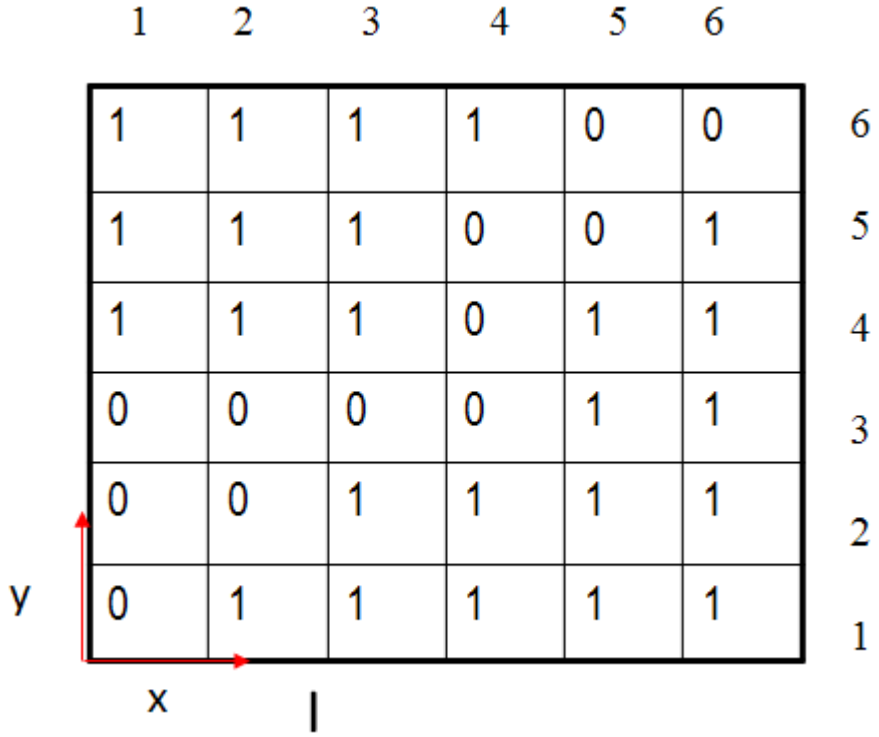
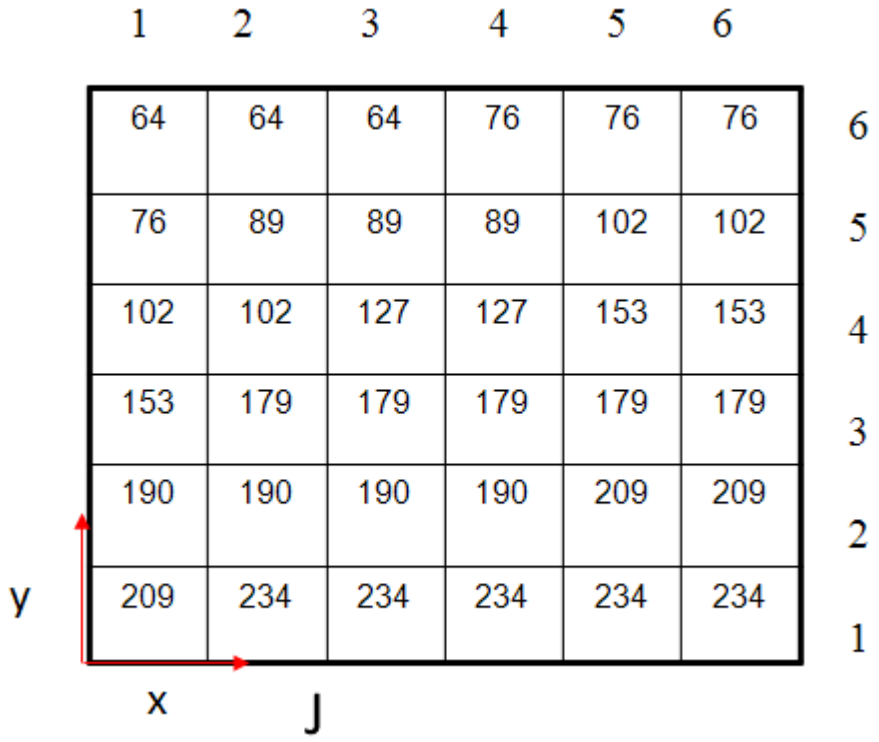
Consider the following binary image I:



Consider the following greyscale image J:



Question 29
Let's suppose a greyscale Image F and a linear mapping from Image F to Image G with bias **b** equal to 50 and gain **a** equal to 0.8. What is the greyscale value for G(2,3) if F(2,3) is equal to 50?

