**1. Noise reduction is obtained by blurring the image using smoothing filter.**  
a) True  
b) False

Answer: a  
Explanation: Noise reduction is obtained by blurring the image using smoothing filter. Blurring is used in pre-processing steps, such as removal of small details from an image prior to object extraction and, bridging of small gaps in lines or curves.

**2. What is the output of a smoothing, linear spatial filter?**  
a) Median of pixels  
b) Maximum of pixels  
c) Minimum of pixels  
d) Average of pixels

Answer: d  
Explanation: The output or response of a smoothing, linear spatial filter is simply the average of the pixels contained in the neighbourhood of the filter mask.

**3. Smoothing linear filter is also known as median filter.**  
a) True  
b) False

Answer: b  
Explanation: Since the smoothing spatial filter performs the average of the pixels, it is also called as averaging filter.

**4. Which of the following in an image can be removed by using smoothing filter?**  
a) Smooth transitions of gray levels  
b) Smooth transitions of brightness levels  
c) Sharp transitions of gray levels  
d) Sharp transitions of brightness levels

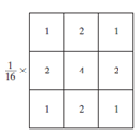
Answer: c  
Explanation: Smoothing filter replaces the value of every pixel in an image by the average value of the gray levels. So, this helps in removing the sharp transitions in the gray levels between the pixels. This is done because, random noise typically consists of sharp transitions in gray levels.

**5. Which of the following is the disadvantage of using smoothing filter?**  
a) Blur edges  
b) Blur inner pixels  
c) Remove sharp transitions  
d) Sharp edges

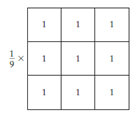
Answer: a  
Explanation: Edges, which almost always are desirable features of an image, also are characterized by sharp transitions in gray level. So, averaging filters have an undesirable side effect that they blur these edges.

**6. Smoothing spatial filters doesn’t smooth the false contours.**  
a) True  
b) False

Answer: b  
Explanation: One of the application of smoothing spatial filters is that, they help in smoothing the false contours that result from using an insufficient number of gray levels.

**7. The mask shown in the figure below belongs to which type of filter?**  
[](https://www.sanfoundry.com/wp-content/uploads/2017/06/digital-image-processing-questions-answers-smoothing-spatial-filters-q7.png)  
a) Sharpening spatial filter  
b) Median filter  
c) Sharpening frequency filter  
d) Smoothing spatial filter

Answer: d  
Explanation: This is a smoothing spatial filter. This mask yields a so called weighted average, which means that different pixels are multiplied with different coefficient values. This helps in giving much importance to the some pixels at the expense of others.

**8. The mask shown in the figure below belongs to which type of filter?**  
[](https://www.sanfoundry.com/wp-content/uploads/2017/06/digital-image-processing-questions-answers-smoothing-spatial-filters-q8.png)  
a) Sharpening spatial filter  
b) Median filter  
c) Smoothing spatial filter  
d) Sharpening frequency filter

Answer: c  
Explanation: The mask shown in the figure represents a 3×3 smoothing filter. Use of this filter yields the standard average of the pixels under the mask.

**9. Box filter is a type of smoothing filter.**  
a) True  
b) False

Answer: a  
Explanation: A spatial averaging filter or spatial smoothening filter in which all the coefficients are equal is also called as box filter.

**10. If the size of the averaging filter used to smooth the original image to first image is 9, then what would be the size of the averaging filter used in smoothing the same original picture to second in second image?**  
[](https://www.sanfoundry.com/wp-content/uploads/2017/06/digital-image-processing-questions-answers-smoothing-spatial-filters-q10.png)  
a) 3  
b) 5  
c) 9  
d) 15

Answer: d  
Explanation: We know that, as the size of the filter used in smoothening the original image that is averaging filter increases then the blurring of the image. Since the second image is more blurred than the first image, the window size should be more than 9.

**11. Which of the following comes under the application of image blurring?**  
a) Object detection  
b) Gross representation  
c) Object motion  
d) Image segmentation

Answer: b  
Explanation: An important application of spatial averaging is to blur an image for the purpose of getting a gross representation of interested objects, such that the intensity of the small objects blends with the background and large objects become easy to detect.

**12. Which of the following filters response is based on ranking of pixels?**  
a) Nonlinear smoothing filters  
b) Linear smoothing filters  
c) Sharpening filters  
d) Geometric mean filter

Answer: a  
Explanation: Order static filters are nonlinear smoothing spatial filters whose response is based on the ordering or ranking the pixels contained in the image area encompassed by the filter, and then replacing the value of the central pixel with the value determined by the ranking result.

