



Image Processing – Lecture 2

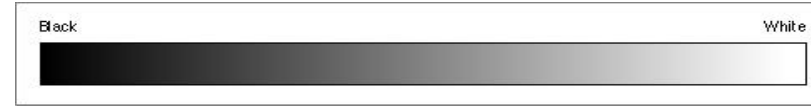
Digital colors – Recap and exercises



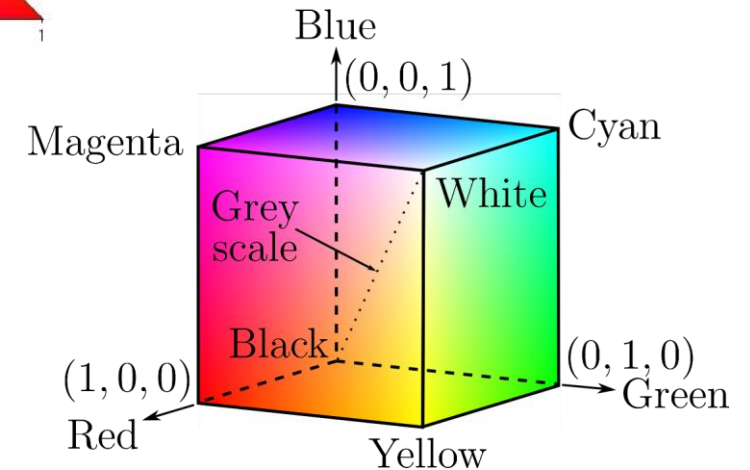
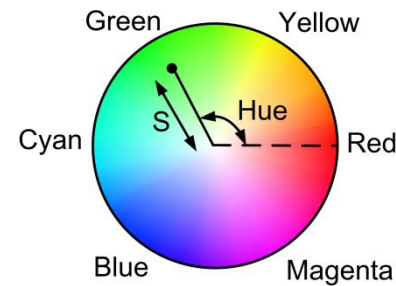
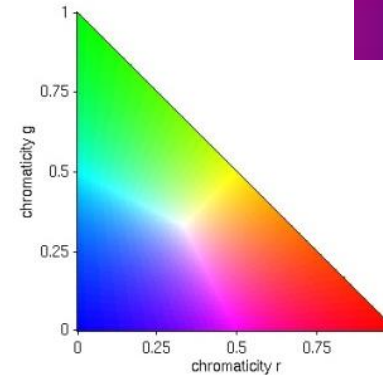
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What to remember

- Achromatic versus chromatic
- Subtractive color versus additive color
- Color spaces
 - RGB: Used in cameras
 - Normalized RGB: Decouples intensity and color
 - HSI: Decouples intensity and color and is easy to threshold
- Color thresholding