(a) 28
(b) 255
(c) 60
(d) 90
(e) None of the above.

Question 30
How many shades of grey are there in a 7-bits image?

(a) 128
(b) 256
(c) 64
(d) 63
(e) None of the above.

Question 33
Which statement is *true*?

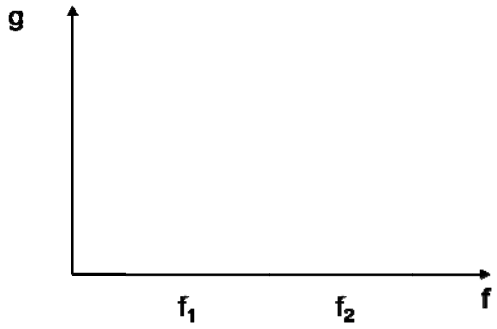
(a) The "negation" linear mapping transforms dark regions of an image into darker regions.
(b) A histogram displays the frequencies of appearance of pixel values in an image.
(c) Irrespective of the image they are applied to, the median and average filters never produce the same outcome.
(d) Linear mapping with a positive bias decreases brightness.
(e) All of the other.

Question 31

Let's suppose a greyscale Image K with Kmin=50 and Kmax=170. What are the values of the bias a and gain b of the stretching mapping which maps the pixel value range [Kmin, Kmax] of image K into the pixel value range [10-250]?

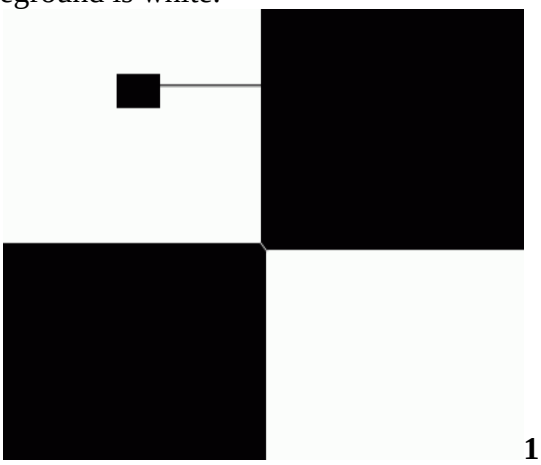
(a) a=1, b=45
(b) a=2, b=-90
(c) a=-1, b=45
(d) a=2, b=90
(e) None of the above.

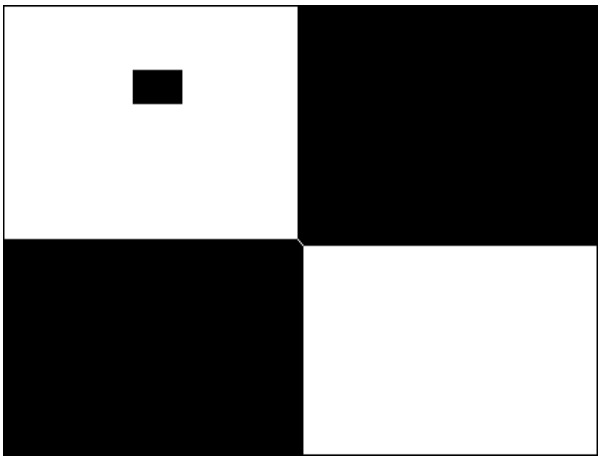
$$g_{out} = (K - K_{\min})(\frac{g_{\max} - g_{\min}}{K_{\max} - K_{\min}}) + g_{\min}$$

