



# معالجة الصور

9:11

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2nd Level

Final Exam

Duration: 2 hours

1. \* الإسم الرباعي (بالعربي فقط).

محمد محمود عبدالنواب يوسف

2. \* رقم الجلوس.

162018142

3. \* المستوي.

☐ الاول

☐ الثاني

☒ الثالث

- ☐ رابعة 2013
- ☐ رابعة 2014
- ☐ رابعة 2015
- ☐ رابعة 2016
- ☐ رابعة 2017

4. \* البرنامج

- ☒ عام
- ☐ بايو
- ☐ هندسة

5. \* رقم المعمل

6. \* رقم الكمبيوتر

7. \* الكود (قد تمت مراجعة بيانات الطالب ورقم الجلوس)

8. Noise removal is an example of Low-level image processing.  
(2 Points)

☒ True

☐ False

9. The subdivisions of the intensity scale are called histogram.....  
(2 Points)

☒ bins

☐ intervals

☐ points

10. The sum of all components of a normalized histogram is always 1.  
(2 Points)

☐ True

☒ False

11. Let  $r_k$ , for  $k = 0, 1, 2, \dots, L - 1$ , denote the intensities of an  $L$ -level digital image,  $f(x, y)$ . The .....histogram of  $f$  is defined as  $h(r_k) = n_k$  where  $n_k$  is the number of pixels in  $f$  with intensity  $r_k$ .  
(2 Points)

☐ normalized

☐ equalization

☒ unnormalized

12. By using bit depths,  $k=3$ , the image can be represented by the range of pixels between  $[0, \dots, 8]$ .  
(2 Points)

☐ True



☐ False

13. Gray images: Each pixel is just black or white. Since there are only two possible values for each pixel (0,1), we only need one bit per pixel.

(2 Points)

☐ True

☒ False

14. ....is the general form of the power-law transformation.

(2 Points)

☐  $s = rc^{\gamma}$

☒  $s = cr^{\gamma}$

☐  $c = sr^{\gamma}$

15. The bit depth usually refers to the number of bits used to represent one color component, not the number of bits needed to represent an entire color pixel.

(2 Points)

☒ True

☐ False

16. The expansion of PDF is ..... in uniform PDF.

(2 Points)

☐ Post derivation function

☒ Probability density function

☐ Probability distribution function

17. Feature ..... assigns quantitative attributes to the detected features.  
(2 Points)

- ☐ detection
- ☐ extraction
- ☒ description

18. In intensity-level slicing, instead of highlighting gray-level range, we could highlight the contribution made by each bit.  
(2 Points)

- ☐ True
- ☒ False

19. Transforming the pixel values of an image using the log transformation is an example of contrast compression of the dark pixels.  
(2 Points)

- ☐ True
- ☒ False

20. The locations of points  $(r_1, s_1)$  and  $(r_2, s_2)$ , If  $r_1 = s_1$ , and  $r_2 = s_2$ , the transformation is a linear function that produces no changes in intensity.  
(2 Points)

- ☒ True
- ☐ False

21. Binary Image: Each pixel is a shade of gray, normally from 0 (black) to 255 (white). This range means that each pixel can be represented by eight bits, or exactly one byte.

(2 Points)

☐ True

☒ False

22. In the frequency domain, operations are performed on the Fourier transform of an image, rather than on the image itself.

(2 Points)

☒ True

☐ False

23. Bitmap representations use a series of drawing commands to represent an image.

(2 Points)

☐ True

☒ False

24. A ..... image is composed of a finite number of elements, each of which has a particular location and value. These elements are called picture elements, image elements, pels, and pixels.

(2 Points)

☐ finite

☒ digital

☐ continuous

25. A digital Image may be defined as a two-dimensional function,  $f(x, y)$ , where  $x$  and  $y$  are spatial (plane) coordinates.  
(2 Points)

☐ True

☒ False

26. In general, log transformation can be formulized as;  $s = c \log(1-r)$ , where  $c$  is constant and  $r \geq 0$ .  
(2 Points)

☐ True

☒ False

27. The components of  $p(r_k)$  are estimates of the Probability density function (PDF) occurring in an image.  
(2 Points)

☐ True

☒ False

28. The amplitude of  $f(x, y)$  at any pair of coordinates  $(x, y)$  is called the ..... or gray level of the image at that point.  
(2 Points)

☐ intensity slicing

☐ sampling

☒ intensity

29. Feature description refers to finding the features in an image, region, or boundary.  
(2 Points)

- ☐ True
- ☒ False

30. ....is the process of replacing a continuously varying function with a discrete set of quantization levels.  
(2 Points)

- ☒ Quantization
- ☐ Sampling
- ☐ Rasterization

31. We use the ..... transformation to expand the values of dark pixels in an image, while compressing the higher-level values.  
(2 Points)

- ☐ identity
- ☒ log
- ☐ power

32. Lower-order bits usually contain most of the significant visual information.  
(2 Points)

- ☐ True
- ☒ False



33. In an RGB-encoded color image with an 8-bit depth, each pixel requires 24 bits to encode all three components, while the same image with a 12-bit depth would require a total of 36 bits and the range of each individual color component is [0 . . . 255].

