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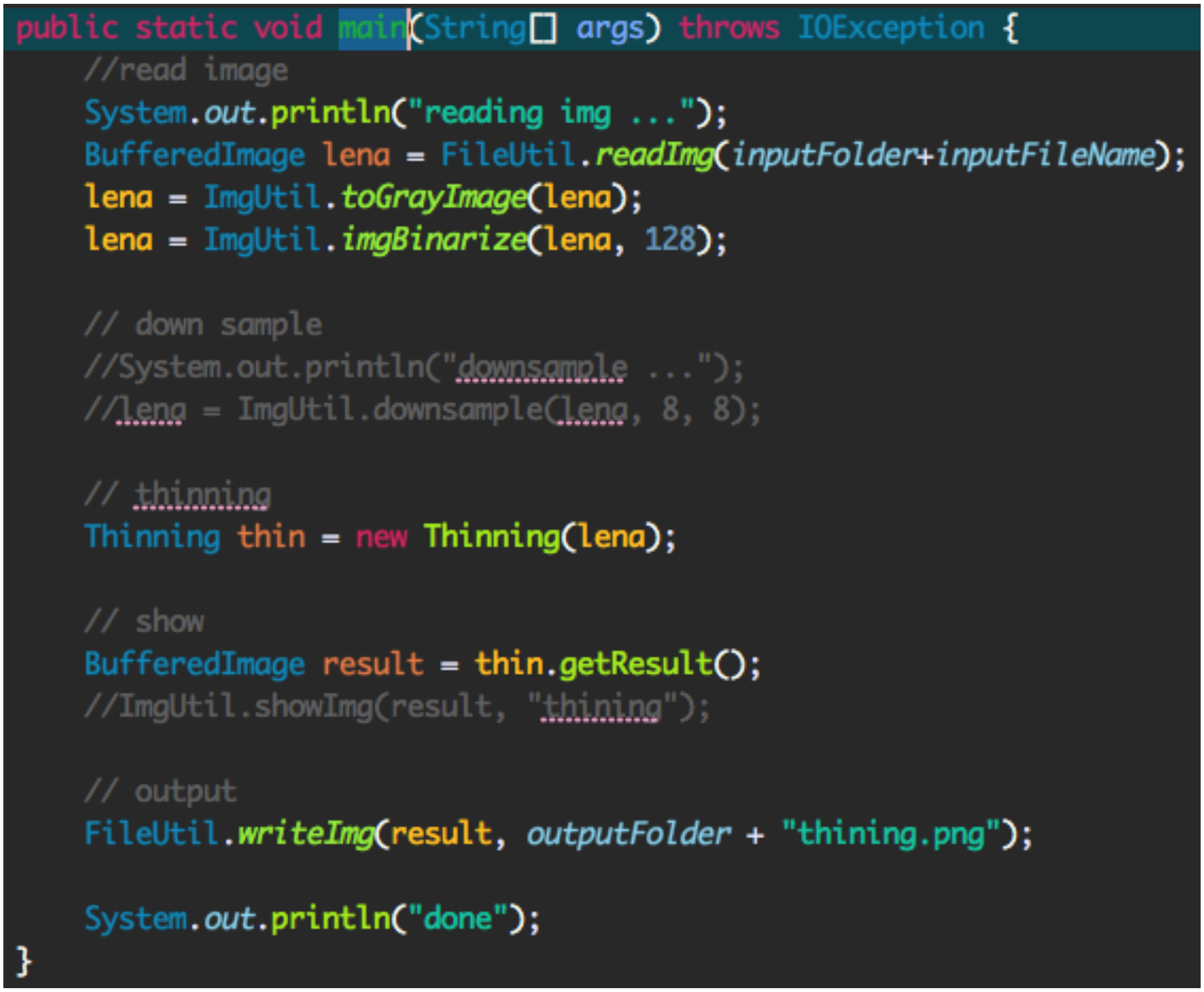
Computer Vision Hw7 Report

- Discription
    - Thinning
- Algorithm
    - Original 512x512 image
    - Thinning algorithm in ppt
- Parameters (if any)
    - no

