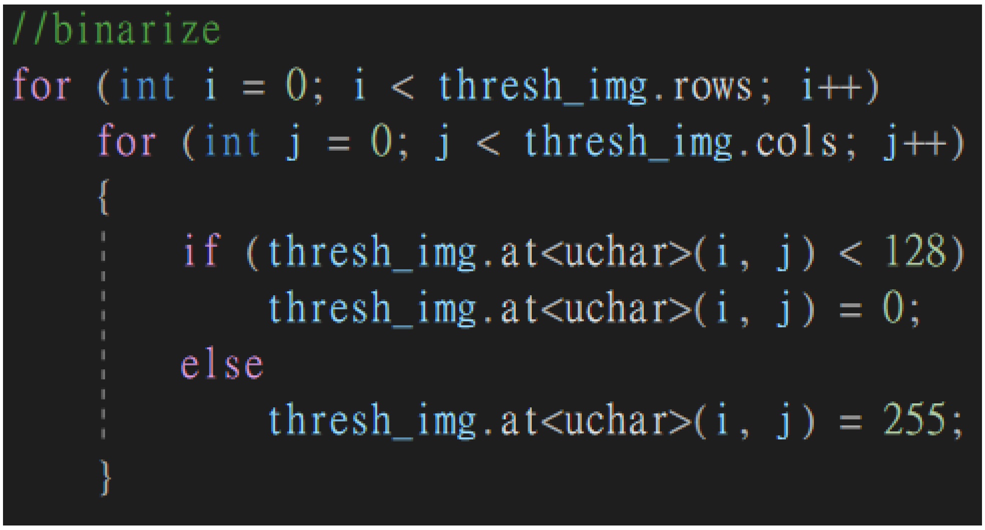
電腦視覺課程 **HW2 姓名:**陳嘉政 **學號:r10922171**

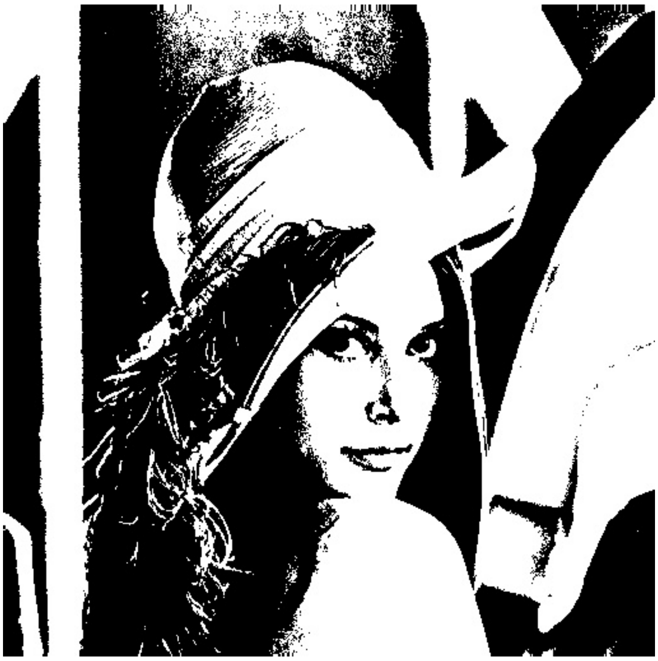
1. **binary image**

(1)程式碼**:**



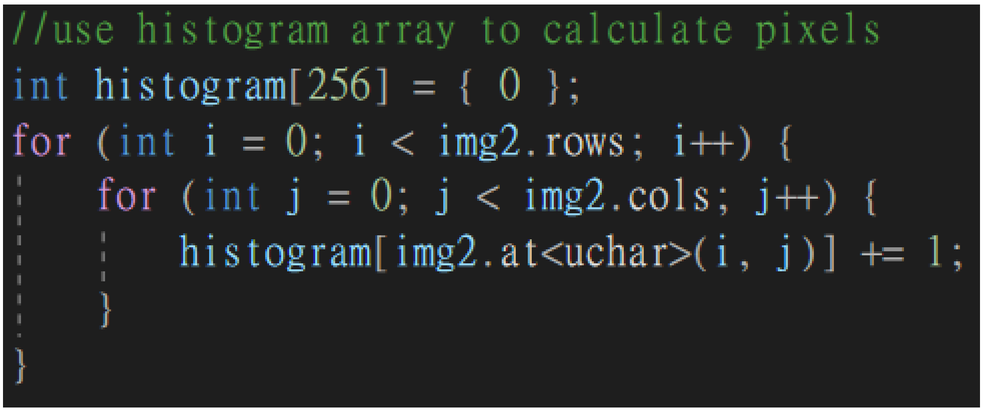
```
//binarize
for (int i = 0; i < thresh_img.rows; i++)
    for (int j = 0; j < thresh_img.cols; j++)
    {
        if (thresh_img.at<uchar>(i, j) < 128)
            thresh_img.at<uchar>(i, j) = 0;
        else
            thresh_img.at<uchar>(i, j) = 255;
    }
```

