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CS 435

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Homework #1

Theory Problems

1. (2pts) Given a point in 3D space, (3,5,20) and an effective focal length of 10, where will this point appear on the 2D image plane?

$$(x, y) = \frac{f}{Z}(X, Y)$$

$$(x, y) = \frac{10}{20}(3,5)$$
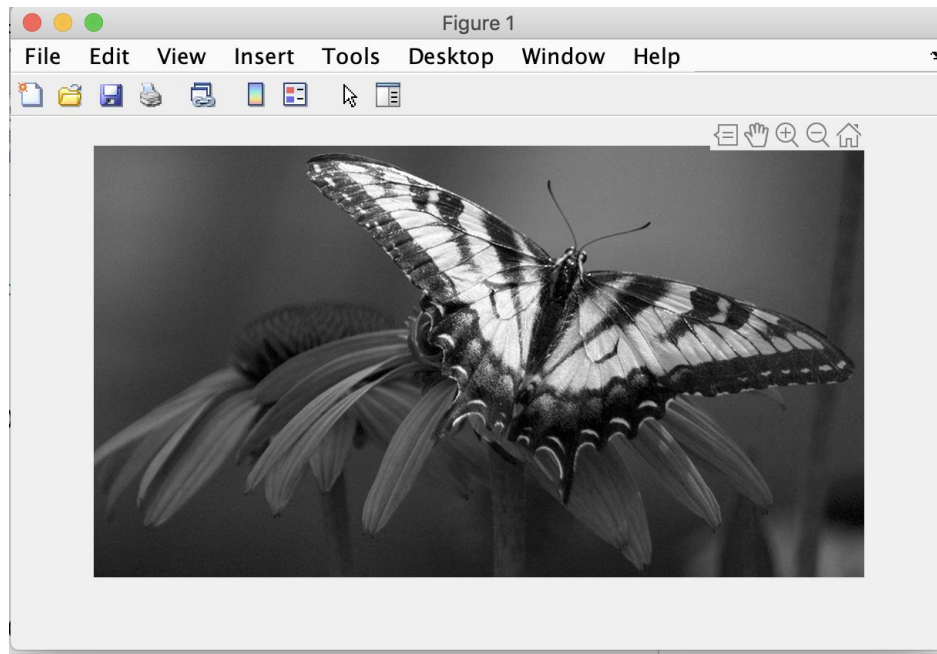
$$(1.5, 2.5) = \frac{10}{20}(3,5)$$

2. (2pts) If we have a focal length of 10 and a lens effective diameter of 5, what is the field of view of this camera system (in degrees)?