**13. Median filter belongs to which category of filters?**  
a) Linear spatial filter  
b) Frequency domain filter  
c) Order static filter  
d) Sharpening filter

Answer: c  
Explanation: The median filter belongs to order static filters, which, as the name implies, replaces the value of the pixel by the median of the gray levels that are present in the neighbourhood of the pixels.

**14. Median filters are effective in the presence of impulse noise.**  
a) True  
b) False

Answer: a  
Explanation: Median filters are used to remove impulse noises, also called as salt-and-pepper noise because of its appearance as white and black dots in the image.

**15. What is the maximum area of the cluster that can be eliminated by using an n×n median filter?**  
a) n2  
b) n2/2  
c) 2\*n2  
d) n

Answer: b  
Explanation: Isolated clusters of pixels that are light or dark with respect to their neighbours, and whose area is less than n2/2, i.e., half the area of the filter, can be eliminated by using an n×n median filter.

**1. Which of the following is the primary objective of sharpening of an image?**  
a) Blurring the image  
b) Highlight fine details in the image  
c) Increase the brightness of the image  
d) Decrease the brightness of the image

Answer: b  
Explanation: The sharpening of image helps in highlighting the fine details that are present in the image or to enhance the details that are blurred due to some reason like adding noise.

**3. In spatial domain, which of the following operation is done on the pixels in sharpening the image?**  
a) Integration  
b) Average  
c) Median  
d) Differentiation

Answer: d  
Explanation: We know that, in blurring the image, we perform the average of pixels which can be considered as integration. As sharpening is the opposite process of blurring, logically we can tell that we perform differentiation on the pixels to sharpen the image.

**2. Sharpening is analogous to which of the following operations?**  
a) To spatial integration  
b) To spatial differentiation  
c) All of the mentioned  
d) None of the mentioned

Answer: b  
Explanation: Smoothing is analogous to integration and so, sharpening to spatial differentiation.

**2. How can Sharpening be achieved?**  
a) Pixel averaging  
b) Slicing  
c) Correlation  
d) None of the mentioned

Answer: d  
Explanation: Sharpening is achieved using Spatial Differentiation.

**3. What does Image Differentiation enhance?**  
a) Edges  
b) Pixel Density  
c) Contours  
d) None of the mentioned

Answer: a  
Explanation: Image Differentiation enhances Edges and other discontinuities.

**3. What is the process of moving a filter mask over the image and computing the sum of products at each location called as?**  
a) Convolution  
b) Correlation  
c) Linear spatial filtering  
d) Non linear spatial filtering

Answer: b  
Explanation: The process is called as Correlation.

**1. The output of a smoothing, linear spatial filtering is a \_\_\_\_\_\_\_\_\_\_\_\_ of the pixels contained in the neighbourhood of the filter mask.**  
a) Sum  
b) Product  
c) Average  
d) Dot Product

Answer: c  
Explanation: Smoothing is simply the average of the pixels contained in the neighbourhood.

**2. Averaging filters is also known as \_\_\_\_\_\_\_\_\_\_\_\_ filter.**  
a) Low pass  
b) High pass  
c) Band pass  
d) None of the Mentioned

Answer: a  
Explanation: Averaging filters is also known as Low pass filters.

**3. What is the undesirable side effects of Averaging filters?**  
a) No side effects  
b) Blurred image  
c) Blurred edges  
d) Loss of sharp transitions

Answer: c  
Explanation: Blue edges is the undesirable side effect of Averaging filters.

**4. A spatial averaging filter in which all coefficients are equal is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**  
a) Square filter  
b) Neighbourhood  
c) Box filter  
d) Zero filter

Answer: c  
Explanation: It is called a Box filter.

**5. Which term is used to indicate that pixels are multiplied by different coefficients?**  
a) Weighted average  
b) Squared average  
c) Spatial average  
d) None of the Mentioned

Answer: a  
Explanation: It is called weighted average since more importance(weight) is given to some pixels.

**6. The non linear spacial filters whose response is based on ordering of the pixels contained is called \_\_\_\_\_\_\_\_\_\_\_\_\_.**  
a) Box filter  
b) Square filter  
c) Gaussian filter  
d) Order-statistic filter

Answer: d  
Explanation: It is called Order-statistic filter.

