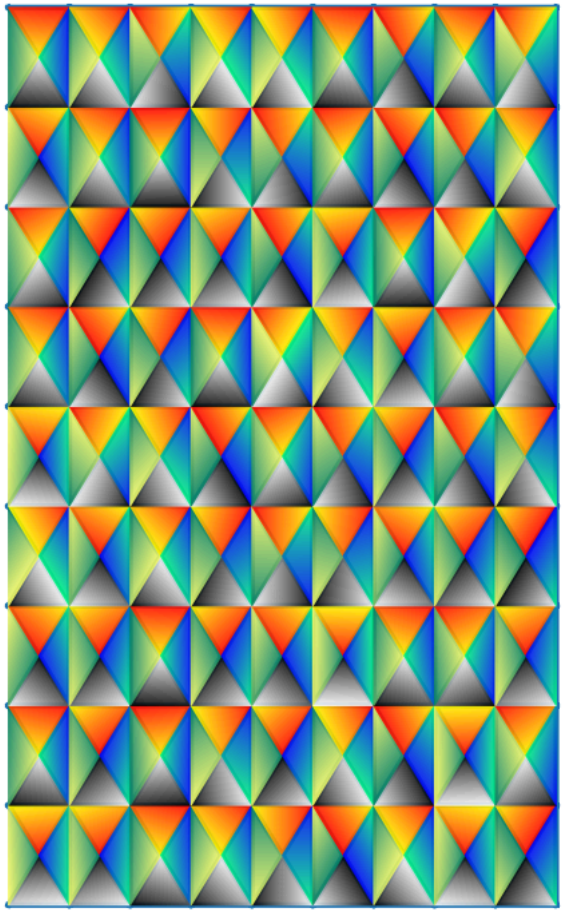
Triangles algorithm specification
How to build model for python's Triplot



Vertices

xy meshgrid

(0,0)	(1,0)	(2,0)	(3,0)	(4,0)	(5,0)	(6,0)	(7,0)	(8,0)	(9,0)
(0,1)									
(0,2)									
(0,3)									
(0,4)									
(0,5)									
(0,6)									
(0,7)									
(0,8)									
(0,9)									

Indexing = ‘xy’ format
X = linspace(0,1, 10)
Y= linspace(0,1,10)

xx meshgrid

0	0.111	0.222	0.333	0.444	0.555	0.666	0.777	0.888	1
0	0.111	0.222	0.333	0.444	0.555	0.666	0.777	0.888	1
0	0.111	0.222	0.333	0.444	0.555	0.666	0.777	0.888	1
0	0.111	0.222	0.333	0.444	0.555	0.666	0.777	0.888	1
0	0.111	0.222	0.333	0.444	0.555	0.666	0.777	0.888	1
0	0.111	0.222	0.333	0.444	0.555	0.666	0.777	0.888	1
0	0.111	0.222	0.333	0.444	0.555	0.666	0.777	0.888	1
0	0.111	0.222	0.333	0.444	0.555	0.666	0.777	0.888	1
0	0.111	0.222	0.333	0.444	0.555	0.666	0.777	0.888	1
0	0.111	0.222	0.333	0.444	0.555	0.666	0.777	0.888	1

yy meshgrid

0	0	0	0	0	0	0	0	0	0
0.111	0.111	0.111	0.111	0.111	0.111	0.111	0.111	0.111	0.111
0.222	0.222	0.222	0.222	0.222	0.222	0.222	0.222	0.222	0.222
0.333	0.333	0.333	0.333	0.333	0.333	0.333	0.333	0.333	0.333
0.444	0.444	0.444	0.444	0.444	0.444	0.444	0.444	0.444	0.444
0.555	0.555	0.555	0.555	0.555	0.555	0.555	0.555	0.555	0.555
0.666	0.666	0.666	0.666	0.666	0.666	0.666	0.666	0.666	0.666
0.777	0.777	0.777	0.777	0.777	0.777	0.777	0.777	0.777	0.777
0.888	0.888	0.888	0.888	0.888	0.888	0.888	0.888	0.888	0.888
1	1	1	1	1	1	1	1	1	1

