

Lab 8 Report

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3.1



Figure 1. original image



Figure 2. result of thresholding

RMSE = 87.3933165438293

Fidelity = 77.3371491724335

4.2 Exercise: Ordered Dithering

1.

	1	2
	3	0

Figure 3. 2x2 Bayer index matrices

5	9	6	10
13	1	14	2
7	11	4	8
15	3	12	0

Figure 4. 4x4 Bayer index matrices

21	37	25	41	22	38	26	42
53	5	57	9	54	6	58	10
29	45	17	33	30	46	18	34
61	13	49	1	62	14	50	2
23	39	27	43	20	36	24	40
55	7	59	11	52	4	56	8
31	47	19	35	28	44	16	32
63	15	51	3	60	12	48	0

Figure 5. 8x8 Bayer index matrices

2.



Figure 6. halftoned image produced by 2x2 matrix



Figure 7. halftoned image produced by 4x4 matix



Figure 8. halftoned image produced by 8x8 matix

3.

$RMSE_{2 \times 2} = 97.6689721921400$

$Fid_{2 \times 2} = 50.056947960301500$

$RMSE_{4 \times 4} = 1.010069220156947e+02$

$Fid_{4 \times 4} = 16.558342510690416$

$RMSE_{8 \times 8} = 1.009145296239608e+02$

$Fid_{8 \times 8} = 14.691773433816397$

5.1 Exercise: Error Diffusion

2.



3.

RMSE = 99.192402741527390

Fidelity = 14.140898102731818

4.

	RMSE	fidelity
simple thresholding	87.3933165438293	77.3371491724335
2x2	97.6689721921400	50.056947960301500
4x4	1.010069220156947e+02	16.558342510690416
8x8	1.009145296239608e+02	14.691773433816397
error diffusion	99.192402741527390	14.140898102731818

From the results, we can observe that RMSE does not change much for different methods, but fidelity decreases for different methods. When the quality is better, the fidelity is smaller.