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[Dashboard](#) ~ My courses ~ 2023S_CMPF362_CS563 ~ 22 May ~ 28 May ~ Quiz 2**Started on** Monday, 22 May 2023, 6:10 PM**State** Finished**Completed on** Monday, 22 May 2023, 6:57 PM**Time taken** 47 mins 13 secs**Grade** **5.25** out of 9.00 (**58.33%**)**Question 1****Correct** Mark 0.25 out of 0.25

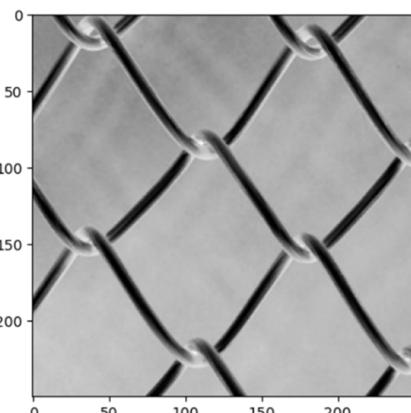
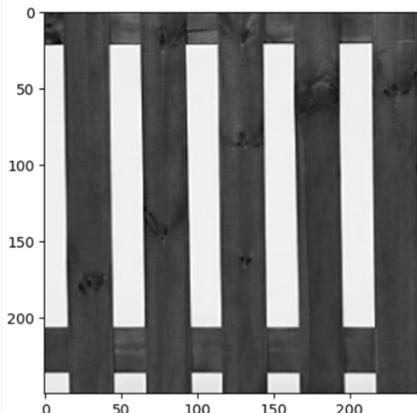
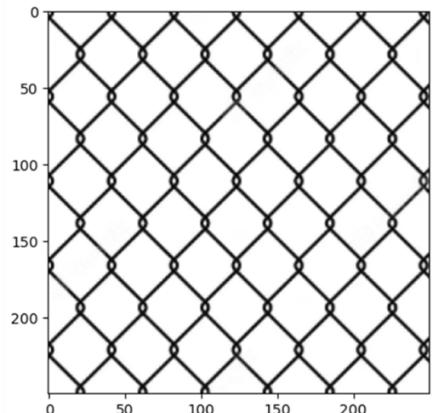
Which step of the Canny edge detection algorithm is responsible for linking weak edges to form longer and connected edges?

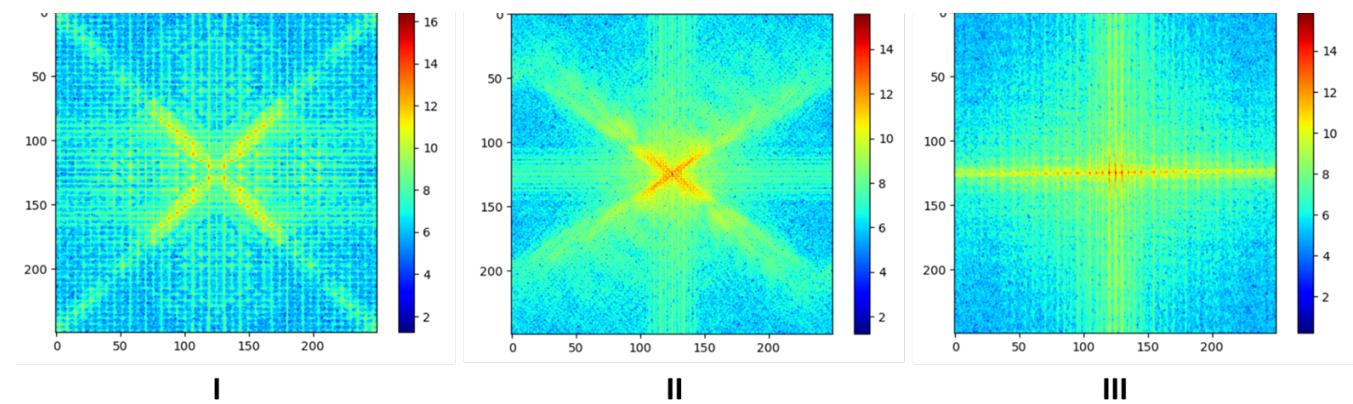
- Gaussian blurring
- Gradient computation
- Hysteresis thresholding ✓
- Non-maximum suppression

Your answer is correct.