Cell Indices

ij meshgrid

(0,0)	(0,1)	(0,2)	(0,3)	(0,4)	(0,5)	(0,6)	(0,7)	(0,8)
(1,0)								
(2,0)								
(3,0)								
(4,0)								
(5,0)								
(6,0)								
(7,0)								
(8,0)								

Indexing = ‘ij’ format
c_{ii} = arange(0,9)
c_{jj} = arange(0,9)

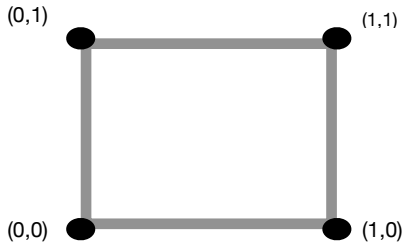
ii meshgrid

0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8

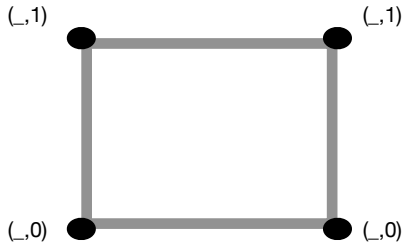
jj meshgrid

0	1	2	3	4	5	6	7	8
0	1	2	3	4	5	6	7	8
0	1	2	3	4	5	6	7	8
0	1	2	3	4	5	6	7	8
0	1	2	3	4	5	6	7	8
0	1	2	3	4	5	6	7	8
0	1	2	3	4	5	6	7	8
0	1	2	3	4	5	6	7	8
0	1	2	3	4	5	6	7	8

Cell



j component of cell vertices

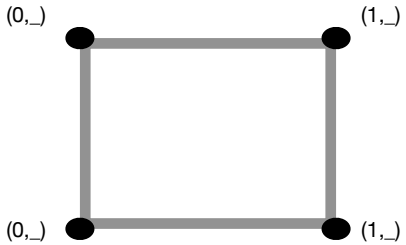


+

jj cell vertices

0	1	2	3	4	5	6	7	8
0	1	2	3	4	5	6	7	8
0	1	2	3	4	5	6	7	8
0	1	2	3	4	5	6	7	8
0	1	2	3	4	5	6	7	8
0	1	2	3	4	5	6	7	8
0	1	2	3	4	5	6	7	8
0	1	2	3	4	5	6	7	8
0	1	2	3	4	5	6	7	8