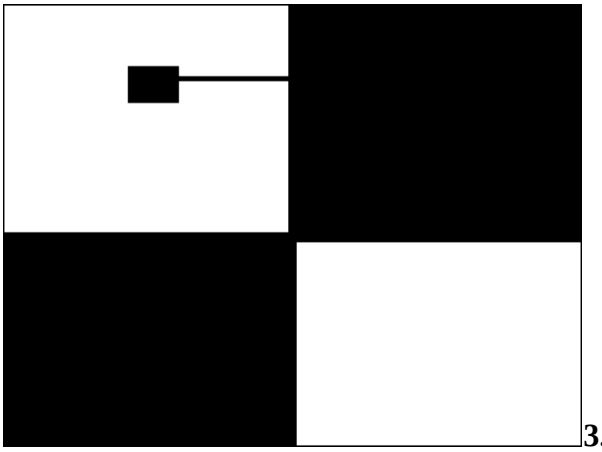


Question 32

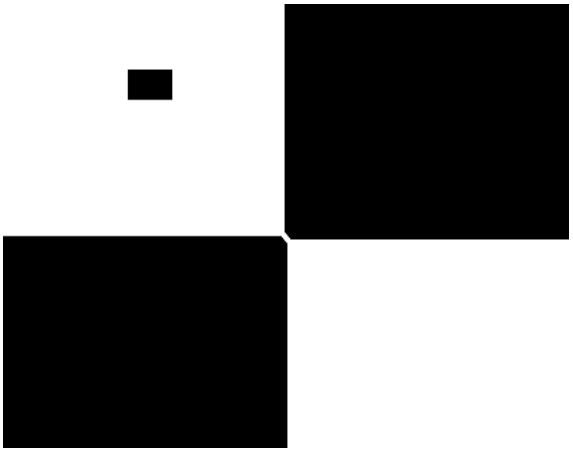
Image Z is the original binary image. Each of images 1, 2,3, 4 is the result of applying one morphological operation to image Z. A square 3x3 structuring element was used, and the foreground is white.

Z. 

1 



2.

3. 

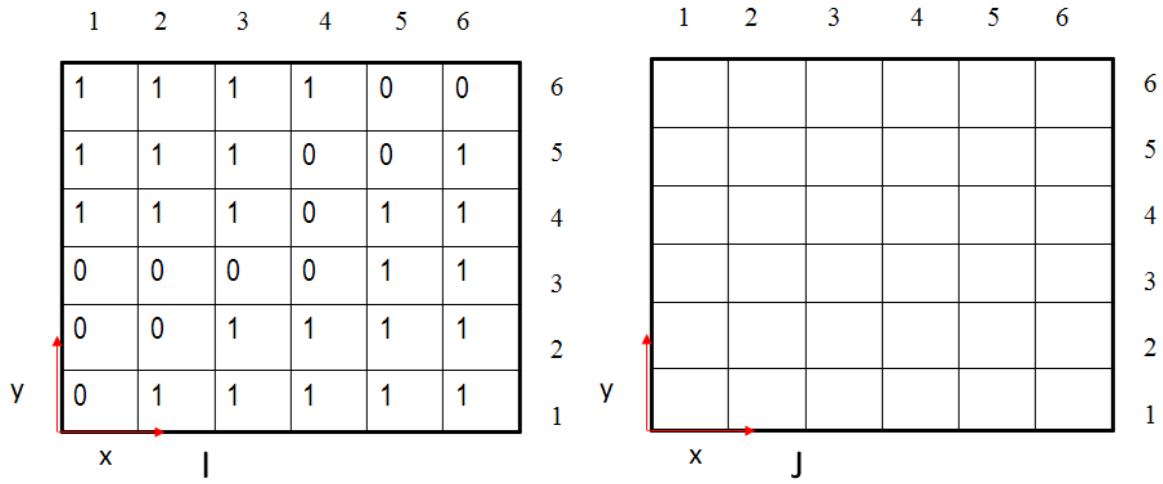
Which of the following answers gives the correct operations?