The correct answer is:

Hysteresis thresholding

Question 2**Partially correct** Mark 0.25 out of 0.75**A****B****C**



Find the correct matching between the gray-scale images at the top row and the magnitude of their Fourier Transforms at the bottom row. Note that when visualizing the magnitude of Fourier Transforms, log transform is used where zero frequency component is shifted to the center.

- | | | |
|---|-----|--------------------------------------|
| A | I | X |
| B | III | ✓ |
| C | II | X |

Your answer is partially correct.

You have correctly selected 1.

The correct answer is:

A → II,

B → III,

C → I

Question 3

Correct Mark 0.25 out of 0.25

Consider that Fourier Transform of f is F and Fourier Transform of g is G . What is the Fourier Transform of $(3 + 4 * g)$?

- $3 * 4 * F * G$
- $F + G$
- $F * G$
- $4 * F + 3 * G$
- $3 * F + 4 * G$ ✓

Your answer is correct.

The correct answer is:

$3 * F + 4 * G$

Question 4

Correct Mark 0.75 out of 0.75

Consider that we apply Hough transform for detecting circles.

Find the correct matching between the given conditions and how a point in the image space is mapped to the parameter space.

When the radius is unknown and the gradient direction is unknown,

a point in the image space maps to a cone in the parameter space.



When the radius is fixed and the gradient direction is unknown,

a point in the image space maps to a circle in the parameter space.



When the radius is unknown and the gradient direction is known,

a point in the image space maps to a line in the parameter space.



Your answer is correct.

The correct answer is:

When the radius is unknown and the gradient direction is unknown, → a point in the image space maps to a cone in the parameter space.,

When the radius is fixed and the gradient direction is unknown, → a point in the image space maps to a circle in the parameter space.,

When the radius is unknown and the gradient direction is known, → a point in the image space maps to a line in the parameter space.

Question 5

Correct Mark 0.25 out of 0.25

In Hough Transform, the same result is obtained regardless of discretization of the parameter space (whether it is too coarse or too fine).

Select one:

- True
- False ✓

The correct answer is 'False'.

Question 6

Incorrect Mark 0.00 out of 0.25

When we increase the order of the butterworth low/high pass filter, it becomes closer to the ideal low/high pass filter.

Select one:

- True
- False ✗

The correct answer is 'True'.

Question 7

Correct Mark 0.25 out of 0.25

Consider that we have an image with size $m \times n$ and we want to filter the image using a filter with size $a \times b$. Suppose that the size of the image is greater than the size of the filter (i.e. $m > a$ and $n > b$).

What is the cost of filtering in the spatial domain in Big-O notation?

Suppose that the filter is separable.

- $O(m \cdot n \cdot \log(m \cdot n))$
- $O(m \cdot n \cdot (a+b))$ ✓
- $O(m \cdot n \cdot a \cdot b)$

Your answer is correct.

The correct answer is:

$O(m \cdot n \cdot (a+b))$

Question 8

Correct Mark 0.25 out of 0.25

Ringing effect could be observed in the filtering results when we filter the image using Butterworth high/low pass filter.

Select one:

- True ✓
- False

The correct answer is 'True'.

Question 9

Correct Mark 0.25 out of 0.25

Which of the followings is **true** for mean-shift segmentation algorithm?

- Requires number of clusters as a parameter
- Segmentation result does not change much as the dimension of the feature space increases.
- Segmentation results depend on the window size parameter. ✓
- Could only find spherical clusters

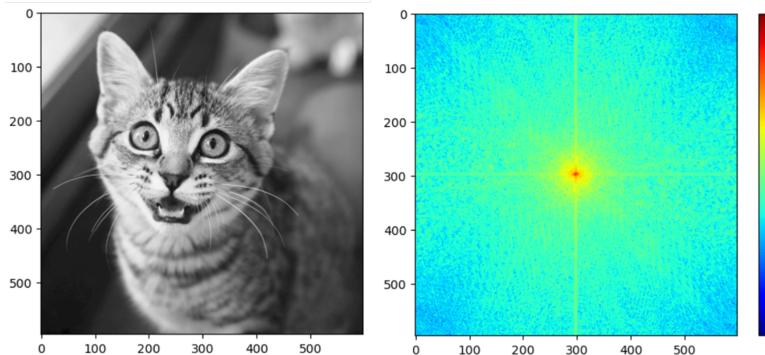
Your answer is correct.

