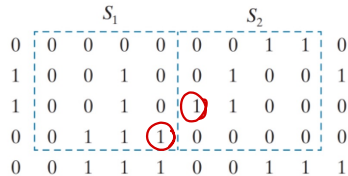




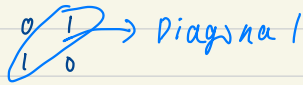
Question 1:

Consider the two image subsets, S_1 and S_2 in the following figure. With reference to Section 2.5 in textbook, and assuming that $V = \{1\}$, determine whether these two subsets are:

- (a) 4-adjacent. (8%)
- (b) 8-adjacent. (8%)
- (c) m-adjacent. (8%)



(a) False, because if we look at the boundaries of this two images, we can find that there are two pixels diagonal.



(b) True, Although these two image are not 4-adjacent. However, it's 8-adjacent because of there are diagonal pixels.

(c) True, because it's not 4-adjacent but there are diagonal pixels, it's m-adjacent.

Question 2:

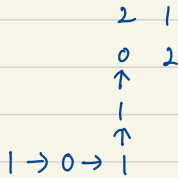
Consider the image segment shown in the figure that follows.

- (a) As in Section 2.5, let $V = \{0,1\}$ be the set of intensity values used to define adjacency. Compute the lengths of the shortest 4-, 8-, and m-path between p and q in the following image. If a particular path does not exist between these two points, explain why. (8%)
- (b) Repeat (a) but using $V = \{1,2\}$. (8%)

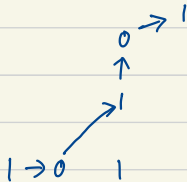
	3	1	2	1 (q)
	2	2	0	2
	1	2	1	1
(p)	1	0	1	2

(a)

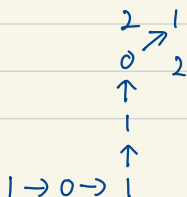
4-Path: No, It's not available. It stuck at (2,3).



8-path: Yes, it's available. Its length is 4.



m-path: Yes. Its length is 5.



(b) $\mathcal{V} = \{1, 2\}$

4-path: $\begin{array}{cccc} 3 & 1 & \rightarrow 2 & \rightarrow 1 \end{array}$ Its length is 6

$\begin{array}{cccc} 2 & 2 & 0 & 2 \end{array}$

$\begin{array}{cccc} 1 & \rightarrow 2 & 1 & 1 \end{array}$

$\begin{array}{cccc} 1 & 0 & 1 & 2 \end{array}$

8-path: $\begin{array}{cccc} 3 & 1 & 2 & \rightarrow 1 \end{array}$ Its length is 4

$\begin{array}{cccc} 2 & 2 & 0 & 2 \end{array}$

$\begin{array}{cccc} 1 & 2 & 1 & 1 \end{array}$

$\begin{array}{cccc} 1 & 0 & 1 & 2 \end{array}$

m-path: $\begin{array}{cccc} 3 & 1 & \rightarrow 2 & \rightarrow 1 \end{array}$ Its length is 6

$\begin{array}{cccc} 2 & 2 & 0 & 2 \end{array}$

$\begin{array}{cccc} 1 & \rightarrow 2 & 1 & 1 \end{array}$

$\begin{array}{cccc} 1 & 0 & 1 & 2 \end{array}$

(1) $q \in N_4(p)$

(2) $q \in N_0(p), N_4(p) \cap N_4(q) = \emptyset$