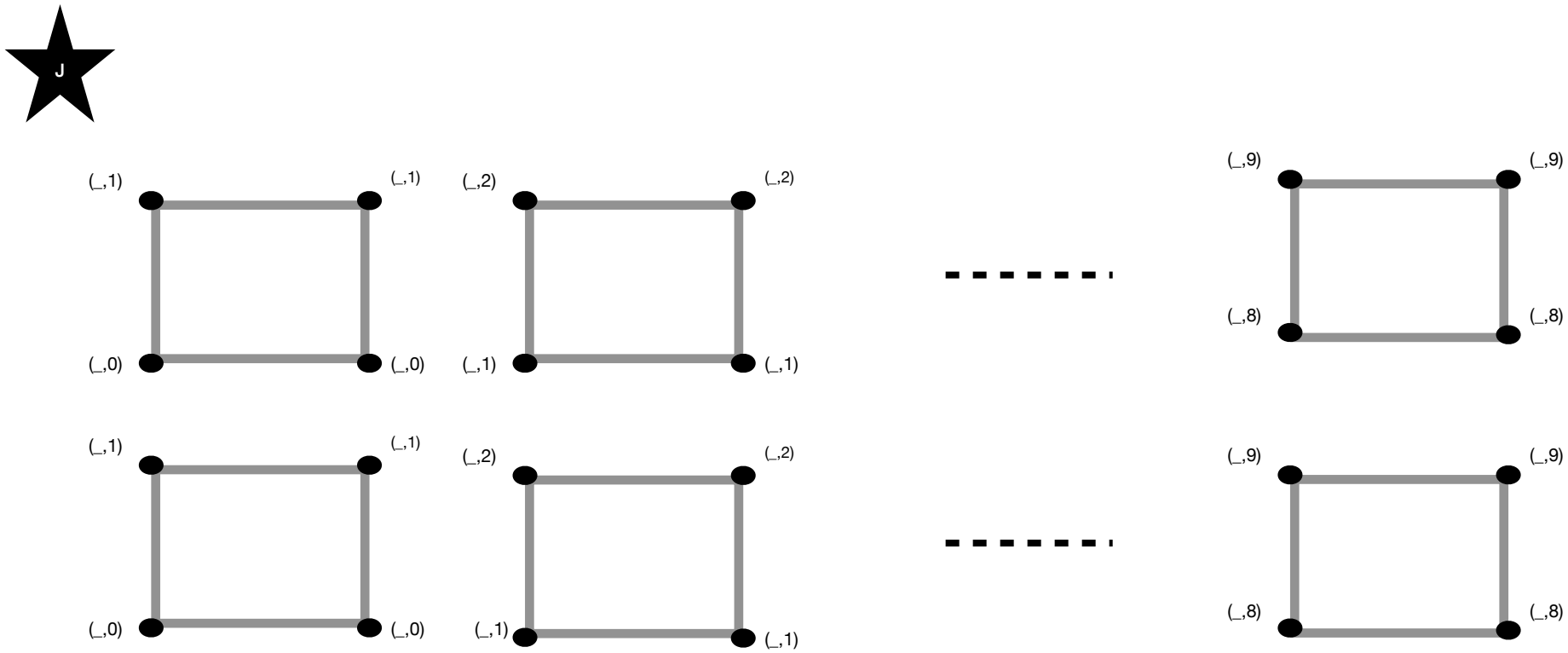
i component of cell vertices

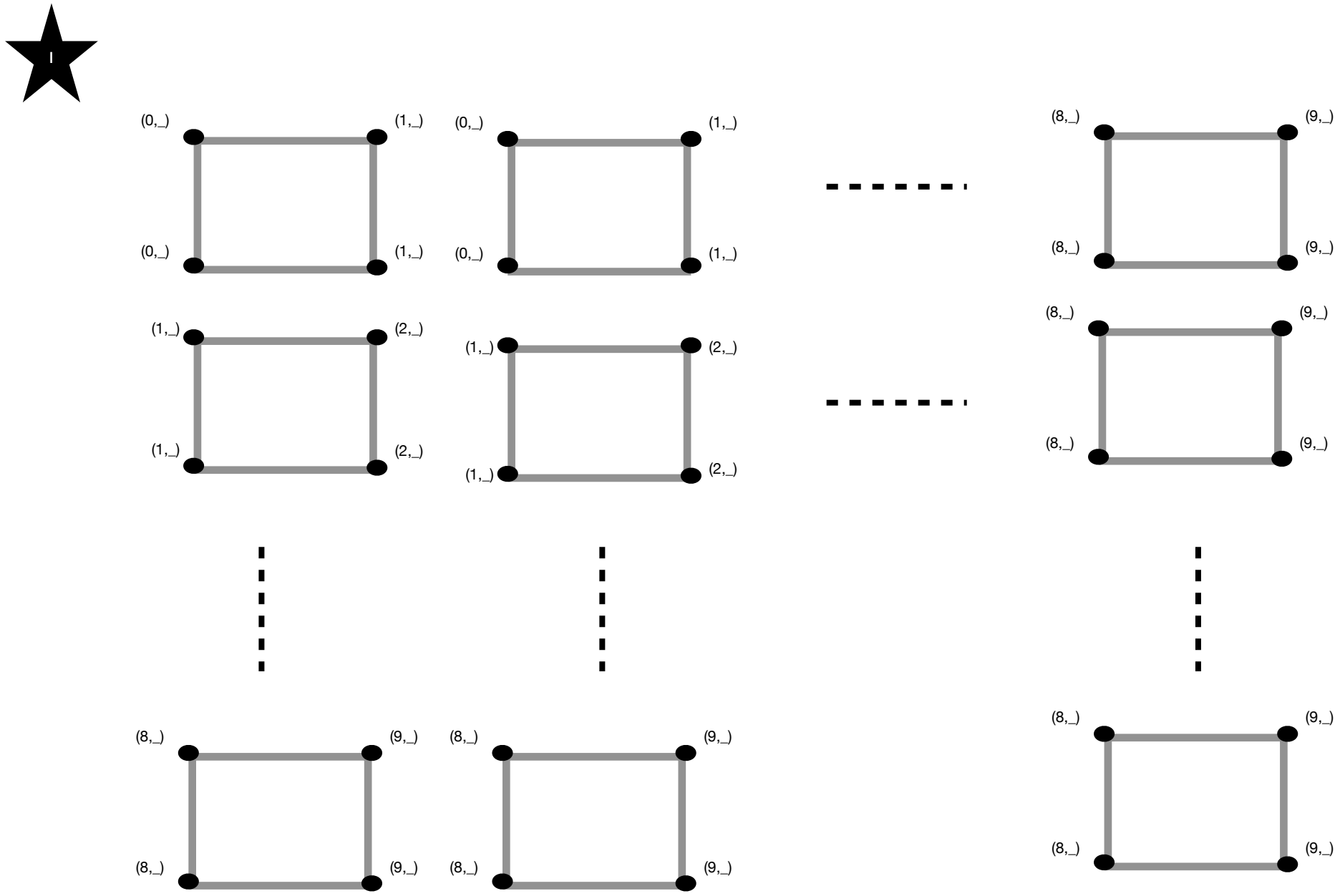


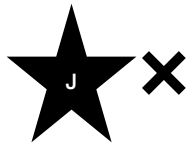
