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

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*:

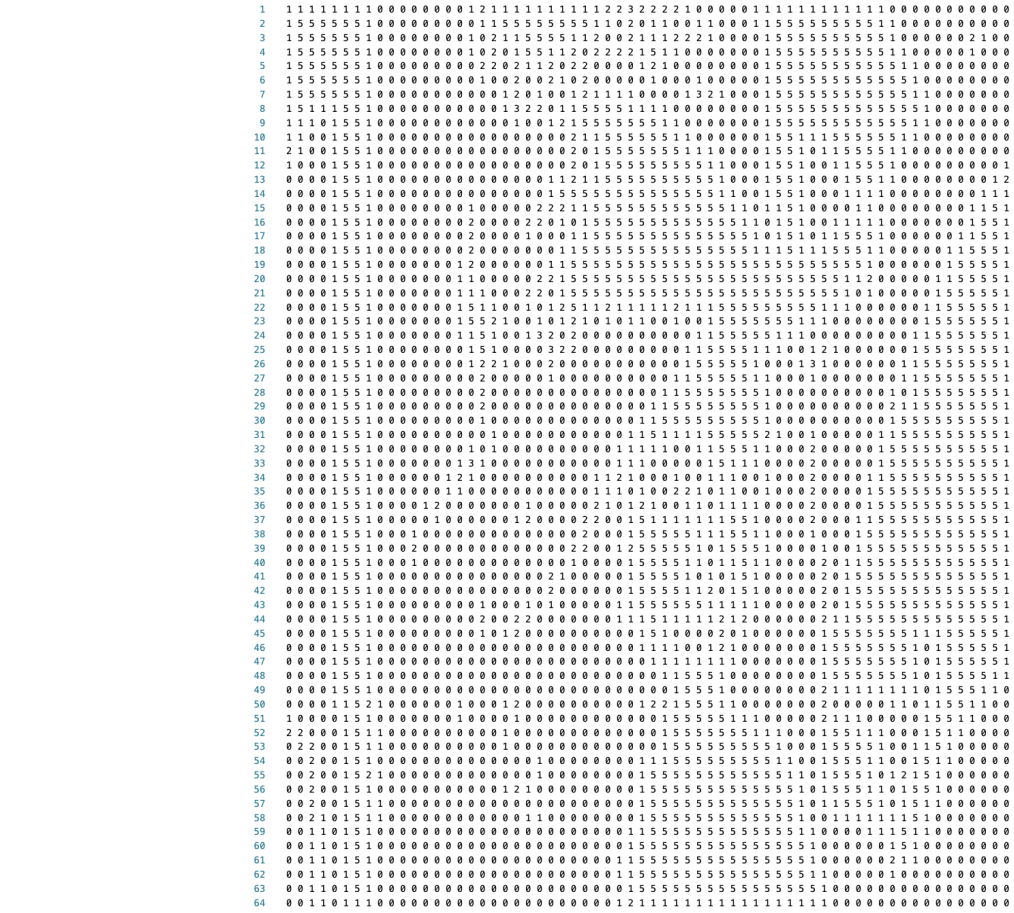
$$f(a_1, a_2, a_3, a_4) = \begin{cases} 5, & if\ a_1 = a_2 = a_3 = a_4 = r \\ n, & where\ n = \#\{a_k | a_k = q\}, otherwise \end{cases}$$

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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