- Principal Code Fragment

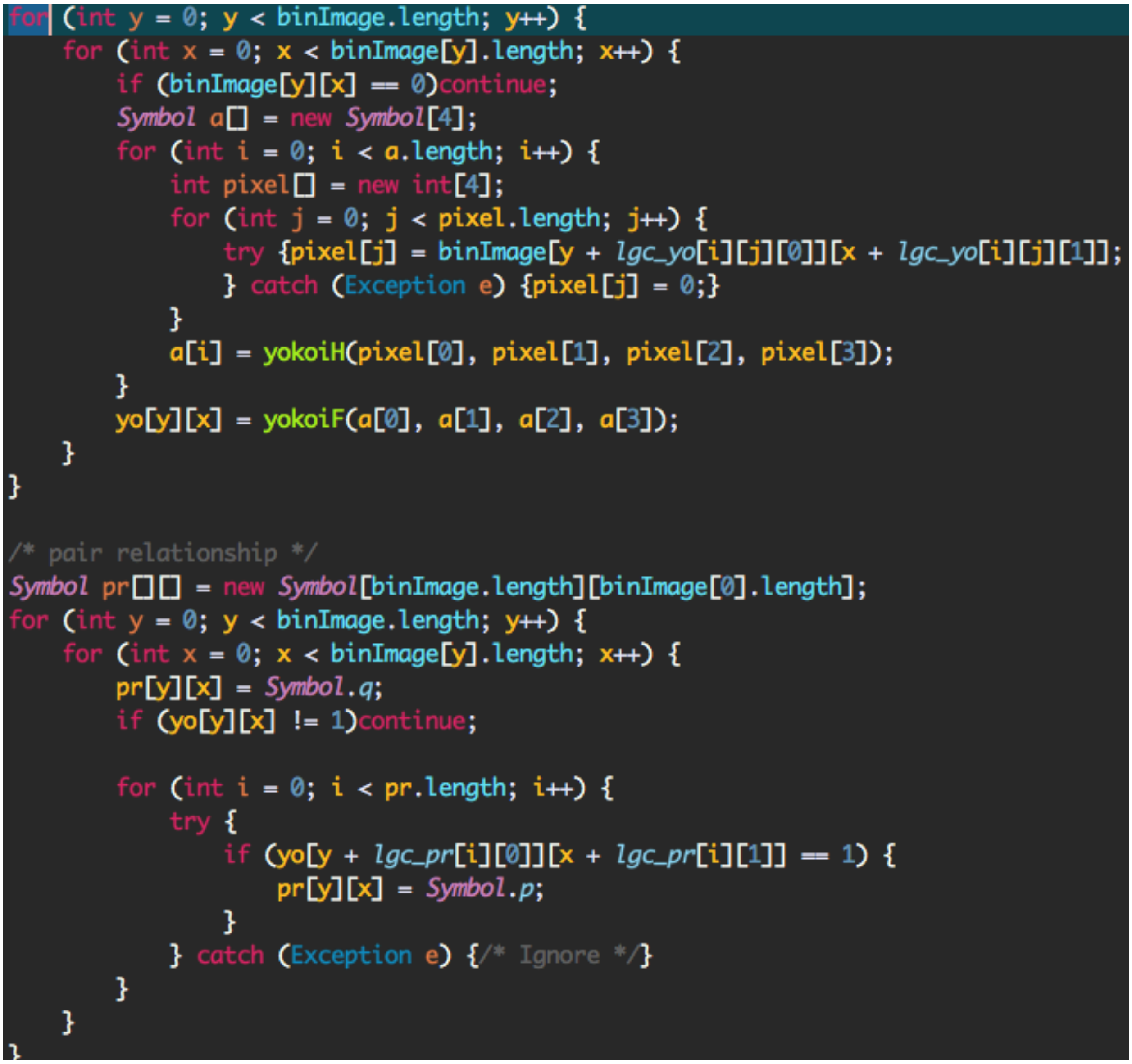
  Main (file – /src/hw7/ DemoThinning.java)