**7. Impulse noise in Order-statistic filter is also called as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  
a) Median noise  
b) Bilinear noise  
c) Salt and pepper noise  
d) None of the Mentioned

Answer: c  
Explanation: It is called salt-and-pepper noise because of its appearance as white and black dots superimposed on an image.

**8. Best example for a Order-statistic filter is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  
a) Impulse filter  
b) Averaging filter  
c) Median filter  
d) None of the Mentioned

Answer: c  
Explanation: Median filter is the best known Order-statistic filter.

**9. What does “eliminated” refer to in median filter?**  
a) Force to average intensity of neighbours  
b) Force to median intensity of neighbours  
c) Eliminate median value of pixels  
d) None of the Mentioned

Answer: b  
Explanation: It refers to forcing to median intensity of neighbours.

**10. Which of the following is best suited for salt-and-pepper noise elimination?**  
a) Average filter  
b) Box filter  
c) Max filter  
d) Median filter

Answer: d  
Explanation: Median filter is better suited than average filter for salt-and-pepper noise elimination.

**1. Smoothing filter is used for which of the following work(s)?**  
a) Blurring  
b) Noise reduction  
c) All of the mentioned  
d) None of the mentioned

Answer: c  
Explanation: Smoothing filter is used for blurring and noise reduction.

**2. The response of the smoothing linear spatial filter is/are \_\_\_\_\_\_\_\_\_\_**  
a) Sum of image pixel in the neighborhood filter mask  
b) Difference of image in the neighborhood filter mask  
c) Product of pixel in the neighborhood filter mask  
d) Average of pixels in the neighborhood of filter mask

Answer: d  
Explanation: The average of pixels in the neighborhood of filter mask is simply the output of the smoothing linear spatial filter.

**3. Which of the following filter(s) results in a value as average of pixels in the neighborhood of filter mask.**  
a) Smoothing linear spatial filter  
b) Averaging filter  
c) Lowpass filter  
d) All of the mentioned

Answer: d  
Explanation: The output as an average of pixels in the neighborhood of filter mask is simply the output of the smoothing linear spatial filter also known as averaging filter and lowpass filter.

**1. Which of the following filter(s) has the response in which the central pixel value is replaced by value defined by ranking the pixel in the image encompassed by filter?**  
a) Order-Statistic filters  
b) Non-linear spatial filters  
c) Median filter  
d) All of the mentioned

Answer: d  
Explanation: An Order-Statistic filters also called non-linear spatial filters, response is based on ranking the pixel in the image encompassed by filter that replaces the central pixel value. A Median filter is an example of such filters.

**2. Is it true or false that “the original pixel value is included while computing the median using gray-levels in the neighborhood of the original pixel in median filter case”?**  
a) True  
b) False

Answer: a  
Explanation: A median filter the pixel value is replaced by median of the gray-level in the neighborhood of that pixel and also the original pixel value is included while computing the median.

**3. Two filters of similar size are used for smoothing image having impulse noise. One is median filter while the other is a linear spatial filter. Which would the blurring effect of both?**  
a) Median filter effects in considerably less blurring than the linear spatial filters  
b) Median filter effects in considerably more blurring than the linear spatial filters  
c) Both have the same blurring effect  
d) All of the mentioned

Answer: a  
Explanation: For impulse noise, median filter is much effective for noise reduction and causes considerably less blurring than the linear spatial filters.

**1. In neighborhood operations working is being done with the value of image pixel in the neighborhood and the corresponding value of a subimage that has same dimension as neighborhood. The subimage is referred as \_\_\_\_\_\_\_\_\_**  
a) Filter  
b) Mask  
c) Template  
d) All of the mentioned

Answer: d  
Explanation: Working in neighborhood operations is done with the value of a subimage having same dimension as neighborhood corresponding to the value in the image pixel. The subimage is called as filter, mask, template, kernel or window.

**2. The response for linear spatial filtering is given by the relationship \_\_\_\_\_\_\_\_\_\_  
a) Sum of filter coefficient’s product and corresponding image pixel under filter mask**  
b) Difference of filter coefficient’s product and corresponding image pixel under filter mask  
c) Product of filter coefficient’s product and corresponding image pixel under filter mask  
d) None of the mentioned

Answer: a  
Explanation: In spatial filtering the mask is moved from point to point and at each point the response is calculated using a predefined relationship. The relationship in linear spatial filtering is given by: the Sum of filter coefficient’s product and corresponding image pixel in area under filter mask.

