Lab 1. Preparation tasks

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Version 1:

1. Basic image operations and data types

1 A) What is the highest pixel value in the image?

253

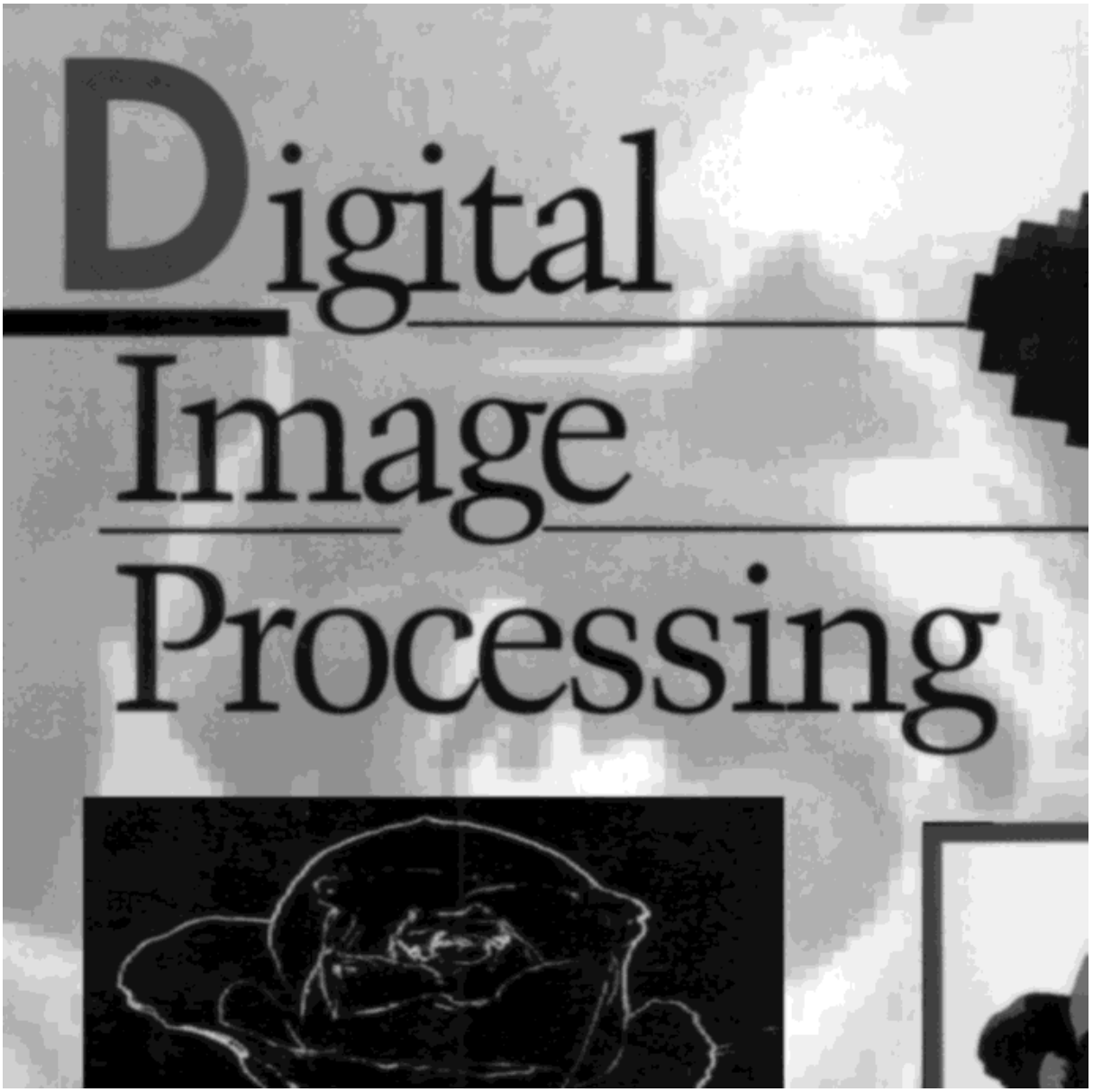
1 B) What is the maximum value for Image2?

16

1 C) What do you see if you display Image2?

A darker version of the original image

1 D) Image3:



1 E) How many gray levels does Image3 have?

17

1 F) Explain what has happened to the image after these operations!

Because the values are rounded up when we convert from Image to Image2 to Image 3 we lose a lot of pixel values resulting in fewer gray levels.

1 G) Explain the difference between using uint8 images and double images in this task.

When multiplying/dividing pixel value in uint8 we will lose information because the values are rounded up to be integers. When using double values the values are not rounded up so the information stays the same.

