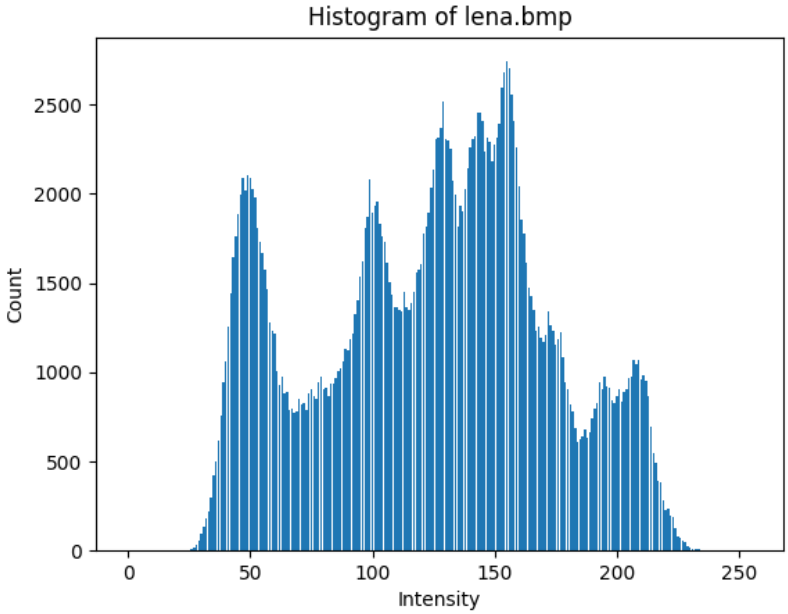
Homework 1

B07902068 陳柏豪

(a)

Binarization is done by looping through each pixels, and assign its value to (0, 0, 0) or (255, 255, 255) according to the threshold 128.

(b)



Histogram is calculated by looping through each pixels, and increase the count of the intensity by 1. The picture is drawn by `matplot.pyplot.bar()`.

(c)

Connected components are found by the classical algorithm introduced in the lecture.

I used a structure of disjoint sets to record the properties of a component found in the first top-down process. A set represents a component, and its label is the label of the root. The properties recorded are area, coordinates for drawing bounding box, sum of rows, and sum of columns.

For a new point, if there is no labeled neighbor, then it creates a new component, otherwise, it is added to the neighbor's component. If it belongs to two components, then connect the two components by connecting the root of the sets they belong to. Finally, merge properties of each set to its root, then properties of the root is that of the corresponding components.