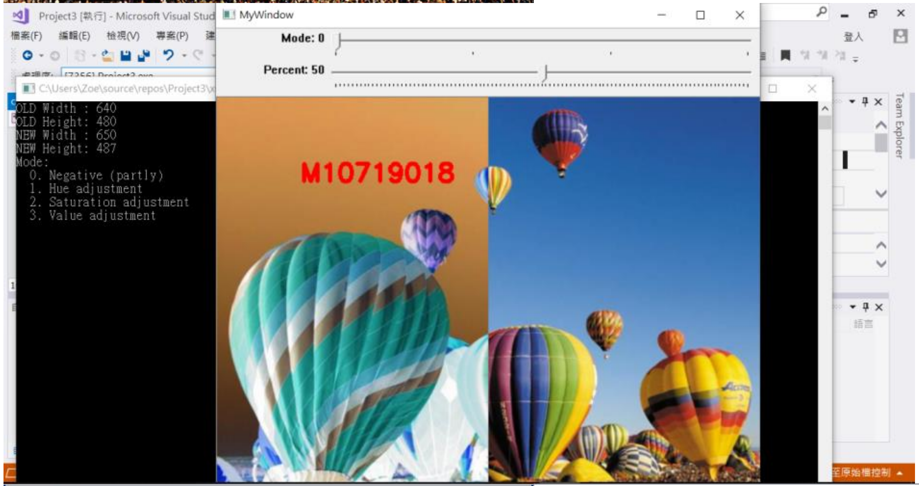
1.Code 部分

```
#include <iostream>
#include "opencv2/imgproc/imgproc.hpp" //openCV image processing library
#include "opencv2/highgui/highgui.hpp"  //openCV high gui libruary

using namespace std; //C++ 命名空間
using namespace cv;  //openCV 命名空間

// 全域變數
int slider_mode = 0; // 模式切換滑桿初始值 = 0
int slider_value = 50; // 數值調整滑桿初始值 = 50
int const max_value = 100; // 數值調整滑桿最大值 = 100

Mat img1, img2, img3;

/*滑桿回呼函式原型  宣告*/
void SliderCallback(int, void*);

//主程式
int main(int argc, char** argv)
{
	// 讀取原始影像 (用 imread)
	img1 = imread("C:/Users/Zoe/Desktop/gui/2.jpg");
	//印出原影像尺寸
	cout << "OLD Width : " << img1.cols << endl;
	cout << "OLD Height: " << img1.rows << endl;
	double e = 650.00*img1.rows / img1.cols;
	//將新影像寬設為 650，長寬比不變  (用 resize)
	resize(img1, img1, Size(650, e), 0, 0);

	// 印出新影像寬度
	cout << "NEW Width : " << img1.cols << endl;
	cout << "NEW Height: " << img1.rows << endl;

	// 印出滑桿1的四種影像調整模式
	cout << "Mode:" << endl;
	cout << "  0. Negative (partly)" << endl;
	cout << "  1. Hue adjustment" << endl;
	cout << "  2. Saturation adjustment" << endl;
	cout << "  3. Value adjustment"  << endl;


	// 測試影像是否存在，如不不存在，印出 Image not found!
	if(img1.empty())
	{
		cout << "Image not found!"<< endl;
	}

	// 建立視窗 (用 namedWindow)
	namedWindow("MyWindow");
```

```
    // 建立模式切換(slider_mode)滑桿 (用 createTrackbar)
    createTrackbar("Mode", "MyWindow", &slider_mode, 3, SliderCallback);

    // 建立數值調整(slider_value)滑桿 (用 createTrackbar)
    createTrackbar("Percent", "MyWindow", &slider_value, max_value, SliderCallback);

    // 滑桿初始化
    SliderCallback(0, 0);

    // 等候, 按 'ESC' 離開
        while (waitKey()==27)
        {
            break;
        }

    return 0;
}

/*滑桿回呼函式 定義*/
void SliderCallback(int, void*)
{
    //用 switch 選擇 slider_mode
    switch (slider_mode)
    {
    case 0: //局部反白
    {
        img2 = img1.clone();
        //產生反白影像 (用 bitwise not)
        bitwise_not(img2, img3);
        //計算影像水平方向上的分割位置 x
        double x = img2.cols / 100.00 * getTrackbarPos("Percent", "MyWindow");
        //以 Rect 建立 roi
        Mat img3ROI = img3(Rect(0, 0, x, img3.rows));
        Mat img2ROI = img2(Rect(0, 0, img3ROI.cols , img3ROI.rows));
        //將新影像的 roi 貼入反白影像的 roi 區域
        addWeighted(img2ROI, 0, img3ROI, 1, 0, img2ROI);

        break;

    }

    case 1: //色相(H)平移
    {
        img2 = img1.clone();
        //BGR至HSV色空間轉換
        cvtColor(img2, img2, COLOR_BGR2HSV);
        //將三通道hsv轉換成一通道的影像陣列  (用 split)
        vector<Mat> hsv_plan;
        split(img2, hsv_plan);
        //對影像陣列[0] 做 convertScaleAbs, alpha = 1, beta = slider_value - 50
        convertScaleAbs(hsv_plan[0], hsv_plan[0], 1, slider_value - 50);
        //將一通道的影像陣列轉換成三通道hsv  (用 merge)
        merge(hsv_plan, img2);
        //HSV至BGR色空間轉換
        cvtColor(img2, img2, COLOR_HSV2BGR);
        break;

    }

    case 2: //飽和度(S)倍率
    {
        img2 = img1.clone();
        //BGR至HSV色空間轉換
        cvtColor(img2, img2, COLOR_BGR2HSV);
        //將三通道hsv轉換成一通道的影像陣列  (用 split)
        vector<Mat> hsv_plan;
        split(img2, hsv_plan);
        //對影像陣列[1] 做 convertScaleAbs, alpha = slider_value / 50.0, beta = 0
        convertScaleAbs(hsv_plan[1], hsv_plan[1], slider_value / 50.0, 0);
        //將一通道的影像陣列轉換成三通道hsv  (用 merge)
        merge(hsv_plan, img2);
        //HSV至BGR色空間轉換
        cvtColor(img2, img2, COLOR_HSV2BGR);
        break;
    }

    case 3: //明度(V)倍率
    {
        img2 = img1.clone();
        //BGR至HSV色空間轉換
        cvtColor(img2, img2, COLOR_BGR2HSV);
        //將三通道hsv轉換成一通道的影像陣列  (用 split)
        vector<Mat> hsv_plan;
        split(img2, hsv_plan);
        //對影像陣列[2] 做 convertScaleAbs, alpha = slider_value / 50.0, beta = 0
        convertScaleAbs(hsv_plan[2], hsv_plan[2], slider_value / 50.0, 0);
        //將一通道的影像陣列轉換成三通道hsv  (用 merge)
        merge(hsv_plan, img2);
        //HSV至BGR色空間轉換
        cvtColor(img2, img2, COLOR_HSV2BGR);
        break;
    }
    }
    // 上字: 學號 (用 putText)
    putText(img2, string("M10719018"), Point(100, 100), 0, 1, Scalar(0, 0, 255), 3);
    // 在視窗裡顯示結果
    imshow("MyWindow", img2);
}
```