**3. In linear spatial filtering, what is the pixel of the image under mask corresponding to the mask coefficient w (1, -1), assuming a 3\*3 mask?**  
a) f (x, -y)  
b) f (x + 1, y)  
c) f (x, y – 1)  
d) f (x + 1, y – 1)

Answer: d  
Explanation: The pixel corresponding to mask coefficient (a 3\*3 mask) w (0, 0) is f (x, y), and so for w (1, -1) is f (x + 1, y – 1).

**4. Which of the following is/are a nonlinear operation?**  
a) Computation of variance  
b) Computation of median  
c) All of the mentioned  
d) None of the mentioned

Answer: c  
Explanation: Computation of variance as well as median comes under nonlinear operation.

**5. Which of the following is/are used as basic function in nonlinear filter for noise reduction?**  
a) Computation of variance  
b) Computation of median  
c) All of the mentioned  
d) None of the mentioned

Answer: b  
Explanation: Computation of median gray-level value in the neighborhood is the basic function of nonlinear filter for noise reduction.

**6. In neighborhood operation for spatial filtering if a square mask of size n\*n is used it is restricted that the center of mask must be at a distance ≥ (n – 1)/2 pixels from border of image, what happens to the resultant image?**  
a) The resultant image will be of same size as original image  
b) The resultant image will be a little larger size than original image  
c) The resultant image will be a little smaller size than original image  
d) None of the mentioned

Answer: c  
Explanation: If the center of mask must be at a distance ≥ (n – 1)/2 pixels from border of image, the border pixels won’t get processed under mask and so the resultant image would be of smaller size.

**7. Which of the following method is/are used for padding the image?**  
a) Adding rows and column of 0 or other constant gray level  
b) Simply replicating the rows or columns  
c) All of the mentioned  
d) None of the mentioned

Answer: c  
Explanation: In neighborhood operation for spatial filtering using square mask, padding of original image is done to obtain filtered image of same size as of original image done, by adding rows and column of 0 or other constant gray level or by replicating the rows or columns of the original image.

**8. In neighborhood operation for spatial filtering using square mask of n\*n, which of the following approach is/are used to obtain a perfectly filtered result irrespective of the size?**  
a) By padding the image  
b) By filtering all the pixels only with the mask section that is fully contained in the image  
c) By ensuring that center of mask must be at a distance ≥ (n – 1)/2 pixels from border of image  
d) None of the mentioned

Answer: c  
Explanation: By ensuring that center of mask must be at a distance ≥ (n – 1)/2 pixels from border of image, the resultant image would be of smaller size but all the pixels would be the result of the filter processing and so is a fully filtered result.  
In the other approach like padding affect the values near the edges that gets more prevalent with mask size increase, while the another approach results in the band of pixels near border that gets processed with partial filter mask. So, not a fully filtered case.

**4. An image contains noise having appearance as black and white dots superimposed on the image. Which of the following noise(s) has the same appearance?**  
a) Salt-and-pepper noise  
b) Gaussian noise  
c) All of the mentioned  
d) None of the mentioned

Answer: c  
Explanation: An impulse noise has an appearance as black and white dots superimposed on the image. This is also known as Salt-and-pepper noise.

**5. While performing the median filtering, suppose a 3\*3 neighborhood has value (10, 20, 20, 20, 15, 20, 20, 25, 100), then what is the median value to be given to the pixel under filter?**  
a) 15  
b) 20  
c) 100  
d) 25

Answer: b  
Explanation: The values are first sorted and so turns out to (10, 15, 20, 20, 20, 20, 20, 25, and 100). For a 3\*3 neighborhood the 5th largest value is the median, and so is 20.

**6. Which of the following are forced to the median intensity of the neighbors by n\*n median filter?**  
a) Isolated cluster of pixels that are light or dark in comparison to their neighbors  
b) Isolated cluster of pixels whose area is less than one-half the filter area  
c) All of the mentioned  
d) None of the mentioned

Answer: c  
Explanation: The isolated cluster pixel value doesn’t come as a median value and since are either are light or dark as compared to neighbors, so are forced with median intensity of neighbors that aren’t even close to their original value and so are sometimes termed “eliminated”.  
If the area of such isolated pixels are < n2/2, that is again the pixel value won’t be a median value and so are eliminated.  
Larger cluster pixels value are more pronounced to be a median value, so are considerably less forced to median intensity.

**7. Which filter(s) used to find the brightest point in the image?**  
a) Median filter  
b) Max filter  
c) Mean filter  
d) All of the mentioned

A max filter gives the brightest point in an image and so is used.