$$\tan\left(\frac{\theta}{2}\right) = \frac{D}{2f}$$

$$\tan\left(\frac{\theta}{2}\right) = \frac{5}{20} = \frac{1}{4}$$
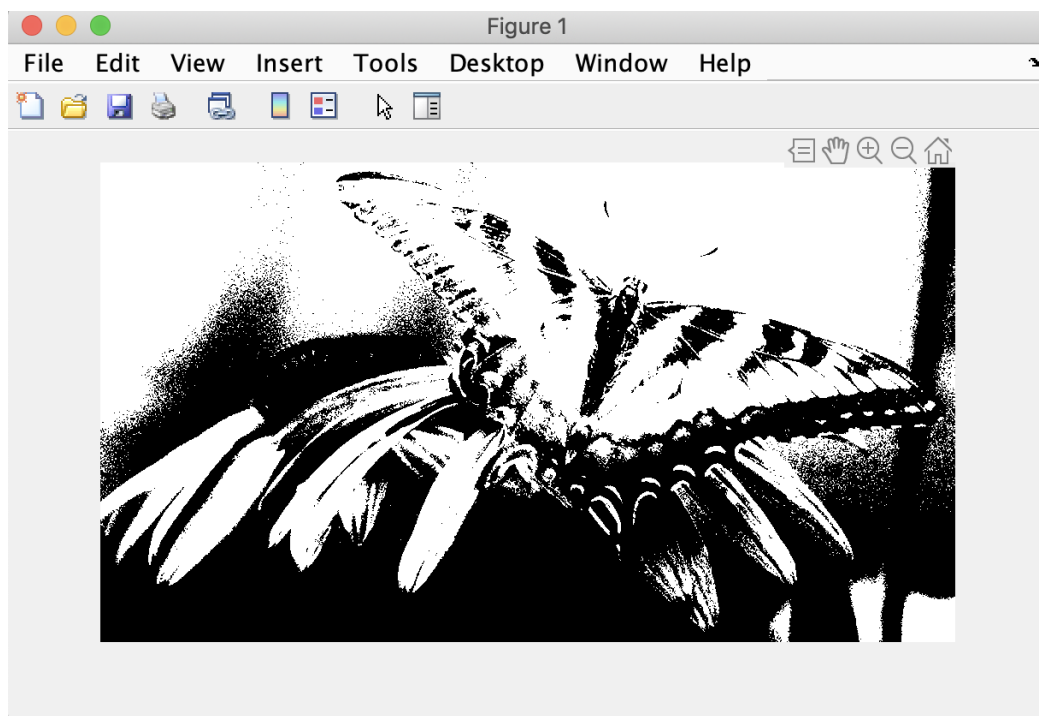
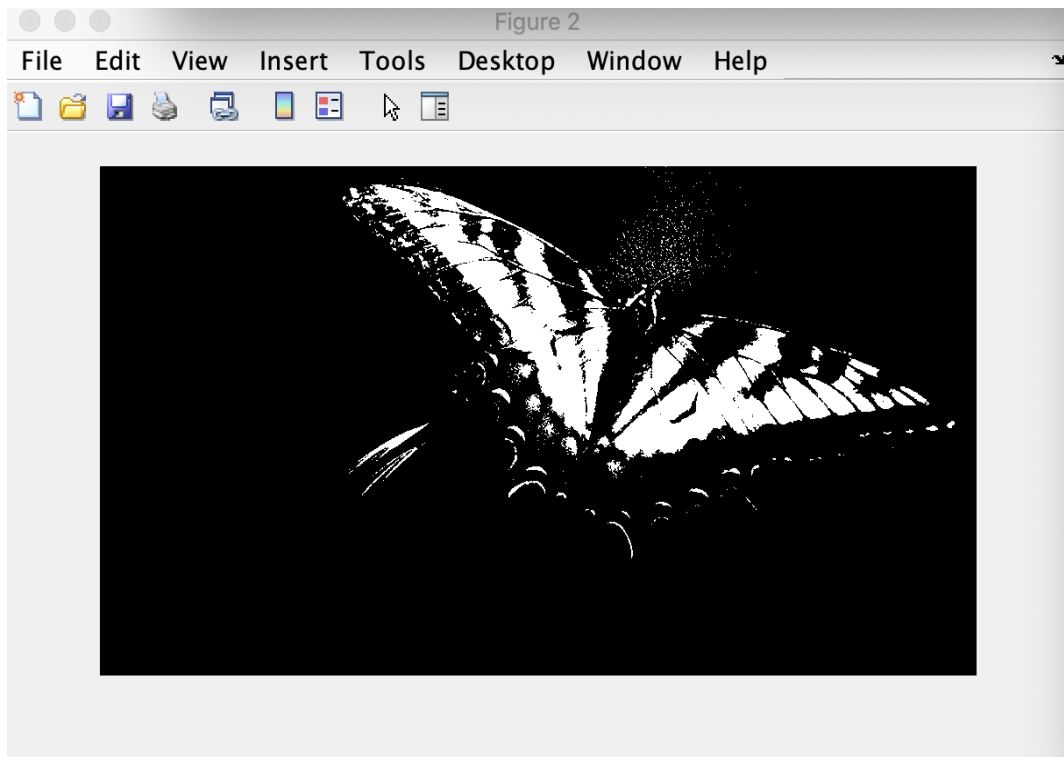$$tan^{-1}\left(\frac{1}{4}\right) = 14.03624347 \; degrees$$

