

Assignment on Filtering

Implement a **gaussian filter** following the below instructions:

1. You are free to take any image you want. But try to take a clear and well resolution image, in which the output will be clearly visible.
2. User will give the **value of sigma as input**. Note that, the sigma value i.e., the value of the standard deviation can be **any numeric value**. **The higher the value, the more the image will be blurred**.

The following image demonstrates the input:

```
Command Window
>>
>>
>>
>>
>>
>>
>>
>>
>> gaussian
Enter the sigma value:5

sigma =

     5

>>
```

3. You should design the **gaussian kernel** like this:
Divide your roll number by 4. And take the remainder. Then use the following chart-

Remainder	Kernel Size
0	3X3
1	5X5
2	7X7
3	11X11

For example, for Id 12, if we divide 12 by 4, we get the remainder of 0. So, Id 12 will design a 3X3 gaussian kernel for filtering.

4. In our provided code, there is a little bug which you have to fix it in this assignment. The bug is: the kernel is not center-based; that is - after computing the linear operation, the output is placed at upper left corner (see figure-a). But the correct way to do this is shown

in figure (b) where the **output is placed in the center of the kernel**. In your assignment, you must follow the correct approach. Moreover, the boundary issues must be handled properly in your code.

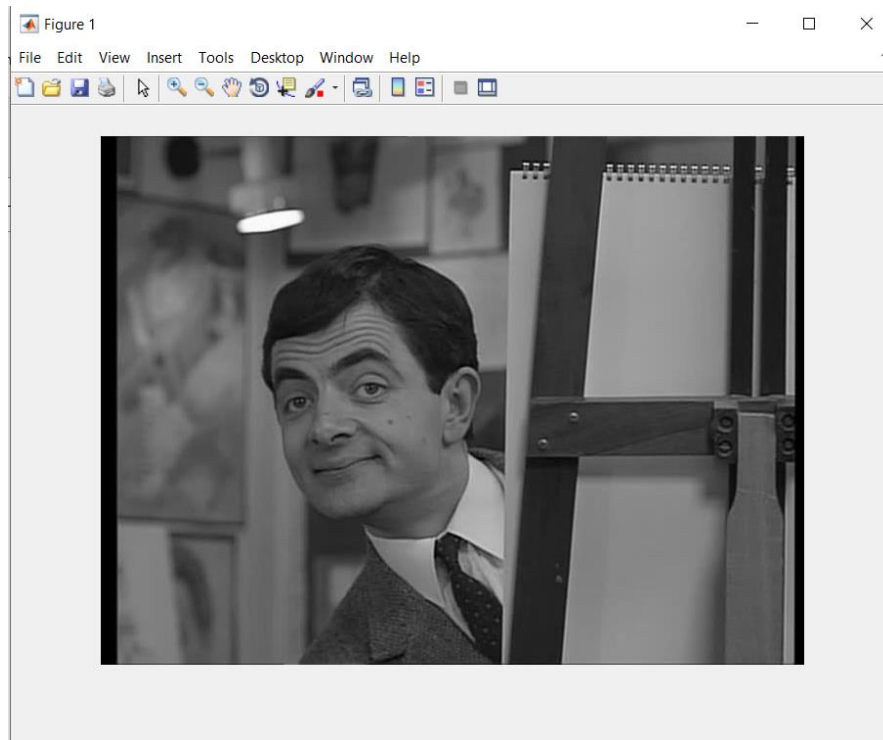
INPUT								Filter			OUTPUT							
	1	2	3	4	5	6	7					1	2	3	4	5	6	7
1	49	49	48	48	48	49	49	1/9	1/9	1/9		1	48					
2	47	47	48	49	49	49	48	1/9	1/9	1/9		2						
3	47	48	49	49	50	50	49	1/9	1/9	1/9		3						
4	49	49	49	49	49	50	50					4						
5	48	48	48	48	48	49	50					5						
6	48	48	49	50	50	50	49					6						
7	49	50	50	51	51	50	50					7						

(a) Incorrect approach

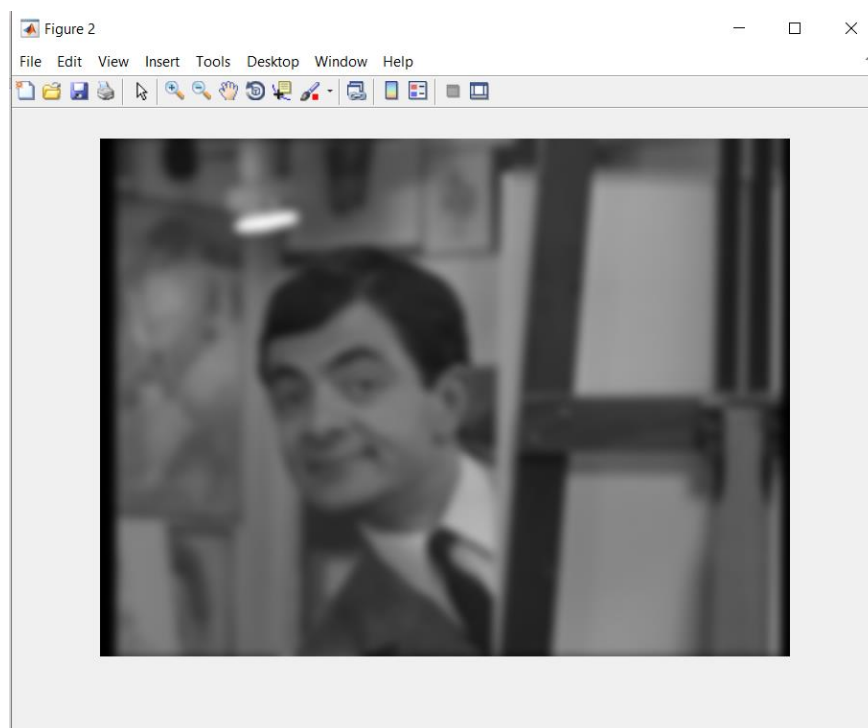
INPUT								Filter			OUTPUT							
	1	2	3	4	5	6	7					1	2	3	4	5	6	7
1	49	49	48	48	48	49	49	1/9	1/9	1/9	1							
2	47	47	48	49	49	49	48	1/9	1/9	1/9	2		48					
3	47	48	49	49	49	50	49	1/9	1/9	1/9	3							
4	49	49	49	49	49	50	50				4							
5	48	48	48	48	48	49	50				5							
6	48	48	49	50	50	50	49				6							
7	49	50	50	51	51	50	50				7							

(b) Correct approach

- Most importantly, you cannot use any inbuilt function for filtering here.
- Please submit the **.m file, the input image and the output image** in a folder. Rename the folder with your id, zip it and then submit it.
- The following images demonstrate the input image and the output image.



(a) Input Image



(b) Output Image (with a sigma value of 5)