(2)結果

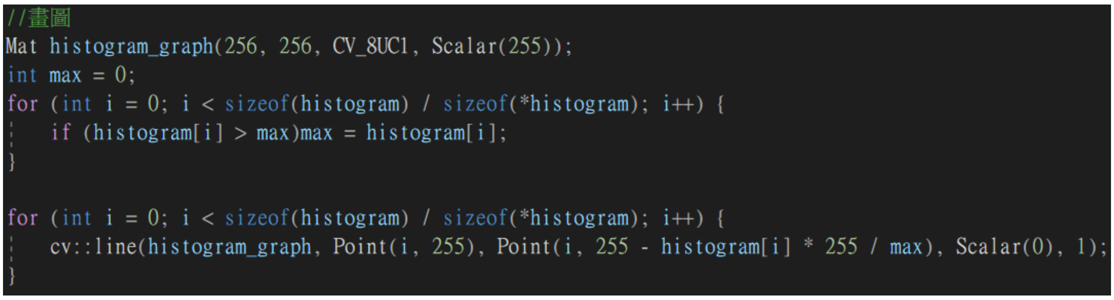


2. **histogram**

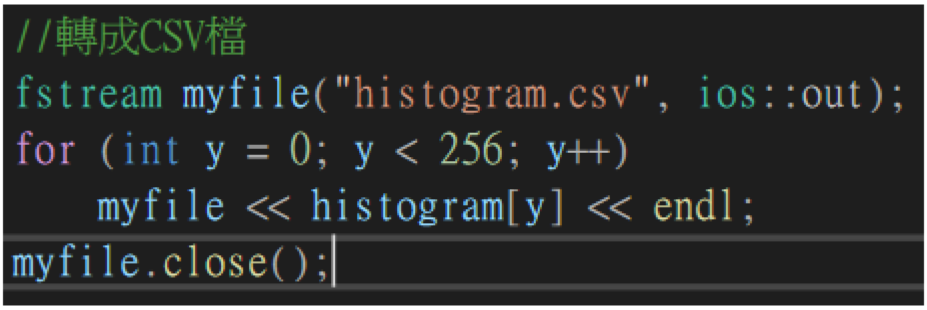
(1)程式碼**:**



```
//use histogram array to calculate pixels
int histogram[256] = { 0 };
for (int i = 0; i < img2.rows; i++) {
    for (int j = 0; j < img2.cols; j++) {
        histogram[img2.at<uchar>(i, j)] += 1;
    }
}
```



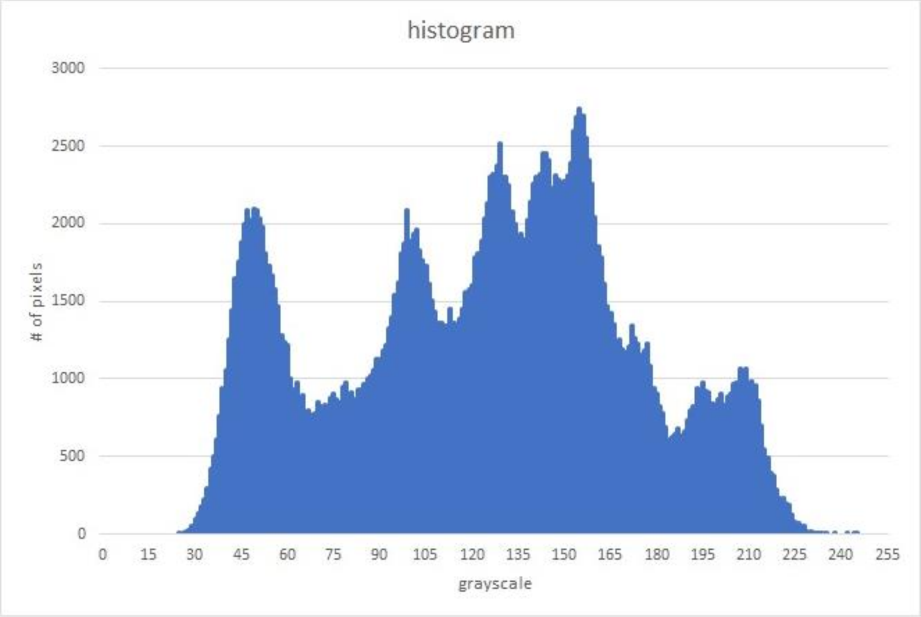
```
//畫圖
Mat histogram_graph(256, 256, CV_8UC1, Scalar(255));
int max = 0;
for (int i = 0; i < sizeof(histogram) / sizeof(*histogram); i++) {
    if (histogram[i] > max)max = histogram[i];
}

for (int i = 0; i < sizeof(histogram) / sizeof(*histogram); i++) {
    cv::line(histogram_graph, Point(i, 255), Point(i, 255 - histogram[i] * 255 / max), Scalar(0), 1);
}
```



```
//轉成CSV檔
fstream myfile("histogram.csv", ios::out);
for (int y = 0; y < 256; y++)
    myfile << histogram[y] << endl;
myfile.close();
```

之後以 **CSV** 檔輸出到 **excel** 後，利用內建圖表來製作直方圖

(2)結果



3. **connected components**

(1) 步驟:因程式片段太大，所以用文字說明。主要利用 **iteration** 演算法，每個 **iteration** 分別做一次 **top-down**，一次 **bottom-up labeling**。判斷方向為四連通來分組，之後再畫圖。

(2) 結果