

1.

a) What type of values would you expect for the DCT of the enlarged 8 pixel × 8 pixel image below (*i.e.*, where do you expect nonzero values)? The grayscale values are given in the matrix. Explain your answer.

b) Compute the values. You can use computer help (*e.g.*, write a program, use MATLAB, etc.)



Figure 2.65

0	255	155	155	255	255	200	255
0	255	155	155	255	255	200	255
0	255	155	155	255	255	200	255
0	255	155	155	255	255	200	255
0	255	155	155	255	255	200	255
0	255	155	155	255	255	200	255
0	255	155	155	255	255	200	255
0	255	155	155	255	255	200	255

2.

Say that your 1-CCD camera detects the following RGB values in a 3 pixel × 3 pixel area. What value would it record for the three pixels that are in boldface, assuming the nearest neighbor algorithm is used? (Give the R, G, and B values for these pixels.)

G = 240	R = 255	G = 239	R = 244	G = 236
B = 238	<b>G = 229</b>	<b>B = 224</b>	G = 230	B = 222
G = 244	R = 255	G = 238	<b>R = 250</b>	G = 236
B = 230	G = 226	B = 222	G = 232	B = 228
G = 244	R = 255	G = 238	R = 250	G = 236

3.

Answer the following questions based on the diagram below.

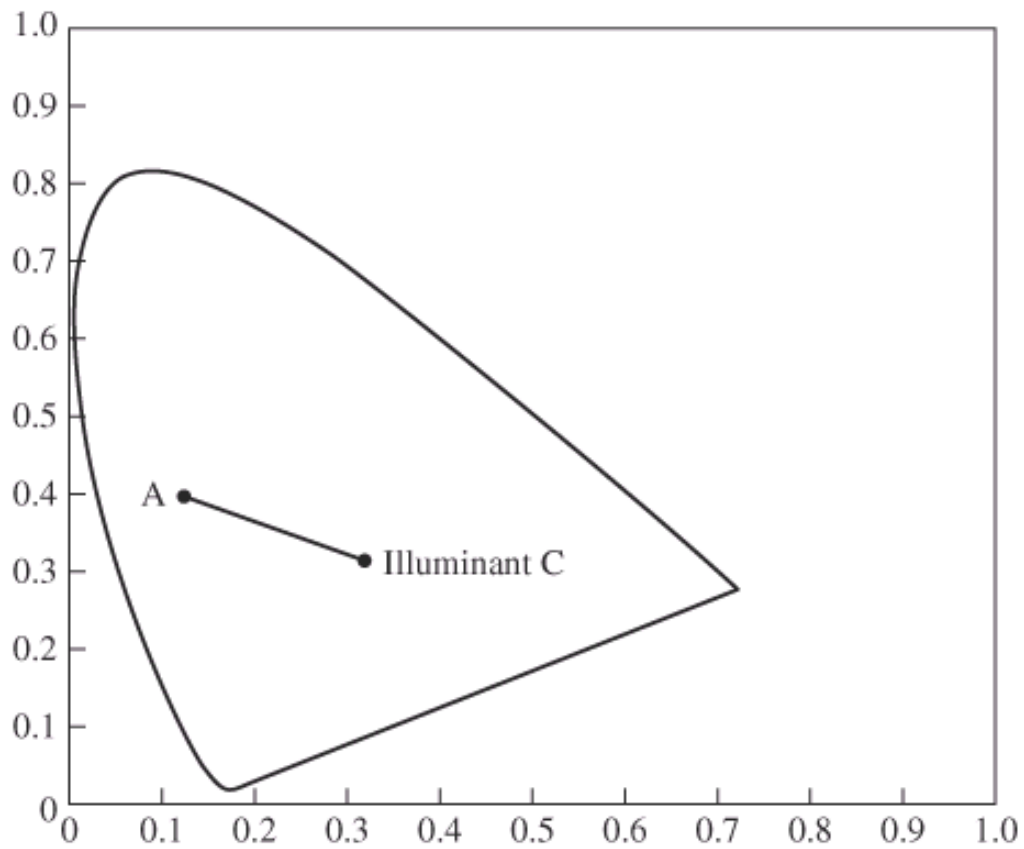


Figure 2.66

- What color is point A?
- How would you find the dominant wavelength of this color?
- What does the line segment between A and C represent?
- How would you determine the saturation of the color at point A?

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