(2 Points)

☒ True

☐ False

34. An 8-bit image may be considered as being composed of eight one-bit planes, with plane 8 containing the lowest-order bit of all pixels in the image, and plane 1 all the highest-order bits.

(2 Points)

☐ True

☒ False

35. ....order planes contribute to more subtle intensity details in the image.

(2 Points)

☐ Higher

☒ Lower

☐ Bit

36. ....representations use one or more two-dimensional arrays of pixels.

(2 Points)

☐ Vector

☐ 3D

☒ Bitmap

37. The number,  $b$ , of bits required to store a digital image with size  $M \times N$  is

$$b = M \times N \times k.$$

(2 Points)

☒ True

☐ False

38. Image acquisition is the first fundamental step in image processing.

(2 Points)

☒ True

☐ False

39. .... partitions an image into its constituent parts or objects.

(2 Points)

☐ Compression

☐ Enhancement

☒ Segmentation

40. The number of intensity levels,  $L$ , being an integer power of two; that is  $L = 2^k$  where  $k$  is an integer.

(2 Points)

☒ True

☐ False

41. An image may be continuous with respect to the x- and y-coordinates, and also in amplitude. To digitize it, we have to sample the function in both coordinates and also in amplitude. Digitizing the coordinate values is called sampling. Digitizing the amplitude values is called.....

(2 Points)

- ☐ resolution
- ☒ quantization
- ☐ sampling

42. The .....function is the trivial case in which the input and output intensities are identical.

(2 Points)

- ☒ identity
- ☐ log
- ☐ power

43. In the spatial domain, first transforming an image into the transform domain, doing the processing there, and obtaining the inverse transform to bring the results back into the spatial domain.

(2 Points)

- ☐ True
- ☒ False

44. When an image can have  $2^k$  possible intensity levels, it is common practice to refer to it as a ".....image," (e.g., a 256-level image is called an 8-bit image).

(2 Points)

- ☒ k-bit
- ☐ 8-bit

☐ binary

45. ....Level: Primitive operations (e.g., noise reduction, contrast enhancement, etc.) where both the input and the output are images.

(2 Points)

☒ Low

☐ Mid

☐ High

46. We use intensity transformations principally for image enhancement and image segmentation.

(2 Points)

☒ True

☐ False

47. .... expands the range of intensity levels in an image so that it spans the ideal full intensity range of the recording medium or display device.

(2 Points)

☐ Power-law Transformations

☒ Contrast stretching

☐ Intensity Slicing

48. Image reconstruction: processing an image so that the result is more suitable for a particular application.

(2 Points)

☐ True

☒ False

49. ....pass filter passes low frequencies.  
(2 Points)

- ☐ Band
- ☒ Low
- ☐ High

50. The normalized histogram of  $f$  is defined as  $p(r_k) = n_k / MN$ . where, as usual,  $M$  and  $N$  are the number of image rows and columns, respectively.  
(2 Points)

- ☒ True
- ☐ False

51. Reducing a grayscale image to only two levels of gray (black and white) is usually referred to as .....  
(2 Points)

- ☒ binarization
- ☐ blurring
- ☐ sampling

52. In the spatial domain, arithmetic calculations and/or logical operations are performed directly on the original pixel values of an image.  
(2 Points)

- ☒ True
- ☐ False

53. The negative of an image with intensity levels in the range  $[0, L - 1]$  is obtained by using the negative transformation function, which has the form:  $s = L + 1 - r$ .  
(2 Points)

☐ True

☒ False

54. Spatial filtering modifies an image by replacing the value of each pixel by a function of the values of the pixel and its neighbors.  
(2 Points)

☒ True

☐ False

55. Image processing methods in the frequency domain are based on direct manipulation of pixels in an image.  
(2 Points)

☐ True

☒ False

56. .... an image into its bit planes is useful for analyzing the relative importance of each bit in the image, a process that aids in determining the adequacy of the number of bits used to quantize the image.  
(2 Points)

☐ Segmentation

☐ Restoration

☒ Decomposing

57. Image enhancement is an area that also deals with improving the appearance of an image. However, unlike restoration, which is subjective, image restoration is objective.  
(2 Points)

☐ True

☒ False

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