+

ii meshgrid vertices

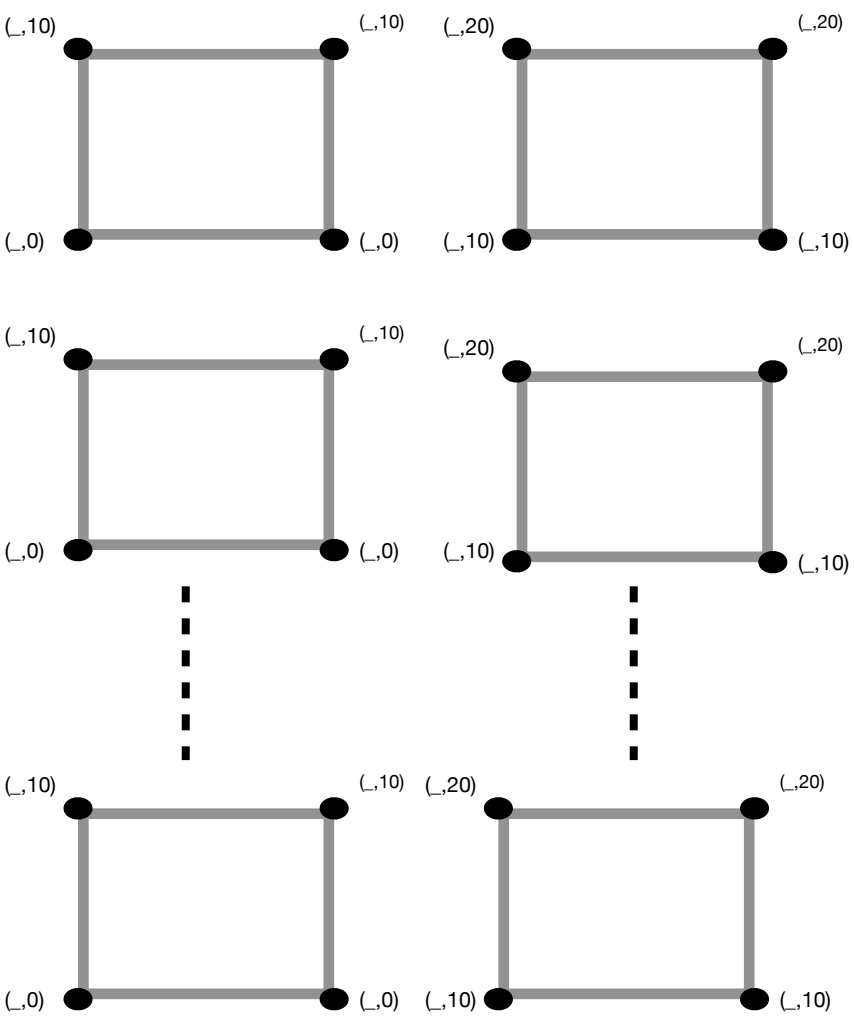
0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8