The correct answer is: Segmentation results depend on the window size parameter.

Question 10

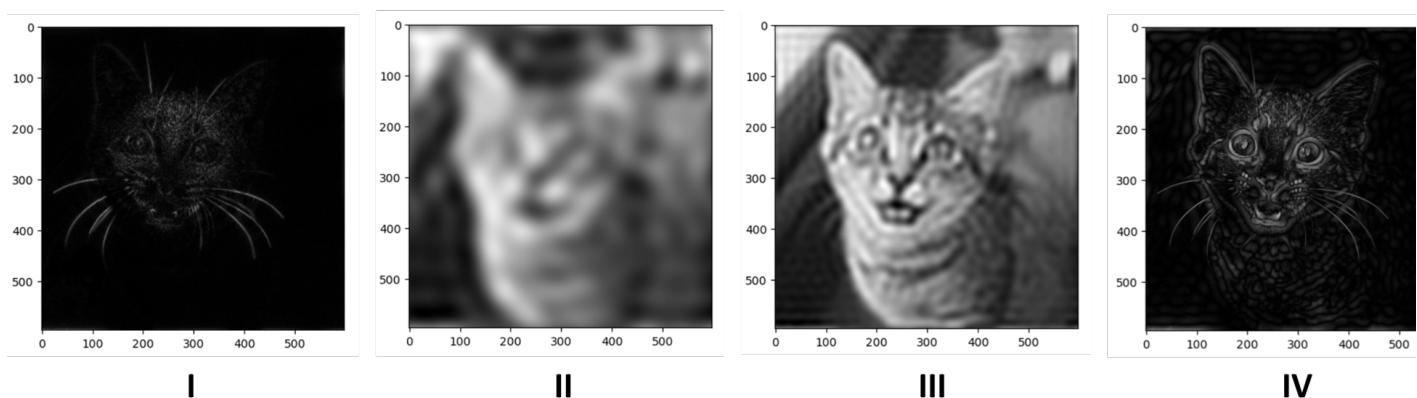
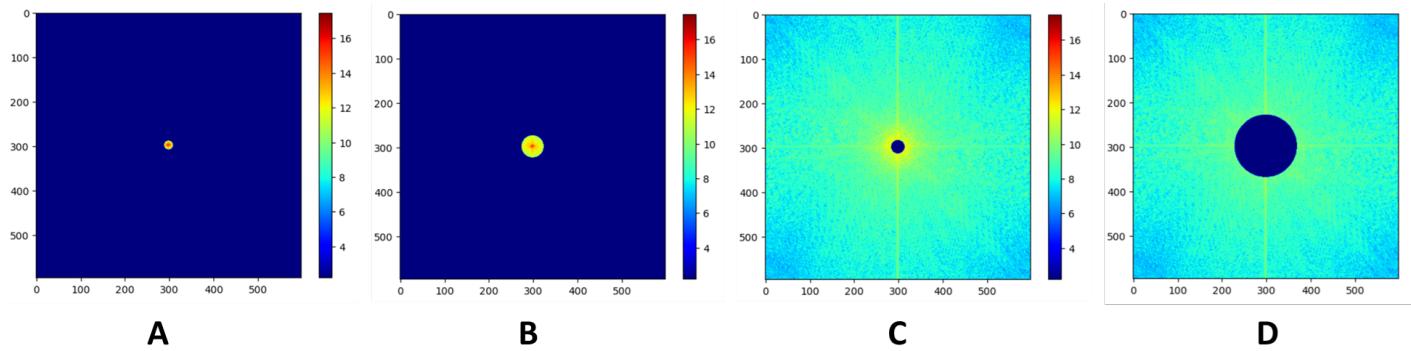
Partially correct

Mark 0.50 out of 1.00



Consider the gray-scale image given above where the magnitude of its Fourier Transform is visualized on right.

We filter this image in four different settings. Below, at the first row, we present the filtering results in the frequency domain and, at the second row, we present the filtering results in the spatial domain.



Find the correct matching between the results in the first row and the second row.

Note that while visualizing the magnitude of Fourier Transforms, log transform is used where zero frequency component is shifted to the center.

- | | | |
|---|-----|------------------------------------|
| A | III | X |
| B | II | X |

- C IV ✓
 D I ✓

Your answer is partially correct.

