# **Worksheet 3 - Manipulating Image Matrices and Keyboard input**

# TASK 1

1. Create a Python program which loads an image, convert it to grayscale and store it an a numpy array.
2. Research how to use the input() function, cast the input to an integer and store the result in a variable named *t\_value*.
3. invert an image making use of a user inputted threshold, using the formula:

im\_result = *t\_value* - im

1. Introduce validation to avoid thresholds outside the 0 to 255 range.

# TASK 2 - Subplots

1. Load the PIL, pyplot and numpy libraries.
2. Open an RGB image of your choice, storing it in a 3D matrix.
3. Create a Python program that displays each colour in an RGB image separately. Use a 2x2 subplot to display each colour and the original image. Switch off display of axis in your 2x2 subplot.
4. Save the Red, Green and Blue images separately.

# TASK 3 – Splitting images

1. Open an RGB image of your choice, storing it in a 3D matrix.
2. Use the shape() function to calculate the width and height of the image. Store these values into two variables width and height.
3. Use these variables to split the image into four separate matrices.
4. Display the matrices as four images in a 2x2 subplot.