Activity 1: Color Images

Primary Goal: Practice loading images and identifying color values.
Secondary Goal: Discuss how contextual information influences perception.

Download the **Activity1** folder from our course website to your Desktop. Right-click the file to Extract the zip file.

1.) In Matlab, load the first image **a.jpg** and display the image. Look at the regions labeled A, B, and C.
  a.) Predict the color values at those locations. Write each RGB 3-tuple in the blank below.
  b.) On the Matlab figure toolbar, click the "Data Cursor" tool. Then click on a pixel to the immediate right of letters A, B, and C. Be sure you do not click on the letter text, but rather the colored region next to the letter.

You may want to zoom into the region first using the "Zoom In" tool (the magnifying glass with the + sign).
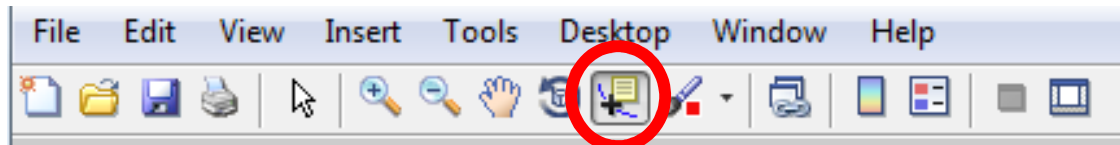
The Data Cursor tool tells you the (x,y) coordinates of the pixel and its RGB 3-tuple. Write the actual values in the blanks below and compare to your predictions.

	Predicted			**Actual**	
A (0 , 255 , 0)			A (82 , 112 , 40)		
B (255 , 255 , 1)			B (250 , 172 , 20)		
C (200 , 200 , 200)			C (168 , 172 , 181)		

2.) Now load the image **b.jpg** and repeat the procedure in #1 for regions A and B. Be sure to make your predictions *before* you start clicking on the image.

<div align="center">

Predicted **Actual**

A (__220__ , __220__ , __220__) A (__120__ , __120__ , __120__)

B (__150__ , __150__ , __150__) B (__120__ , __120__ , __120__)

</div>

You may see a surprising discrepancy between your predictions and the actual values. This image is a famous illusion created by Prof. Edward Adelson. This illusion demonstrates that humans perceive color not just on the "pixel" information, but rather on larger contextual information.

Edward H. Adelson
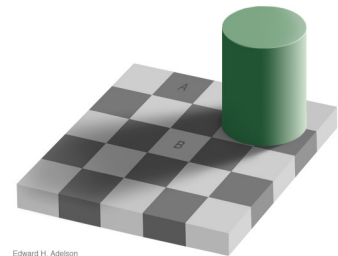
In this image, there were two important contextual features that threw off our color prediction. What were they?

    i. The visual system determines the color of objects based on local contrast.

    ii. Shadows have gradual changes in light level, and the visual system tends to ignore these changes.

In image processing, we have to remember that computer sees each pixel individually as just one entry in a large matrix. Computers do not see the image as a whole, or the "big picture." One of the major challenges of computer vision is to get computers to understand larger contextual information.

However, as this illusion demonstrates, sometimes contextual information can lead to misleading perceptions.