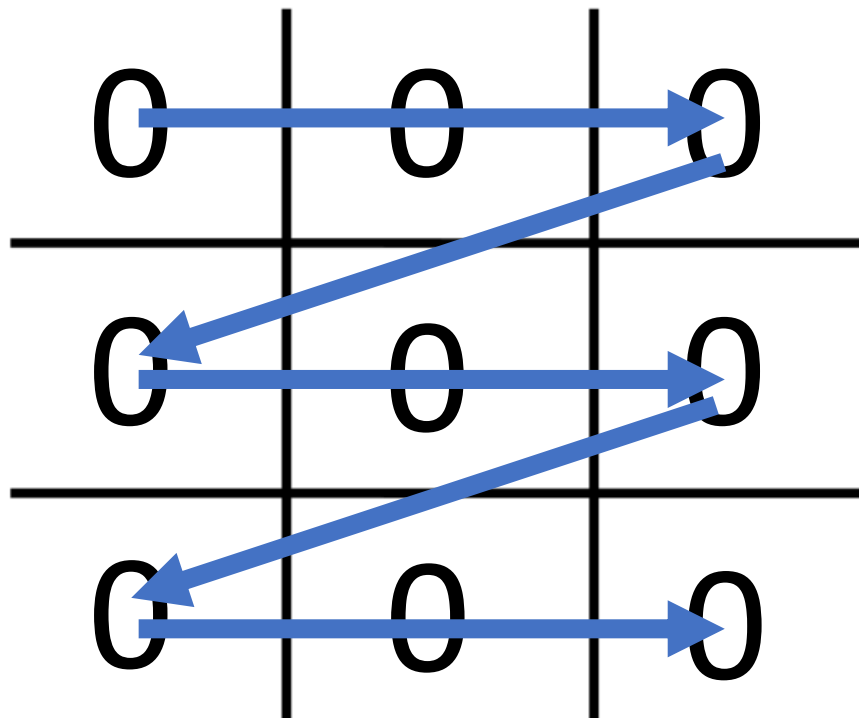
Air Nation (Ang) = 2 List: [0,0,0,0,0,0,0,0,0]



Matrices

Fire Nation (Zuko) = 1

Air Nation (Ang) = 2 List: [0,0,0,0,0,0,0,0,0]



Matrices

Fire Nation (Zuko) = 1

List:

Air Nation (Ang) = 2 [2,0,1,0,2,1,0,0,2]

2	0	1
0	2	1
0	0	2



Matrices

Fire Nation (Zuko) = 1

List:

Air Nation (Ang) = 2 [2,0,1,0,2,1,0,0,1]

So what is the logic of the game?

Any column or row with all 3 spaces
containing the same value

Or any diagonal with all 3 spaces
containing the same value

So:



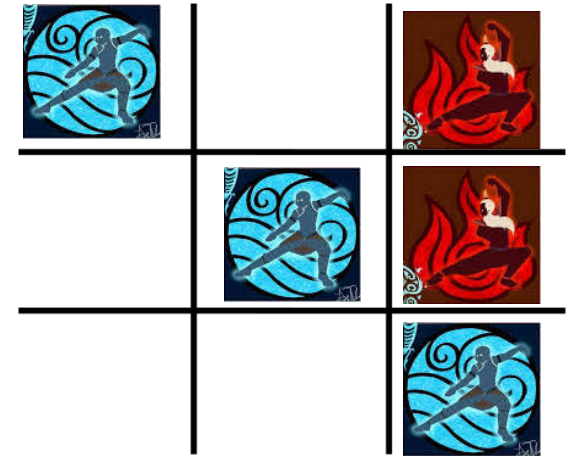
Matrices

Fire Nation (Zuko) = 1

List:

Air Nation (Ang) = 2 [2,0,1,0,2,1,0,0,2]

2	0	1
0	2	1
0	0	2



Matrices

Fire Nation (Zuko) = 1

Air Nation (Ang) = 2 List: [2,0,1,1,0,1,2,0,1]

