

1. 00011000  
 01111110  
 11111111  
 01111111  
 11111111  
 01111110

2. 00000000  
 00000000  
 00011000  
 00010000  
 00000000  
 00000000

3. 110000  
 110000  
 110000  
 100000  
 000011  
 000010

4 open

00000000  
 00100000  
 01110001  
 01110011  
 00100101  
 00001110  
 00000100

close

00111100  
 01111110  
 11111111  
 11111111  
 11111111  
 00011111  
 00001110  
 00000100

## 과제5

Visual Studio 2019 IDE showing the code for 7주차\_12\_과제5.cpp. The code performs image processing on a coin image using OpenCV.

```

1 #include <opencv2/opencv.hpp>
2 using namespace cv;
3
4 int main()
5 {
6     Mat image = imread("C:/Users/Chan's Victus/Documents/class/Project/image/coin.jpg");
7     if (image.empty())
8     {
9         std::cerr << "Image not found!" << std::endl;
10        return -1;
11    }
12    //1) 명암도 영상 변환(color -> grayscale)
13    Mat gray_image;
14    cvtColor(image, gray_image, COLOR_BGR2GRAY);
15
16    //2) 블러링
17    Mat blurred_image;
18    GaussianBlur(gray_image, blurred_image, Size(9, 9), 0);
19
20    //3) 이진화
21    Mat binary_image;
22    threshold(blurred_image, binary_image, 0, 255, THRESH_OTSU);
23
24    //4) 모폴로지 연산
25    Mat morph_image;
26    Mat kernel = getStructuringElement(MORPH_RECT, Size(3, 3));
27    morphologyEx(binary_image, morph_image, MORPH_OPEN, kernel);
28    morphologyEx(morph_image, morph_image, MORPH_CLOSE, kernel);
29
30    imshow("Origin Image", image);
31    imshow("After Image", morph_image);
32    waitKey(0);
33    return 0;
34 }

```

The output window shows the build process:

```

>1 of 86 functions ( 1.2%) were compiled, the rest were copied from previous compilation
> 0 functions were new in current compilation
> 0 functions had inline decision re-evaluated but remain unchanged
>코드를 생성했습니다.
>Project.vcxproj -> C:\Users\Chan's Victus\Documents\class\Project\x64\Release\Project
>"Project.vcxproj" 프로젝트를 빌드했습니다.
===== 빌드: 1개 성공, 0개 실패, 0개 최신 상태, 0개 건너뛴 =====
===== 빌드이(가) 오후 10:53에 시작되었고 01.655 초이(가) 소요됨 =====

```

