1. Consider that the maximum value of an image I_1 is M and its minimum is m (with M different than m). An intensity transform that maps the image I_1 onto I_2 such that the maximal value of I_2 is L and the minimal is 0 is: 1 point

- $\frac{L}{M-m} \cdot I_1$
- $\frac{I_1}{M-m} \cdot L$
- $\frac{I_1-m}{M-m} \cdot L$
- Such transform does not exist.

2. Why global discrete histogram equalization does not, in general, yield a flat (uniform) histogram? 1 point

- Actually, global discrete histogram equalization always yields flat histograms by definition.
- Because images are in color.
- Because the histogram equalization mathematical derivation doesn't exist for discrete signals.
- Because in global histogram equalization, all pixels with the same value are mapped to the same value.

3. Discrete histogram equalization is an invertible operation, meaning we can recover the original image from the equalized one by inverting the operation, since: 1 point

- Pixels with different values are mapped to pixels with different values.
- There is a unique histogram equalization formula per image.
- Actually, histogram equalization is in general non-invertible.
- Images have unique histograms

4. Given an image with only 2 pixels and 3 possible values for each one. Determine the number of possible different images and the number of possible different histograms 1 point

- 6 images and 6 histograms.
- 9 images and 9 histograms.
- 9 images and 6 histograms
- 6 images and 9 histograms.

5. Which integer x number minimizes $\sum_{i=1}^{i=99} |x-i|$? 1 point

- 50.5
- 50
- 51
- 49

6. Applying a 3×3 averaging filter to an image a large (infinity) number of times is 1 point

- The same as applying a median filter.
- Equivalent to replacing all the pixel values by 0.
- Equivalent to replacing all the pixel values by the average of the values in the original image.
- The same as applying it a single time.

7. Which integer x number minimizes $\sum_{i=1}^{i=3} |x-i|^2$? 1 point

- 4
- 1
- 2
- 3

8. Consider a row of pixels with values 1, 1, 1, 1, 5, 1, 1, 1, 1. When we apply an average and a median filter of size 3, the output values of the 5th pixel starting from the left are 1 point

- 5 and 1 respectively
- 9/3 and 1 respectively
- 1 for both operations
- 7/3 and 1, respectively.

9. Consider a row of pixels with values 1, 1, 1, 1, 5, 5, 5, 5, 5. When we apply an average and a median filter of size 3, the output values of the 5th pixel starting from the left are 1 point

- 1 and 5, respectively
- 5 for both operations
- 11/3 and 5, respectively
- 7/3 and 1 respectively

10. Consider an image denoising operation T, and write $T(I)$ the application of T to the image I. 1 point

- If T is the non-local means algorithm, then $T(T(I)) = T(I)$.
- If T is the non-local means algorithm, then $T^n(I) = average(I)$, where T^n stands for applying T an infinite number of times and $average(I)$ is the pixel average of the image I.
- If T is the non-local means algorithm, then there is no image for which $T(I) = I$.
- None of the above statements is correct.

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