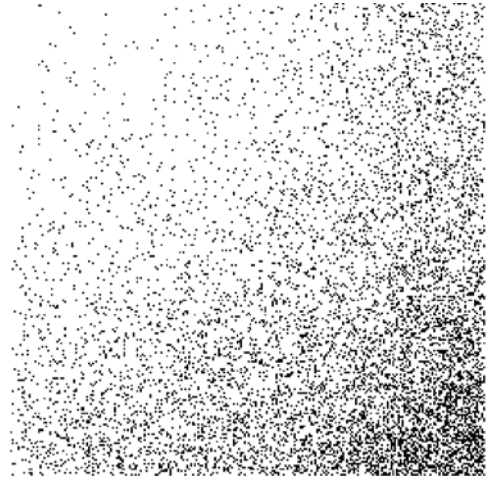
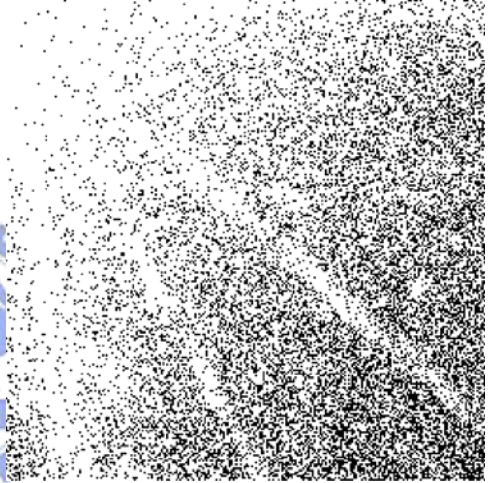
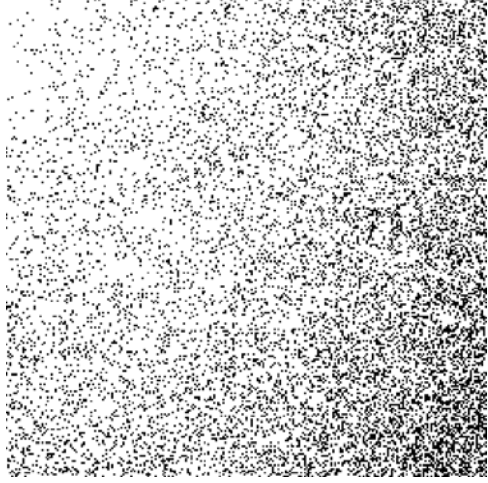
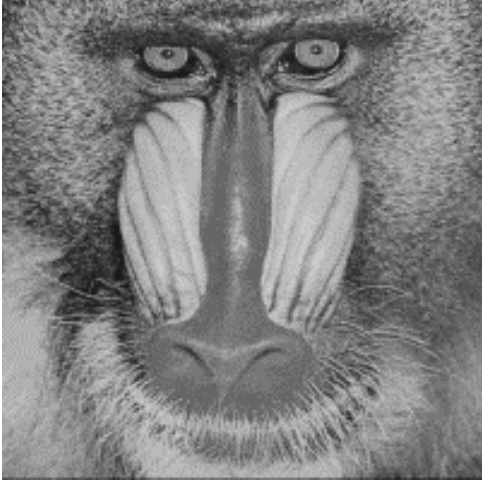


