CSCI 576 Assignment 3 - solutions

DCT =

1.0e+003 *

1.0162	0.2160	-0.0068	-0.0272	0.0293	-0.0208	-0.0112	0.0080
0.1361	0.0526	-0.0935	-0.0073	0.0340	-0.0188	-0.0113	0.0106
-0.0459	-0.0492	0.0139	0.0538	0.0111	-0.0247	-0.0001	0.0084
0.0088	0.0381	0.0479	0.0156	-0.0179	-0.0109	0.0042	0.0037
-0.0013	-0.0059	-0.0012	-0.0047	0.0008	0.0066	0.0048	0.0002
-0.0045	-0.0012	0.0033	0.0081	0.0070	0.0061	-0.0002	0.0012
-0.0029	-0.0021	0.0009	-0.0015	0.0000	-0.0034	-0.0009	-0.0012
-0.0008	-0.0034	-0.0006	-0.0018	-0.0042	-0.0013	0.0023	0.0016

Quantization table

16	11	10	16	24	40	51	61
12	12	14	19	26	58	60	55
14	13	16	24	40	57	69	56
14	17	22	29	51	87	80	62
18	22	37	56	68	109	103	77
24	35	55	64	81	104	113	92
49	64	78	87	103	121	120	101
72	92	95	98	112	100	103	99

Quantized output =

64	20	-1	-2	1	-1	0	0
11	4	-7	0	1	0	0	0
-3	-4	1	2	0	0	0	0
1	2	2	1	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0

Zigzag scan of AC coeffs: 20 11 -3 4 -1 -2 -7 -4 1 0 2 1 0 1 -1 1 2 2 0 0 0 0 0 1 EOB

Intermediary notation for AC seq and corresponding bitstream for luminance

< 0, 5 > < 20 >
< 0, 4 > < 11 >
< 0, 2 > < -3 >
< 0, 3 > < 4 >
< 0, 1 > < -1 >
< 0, 2 > < -2 >
< 0,3 > < -7 >
< 0, 3 > < -4 >
< 0, 1 > < 1 >
< 1, 2 > < 2 >
< 0, 1 > < 1 >
< 1, 1 > < 1 >
< 0, 1 > < -1 >
< 1, 1 > < 1 >
< 0, 2 > < 2 >
< 0, 2 > < 2 >
< 5, 1 > < 1 >
<EOB>

11010 10100 1011 1011 01 00 100 100 00 0 01 01 100 000 00 1 11011 10 00 1 1100 1 00 0 00 1 01 10 01 10 11111010 1 1010

Compression ratio = original bits/final bits = (64x8)/86 = 5.953 (OR if reversed – 0.1679)