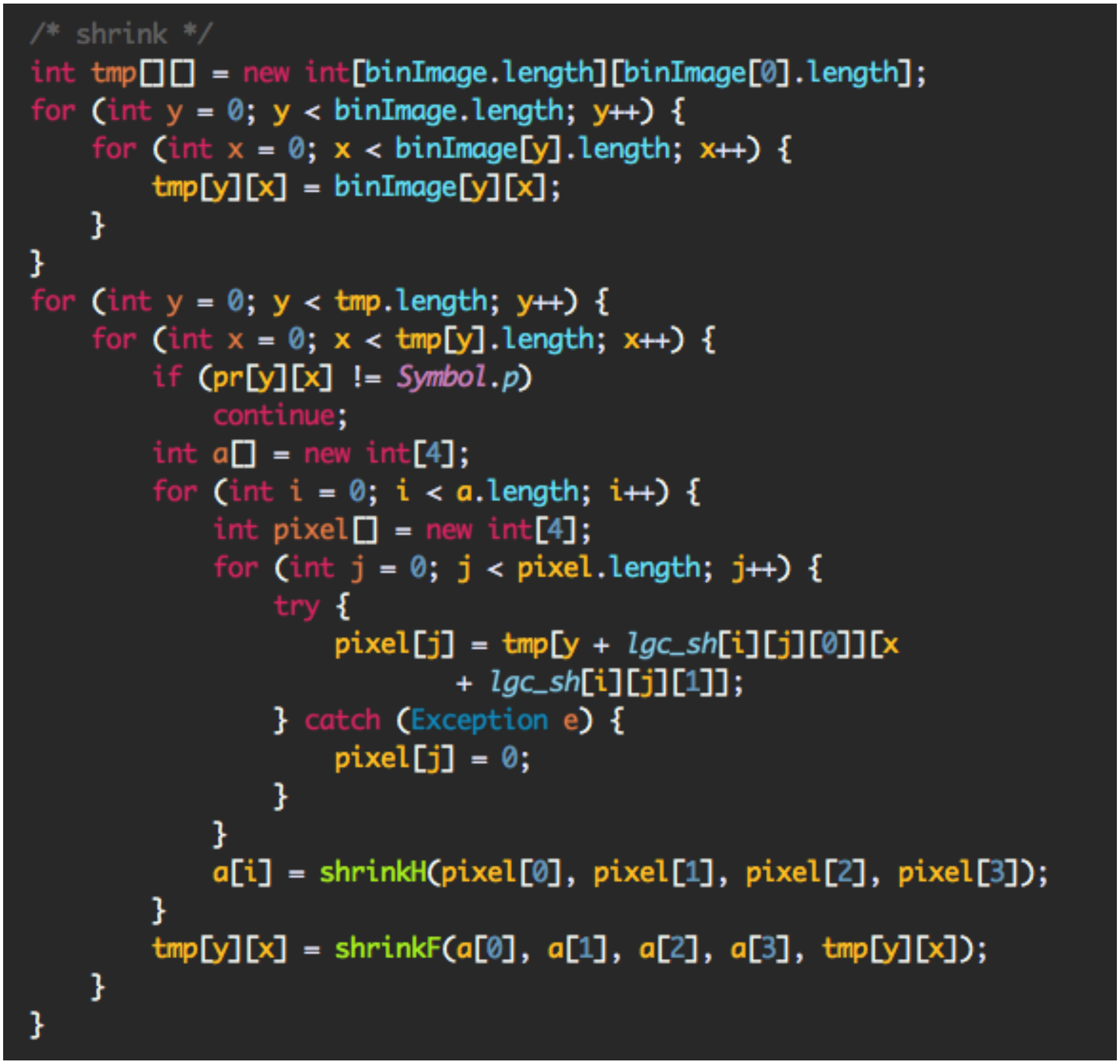
```
public static void main(String[] args) throws IOException {
    //read image
    System.out.println("reading img ...");
    BufferedImage lena = FileUtil.readImg(inputFolder+inputFileName);
    lena = ImgUtil.toGrayImage(lena);
    lena = ImgUtil.imgBinarize(lena, 128);

    // down sample
    //System.out.println("downsample ...");
    //lena = ImgUtil.downsample(lena, 8, 8);

    // thinning
    Thinning thin = new Thinning(lena);

    // show
    BufferedImage result = thin.getResult();
    //ImgUtil.showImg(result, "thining");

    // output
    FileUtil.writeImg(result, outputFolder + "thining.png");

    System.out.println("done");
}
```

Thinning

(file – /src/cv1.util.cv /Thinning.java)



```
for (int y = 0; y < binImage.length; y++) {
    for (int x = 0; x < binImage[y].length; x++) {
        if (binImage[y][x] == 0)continue;
        Symbol a[] = new Symbol[4];
        for (int i = 0; i < a.length; i++) {
            int pixel[] = new int[4];
            for (int j = 0; j < pixel.length; j++) {
                try {pixel[j] = binImage[y + lgc_yo[i][j][0]][x + lgc_yo[i][j][1]];
                } catch (Exception e) {pixel[j] = 0;}
            }
            a[i] = yokoiH(pixel[0], pixel[1], pixel[2], pixel[3]);
        }
        yo[y][x] = yokoiF(a[0], a[1], a[2], a[3]);
    }
}

/* pair relationship */
Symbol pr[][] = new Symbol[binImage.length][binImage[0].length];
for (int y = 0; y < binImage.length; y++) {
    for (int x = 0; x < binImage[y].length; x++) {
        pr[y][x] = Symbol.q;
        if (yo[y][x] != 1)continue;

        for (int i = 0; i < pr.length; i++) {
            try {
                if (yo[y + lgc_pr[i][0]][x + lgc_pr[i][1]] == 1) {
                    pr[y][x] = Symbol.p;
                }
            } catch (Exception e) {/* Ignore */}
        }
    }
}
```



```
/* shrink */
int tmp[][] = new int[binImage.length][binImage[0].length];
for (int y = 0; y < binImage.length; y++) {
    for (int x = 0; x < binImage[y].length; x++) {
        tmp[y][x] = binImage[y][x];
    }
}
for (int y = 0; y < tmp.length; y++) {
    for (int x = 0; x < tmp[y].length; x++) {
        if (pr[y][x] != Symbol.p)
            continue;
        int a[] = new int[4];
        for (int i = 0; i < a.length; i++) {
            int pixel[] = new int[4];
            for (int j = 0; j < pixel.length; j++) {
                try {
                    pixel[j] = tmp[y + lgc_sh[i][j][0]][x
                            + lgc_sh[i][j][1]];
                } catch (Exception e) {
                    pixel[j] = 0;
                }
            }
            a[i] = shrinkH(pixel[0], pixel[1], pixel[2], pixel[3]);
        }
        tmp[y][x] = shrinkF(a[0], a[1], a[2], a[3], tmp[y][x]);
    }
}
```

- Result Image