Part1

Part2
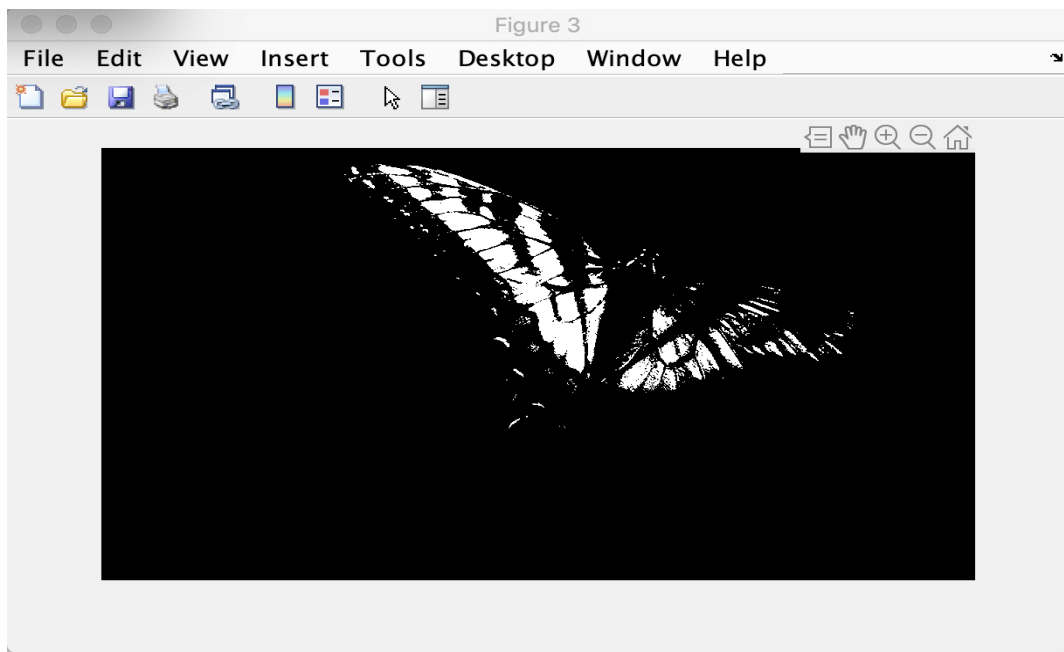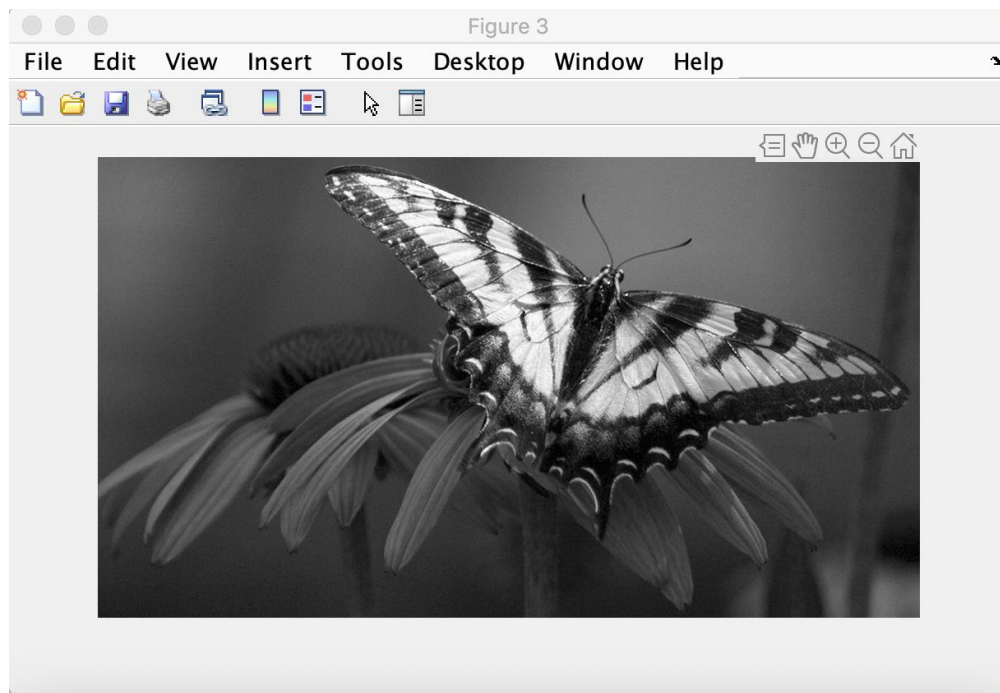