#Top down Approach

(0,0)	(0,1)	(0,2)
(1,0)	(1,1)	(1,2)
(2,0)	(2,1)	(2,2)

* ↓

1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31	32	33	34	35	36

=

(0,0)	(0,1)	(0,2)	(0,3)
(1,0)	(1,1)	(1,2)	(1,3)
(2,0)	(2,1)	(2,2)	(2,3)
(3,0)	(3,1)	(3,2)	(3,3)

4×4

→ For each Vmm operation we get 4 values.

Vector (column of values)

1	(0,0)			
2	(0,1)			
3	(0,2)			
7	(1,0)	(0,0)		
8	(1,1)	(0,1)		
9	(1,2)	(0,2)		
13	(2,0)	(1,0)	(0,0)	
14	(2,1)	(1,1)	(0,1)	
15	(2,2)	(1,2)	(0,2)	
19		(2,0)	(1,0)	(0,0)
20		(2,1)	(1,1)	(0,1)
21		(2,2)	(1,2)	(0,2)
25			(2,0)	(1,0)
26			(2,1)	(1,1)
27			(2,2)	(1,2)
31				(2,0)
32				(2,1)
33				(2,2)

1st col   2nd col   3rd col   4th col

Vector   **Matrix**

=

0	1	2	3

we get 4 values out of 1×32

Output Vector

For rest of the convolution

2nd Vmm OP.

3rd VMM OP.

4th Vmm OP.

VMM

$$3 * i + j$$

i = 0, j =   0, 1, 2   0,0,   0,1,   0,2

i = 1,   3, 4, 5   1,0,   1,1,   1,2

i, = 2   6, 7, 8   2,0   2,1   2,2

i = 3   9, 10, 11   3,0   3,1   3,2

i = 4 = 12, 13, 14   4,0   4,1   4,2

i = 5 = 15, 16, 17   5,0   5,1   5,2

$$3 \times i + j =$$

i=0, ĵ=

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

	+	2nd col	3rd col	4th col
1	(0,0)	O	O	O
2	(0,1)	O	O	O
3	(0,2)	O	O	O
7	(1,0)	(0,0)	O	O
8	(1,1)	(0,1)	O	O
9	(1,2)	(0,2)	O	O
13	(2,0)	(1,0)	(0,0)	O
14	(2,1)	(1,1)	(0,1)	O
15	(2,2)	(1,2)	(0,2)	O
19	O	(2,0)	(1,0)	(0,0)
20	O	(2,1)	(1,1)	(0,1)
21	O	(2,2)	(1,2)	(0,2)
25	O	O	(2,0)	(1,0)
26	O	O	(2,1)	(1,1)
27	O	O	(2,2)	(1,2)
31	O	O	O	(2,0)
2	O	O	O	(2,1)
	O	O	O	(2,2)