# Machine Vision

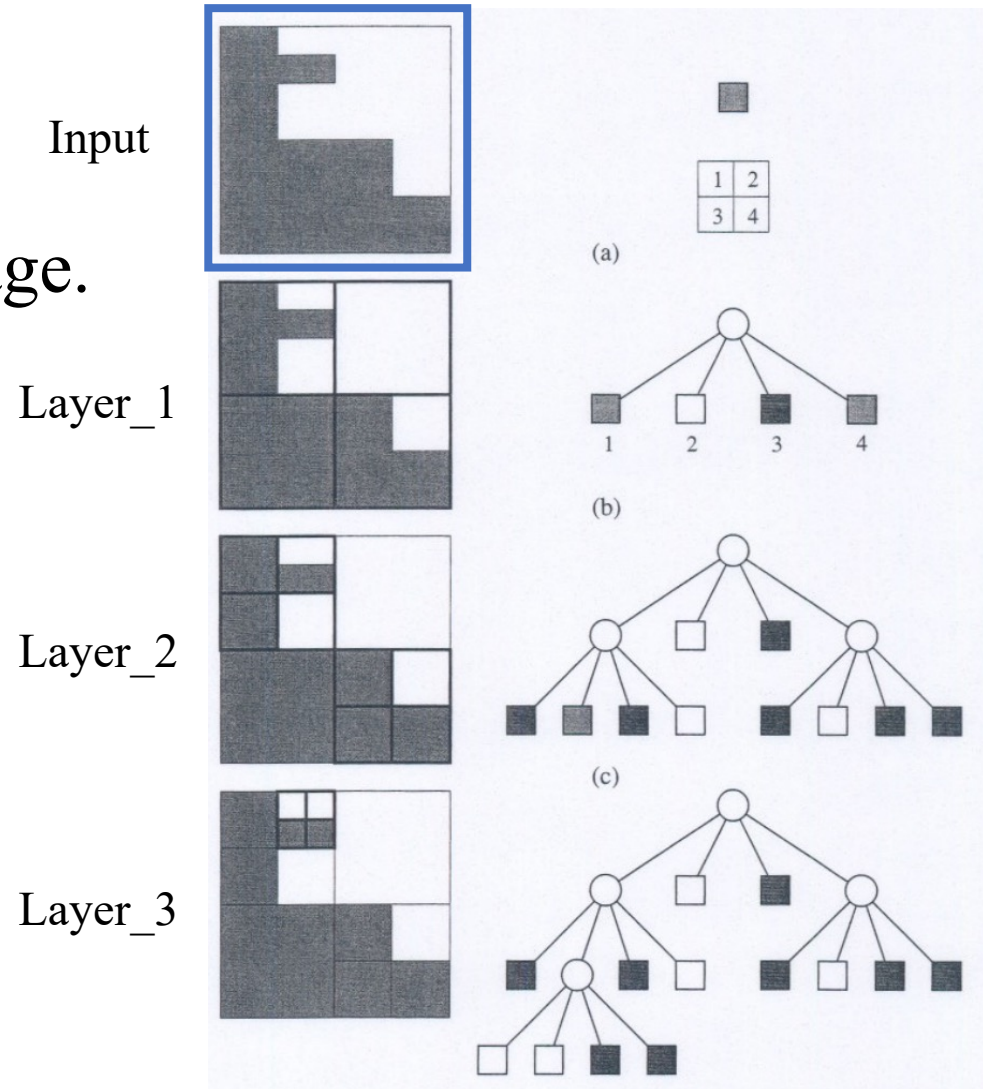## HW#3
Deadline: 2023/04/27 23:59

RVL Room 1421

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# HW#3

1. Quadtree Image Representation

   • Convert the color image to a binary image.

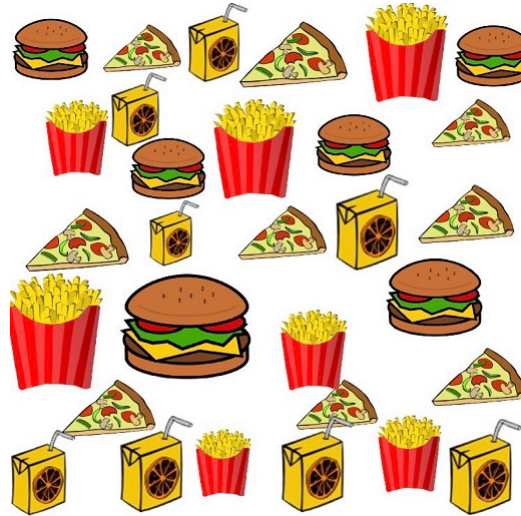   • Splitting image using Quadtree.