1 H) Which class (data type) should you make sure to use when applying such operations to images?

Double

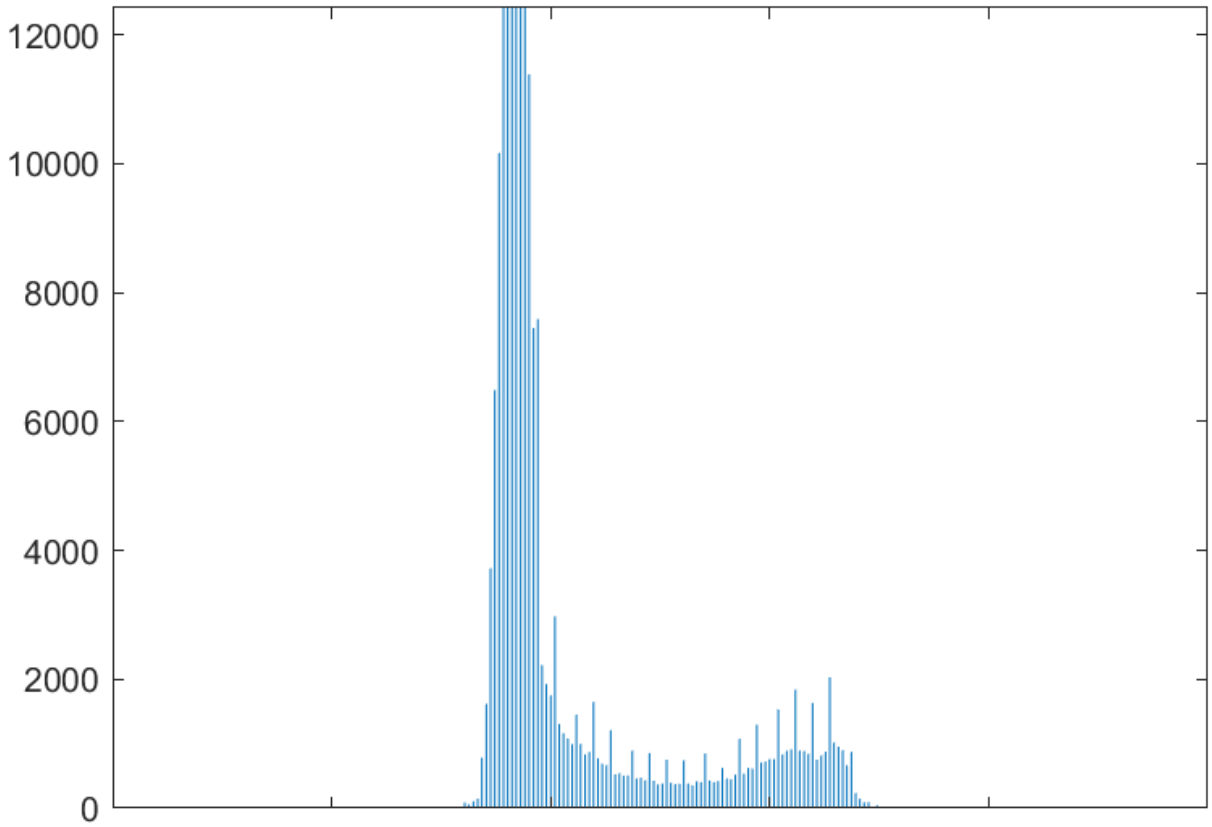
2. Contrast stretching and image histogram