1. Close, 2. Erode, 3. Dilate.
2. Erode, 2. Close, 3. Dilate.
3. Close, 2. Erode, 3. Open.
4. Open, 2. Erode, 3. Dilate.

Question 34

Consider a 3 by 3 cross-like binary mask (structuring element) M. What is the Image value at pixel location (3,4) after performing an erosion on binary image I (introduced at the beginning of this script) using mask M?

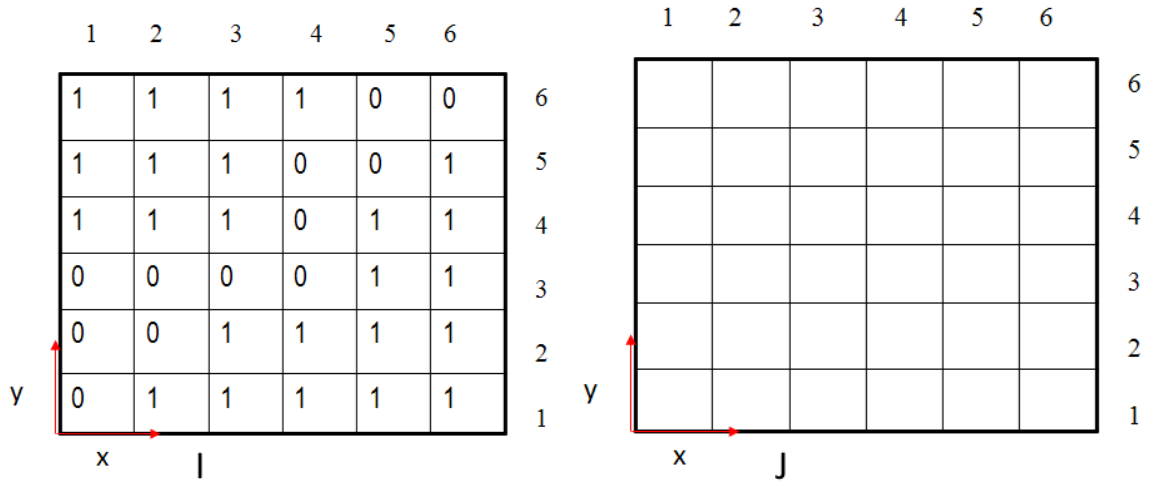
(a) 2
(b) 1
(c) undefined
(d) 0
(e) None of the above.



Question 35

Consider a 3 by 3 cross-like binary mask (structuring element) M. What is the Image value at pixel location (3,4) after performing a dilation on binary image I (introduced at the beginning of this script) using mask M?

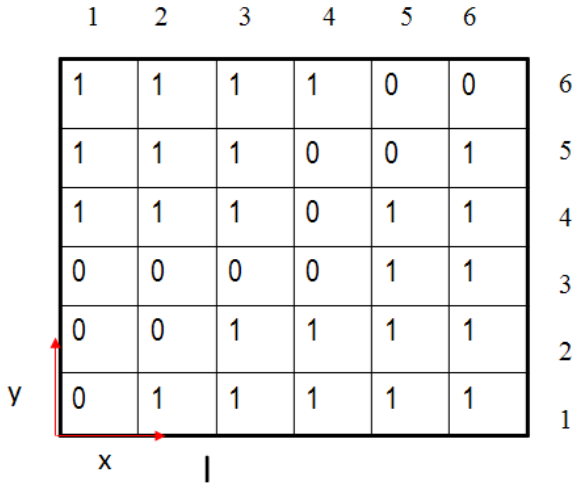
(a) undefined
(b) 0
(c) 2
(d) 1
(e) None of the above.

