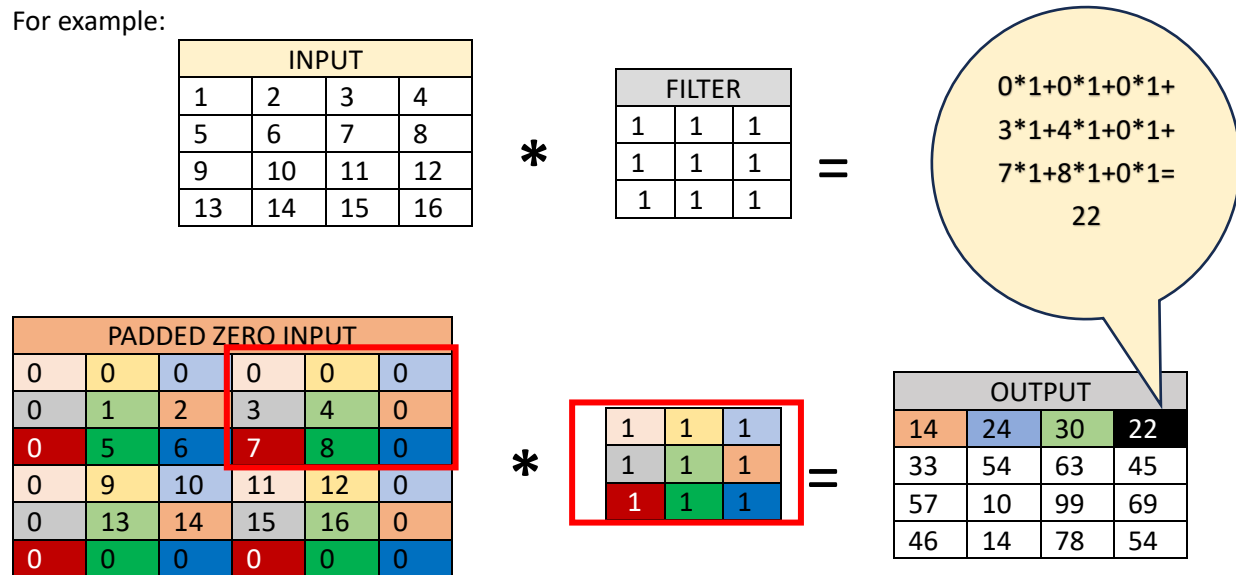


LAB03

Question 1: (*Practice with Conv2d with numpy*): Given a 2D array and a 2D filter (data is inside Q1.txt), (kernel size = (3,3), please do the convolutional operation of the twos. Input 2D array must be padded with 0s to ensure the output shape is equal to the input shape

For example:



```
Enter a file:Q1.txt
OUTPUT:
[14. 24. 30. 22.]
[33. 54. 63. 45.]
[57. 90. 99. 69.]
[46. 72. 78. 54.]
```

Question 2: (*Practice with MaxPool2d in numpy*): Given 2D array in Q2.txt. Please write a function to resize the given array by half using **MaxPool2d** operation with kernel size = (2,2):

Input array					
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

→

Output Array		
8	10	12
20	22	24
32	34	36

```
Enter file path:Q2.txt
OUTPUT:
[ 6.  8. 10.]
[14. 16. 18.]
[25. 27. 29.]
```

Question 3: (*Practice with Upsampling2d in numpy*): Given 2D array in Q3.txt. Please write a function to double the given array using ***Upsampling2d*** operation with kernel size = (2,2):

INPUT					OUTPUT							
1	2	3	4	→	1	1	2	2	3	3	4	4
5	6	7	8		1	1	2	2	3	3	4	4
9	0	1	2		5	5	6	6	7	7	8	8
					5	5	6	6	7	7	8	8
					9	9	0	0	1	1	2	2
					9	9	0	0	1	1	2	2

```

Enter file path:Q3.txt
OUTPUT:
[1. 1. 2. 2. 3. 3. 4. 4.]
[1. 1. 2. 2. 3. 3. 4. 4.]
[5. 5. 6. 6. 7. 7. 8. 8.]
[5. 5. 6. 6. 7. 7. 8. 8.]
[9. 9. 0. 0. 1. 1. 2. 2.]
[9. 9. 0. 0. 1. 1. 2. 2.]
  
```