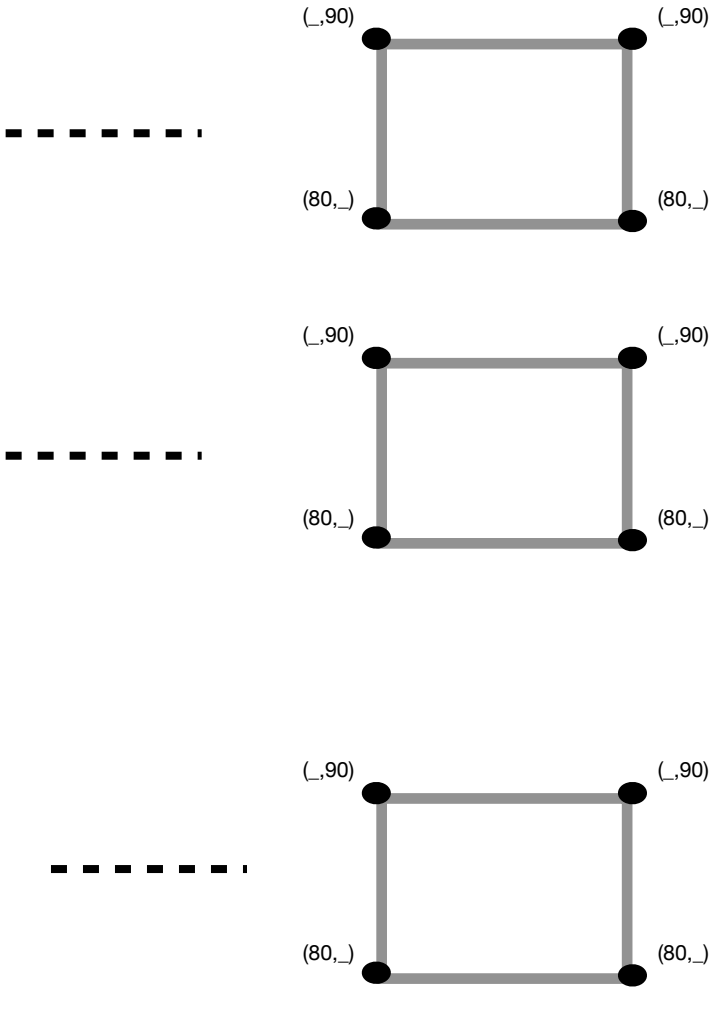

J
(_,1)
(_,1)
(_,0)
(_,0)
(_,2)
(_,2)
(_,1)
(_,1)
(_,9)
(_,9)
(_,8)
(_,8)
(_,1)
(_,1)
(_,0)
(_,0)
(_,2)
(_,2)
(_,1)
(_,1)
(_,9)
(_,9)
(_,8)
(_,8)