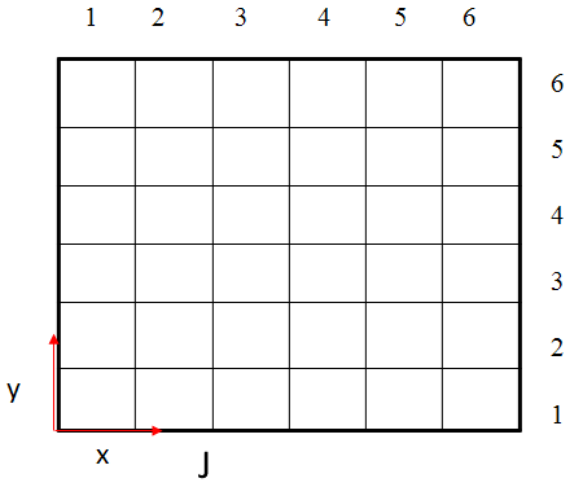


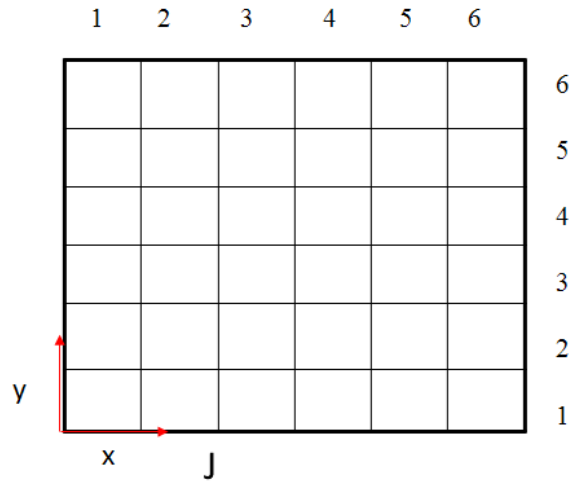
Question 36

Consider a 3 by 3 cross-like binary mask (structuring element) M. What is the Image value at pixel location (3,3) after performing a closing operation on binary image I (introduced at the beginning of this script) using mask M?

(a) 2
(b) 1
(c) undefined
(d) 0
(e) None of the above.



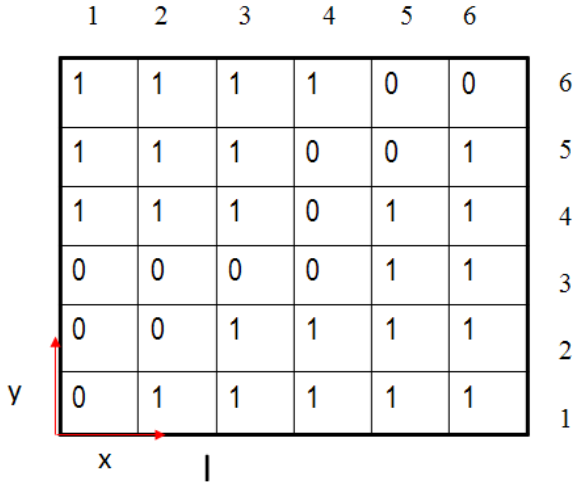


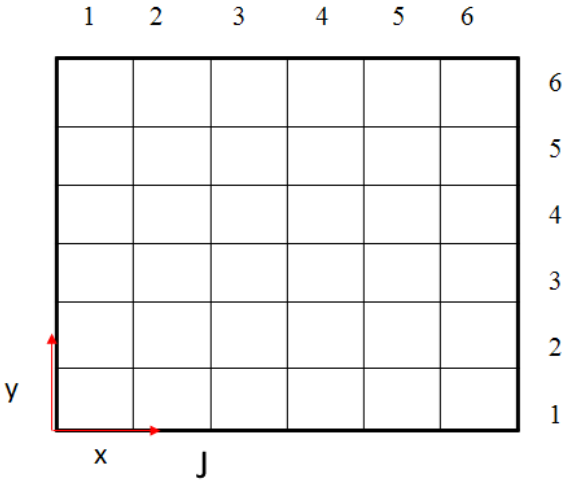


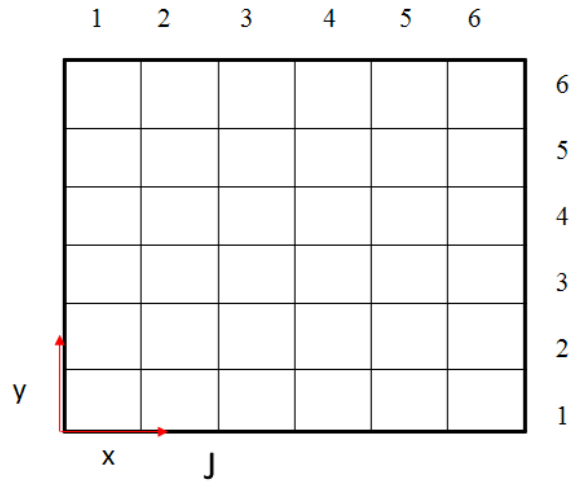
Question 37

Consider a 3 by 3 cross-like binary mask (structuring element) M. What is the Image value at pixel location (3,4) after performing an opening operation on binary image I using mask M?