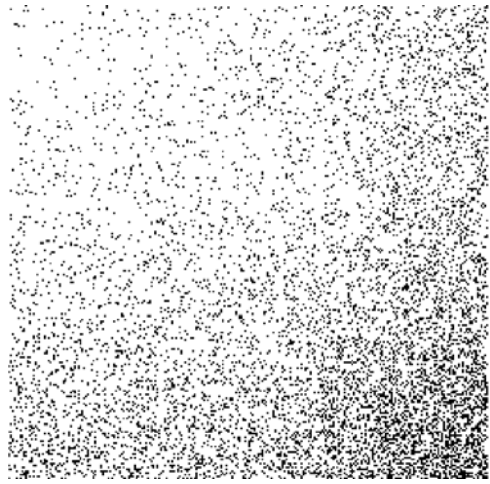
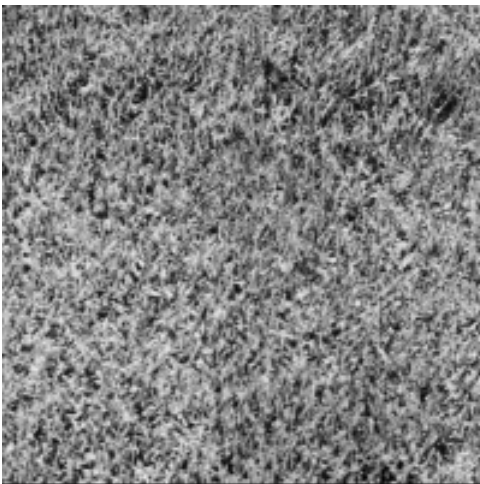
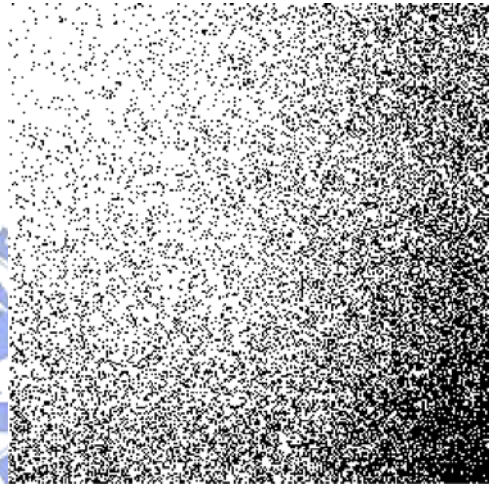
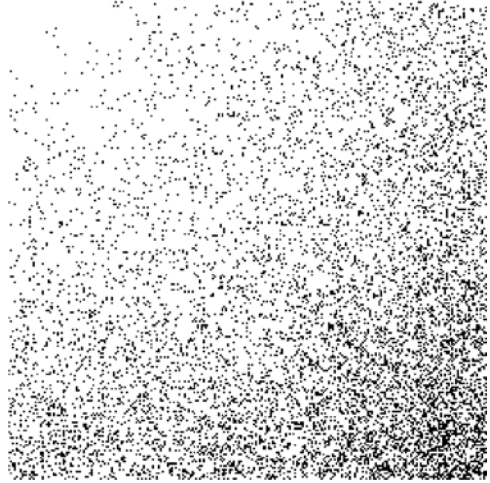
Appendix A

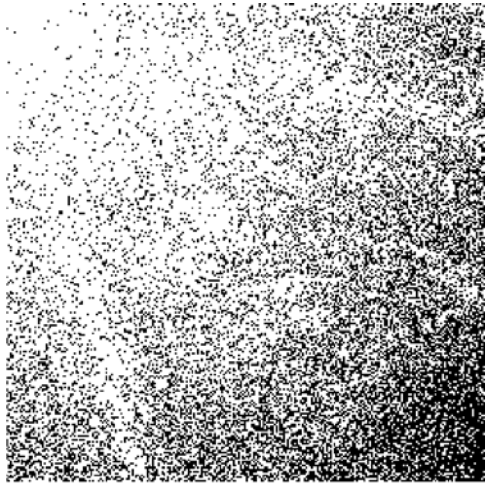
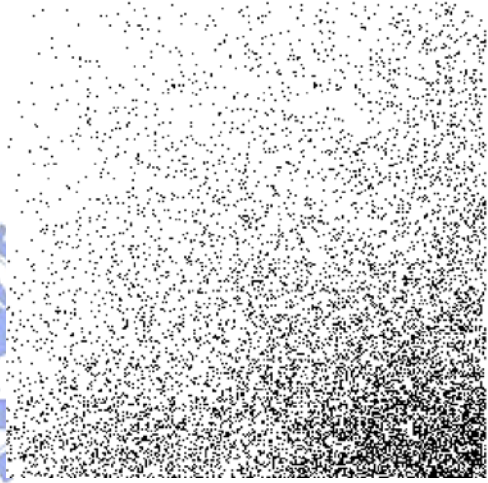
Test Images