2 A) What is the max- and min- values for the image?

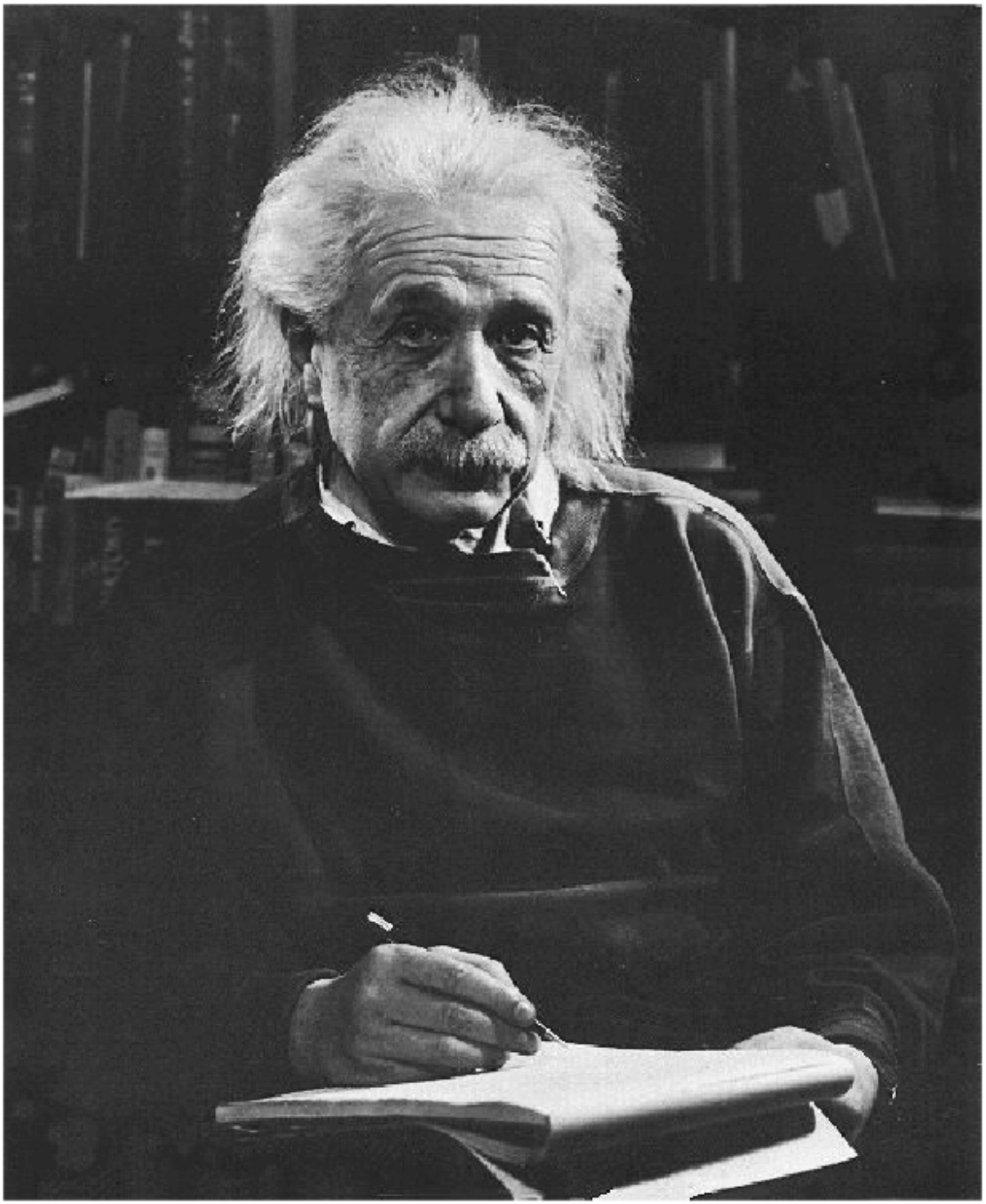
0.6980 max

0.2902 min

2 B) Histogram:



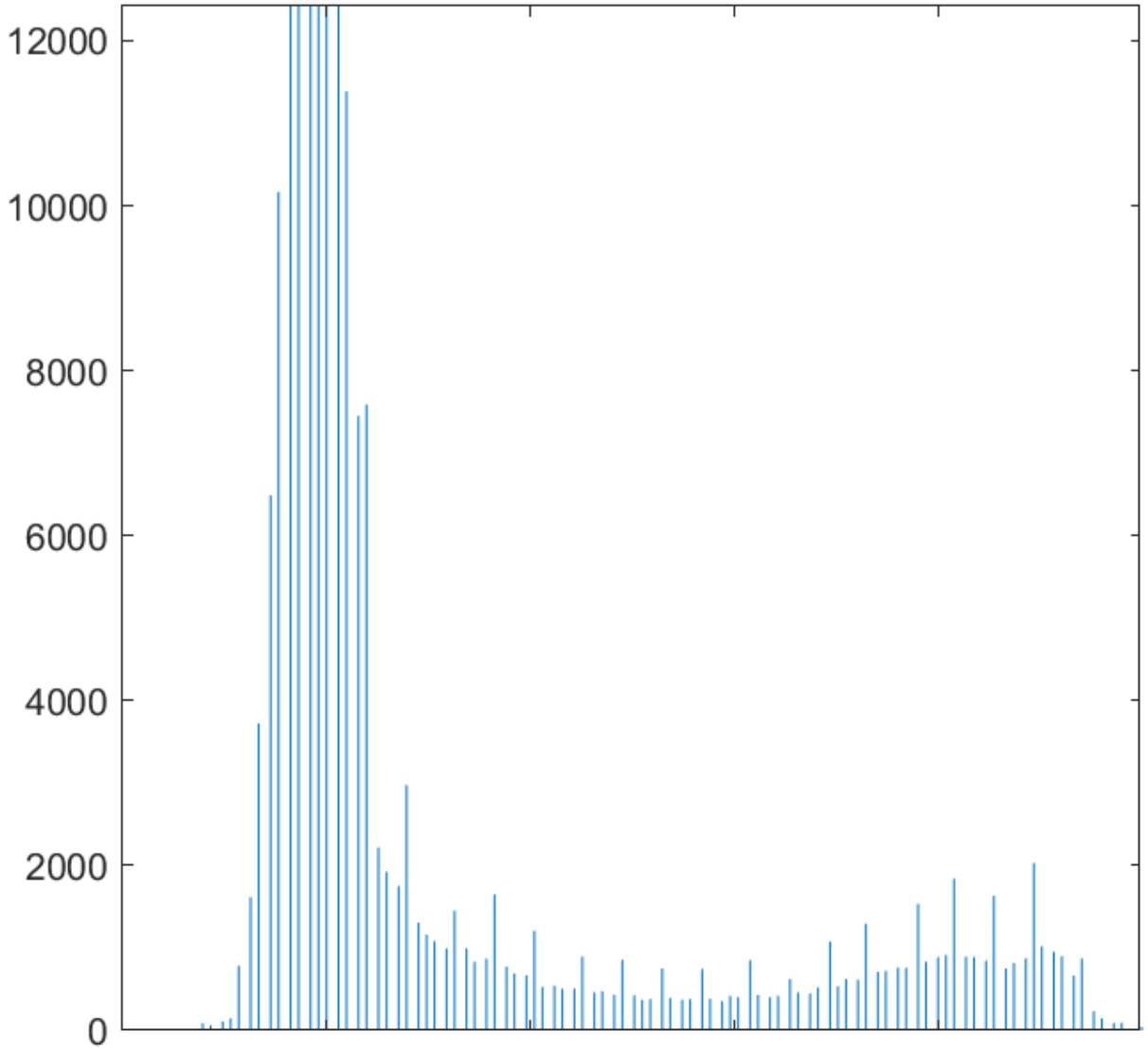
2 C) Resulting image after contrast stretching:



2 D) What will the max- and min- values be for the stretched image?

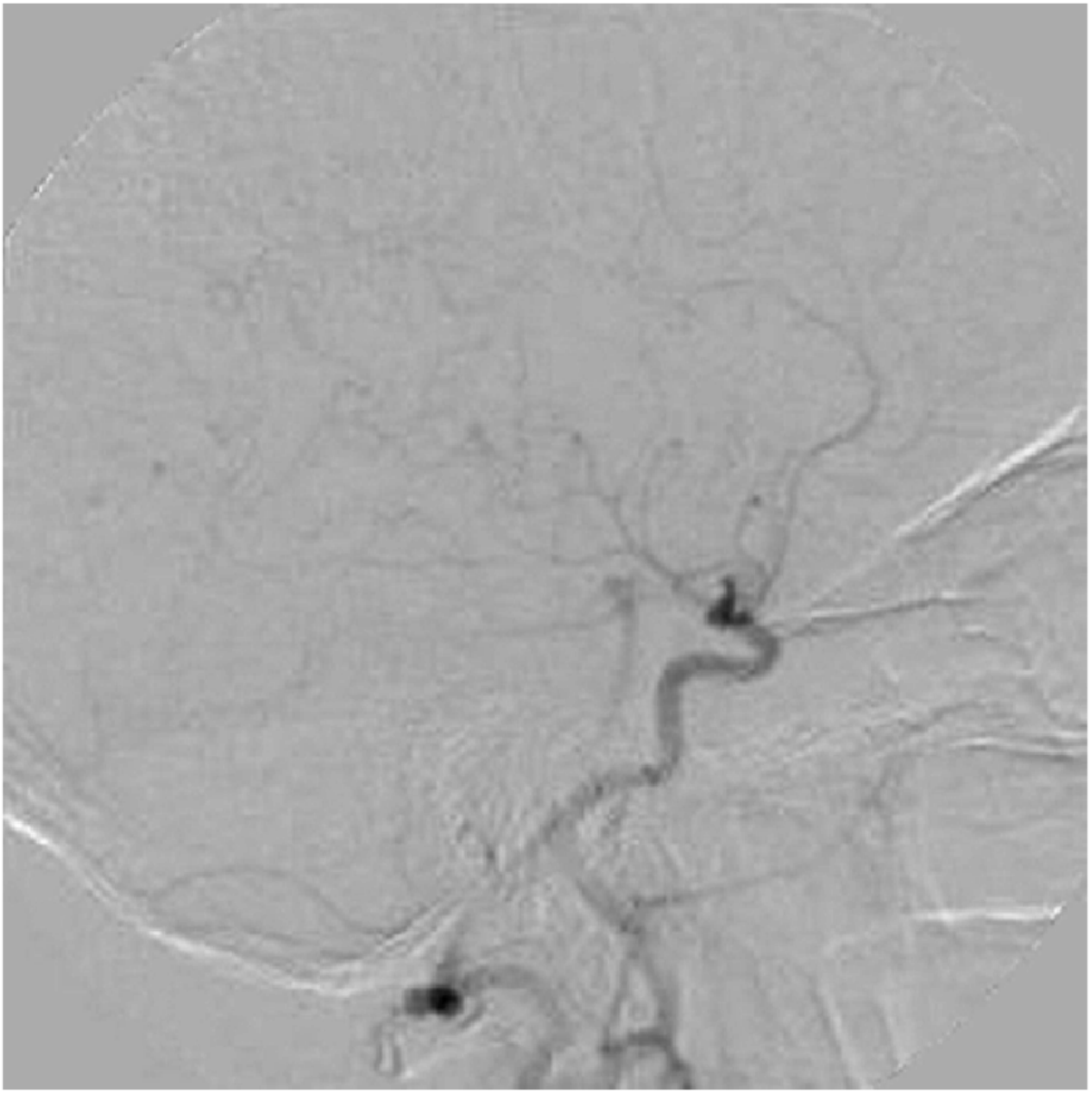
0 and 1

2 E) Histogram for the stretched image:



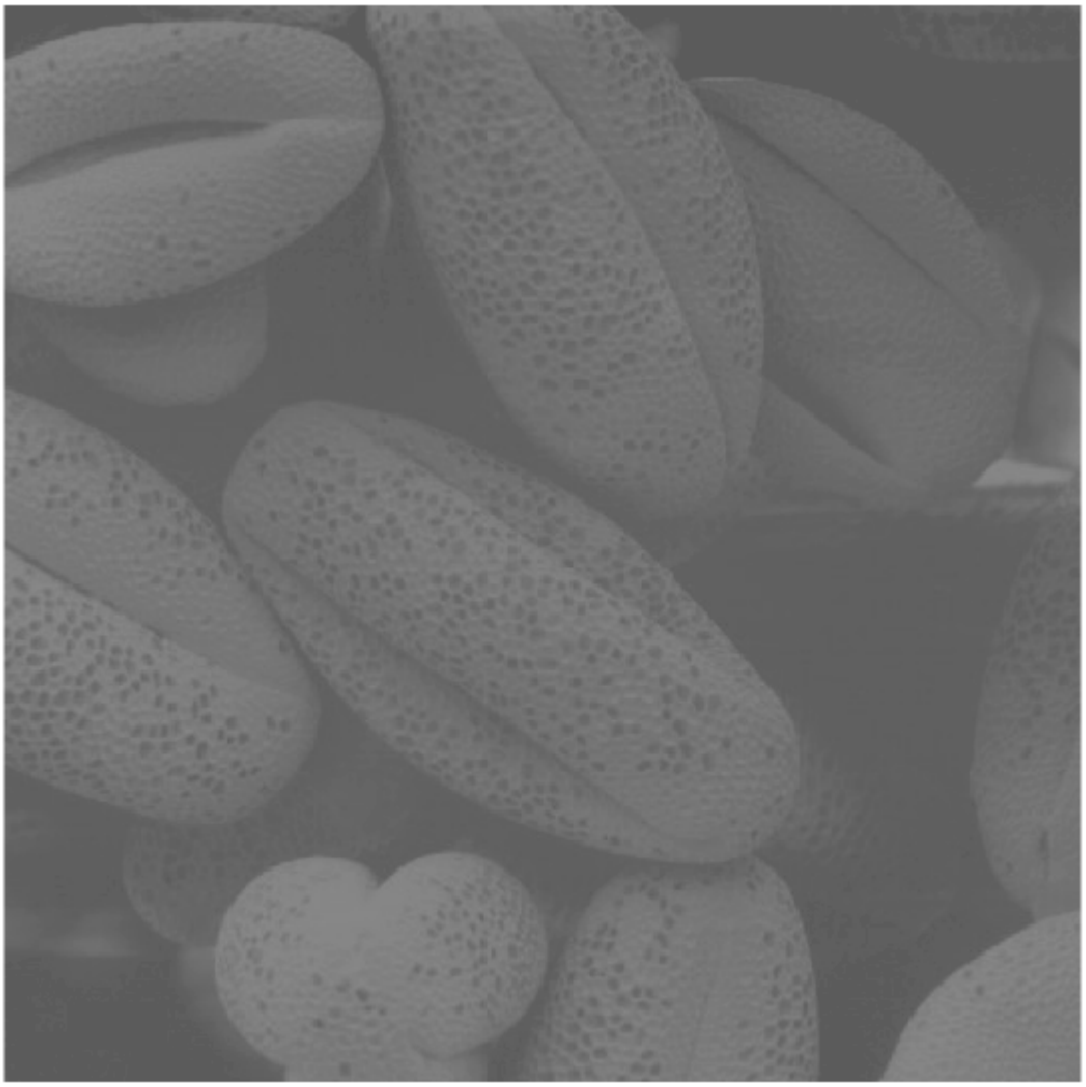
3. Image subtraction

3 A) Enhanced difference image:

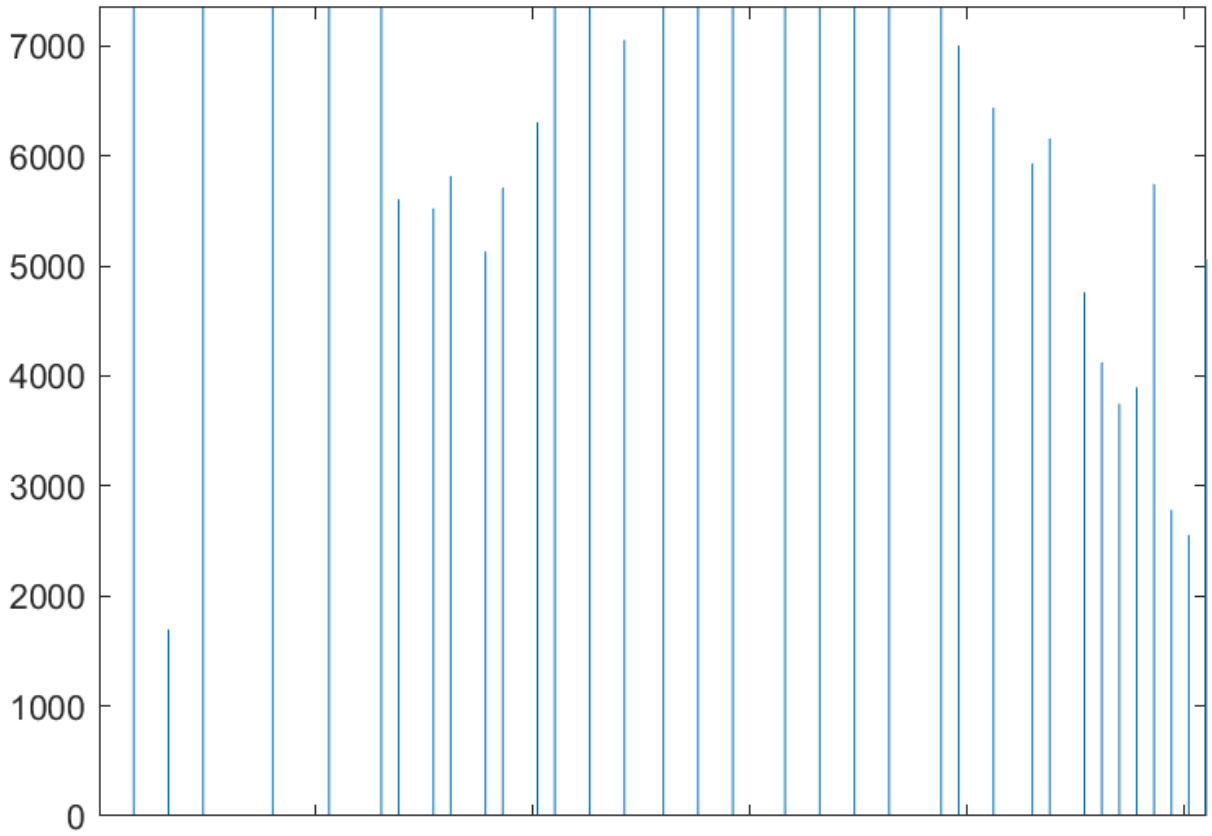


4. Histogram equalization

4 A) Equalized image:

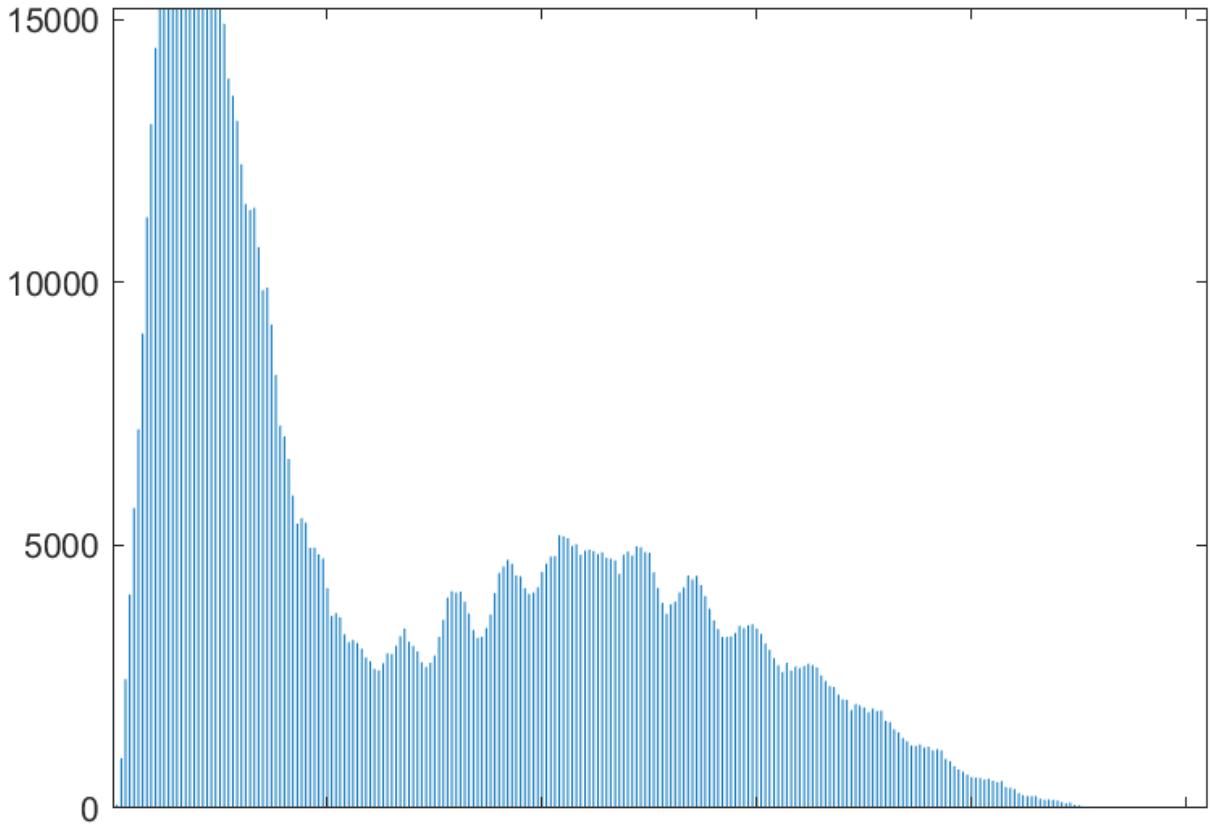


4 B) Histogram for the equalized image:



5. Image division and shading correction

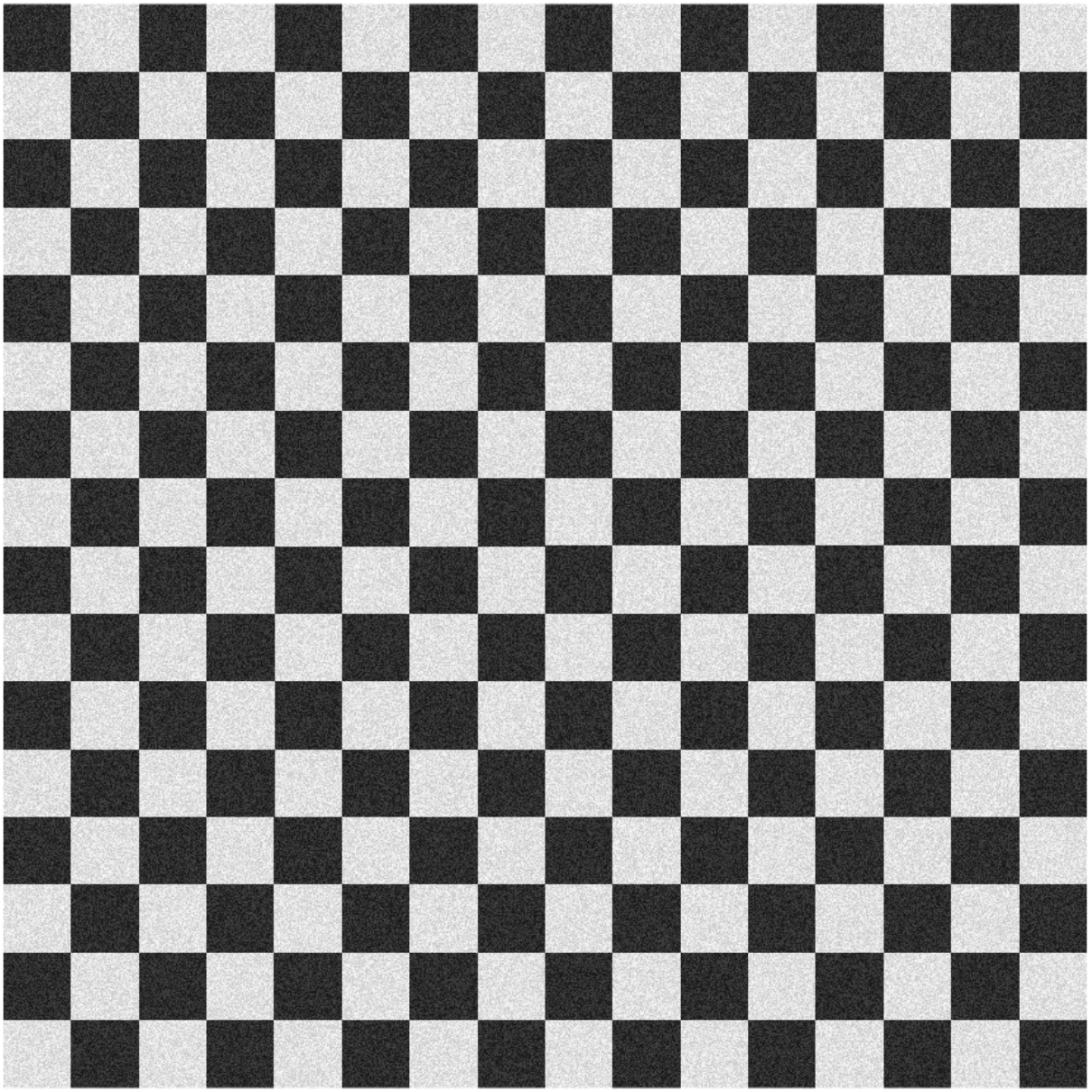
5 A) Histogram image:



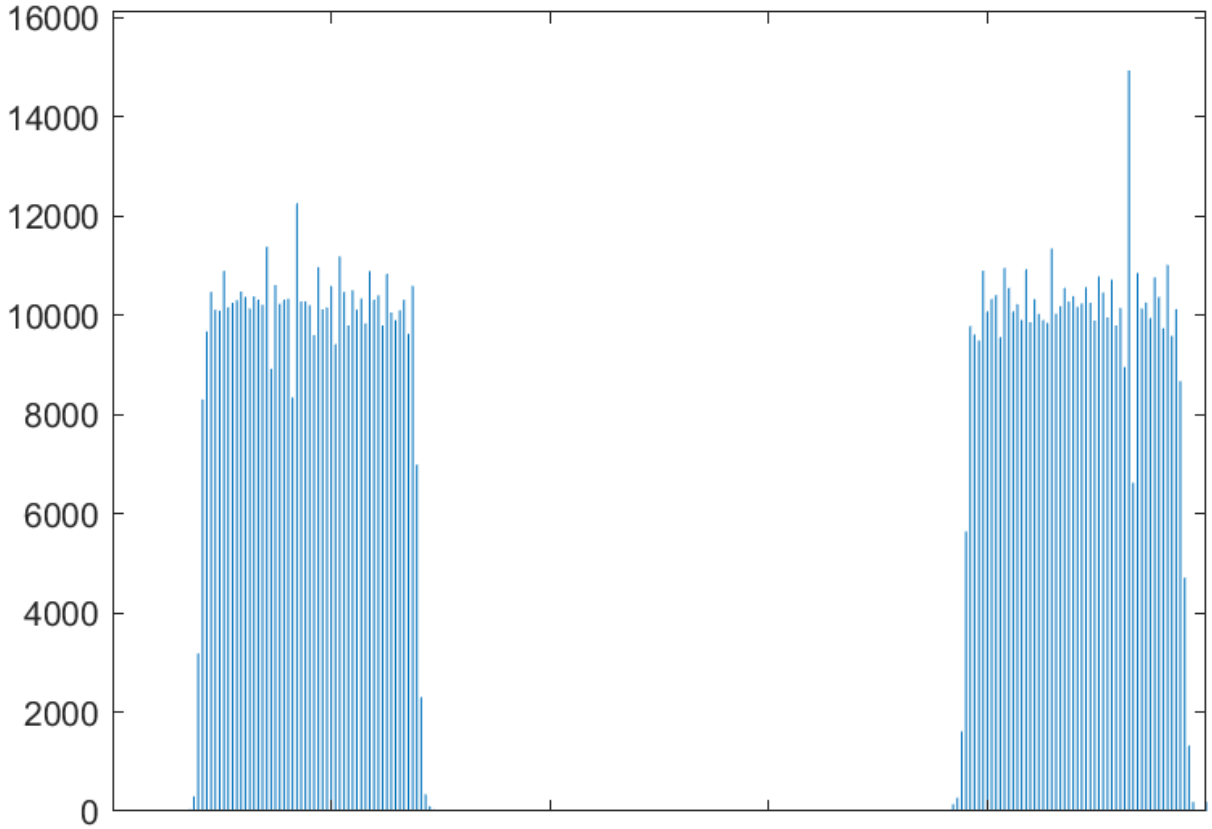
5 B) Is it possible to find a global threshold to segment this image (look at the histogram)?

No, because of the gradient on the checkered pattern. The darkest white squares are almost the same color as the lightest black squares.

