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Question 1.
Part 1
If the scanline needs to be converted to an image that is only black and white with no gray then we can separate monochrome images by bit plane slicing. The most significant bit of each sample forms the 7th bit plane. This bit plane would be as follows. (1 = Light, 0 = Dark)
90 100 100 100 90 90 90 90
90 = 1011010
100 = 1100100

[1, 1, 1, 1, 1, 1, 1, 1]
The image would be entirely white.

Part 2
Best case scenario is the number of scan lines multiplied by 2. So it would be (400 * 2) = 800 then * 8 for data value size which gives 6400 bytes

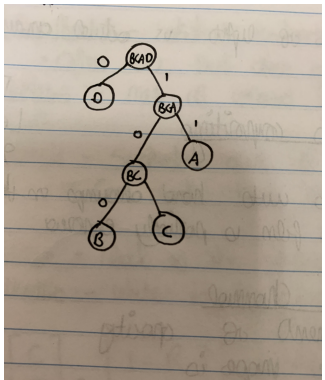
Part 3
108, 139, 135, 244, 172, 173, 56, 99
6C, 8B, 87, F4, AC, AD, 38, 63

4 Bit Conversion
[6, 8, 8, F, A, A, 3, 6]

(6-108)^2 + (8-139)^ + (8-135)^2 + (15- 244)^2 + (10-172) + (10-173)^2 + (3-56) + (6-99)^2
sqrt(10404 + 17161 + 16129 + 52441 + 26244 + 26569 + 2809 + 8649) = 400.5
400.5 / 8 = 50.063%

Question 2.
12 12 12 59 179 254 254 254
12 12 12 59 179 254 254 254
12 12 12 59 179 254 254 254
12 12 12 59 179 254 254 254

A = 12 probability is = .375
B = 59 probability is = .125
C = 179 probability is = .125
D = 254 probability is = .375



A = 11
B = 100
C = 101
D = 0

Entire image encoded
11 11 11 100 0 0 0
11 11 11 100 0 0 0
11 11 11 100 0 0 0
11 11 11 100 0 0 0

15 Bits per line compared to 64
60 bits total compared to 256

Part 2.

(256-60)/256
Savings Ratio = 76.5

(256/60)
Compression Ratio = 4.26