JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -2 EXAMINATION- APRIL-2023

COURSE CODE(CREDITS): 21B1WEC731 (3)   MAX. MARKS: 25

COURSE NAME: Digital Image Processing using Python

COURSE INSTRUCTORS: Dr. Nishant Jain   MAX. TIME: 1.5 Hour

Note: *All questions are compulsory. Marks are indicated against each question in square brackets.*

Consider the following images A and B for the questions in which reference to images A and B is mentioned: (It is given that both the images are in **uint8** format)

A=

100	200	40	40	100
100	200	40	40	100
200	30	30	100	80
200	50	50	100	80
100	50	50	100	80

B=

120	220	60	60	120
120	220	60	60	120
220	50	50	120	100
220	70	70	120	100
120	70	70	120	100

Q1. Considering image, A, write the Python code (single line code) to do the following:

a. To print the value of the pixel located at 2nd row and 4th column.
b. To change all the pixels with value 50 to new value 100.
c. To crop the image such that only pixels having value 40 are left in the output image.
d. To increase the size of the image to 10 X 10.
e. To rotate the image by 45 degrees in clockwise direction.

[1 X 5 = 5]CO3

Q2. (a) Perform the operation of addition on the two images A and B.

(b) Is there any information loss in the result obtained in part (a)? If yes, explain the reason of loss and also explain the method to avoid this type of information loss in the resulting image.

[2+3 = 5]CO2

Q3. (a) Perform the operation of subtraction (A-B) on the two images A and B given above.

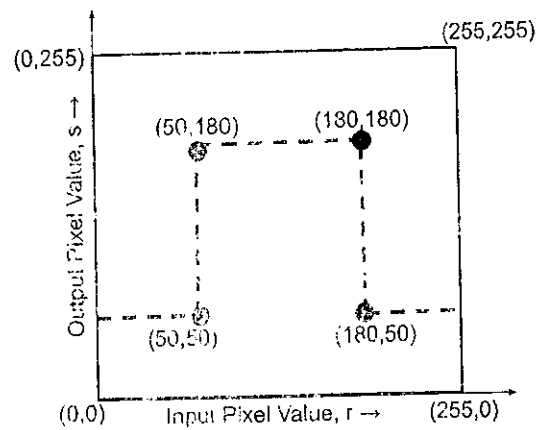(b) State any one application where image subtraction can be used.
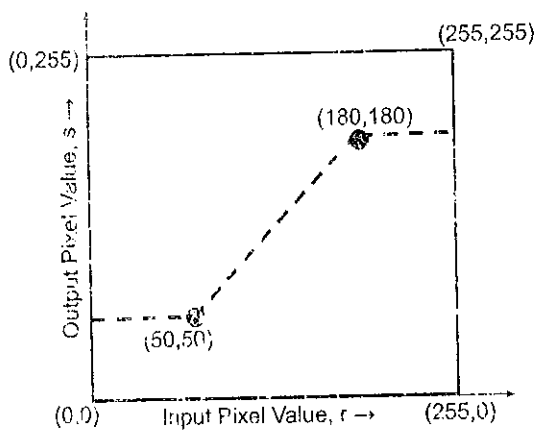
$$[2+3 = 5]CO2$$

Q4. (a) Determine the histogram for the given images A and B.

(b) From the histogram of the two images, what can be inferred about the relation between the two images.

(c) Explain how histogram can be used to determine the number of objects in the image.

$$[2+1+2 = 5]CO2$$

Q5. Determine the output images obtained on applying the following transformation curves on the given image A:

$$[2.5 \times 2 = 5]CO2$$