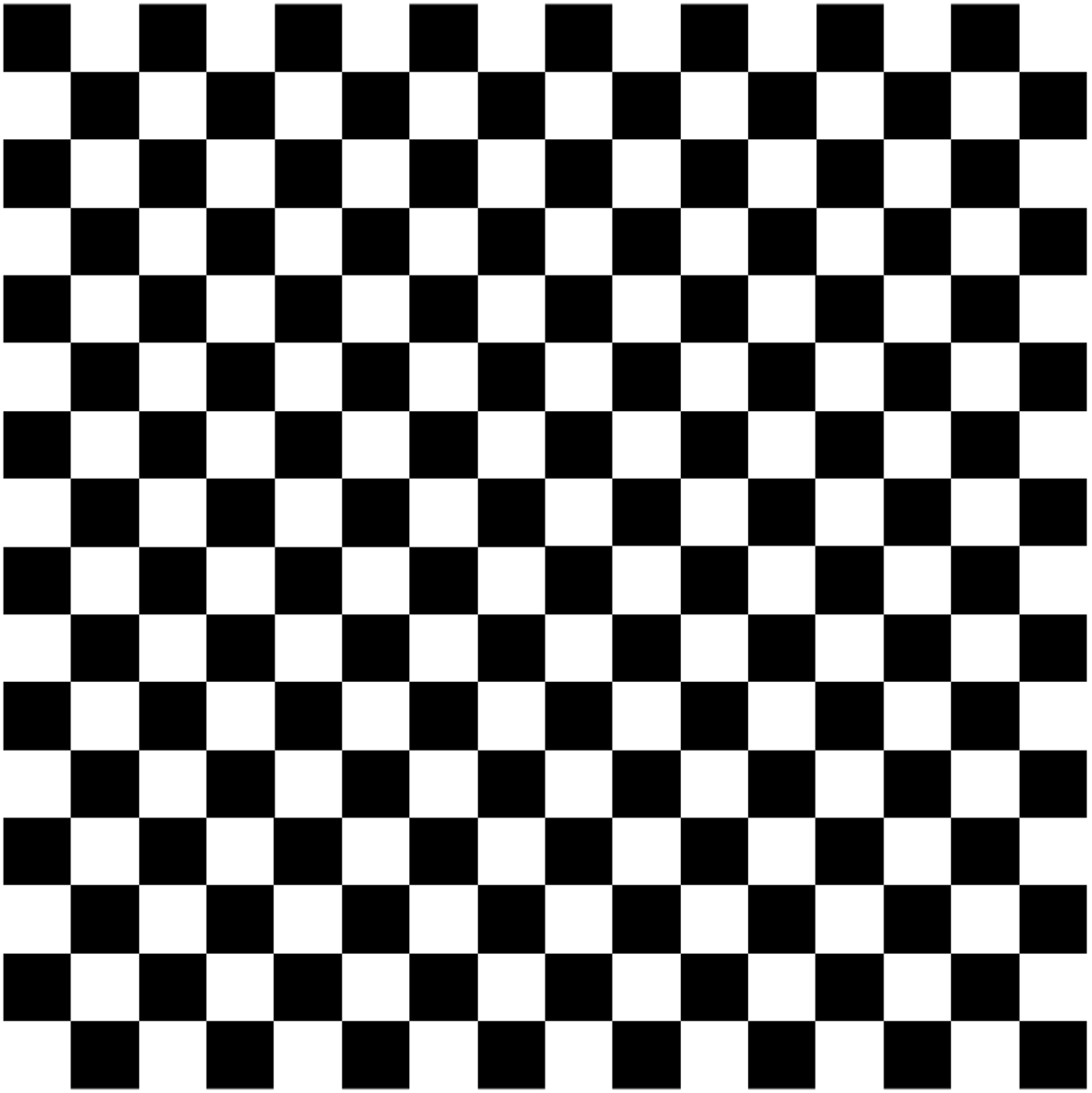
5 C) Recovered image:



5 D) Histogram of recovered image:



5 E) Segmented image:



5 F) What is the data type (class) for the segmented image?

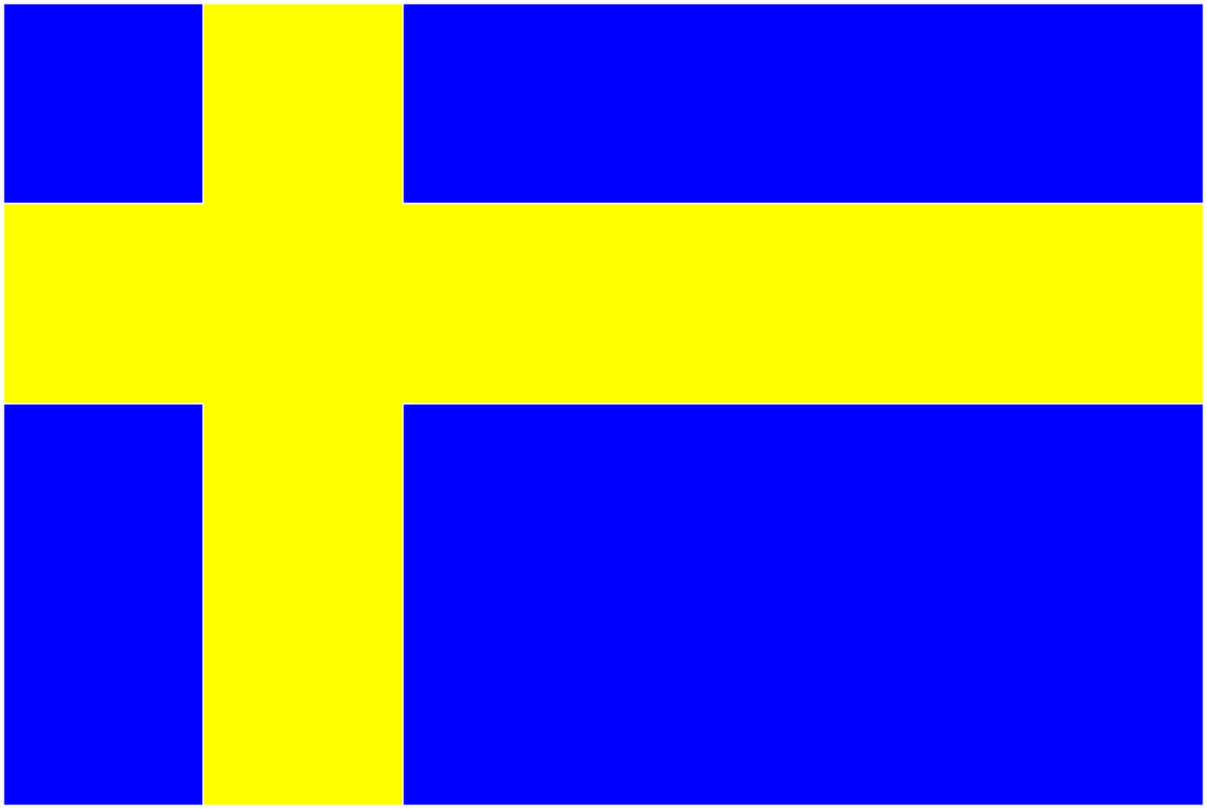
logical

5 G) How many bits (per pixel) is required to store this type of image?

(1024px * 1024px) / 1048576 Bytes = 1 Byte / px = 8 bits per pixel

6. RGB-images and indexing

6 A) Image of Swedish flag:



Save the document as .pdf before submitting!