   • Output images each layer.

# HW#3

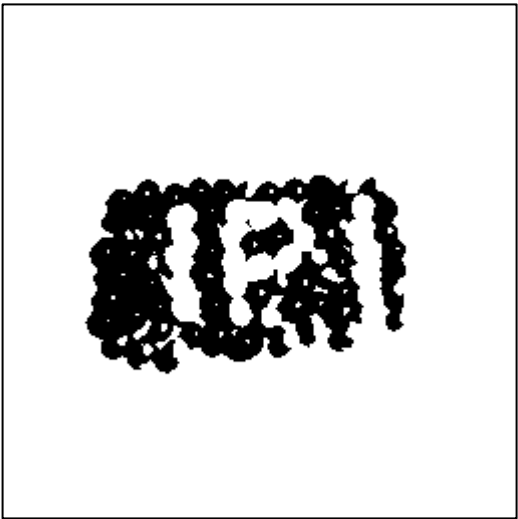- [Download images](#)
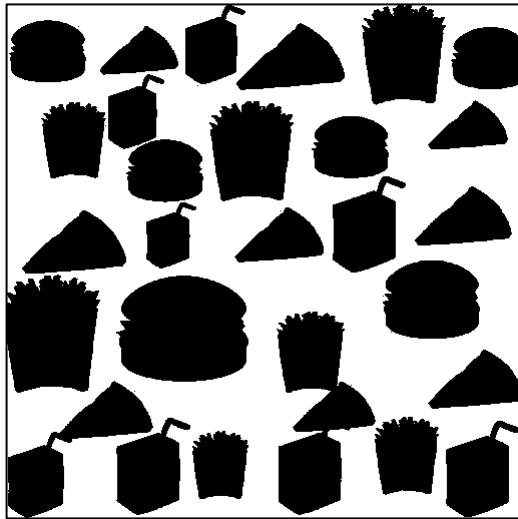
| 1.png | 2.png | 3.png | 4.png |

# HW#3

- Convert the color image to a binary image.
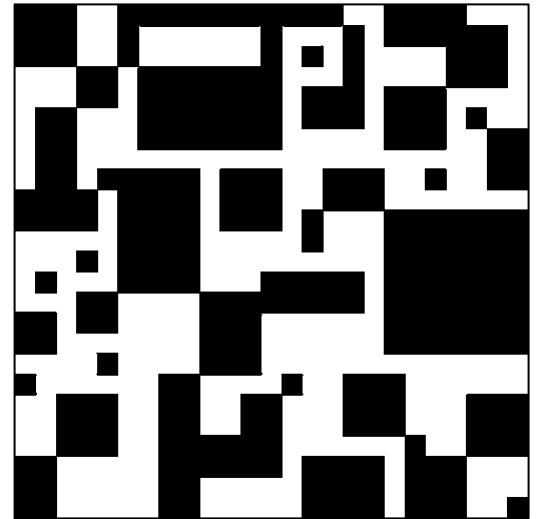
Threshold = 135
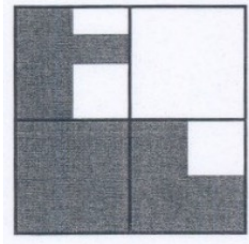
Threshold = 245

Threshold = 155

Threshold = 254

# HW#3

- Splitting image using Quadtree
  - All pixels in subregion are 0 or 255, subregion is 0 and 255.
  - Else subregion is 128.



| Layer_1 | Layer_2 | Layer_3 | Layer_4 | Layer_5 | Layer_6 | Layer_7 | Layer_8 |
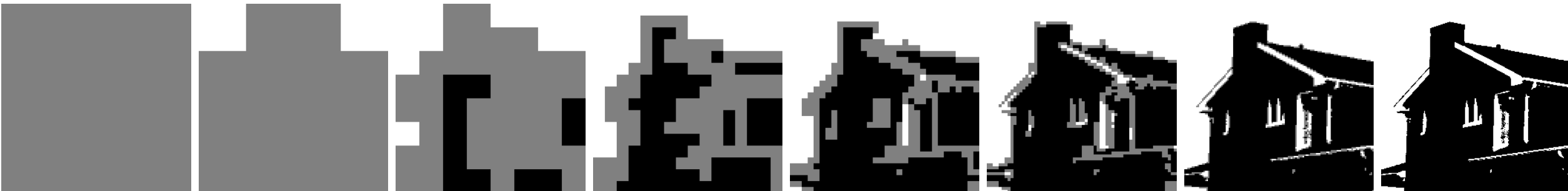
# HW#3