You have correctly selected 2.

The correct answer is:

A → II,

B → III,

C → IV,

D → I

Question 11

Incorrect Mark 0.00 out of 0.50

Consider the following one-dimensional function:

$$f(x) = 2 * \sin(2\pi) + \sin(6\pi) + 5 * \sin(3\pi)$$

In order to reconstruct $f(x)$ from its samples, which of the followings must be true?

- Sampling rate > 3
- Sampling rate > 2 ×
- Sampling rate > 1
- Sampling rate > 6

Your answer is incorrect.

The correct answer is:

Sampling rate > 6

Question 12

Correct Mark 0.50 out of 0.50

input image f

| | 0 | 1 | 2 |
|---|----|----|----|
| 0 | 10 | 80 | 60 |
| 1 | 20 | 40 | 40 |
| 2 | 30 | 10 | 10 |
| 3 | 40 | 10 | 20 |

output image g

| | 0 | 1 | 2 |
|---|---|---|---|
| 0 | | | |
| 1 | | | |
| 2 | ? | | |
| 3 | | | |

Consider the input image f given above.

Suppose that we compute the gradient of f along x and y directions, namely, fx and fy , using Sobel filters and we compute the gradient magnitude as the sum of absolute value of fx and absolute value of fy (i.e. $|fx| + |fy|$).

What is the value of the gradient magnitude at the pixel (2, 1)?

- 40
- 60
- 100 ✓
- 20

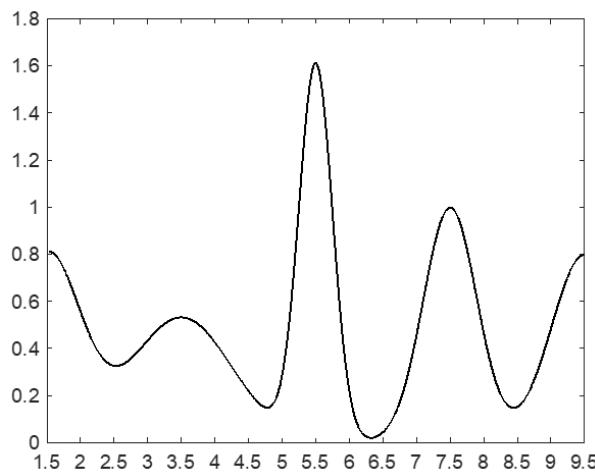
Your answer is correct.

The correct answer is:

100

Question 13

Correct Mark 0.75 out of 0.75



Consider the one-dimensional signal given above. What is the number of segments obtained by applying the watershed segmentation algorithm?

- 6
- 3
- 5
- 4 ✓

Your answer is correct.

The correct answer is:

4

Question 14

Correct Mark 0.25 out of 0.25

Consider that we have an image with size $m \times n$ and we want to filter the image using a filter with size $a \times b$. Suppose that the size of the image is greater than the size of the filter (i.e. $m > a$ and $n > b$).

What is the extent of filtering in the spatial domain in DIP? Operations

What is the cost of filtering in the spatial domain in Big-O notation?

Suppose that the filter is **not** separable.

- $O(m \cdot n \cdot \log(m \cdot n))$
- $O(m \cdot n \cdot a \cdot b)$ ✓
- $O(m \cdot n \cdot (a+b))$

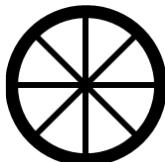
Your answer is correct.

The correct answer is:

$$O(m \cdot n \cdot a \cdot b)$$

Question 15

Incorrect Mark 0.00 out of 0.50



Consider that the wheel given above rotates in clockwise direction and it completes its 360 degree rotation around its center in 4 seconds.

Suppose that this moving wheel appears in a movie.

In order to prevent this wheel appear to be rotating in the wrong (counter-clockwise) direction, which of the followings provides a sufficient condition?

- The time between the movie frames must be less than 0.5 seconds
- The time between the movie frames must be less than 1 seconds ✗
- The time between the movie frames must be less than 0.25 seconds
- The time between the movie frames must be less than 2 seconds

Your answer is incorrect.

The correct answer is:

The time between the movie frames must be less than 0.25 seconds

Question 16

Correct Mark 0.25 out of 0.25

Consider that we have an image with size $m \times n$ and we want to filter the image using a filter with size $a \times b$.