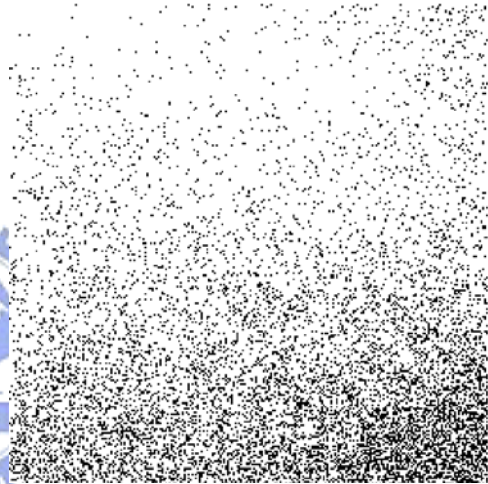
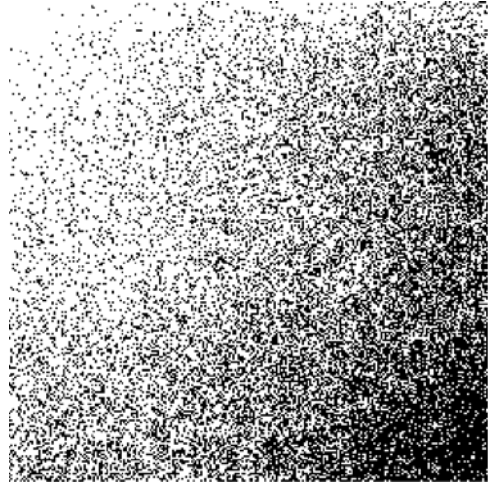
There are Lena, Peppers, Baboon, House, Airplane, Man, Aerial, Grass, Barbara, Boat, Fruits, Goldhill, Straw, Text, and Resolution Chart images, respectively. On the right side of each image shows the spectral activity evaluated by DCT. DCT coefficients are presented with white dots in the figures. Arrows stand for the increase of horizontal and vertical frequencies.







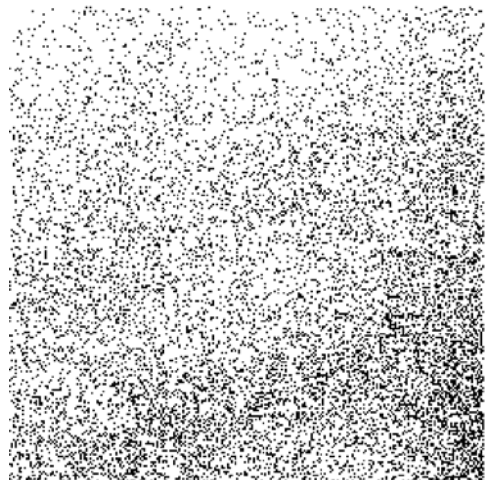


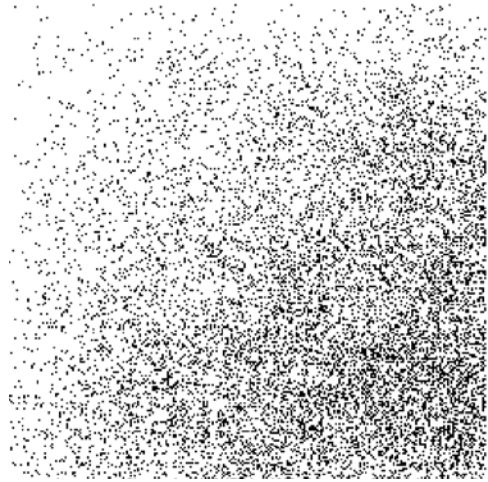
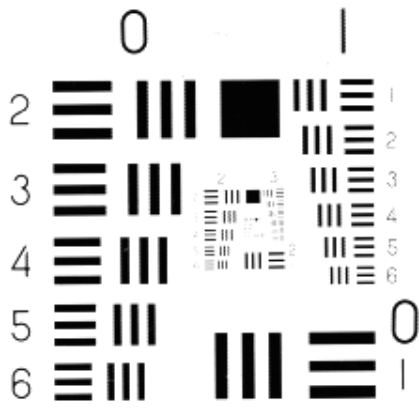


After this point, no more zerotree information coefficient.

To achieve embeddedness, Shapiro uses a change in the sign of the wavelet coefficients with the significance of the coefficients. This also further details of the priority of wavelet coefficients and adaptive arithmetic coding of quantized coefficients will not pursue further in this review. The interested reader should refer to [60] for more details.

