HW6 Report

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Introduction

This program computes the Yokoi connectivity number (4-connected) of an binary image. The overall process includes the following steps:

Preprocess. Down-sample the source image using 8x8 block size with the topmost-left pixel's value, and then binarize it with threshold=128.

Main process. Compute the Yokoi connectivity number of the binary image.

Usage

Place the source image and main.py under the same directory. Run the following command in the terminal.

```
python3 main.py -s <source>
```

Parameters

`-s <source>` : the file path of source image, default = `lena.bmp`

Yokoi Connectivity Number

For each white pixel in the binary image, compute the *f formula*:

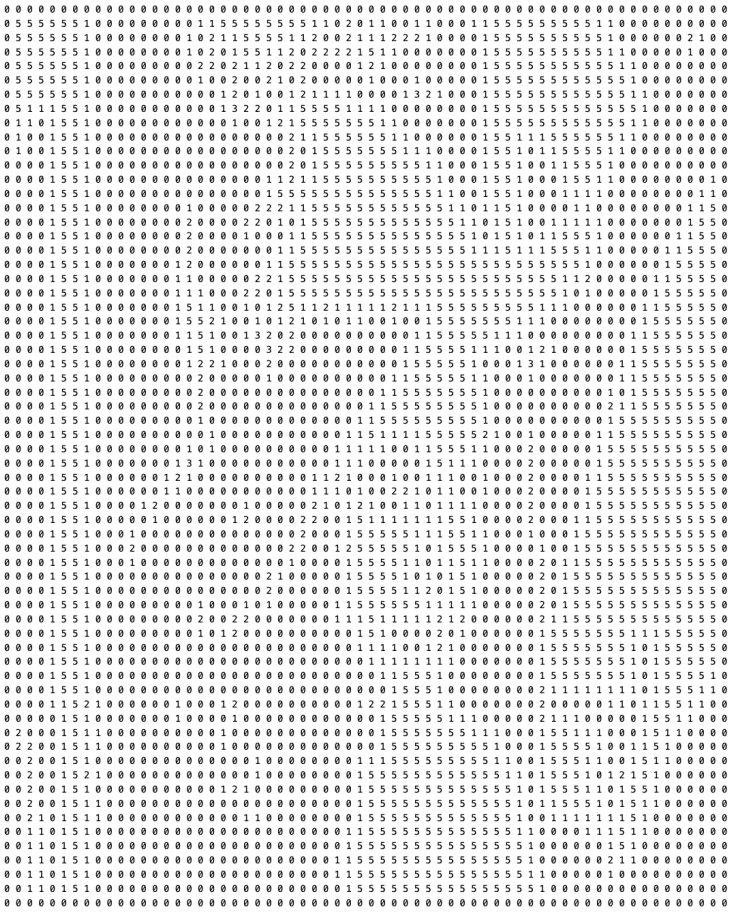
$$f(a_1, a_2, a_3, a_4) = \begin{cases} 5, & if\ a_1 = a_2 = a_3 = a_4 = r \\ n, & where\ n = \#\{a_k | a_k = q\}, otherwise \end{cases}$$

where a_1, a_2, a_3, a_4 are the result of the *h formula* 4 corner neighborhood of the input pixel. The *h formula* is given as the following:

$$h(b, c, d, e) = \begin{cases} s, & if\ b \neq c \\ r, & if\ b = c = d = e \\ q, & otherwise \end{cases}$$

The result is saved as `yokoi.txt` as shown in the next page.

Screenshot of `yokoi.txt`



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