## Feedback — Quiz #1

Help Center

You submitted this quiz on **Sat 17 Jan 2015 12:26 AM IST**. You got a score of **12.00** out of **12.00**.

# **Question 1**

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

|          | Score       | Explanation  |
|----------|-------------|--|
| <b>~</b> | 0.33        |  |
| <b>~</b> | 0.33        |  |
| •        | 0.33        |  |
|          | 1.00 / 1.00 |  |
|          | <b>~</b>    | <ul><li>✓ 0.33</li><li>✓ 0.33</li><li>✓ 0.33</li></ul> |

## **Question Explanation**

See video 1 (parts 1 & 2) with examples from all these disciplines and beyond.

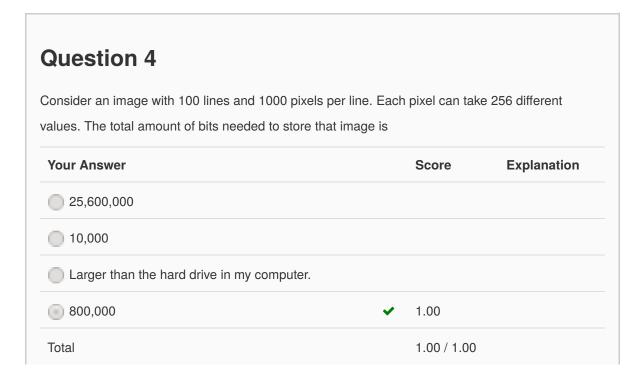
# **Question 2**

Images exist only in the visual spectrum.

|            | n |
|------------|---|
|            |   |
| .00        |   |
| .00 / 1.00 |   |
|            |   |
|            |   |

Check video 3, Figure 1.5 (around 01:30) and the numerous examples provided there.

# Question 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? Your Answer Score Explanation ■ Binocular vision (2 eyes) ■ Color vision ■ Dilated pupils ■ Brightness adaptation ✓ 1.00 Total 1.00 / 1.00 Question Explanation Check Figure 2.4 in video 4 (around 04:30).



## **Question Explanation**

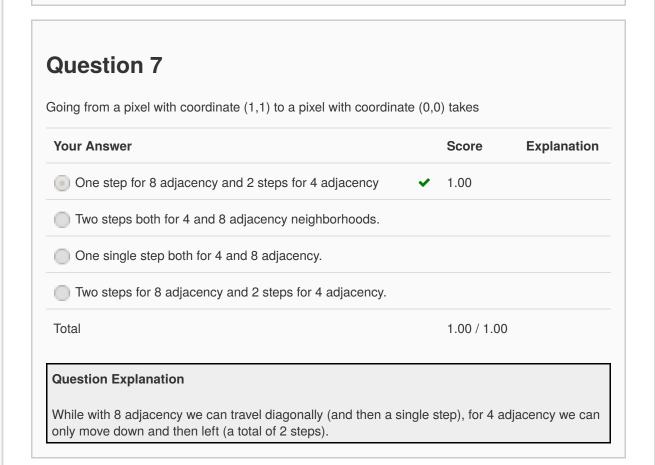
We have a total of 100x1000 pixels in the image, and we need 8 bits per pixel to represent 256 different values. The total number of bits is then 8x100x1000.

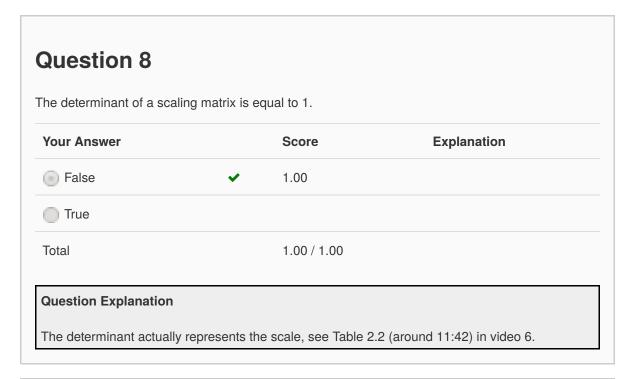
# Question 5 Sampling refers to Your Answer Score Explanation ⑤ Discretization of the spatial image domain. ✓ 1.00 ⑥ Inversion of the pixel values ⑥ Discretization of the values an image pixel can take ⑥ Testing the possible positions of an object in an image Total 1.00 / 1.00 Question Explanation See figures 2.16 (around 03:50) and 2.17 (around 07:17) in video 5.