Said and Pearlman [60] have produced an embedded zerotree algorithm, known as Set Partitioning in Hierarchical Trees (SPIHT). Their method is based on the same premises as EZW but gives more attention to detail. The public domain implementation of SPIHT improves the performance of EZW by 0.3-0.4 dB, due to the fact that the original zerotree algorithm uses only single zerotrees, while in reality, there is a sufficient frequency to warrant special symbols. The Said-Pearlman coder provides symbols for coefficients. Davis and Chawla [69] have shown that both





Appendix B

Compression Results

Lena

WAVELET	N	COMPRESSION RATIO			D
		10:1	30:1	50:1	
DW	1	33.05	27.46	25.57	5
		33.06	27.48	25.62	6
		33.07	27.51	25.67	8
	2	34.76	28.68	26.61	4
		34.75	28.71	26.69	5
		34.72	28.66	26.65	6
	5	34.85	28.21	25.86	4
		34.66	27.98	25.69	5
	BW	2.2	35.37	29.16	27.16
35.30			29.06	27.01	6
CW	2	34.88	28.25	25.78	4
		34.66	28.15	25.87	5
	3	34.44	27.51	24.67	4
		34.02	27.13	24.51	5

Peppers

WAVELET	N	COMPRESSION RATIO			D
		10:1	30:1	50:1	
DW	1	32.90	26.74	24.69	5
		32.92	26.75	24.71	6
		32.96	26.76	24.72	8
	2	34.74	27.95	25.66	4
		34.70	27.91	25.66	5
		34.66	27.85	25.60	6
	5	33.80	26.74	24.24	4
		33.56	26.45	23.98	5
BW	2.2	35.31	28.41	26.17	5
		35.22	28.28	25.95	6
CW	2	33.84	27.08	24.47	4
		33.64	26.88	24.33	5
	3	32.74	25.99	23.31	4
		32.36	25.60	22.99	5

Baboon

WAVELET	N	COMPRESSION RATIO			D
		10:1	30:1	50:1	
DW	1	26.15	23.32	22.50	5
		26.16	23.34	22.52	6
		26.16	23.35	22.53	8
	2	26.54	23.58	22.73	4
		26.54	23.59	22.77	5
		26.53	23.57	22.75	6
	5	26.45	23.44	22.54	4
		26.36	23.38	22.50	5
	BW	2.2	26.28	23.39	22.63
26.23			23.36	22.58	6
CW	2	26.25	23.26	22.39	4
		26.24	23.27	22.46	5
	3	26.05	23.01	22.09	4
		25.98	22.97	22.11	5

House

WAVELET	N	COMPRESSION RATIO			D
		10:1	30:1	50:1	
DW	1	37.00	30.91	28.25	5
		37.04	30.93	28.26	6
		37.04	30.94	28.27	8
	2	37.38	31.06	28.33	4
		37.37	31.18	28.59	5
		37.37	31.15	28.58	6
	5	36.59	29.93	27.26	4
		36.54	30.03	27.58	5
	BW	2.2	37.62	31.52	29.13
37.58			31.44	29.06	6
CW	2	36.98	30.36	27.34	4
		36.93	30.43	27.77	5
	3	36.47	29.16	25.80	4
		36.28	29.24	26.13	5

Airplane

WAVELET	N	COMPRESSION RATIO			D
		10:1	30:1	50:1	
DW	1	31.51	25.64	23.95	5
		31.52	25.65	23.96	6
		31.54	25.65	23.97	8
	2	31.88	26.21	24.30	4
		31.87	26.25	24.42	5
		31.84	26.21	24.38	6
	5	31.51	25.83	23.91	4
		31.34	25.75	23.96	5
BW	2.2	32.16	26.35	24.57	5
		32.09	26.25	24.43	6
CW	2	31.41	25.73	23.72	4
		31.33	25.78	23.95	5
	3	31.16	25.16	23.01	4
		30.96	25.14	23.27	5

Man

WAVELET	N	COMPRESSION RATIO			D
		10:1	30:1	50:1	
DW	1	28.33	23.59	22.51	5
		28.34	24.00	22.52	6
		28.35	24.00	22.52	8
	2	29.03	24.55	22.97	4
		29.01	24.54	23.00	5
		28.99	24.50	22.95	6
	5	28.61	23.96	22.21	4
28.48		23.76	22.07	5	
BW	2.2	29.25	24.72	23.14	5
		29.20	24.63	23.06	6
CW	2	28.72	24.02	22.25	4
		28.59	23.99	22.27	5
	3	28.25	23.41	21.60	4
		28.07	23.21	21.48	5