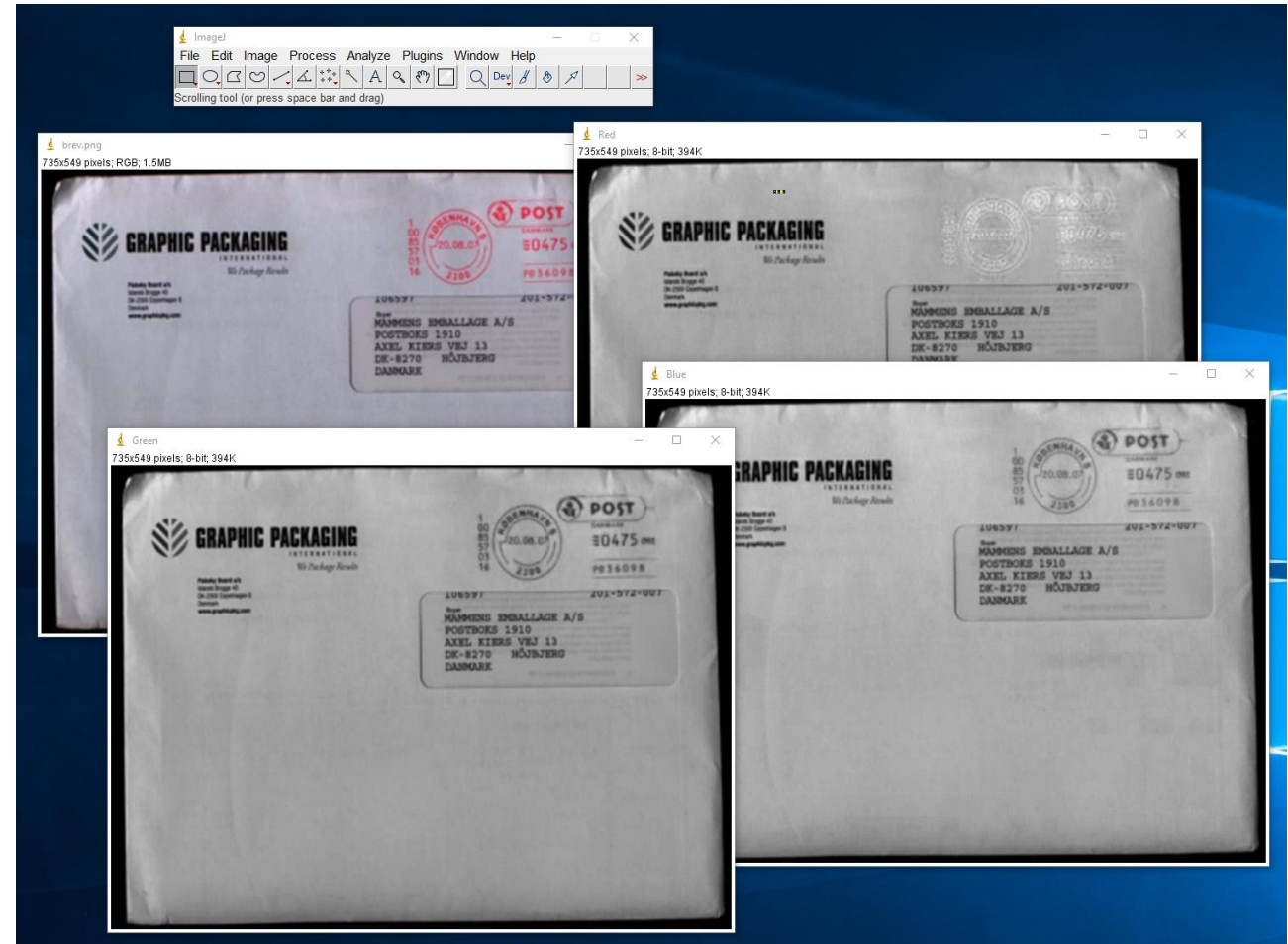


2



ImageJ

- ▶ A good tool for testing out image transformations.
- ▶ Very powerful (but not that intuitive).
- ▶ Looks ancient, but is still under active development.
- ▶ <https://imagej.nih.gov/ij/>



Exercises (1/2)

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- ▶ Threshold letter.png (it's on Moodle) to find the red stamp using ImageJ:
 - ▶ Try Image → Adjust → Threshold...
 - ▶ Try Image → Adjust → Color Threshold... (note the color space used)
 - ▶ Try splitting the RGB channels and comparing them (Image → Color → Split channels)
 - ▶ Try converting to HSB and compare the channels (Image → Color → HSB Stack, Image → Stacks → Stack to images)
 - ▶ Explain why a simple thresholding of the red RGB channel does not work. Is green or blue better? Why?
- ▶ Explain how color is represented in HTML.
- ▶ The image to the right has been captured by a Bayer pattern sensor. Use demosaicing (the algorithm in the book) to convert the image into an RGB image.



Bayer input

100	10	110	11
9	50	8	49
105	12	112	9
14	52	15	54





Exercises (2/2)

- Make a Python program which performs the demosaicing you did manually in the previous exercise
- Make a Python program which loads and converts a pictures to HSI
 - Implement your own conversion function
 - Use OpenCV's built-in conversion function
 - Display the H, S, and I image.
 - Compare to the HSB-stack from ImageJ