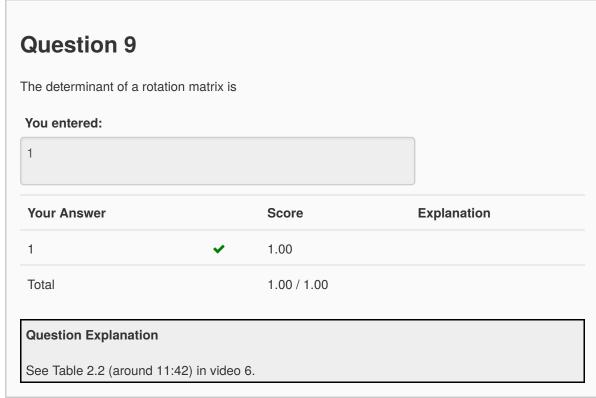
| Question 6   |          |             |             |
|--|----------|-------------|-------------|
| Quantization refers to                                   |          |             |             |
| Your Answer  |          | Score       | Explanation |
| Discretization of the spatial image domain.              |          |             |             |
| Testing the possible positions of an object in an image. |          |             |             |
| Inversion of the pixel values.                           |          |             |             |
| Discretization of the values an image pixel can take.    | <b>~</b> | 1.00        |             |
| Total  |          | 1.00 / 1.00 |             |

## **Question Explanation**

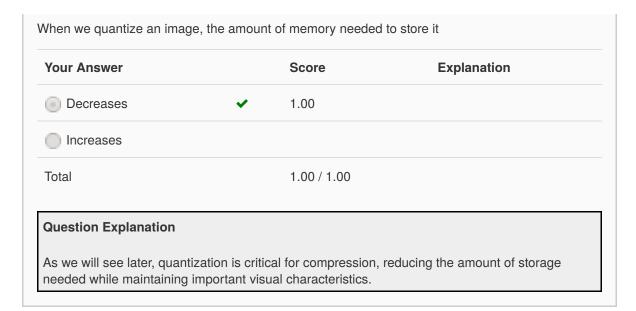
See figures 2.16 (around 03:50) and 2.17 (around 07:17) in video 5.

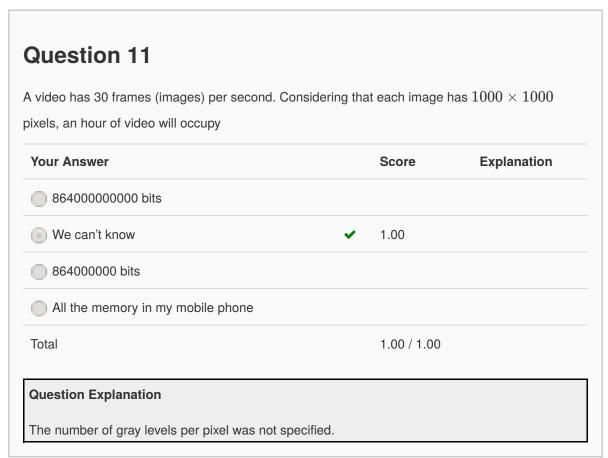






# **Question 10**





## **Question 12**

If we quantize an image with double resolution (meaning we use twice the number of bits per pixel)

| Your Answer                                 |   | Score       | Explanation |
|---|---|-------------|-------------|
| The total storage needed remains the same   |   |             |             |
| The total storage needed is reduced 4 times |   |             |             |
| The total storage needed is reduced by half | ~ | 1.00        |             |
| The image quality remains the same          |   |             |             |
| Total                                       |   | 1.00 / 1.00 |             |

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 the number of bits per pixel and therefore the total storage is only reduced by 2.

## **Question 13**

### (Optional)

- If planning on using Matlab (recommended), watch the tutorial videos provided in the corresponding section, and perform "help images" in the Matlab command line for examples of important image related commands.
- Write a computer program capable of reducing the number of intensity levels in an image from 256 to 2, in integer powers of 2. The desired number of intensity levels needs to be a variable input to your program.
- Using any programming language you feel comfortable with (it is though recommended to use the provided free Matlab), load an image and then perform a simple spatial 3x3 average of image pixels. In other words, replace the value of every pixel by the average of the values in its 3x3 neighborhood. If the pixel is located at (0,0), this means averaging the values of the pixels at the positions (-1,1), (0,1), (1,1), (-1,0), (0,0), (1,0), (-1,-1), (0,-1), and (1,-1). Be careful with pixels at the image boundaries. Repeat the process for a 10x10 neighborhood and again for a 20x20 neighborhood. Observe what happens to the image (we will discuss this in more details in the very near future, about week 3).
- Rotate the image by 45 and 90 degrees (Matlab provides simple command lines for doing this).
- ullet For every 3 imes 3 block of the image (without overlapping), replace all corresponding 9 pixels by their average. This operation simulates reducing the image spatial resolution. Repeat this for 5 imes 5 blocks and 7 imes 7 blocks. If you are using Matlab, investigate simple command lines to do this important operation.

| Your Answer | Score       | Explanation |
|-------------|-------------|-------------|
| Total       | 0.00 / 0.00 |             |
|             |             |             |