DIS

HOMEWORK 2

Akanksha Bhattacharyya
Id: 200262086

Problem 1:

|	S_1					S_2			
0	0	0	0	0	0	0	1	1	0
1	0	0	1	0	0	1	0	0	1
1	0	0	1	0	1 A	1	0	0	0
0	0	1	1 B 1	0	0	0	0	0
0	0	1	1	1	0	0	1	1	1
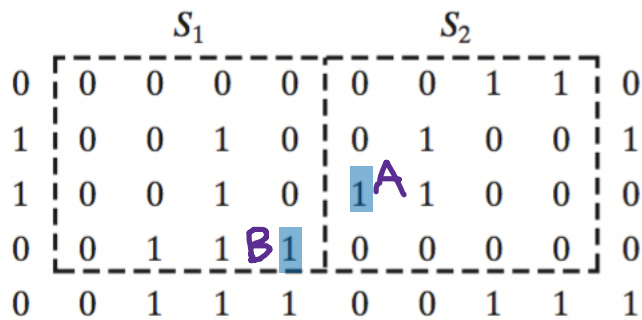
From the figure,
  a) S1 and S2 are not 4-connected as A is in the set V but not in the four neighborhood of B.
  b) S1 and S2 are 8-connected because A belongs to set V and A is in the eight neighborhood of B
  c) S1 and S2 are m-connected because A is in the diagonal neighborhood of B, and four neighborhood of A and four neighborhood of B do not share a common pixel in set V

Problem 2:
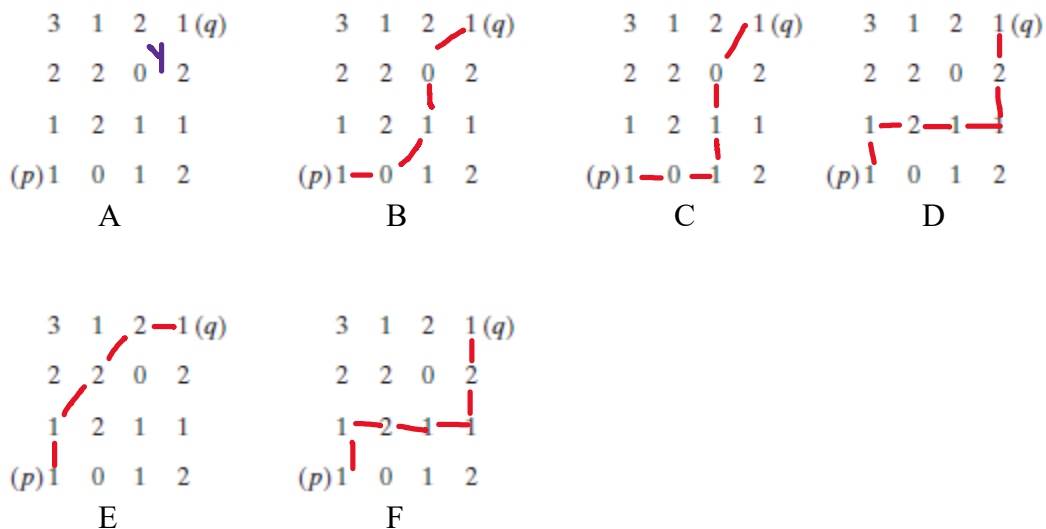
FOR V = {0,1}
  a) There is no path from p to q in 4-path since set V allows p to only move till point Y and beyond that there is no 4-connected path to reach q
  b) For shortest 8-path, the path length is 4. (FIGURE B)
  c) For shortest m-path, the path length is 5. (FIGURE C)

FOR V = {1,2}
  a) For shortest 4-path, the path length is 6. (FIGURE D)
  b) For shortest 8-path, the path length is 4 (FIGURE E)
  c) For shortest m-path, the path length is 6. (FIGURE F)