2	0	1
2	0	1
2	0	0



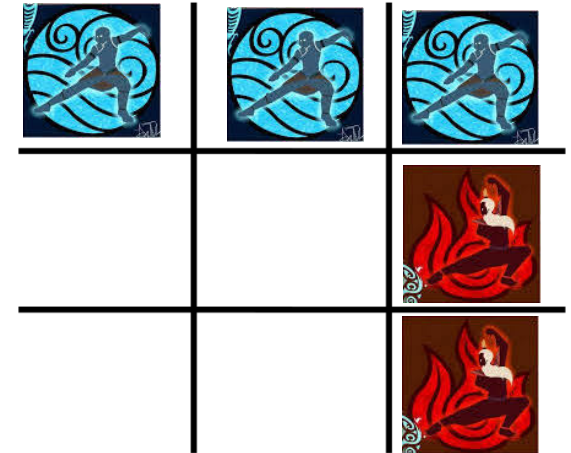
Matrices

Fire Nation (Zuko) = 1

List:

Air Nation (Ang) = 2 [2,2,2,0,0,1,0,0,1]

2	2	2
0	0	1
0	0	1



Matrices

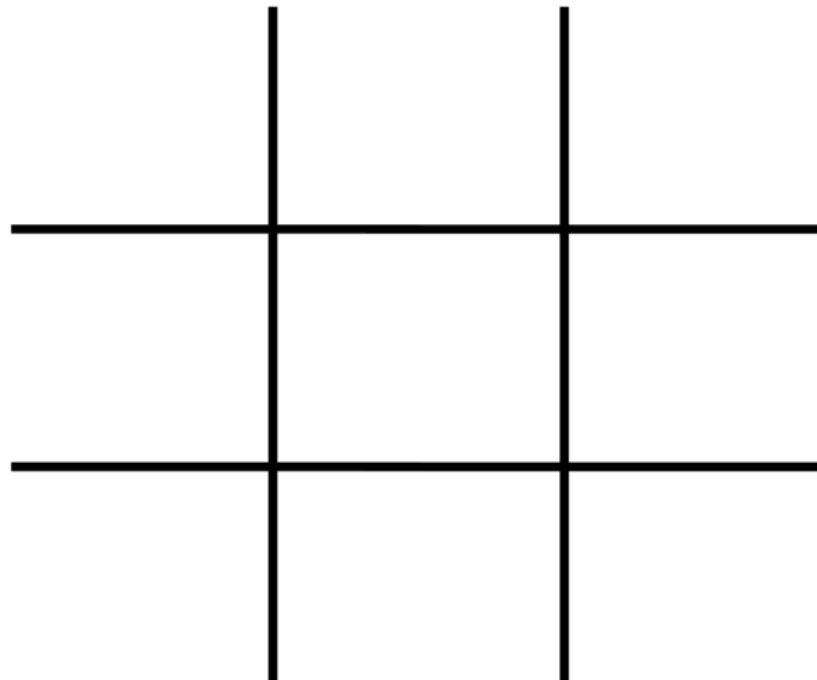


List of lists:

[0,0,0],

[0,0,0],

[0,0,0]



Matrices



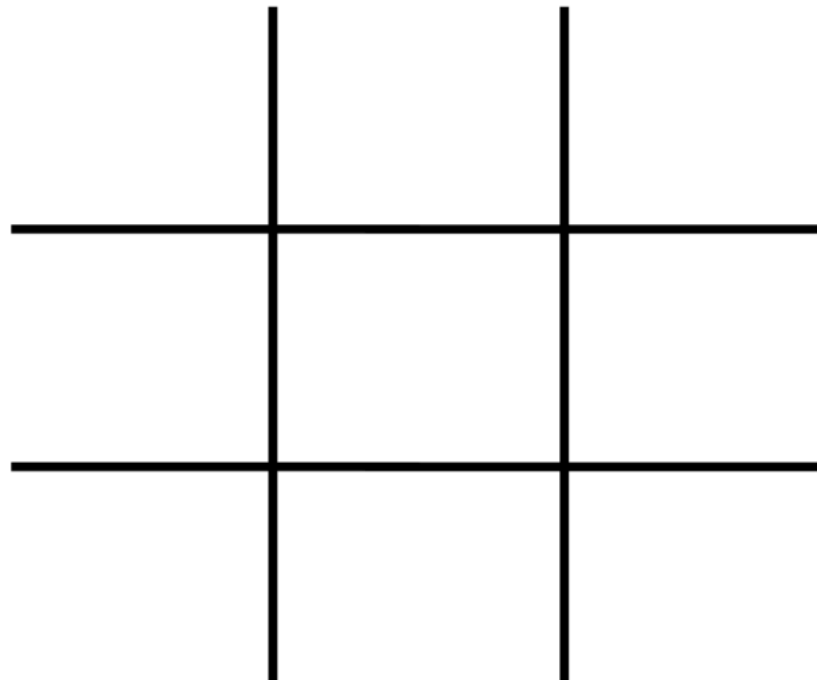
We can create a
similar structure
to the grid we
want to use