(0,_)
(1,_)
(0,_)
(1,_)
(0,_)
(1,_)
(0,_)
(1,_)
(8,_)
(9,_)
(8,_)
(9,_)
(1,_)
(2,_)
(1,_)
(2,_)
(1,_)
(2,_)
(1,_)
(2,_)
(8,_)
(9,_)
(8,_)
(9,_)
(8,_)
(9,_)
(8,_)
(9,_)
(8,_)
(9,_)
(8,_)
(9,_)


J

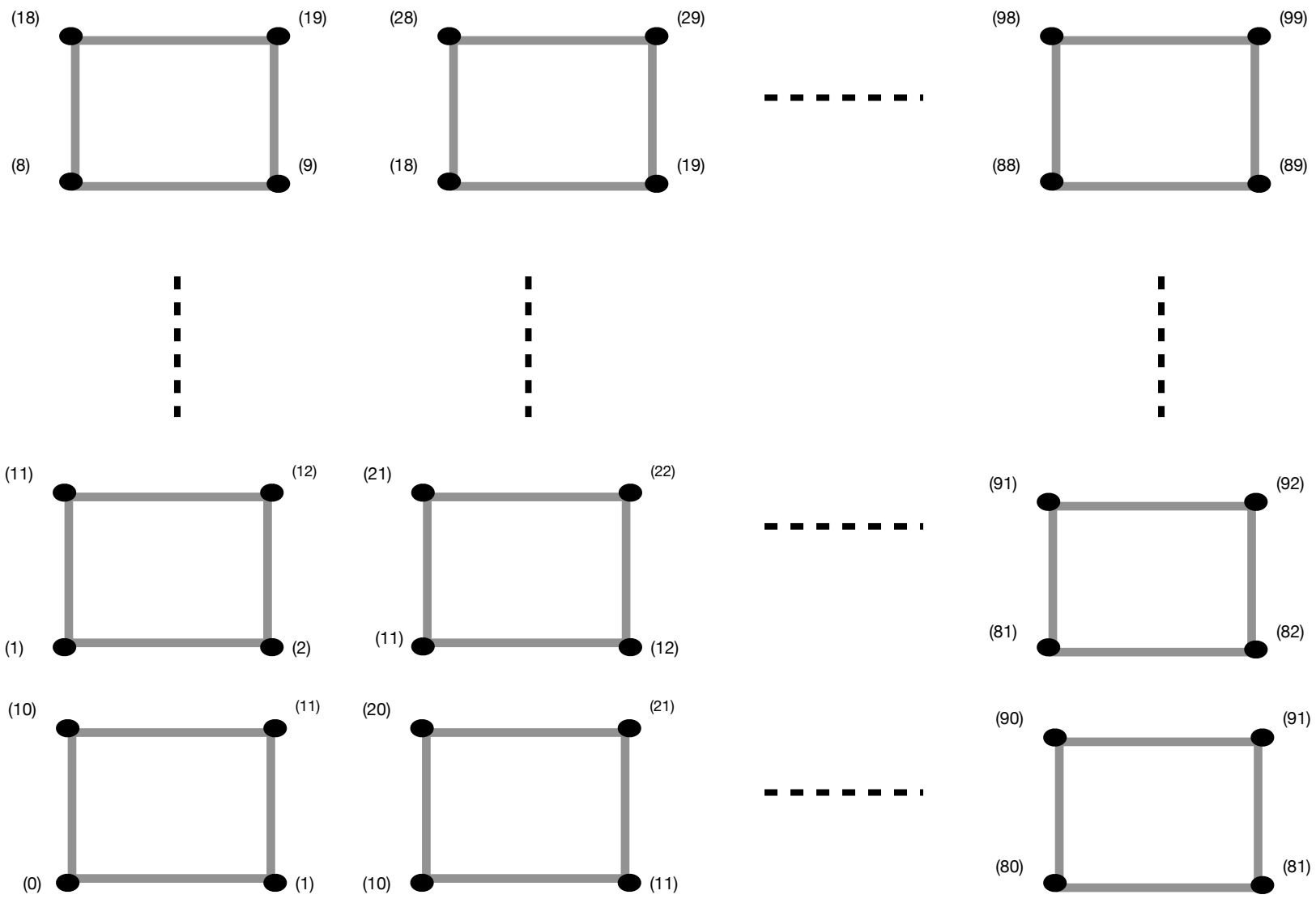
× 10


(_,10)
(_,10)
(_,0)
(_,0)
(_,20)
(_,20)
(_,10)
(_,10)
(_,10)
(_,10)
(_,0)
(_,0)
(_,20)
(_,20)
(_,10)
(_,10)
(_,10)
(_,10)
(_,0)
(_,0)
(_,20)
(_,20)
(_,10)
(_,10)


(_,90)
(_,90)
(80,_)
(80,_)
(_,90)
(_,90)
(80,_)
(80,_)
(_,90)
(_,90)
(80,_)
(80,_)