- **Use [OpenCV-2.x](#) version**
- Allow use OpenCV for C/C++
  - Read, load, save, show: cvLoadImage, cvShowImage …
  - Define size of image: cvSize, cvGetSize
  - Define image: IplImage or Mat
- Not Allow use
  - Cannot use the function of OpenCV Lib to do the main part of homework.
  - Example:
    - cvtColor(image, gray, CV_RGB2GRAY);    // convert RGB to Gray

# HW#3

- Require for program
  - GUI to read, display input and result images is encouraged (but not required).
  - **Use C/C++**
  - Write homework on the one program (using class or subprogram).

# HW#3

- Grade
  - Program (80%)
  - Report (20%)

# HW#3

- Report needs:
    1. Student ID、Name
    2. Describe the main part of your method
    3. Result images (34 pics)
        - 1.png 8 images
        - 2.png 9 images
        - 3.png 8 images
        - 4.png 9 images

## 1-1 Image Quantization (binary, gray, index-color)

getGrayScaleImage(原圖) 是一個對圖像灰階化的函式，對原圖做像素遍歷取得每個像素點的 RGB 值，經由公式 Gray = (0.3 * R) + (0.59 * G) + (0.11 * B) 得出灰階化的值並存入輸出圖像。

```cpp
Mat getGrayScaleImage(const Mat& image) {
    Mat grayImage = Mat(image.rows, image.cols, CV_8UC1);
    const uchar* imagePtr;
    uchar* gray;
    for (int row = 0; row < image.rows; row++) {
        imagePtr = image.ptr<uchar>(row);
        gray = grayImage.ptr<uchar>(row);
        for (int col = 0; col < image.cols; col++) {
            uchar blue = *imagePtr++, green = *imagePtr++, red = *imagePtr++;
            *gray++ = (0.3 * red) + (0.59 * green) + (0.11 * blue);
        }
    }
    return grayImage;
}
```
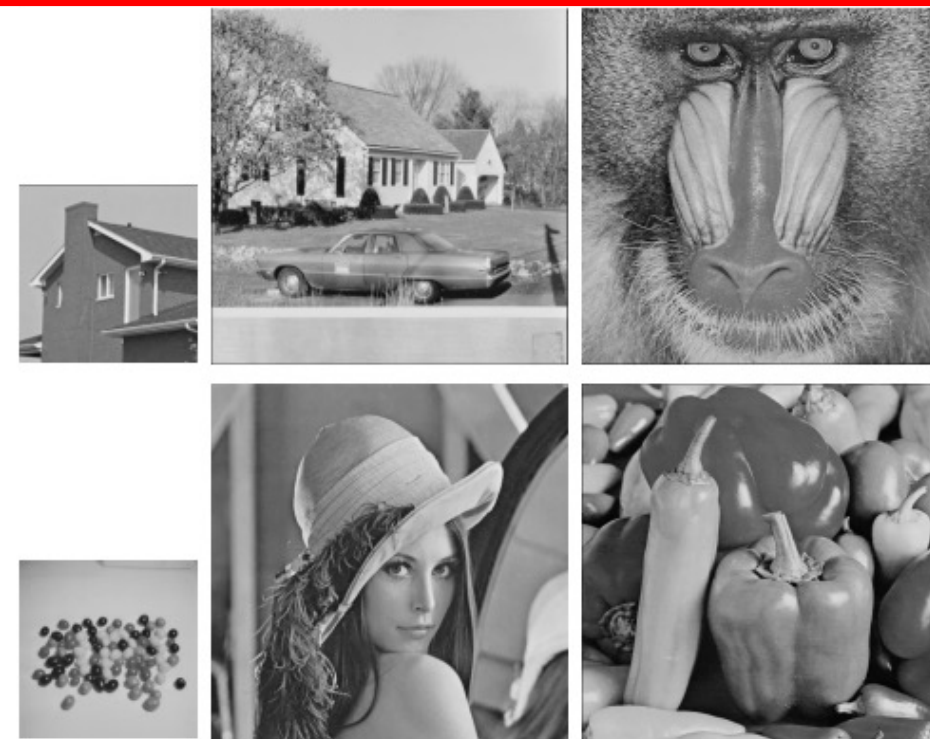
# HW#3

- Submit **studentID_hw3.zip** include:
  - The program source code and result images
  - The report (.pdf)
  - Mail to TAs
- **Deadline: 2023/04/27 23:59**
  - For each hour late, 10% of the total possible points will be deducted.
  - Don't share your code with other students.