Suppose that the size of the image is greater than the size of the filter (i.e. $m > a$ and $n > b$).

What is the cost of filtering in the frequency domain in Big-O notation?

- $O(m \cdot n \cdot \log(m \cdot n))$ ✓
- $O(m \cdot n \cdot a \cdot b)$

- $O(m \cdot n \cdot (a+b))$

Your answer is correct.

The correct answer is:

$O(m \cdot n \cdot \log(m \cdot n))$

Question 17

Correct Mark 0.25 out of 0.25

| | | |
|----|----|----|
| 10 | 20 | 10 |
| 20 | 30 | 10 |
| 10 | 15 | 10 |

Consider 3x3 image given above. What is the value of its Fourier Transform at $u = 0$ and $v = 0$?

- 20
- 15 ✓
- 10
- 30
- 40

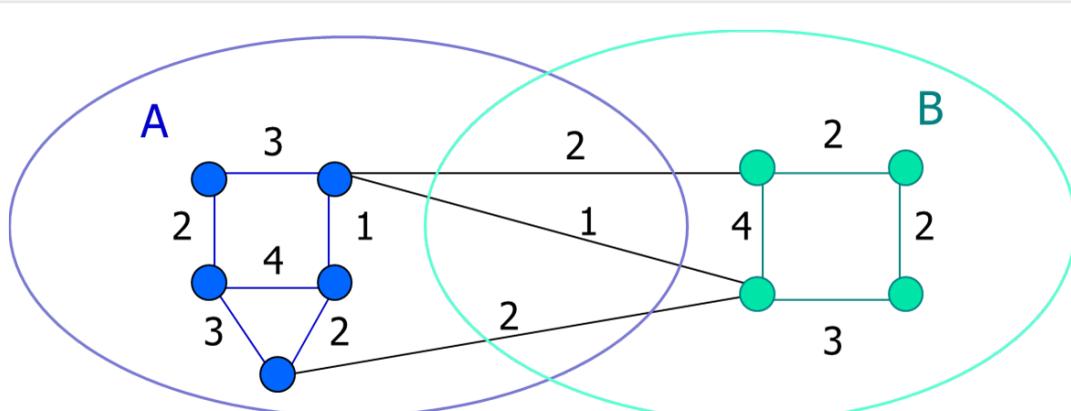
Your answer is correct.

The correct answer is:

15

Question 18

Incorrect Mark 0.00 out of 0.75



Consider the graph given above.

What is the normalized cut measure associated with partitioning the graph into two sets A and B whose nodes are shown with blue and green colors, respectively?

- $(3 / 20) + (3 / 16)$

- $(5 / 20) + (5 / 16)$
- $(5 / 15) + (5 / 11)$ ✗
- $(3 / 18) + (3 / 14)$

Your answer is incorrect.

The correct answer is: $(5 / 20) + (5 / 16)$

Question 19

Correct Mark 0.25 out of 0.25

Ringing effect could be observed in the filtering results when we filter the image using Gaussian high/low pass filter.

Select one:

- True
- False ✓

The correct answer is 'False'.

Question 20

Incorrect Mark 0.00 out of 0.25

Which of the following segmentation method involves finding eigenvector and eigenvalue of a linear system?

- Graph-based segmentation
- Watershed segmentation
- Mean-shift segmentation
- Global thresholding
- Region segmentation using k-means clustering ✗

Your answer is incorrect.

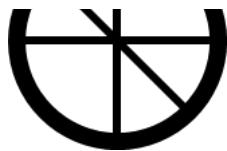
The correct answer is:

Graph-based segmentation

Question 21

Incorrect Mark 0.00 out of 0.50





Consider that the wheel given above rotates in clockwise direction and it completes its 360 degree rotation around its center in 4 seconds.

Suppose that this moving wheel appears in a movie.

In order to prevent this wheel appear to be rotating in the wrong (counter-clockwise) direction, which of the followings provides a sufficient condition?

- The time between the movie frames must be less than 1 seconds
- The time between the movie frames must be less than 2 seconds ×
- The time between the movie frames must be less than 0.25 seconds
- The time between the movie frames must be less than 0.5 seconds

Your answer is incorrect.

The correct answer is:

The time between the movie frames must be less than 1 seconds

Finish review

◀ W10 - HOA

Jump to...

W12 - Hough Transform Questions