1 point

1. Image and video processing has applications in (you can select more than one correct answer.)

- [x] Medical images
- [x] Outer-space images
- [x] Consumer images

The answer is all the above since, as we have seen in the introductory videos, image processing has applications in consumer images, medicalimages, outer-space images, and much more.

1 point

2. Images exist only in the visual spectrum.

- ( ) True
- (•) False

The statement that images exist only in the visual spectrum is False, as we have seen in the early videos.

1 point

3. When you enter dark room in a bright day, it takes some time before you can see reasonable well in the room. Which visual process explains this phenomena?

- (•) Brightness adaptation
- ( ) Binocular vision (2 eyes)
- ( ) Dilated pupils
- ( ) Color vision

Brightness adaptation is the visual process that explains that when you enter dar k room in a bright day, it takes some time before you can seereasonable well in the room.

1 point

4. Consider an image with 100 lines and 1000 pixels per line. Each pixel can take 256 different values. The total amount of bits needed to store that image is

- 25,600,000
- 10,000
- (●) 800,000
- Larger than the hard drive in my computer.

We have a total of 100x1000 pixels in the image, and we need 8 bits per pixel to represent 256 different values. The total number of bits is t hen8x100x1000.

1 point

5. Sampling refers to

- (●) Discretization of the spatial image domain.
- Inversion of the pixel values
- Testing the possible positions of an object in an image
- Discretization of the values an image pixel can take

Sampling refers to discretization of the spatial image domain.

1 point

6. Quantization refers to

- Discretization of the spatial image domain.
- (●) Discretization of the values an image pixel can take.
- Inversion of the pixel values.
- Testing the possible positions of an object in an image.

Quantization refers to discretization of the values an image pixel can take.

1 point

7. Going from a pixel with coordinate (1,1) to a pixel with coordinate (0,0) takes

- (●) Two steps both for 4 and 8 adjacency neighborhoods.
- ( ) One step for 8 adjacency and 2 steps for 4 adjacency
- ( ) One single step both for 4 and 8 adjacency.
- ( ) Two steps for 8 adjacency and 2 steps for 4 adjacency.

While with
8 adjacency we can travel diagonally (and then a single step), for 4 adjacency we can only move down and then left (a total of 2steps).

1 point

8. The determinant of a scaling matrix is equal to 1.

- ( ) True
- (●) False

False. The determinant actually represents the scale

1 point

9. The determinant of a rotation matrix is

1

The determinant of a rotation matrix is equal to 1

1 point

10. When we quantize an image, the amount of memory needed to store it

- (●) Decreases
- ( ) Increases

It decreases. As we will
see later, quantization is critical for compression, reducing the amount of storage needed while maintaining importantvisual characteristics

1 point

11. A video has 30 frames (images) per second. Considering that each image has 1000×1000 pixels, an hour of video will occupy

- 864000000000 bits
- We can't know
- All the memory in my mobile phone
- 864000000 bits

We can't know because the number of gray levels per pixel was not specified.

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1 point

12. If we quantize an image with double resolution (meaning we use twice the number of bits per pixel) and sample it with half the resolution in each direction, then

- The total storage needed is reduced 4 times
- The total storage needed remains the same
- The image quality remains the same
- The total storage needed is reduced by half

Since we are reducing the resolution by 2 in each direction, the total number of pixels is reduced by 4. At the same time we are doubling thenumber of bits per pixel and therefore the total storage is only reduced by 2