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Assignment 1

Q1 a) Pixels = 512 * 512 = 262144 Pixel
bits = 8 * 262144 = 2097152 bit
size in bytes = 2097152 / 8 = 262144 byte

b) size in KB = 262144 / 1024 = 256 KB

Q2) No. of Pixels = 1024 * 1024 = 1048576 Pixel
size in byte = (1048576 * 8) / 8
= 1048576 byte
size in KB = 1048576 / 1024 = 1024 KB

Q3) No. of ~~bits~~ Pixels = 1024 * 1024 = 1048576
size in bytes = (1048576 * 24) / 8
= 3145728 byte
size in KB = ~~[illegible] / 1024 =~~
= 3145728 / 1024
= 3072 KB

Q4) No. of bits = 800 * 600 * 12 = 5760000 bit
size in byte = 5760000 / 8 = 720000 byte
size in KB = 720000 / 1024 = 703.125 KB

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(Q5) No. of levels $= 2^8 = 256$ gray level
No. of Pixels $= 2000 * 1500 = 3000000$ Pixel
Res in $= 3000000 / 1000000 = 3$

(Q6) No. of Pixels $= 2000 * 1500 = 3000000$ Pixel
Res in Mb $= 3000000 / 1000000 = 3$ MP

(Q7) No. of levels $= 2^{10} = 1024$ level
dynamic Range in db $= 20 * \log_{10} 1024 = 60.2$ db

(Q8) $S = 255 - r = 255 - 10 = 245$

(Q9) $S = \frac{120 - 50}{200 - 50} * (256 - 1) = 119$

(Q10) $S = 255 * \left(\frac{100}{255}\right)^{0.4} \approx 175.36$

(Q11) $S = 45 * \log(51) \approx 76.8$

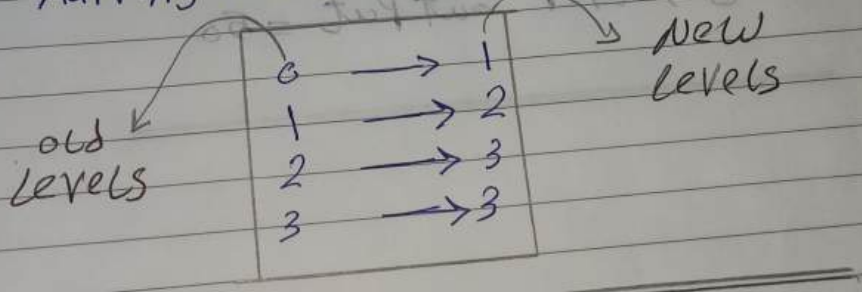
Q12

$$\begin{bmatrix} 245 & 235 & 255 \\ 215 & 205 & 195 \\ 185 & 175 & 165 \end{bmatrix}$$

Q13

No. Level	Pixel Count	Prob. Count/Total	CDF	CDF * (L-1)
0	4	0.4	0.4	1.2 ≈ 1
1	3	0.3	0.7	2.1 ≈ 2
2	2	0.2	0.9	2.7 ≈ 3
3	1	0.1	1	3

Mapping Result:



Q14

$S = 255 * \left(\frac{r}{255}\right)^{\gamma}$ $r = [0, 64, 128, 192, 255]$ $\gamma = 2$

r	→ S
0	→ 0
64	→ ≈ 16
128	→ ≈ 64
192	→ ≈ 145
255	→ 255

$S \approx [0, 16, 64, 145, 255]$

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Q19) Pixels Mapping to 0 = Pixels from 0 → 127
= 700 Pixel → 0

Pixels Mapping to 1 = Pixels from 128 → 255
= 300 Pixel → 1

Count of 0 = 700
Count of 1 = 300

Q20) Sum of 9 Pixels = 450 Pixel
Mean of 9 Pixels = 450/9 = 50

Avg filter output = 50