List of lists:

[0,0,0],

[0,0,0],

[0,0,0]



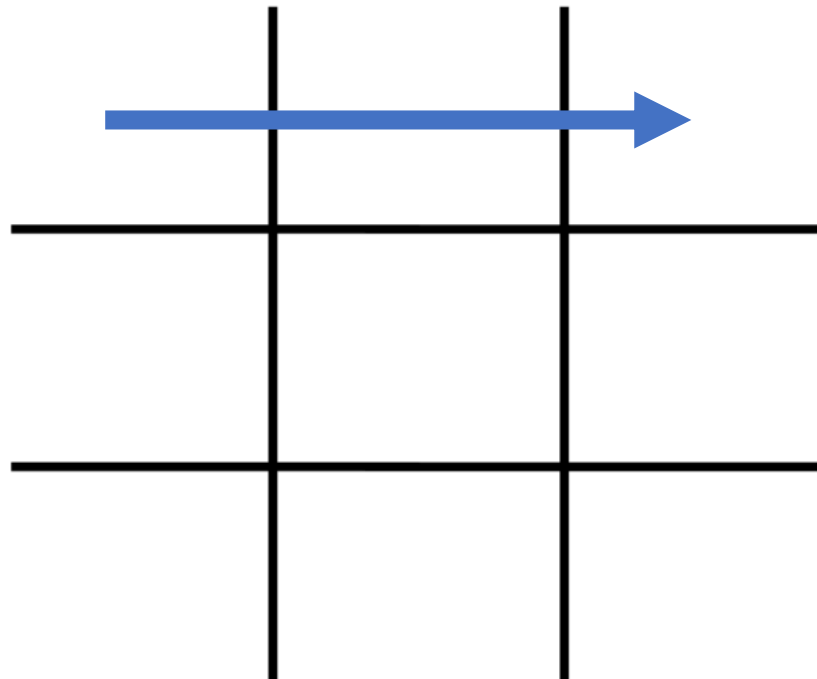
Matrices



We can loop
through an inner
list to get access
to a row

List of lists:

[[0,0,0],
[0,0,0],
[0,0,0]]



Matrices



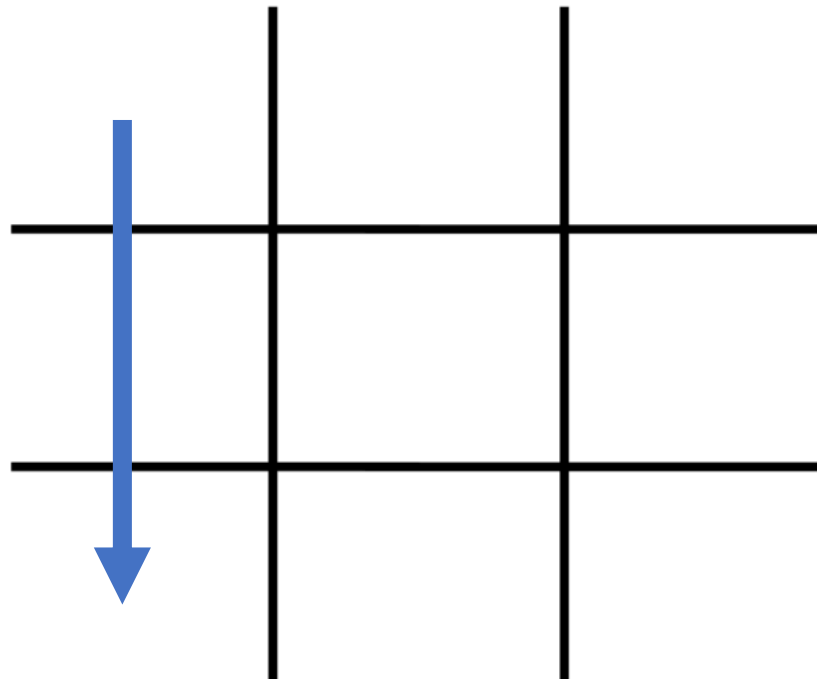
List of lists:

[[0,0,0],
[0,0,0],
[0,0,0]]

We can loop
through columns
by using indexes

–

e.g. index 0 =
column 1



Matrices



Let's look at a bit of code for this...



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