Northern University Bangladesh

Clearance for Assessment

Student ID.: 04180301281 **Semester:** Fall 2021

Student Name: Raiyan Bin Noor **Enrolled Semester:** 10

Program: Bachelor of Science in Computer Science and Engineering (CSE)

Course Code	Course Title	Credit Hour	Section	Remarks
CSE 3124	Microprocessor and Assembly Language Programming	3.0	A	
CSE 3171	Microprocessor and Assembly Language Programming Lab Work	1.0	A	
CSE 4278	Computer Graphics and Multimedia System Design	3.0	B	
CSE 4288	Computer Graphics Lab work	1.0	C	
CSE 4351	Image Processing and Computer Vision	3.0	A	
CSE 4355	Artificial Intelligence and Expert System	3.0	B	
CSE 4383	Image Processing and Computer Vision Lab Work	1.0	A	
CSE 4385	Artificial Intelligence and Expert System Lab Work	1.0	B	

Valid for Mid Term Assessment, Fall 2021

ID: 0418030 1281
Raiyan Bin Noor

Ans. to the ques. no. 2

a) City Block Distance [r=4]:

```
4
4 3 2 3 4
3 2 1 2 3
2 1 0 1 2
  2 1 2 3
4 3 2 3 4
```

Chessboard distance [d=7]:

```
4 4 4 4 4 4 4 4 4
4 3 3 3 3 3 3 3 4
4 3 2 2 2 2 2 3 4
4 3 2 1 1 1 2 3 4
4 3 2 1 0 1 2 3 4
4 3 2 1 1 1 2 3 4
4 3 2 2 2 2 2 3 4
4 3 3 3 3 3 3 3 4
4 4 4 4 4 4 4 4 4
```

c) RLE 2222 4777 8899 111114

4 1 3 2 2 5 1

Binary: ~~0010 0010 0010 0010 0000~~

2: 4 4: 1 7: 3 8: 2 9: 2 1: 5 1: 4

0010 0100 01000001 01110011 10000010 10010010

00010101 00010100

Also can be written as

4 2's . 1 4, 3 7's . 2 8's 2 9's 5 1's 1 4

4 1 3 2 2 5 1

b) Phases in DIP:

1. Image Acquisition: Preprocessing, determining a dimension of the image before capturing. Turning into 2D image.
2. Image Enhancement: In this phase the image enhacend to make it suitble.
3. Image Restoration: It improves the appearence
4. Morphological Processing: Here useful information get extracted.
5. segmentation: It is used to paltitioning or detect edge.
6. Representation and description: This is the information part that describes the image.
7. Object Recognition: Recognize an object 3D to 2D
8. Image Compression: Here we decrease the size of image without harming it.
9. Colour Image Processing: Used to the conversion of the color.

Ans. to the ques. no.3

a) Application of DIP made our life easier as.

1. Image Manupulation: we can sharpen, brighten our images as we want as we can't acquire exactly the same quality image of an object, correction is needed.

2. Medical field: CT Scan, X-ray, Gamma ray imaging are the example of using DIP. By manupulating contrast level or log transform or using power law, the expected result is recived from these operations.

3. Pattern Recognition: Nowadays we can see that we can catch a pattern using camera. As Bar Code, QR code. These are the benefits of DIP.

b)

120	223	252	140	136
110	100	10	30	250
230	117	75	80	189
58	26	140	220	179
123	27	32	232	110

Given,

Binary :

01111000	11011111	11111100	10001100	10001000
01101110	01100100	00001010	00011110	11111010
11100110	01110101	01001011	01011001	10111101
00110111	00011010	10001100	11011100	10110011
01111011	00011011	00100000	11101000	10100000

MSB

0	1	1	1	1
0	0	0	0	1
1	0	0	0	1
0	0	1	1	1
0	0	0	1	1

center bit plane 1

1	1	1	0	0
1	1	0	0	1
1	1	1	1	0
0	0	0	1	0
1	0	0	1	0

center bit plane 2

1	0	1	0	0
1	1	0	0	1
1	1	0	0	1
1	0	0	0	1
1	0	1	1	1

center bit plane 3

1	1	1	0	0
0	0	0	1	1
0	1	0	1	1
1	1	0	1	1
1	1	0	0	0

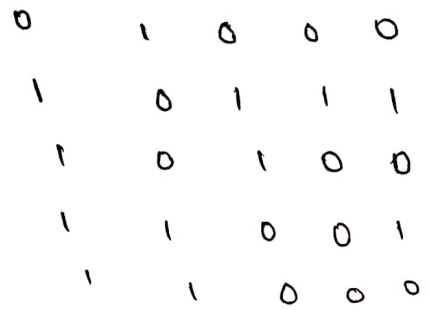
center bit plane 4

1	1	1	1	1
1	0	1	1	1
0	0	1	1	1
0	1	1	1	0
1	1	0	1	0

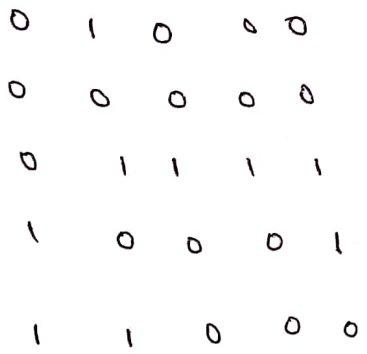
center bit plane 5

0	1	1	1	0
1	1	0	1	0
1	1	0	0	1
1	0	1	1	0
0	0	0	0	0

center bit plan 6



LSB

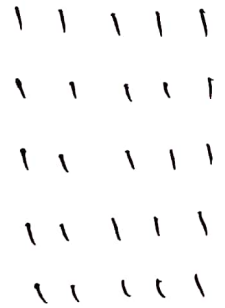


Enhancing :

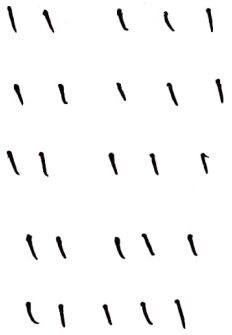
LSB

CBP 6

CBP 5



CBP 4



CBP 3