Aerial

WAVELET	N	COMPRESSION RATIO			D
		10:1	30:1	50:1	
DW	1	25.18	21.66	20.61	5
		25.20	21.67	20.62	6
		25.21	21.68	20.63	8
	2	25.64	22.06	20.89	4
		25.63	22.08	20.96	5
		25.62	22.06	20.94	6
	5	25.39	21.58	20.26	4
		25.33	21.58	20.32	5
	BW	2.2	25.54	21.83	20.64
25.50			21.80	20.60	6
CW	2	25.30	21.52	20.20	4
		25.27	21.57	20.37	5
	3	24.88	21.03	19.67	4
		24.81	21.02	19.78	5

Grass

WAVELET	N	COMPRESSION RATIO			D
		10:1	30:1	50:1	
DW	1	18.81	16.70	16.11	5
		18.81	16.71	16.12	6
		18.82	16.71	16.12	8
	2	19.01	16.73	16.08	4
		19.02	16.76	16.13	5
		19.01	16.75	16.11	6
	5	19.00	16.57	15.85	4
		18.99	16.60	15.93	5
	BW	2.2	18.66	16.43	15.78
18.65			16.42	15.77	6
CW	2	18.76	16.33	15.65	4
		18.77	16.39	15.73	5
	3	18.60	16.17	15.45	4
		18.58	16.20	15.51	5

Barbara

WAVELET	N	COMPRESSION RATIO			D
		10:1	30:1	50:1	
DW	1	29.57	25.15	23.65	5
		29.58	25.15	23.65	6
		29.59	25.16	23.66	8
	2	30.87	26.19	24.45	4
		30.84	26.17	24.48	5
		30.81	26.12	24.43	6
	5	30.58	25.49	23.48	4
30.42		25.27	23.31	5	
BW	2.2	31.01	26.54	24.68	5
		30.94	26.43	24.54	6
CW	2	30.76	25.75	23.51	4
		30.63	25.64	23.50	5
	3	30.06	24.53	22.25	4
		29.79	24.27	22.10	5

Boat

WAVELET	N	COMPRESSION RATIO			D
		10:1	30:1	50:1	
DW	1	30.22	25.42	23.95	5
		30.23	25.42	23.96	6
		30.23	25.43	23.97	8
	2	30.89	26.15	24.53	4
		30.90	26.19	24.64	5
		30.88	26.17	24.63	6
	5	30.67	25.65	23.90	4
		30.60	25.62	24.00	5
		31.10	26.08	24.48	5
BW	2.2	31.06	26.03	24.43	6
		30.83	25.80	24.03	4
CW	2	30.74	25.85	24.23	5
		30.51	25.24	23.33	4
	3	30.37	25.26	23.45	5

Fruits

WAVELET	N	COMPRESSION RATIO			D
		10:1	30:1	50:1	
DW	1	34.39	28.62	26.62	5
		34.40	28.63	26.63	6
		34.41	28.63	26.64	8
	2	35.11	29.05	26.88	4
		35.07	29.04	26.93	5
		35.07	29.01	26.89	6
	5	33.82	27.76	25.49	4
33.63		27.58	25.32	5	
BW	2.2	35.26	29.07	26.99	5
		35.18	28.97	26.87	6
CW	2	34.17	27.92	25.59	4
		34.00	27.82	25.67	5
	3	33.06	26.38	23.92	4
		32.79	26.21	23.95	5

Goldhill

WAVELET	N	COMPRESSION RATIO			D
		10:1	30:1	50:1	
DW	1	30.89	26.78	25.42	5
		30.90	26.79	25.43	6
		30.91	26.79	25.43	8
	2	31.82	27.52	25.99	4
		31.82	27.56	26.08	5
		31.79	27.53	26.04	6
	5	31.74	27.25	25.54	4
		31.68	27.24	25.63	5
	BW	2.2	31.96	27.69	26.24
31.88			27.60	26.13	6
CW	2	31.77	27.24	25.49	4
		31.74	27.31	25.71	5
	3	31.54	26.76	24.80	4
		31.43	26.73	24.87	5