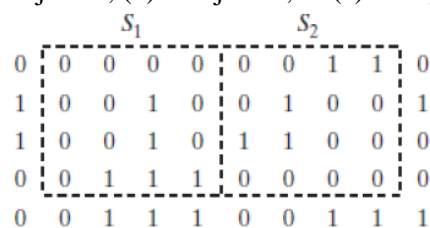


# 15EC72 – Digital Image Processing

## Assignment-I

- Note: i) Write the assignment in a A4 size paper  
 ii) Even USN numbered students have to answer even numbered questions and Odd USN numbered students have to answer odd numbered questions.  
 iii) Submit the assignment on or before 11.00 AM, Monday, 16/09/2019

1. Explain the fundamental steps in digital image processing.
2. Mention thematic bands in NASA's LANDSAT satellite, its wavelength and uses.
3. Explain the differences between image enhancement and restoration.
4. With the help of a neat figure, explain the main elements of the human eye.
5. What is Scotopic and Photopic vision? Why can't the human eye identify colors under dim light conditions?
6. Write a short note on:
  - i. Brightness adaptation and discrimination
  - ii. Weber Ratio
  - iii. Mach band effect
7. Explain the concept of sampling and quantization in image processing with an example.
8. Explain the process of image acquisition using single sensor with motion to generate 2-D image
9. Explain the following terms used in image processing:
  - i. Adjacency and its types
  - ii. Distance measures
  - iii. Connectivity
  - iv. Region
  - v. Edge
10. Consider the two image subsets,  $S_1$  and  $S_2$ , shown in the following figure. For  $V = \{1\}$ , determine whether these two subsets are (a) 4-adjacent, (b) 8-adjacent, or (c) m-adjacent.



11. Consider the image segment shown. Let  $V = \{7, 8\}$  and compute the lengths of the shortest 4-, 8-, and m-path between p and q. If a particular path does not exist between these two points, explain why. Repeat for  $V = \{5, 6, 7\}$ .

(p) 7 8 7 6 4 7  
 5 6 9 8 5 6  
 9 7 8 6 3 5  
 5 6 7 1 4 5  
 3 4 2 6 7 5 (q)

12. Write a short note on spatial domain analysis of digital images.
13. Explain  $D_m$  distance with an example.
14. Explain image enhancement using Arithmetic/ Logic Operations
15. Write a short note on Piecewise-Linear Transformation Functions
16. Explain some of the basic intensity transformation functions used for image enhancement
17. What can we infer from histogram of an image and how can we improve the contrast automatically without human intervention?
18. Let p and q are the two pixels at co-ordinates (100,200) and (150,190) respectively. Compute
  - i) Euclidean ii) city block and iii) chess board distance