(a) 2
(b) 0
(c) 1
(d) undefined
(e) None of the above.







Question 40

Consider the greyscale image J defined at the beginning of the test script. What is the histogram count for pixel value 89?

(a) 2
(b) 0
(c) 4
(d) 3
(e) None of the above.

Value	Count

Question 42

Consider the greyscale image J defined at the beginning of the test script. What is the cumulative histogram count for pixel value 127?

(a) 16
(b) Undefined.
(c) 4/9
(d) 2
(e) None of the above.

Value	Count

Question 41
Consider the greyscale image J defined at the beginning of the test script. What is the cumulative distribution function Image value at pixel value 255?

(a) 255
(b) 1
(c) 36
(d) 1/255
(e) None of the above.

Value	Cdf

Question 50
Consider the greyscale image J defined at the beginning of the test script. What is the Image value at pixel location (3,3) after performing a histogram equalization?

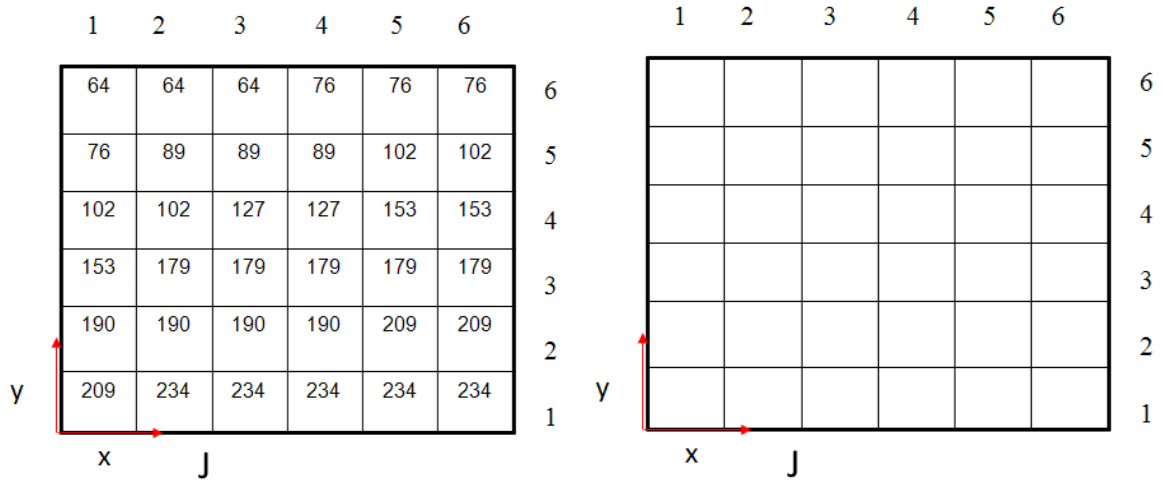
(a) 170
(b) 127
(c) 190
(d) Undetermined.
(e) None of the above.

Value	output

Question 44

Consider the greyscale image J defined at the beginning of the test script. What is the Image value at pixel location (3,3) after applying a 1 by 3 Gaussian filtering on image J?