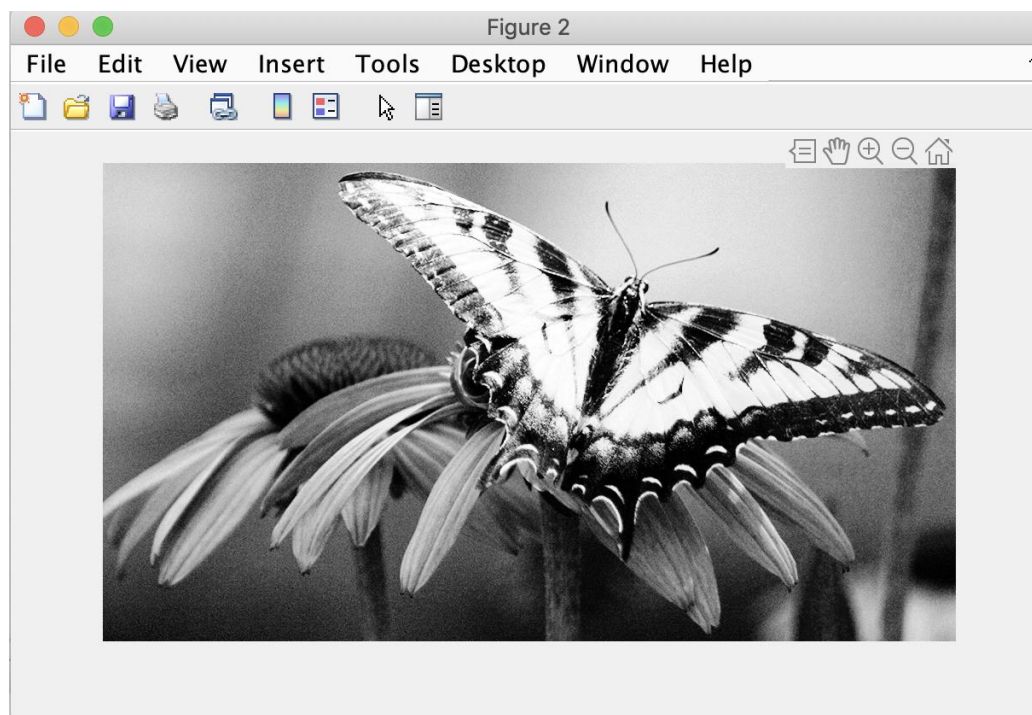
1. t=25%
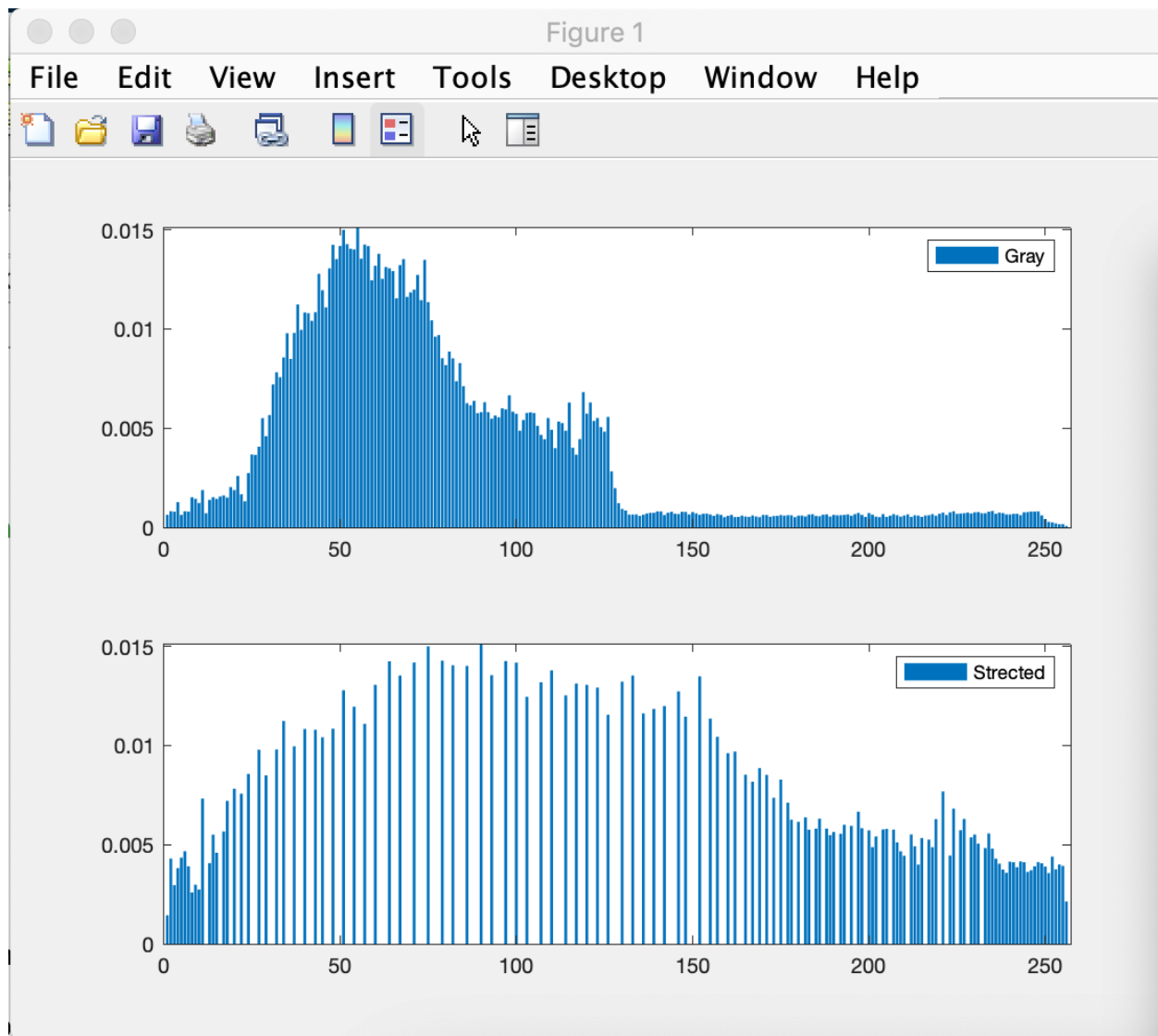