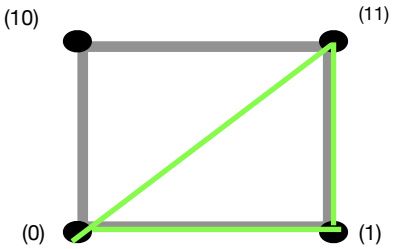
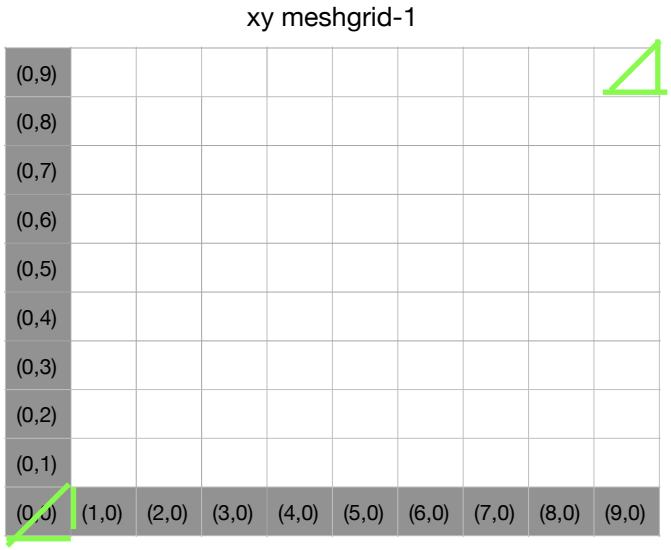
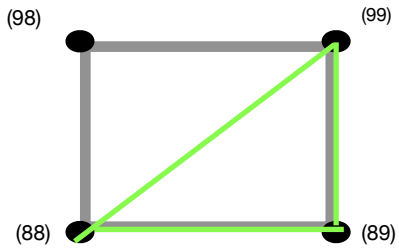
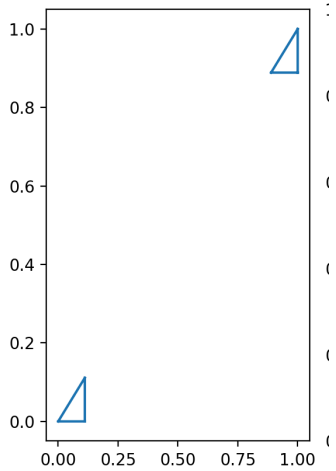
J × 10 + I

Note: Origin is left bottom corner



Indices are used to triangulate (create triangles)

For example, suppose triangulate function accepted [0, 1, 11]. The result is the triangle below:



Another example, suppose triangulate function accepted vertices arrays [0, 1, 11], [88, 89, 99]. The result is a triangle in the bottom left corner and top right corner