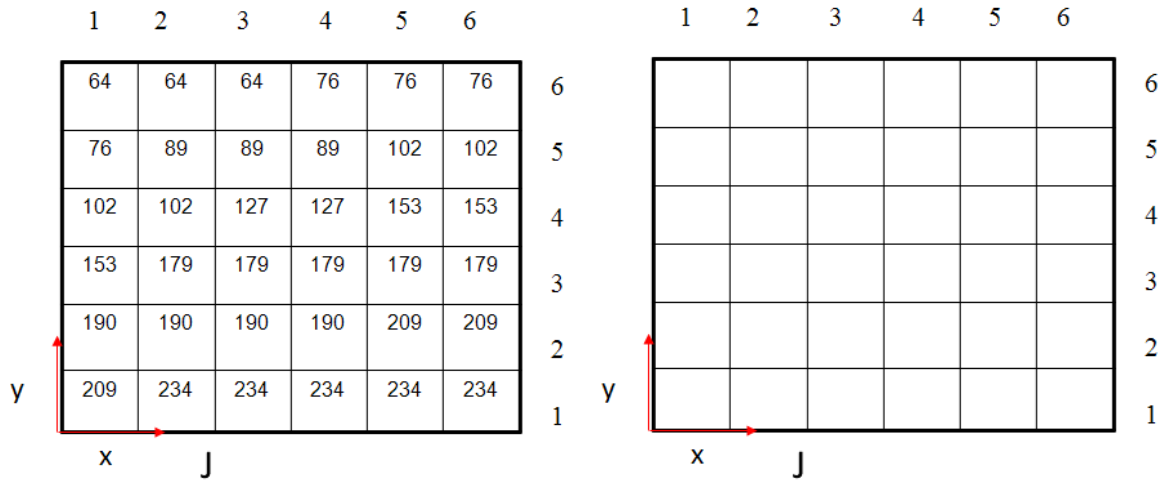
(a) Undefined.
(b) 179
(c) 125
(d) 173
(e) None of the above.



Question 46

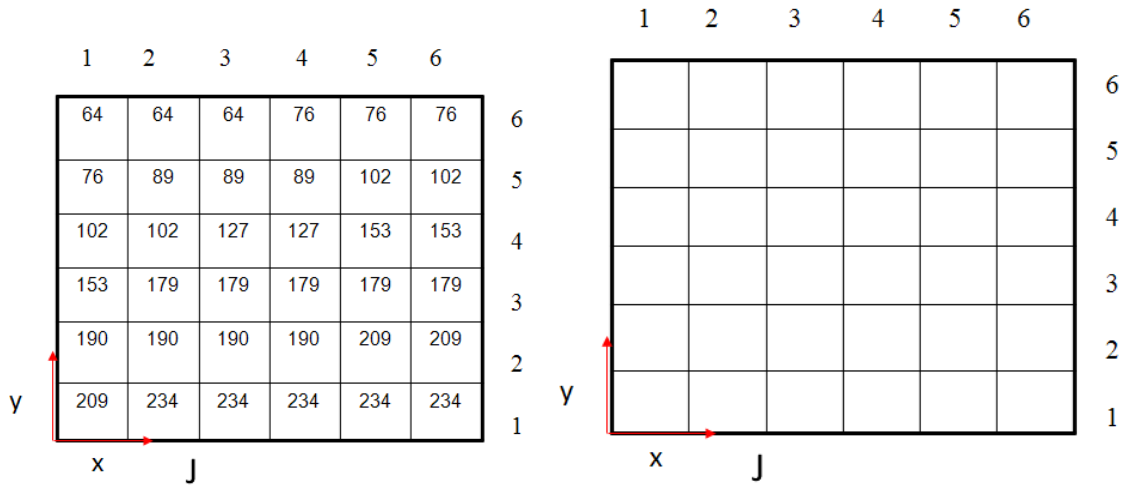
Consider the greyscale image J defined at the beginning of the test script. What is the Image value at pixel location (3,4) after applying a 3 by 3 Median filter on image J?

(a) 89
(b) 127
(c) 179
(d) 102
(e) None of the above.



Question 47
Consider the greyscale image J defined at the beginning of the test script. What is the Image value at pixel location (3,4) after applying a 3 by 3 Average filter on image J?

(a) 127
(b) 89
(c) 132
(d) 179
(e) None of the above



Question 43
Considering an 8 bits image, what is the cumulative histogram count for pixel value 127 if an image has an evenly distributed histogram pixel count for all pixel values?

(a) 1/127
(b) 127
(c) 1
(d) 1/2
(e) None of the above.

Rough Working – This page will not be marked