Exercise Sheet 2

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1. **RGB color space**
   - Build a function that can display the R, G, B individual components of an image.
   - Hints:
       - **i.** Create 3 new images using objects of type *ImagePanel*.
       - **ii.** Create 3 button/functions, one per RGB dimension, which processes the visualized image.
2. HSI color space
   - Create a function that can display the H, S, I individual components of an image.
   - Hints:

   i.
   $$H = \begin{cases} \theta & \Leftarrow B \leq G \\ 2\pi - \theta & \Leftarrow B > G \end{cases} \qquad \theta = \cos^{-1}\left\{ \frac{\frac{1}{2}\left[(R-G)+(R-B)\right]}{\left[(R-G)^2+(R-B)(G-B)\right]^{1/2}} \right\}$$

   ii.
   $$S = 1 - \frac{3}{(R+G+B)}\left[\min(R,G,B)\right]$$

   iii.
   $$I = \frac{1}{3}(R+G+B)$$

   - There are values for which H and S are undefined. Why?

| RGB | H | S | I |

3. **Pseudocolor**
   - Create a function that applies a pseudocolor algorithm to a black and white image. Use any technique you want (intensity slicing, intensity to color)

4. Histograms

- Build a function that calculates the *Intensity (HSI)* histogram of an image. This should be displayed on a new window (*Frame*).
- Hints:
  - i.   I = (R+G+B)/3
  - ii. Change the function *paint* (*public void paint(Graphics g)*) of te new window, that should draw a histogram based on an internal variable of type *int[256]*.
  - iii. Use classes from *Java.awt.Graphics*: *drawLine*, *drawRect*, etc.