2. t=50%

3. *t*=75%

Part3
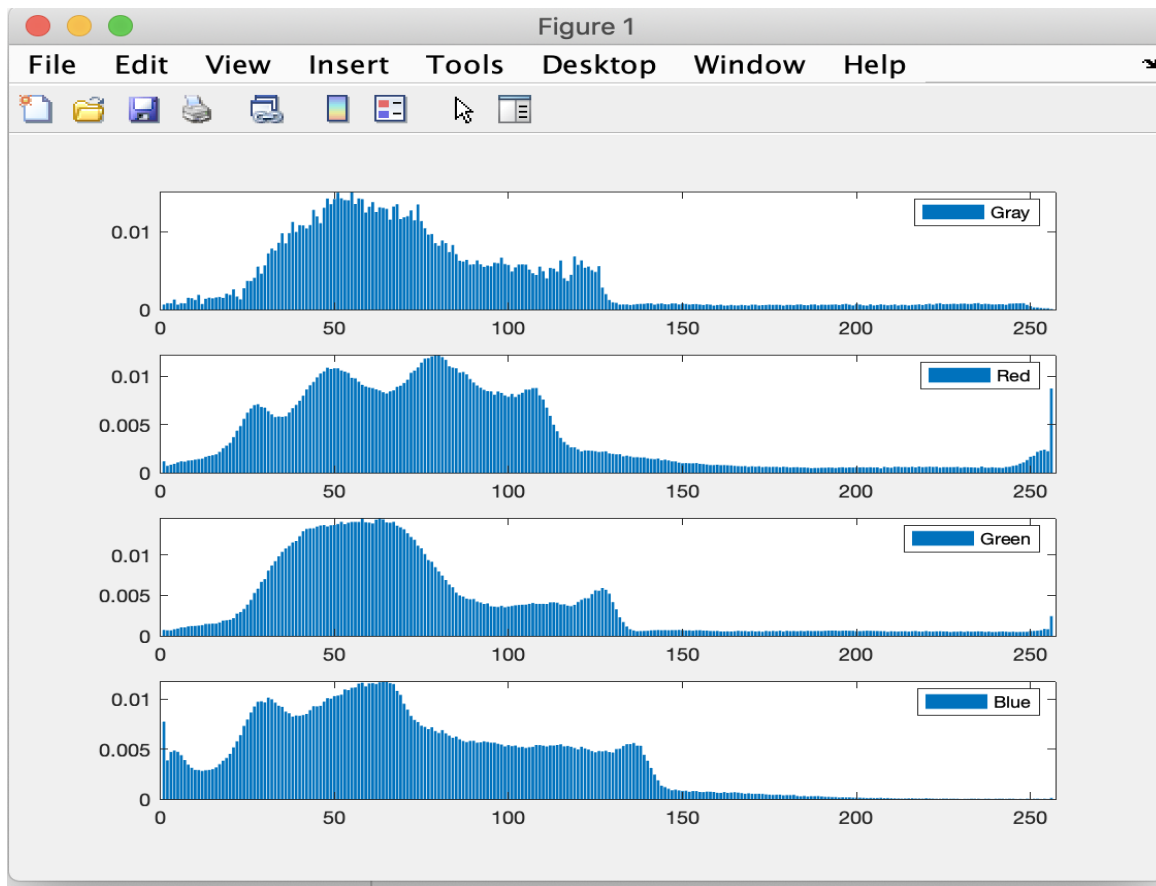
Part4

Original Image

Stretched Image

Histograms

I have stretched it from 30-130 to 0-255 because the graph calculation was concentrated between that area which made it more spread out. This way we balanced the linear graph and make the contrast more even. In this case brighter.