Screenshots:

```
/usr/local/bin/python3.7 /Users/akankshabhattacharyya/PycharmProjects/DIP/path_search.py
matrix
 [[0, 2, 2, 3], [2, 1, 0, 1], [0, 3, 1, 0], [1, 1, 0, 4]]
Enter start location x 3
Enter start location y 0
Enter end location x 1
Enter end location y 3
Enter path type: four, eight or m four
Path using BFS is  [(3, 0), (3, 1), (3, 2), (2, 2), (2, 3), (1, 3)]
time:  4.799999999999249e-05
path length  6

Process finished with exit code 0
```

```
/usr/local/bin/python3.7 /Users/akankshabhattacharyya/PycharmProjects/DIP/path_search.py
matrix
 [[0, 2, 2, 3], [2, 1, 0, 1], [0, 3, 1, 0], [1, 2, 0, 4]]
Enter start location x 3
Enter start location y 0
Enter end location x 0
Enter end location y 3
Enter path type: four, eight or m m
no path

Process finished with exit code 0
```
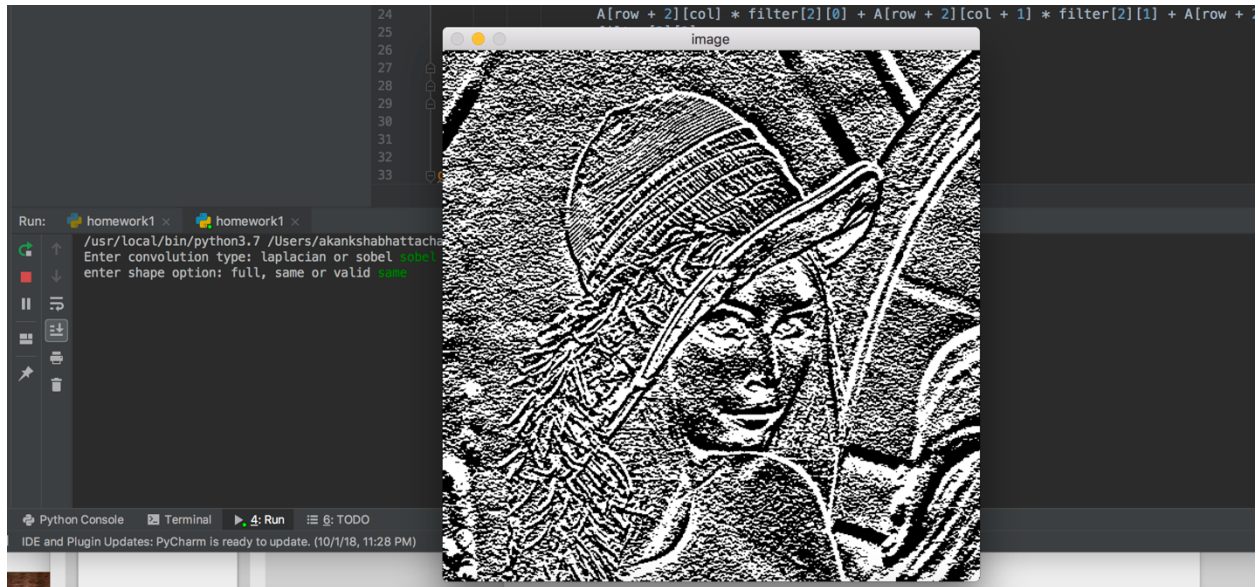
```
/usr/local/bin/python3.7 /Users/akankshabhattacharyya/PycharmProjects/DIP/path_search.py
matrix
 [[0, 2, 2, 3], [2, 1, 0, 1], [0, 3, 1, 0], [1, 1, 0, 4]]
Enter start location x 3
Enter start location y 0
Enter end location x 1
Enter end location y 1
Enter path type: four, eight or m eight
Path using BFS is  [(3, 0), (3, 1), (2, 2), (1, 1)]
time:  7.49999999999868e-05
path length  4

Process finished with exit code 0
```

Problem 3:
Screenshots:

SOBEL

LAPLACIAN