2.Code 結果

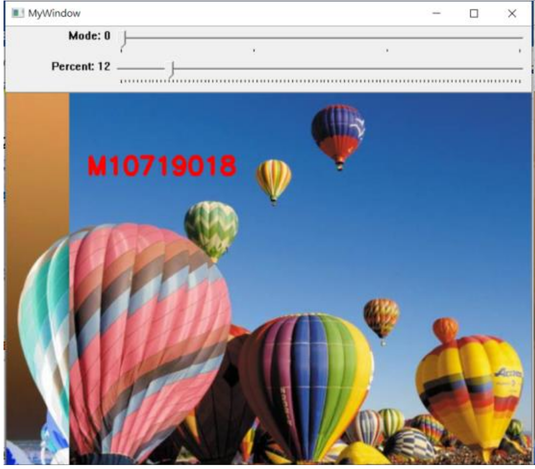


Project3 [執行] - Microsoft Visual Stud
檔案(F) 編輯(E) 檢視(V) 專案(P)
[7356] Project3.exe
C:\Users\Zoe\source\repos\Project3\
MyWindow
登入
Team Explorer
至原始檔控制
M10719018

```
OLD Width : 640
OLD Height: 480
NEW Width : 650
NEW Height: 487
Mode:
  0. Negative (partly)
  1. Hue adjustment
  2. Saturation adjustment
  3. Value adjustment
```

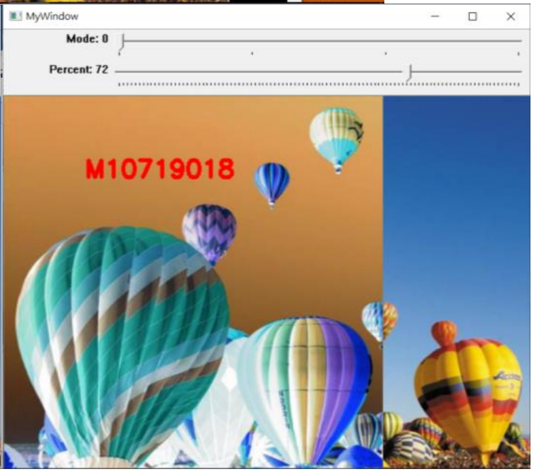
Mode: 0

Percent: 50



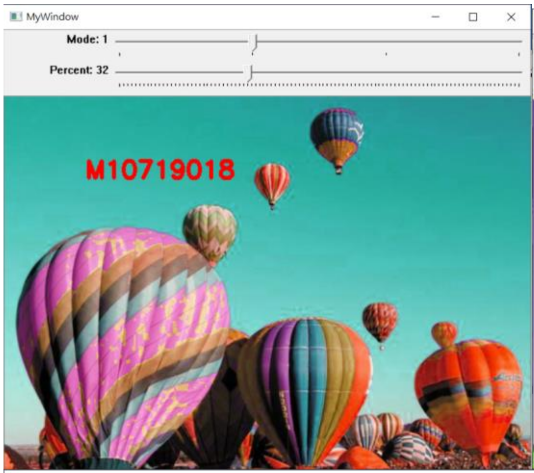
Mode: 0

Percent: 12



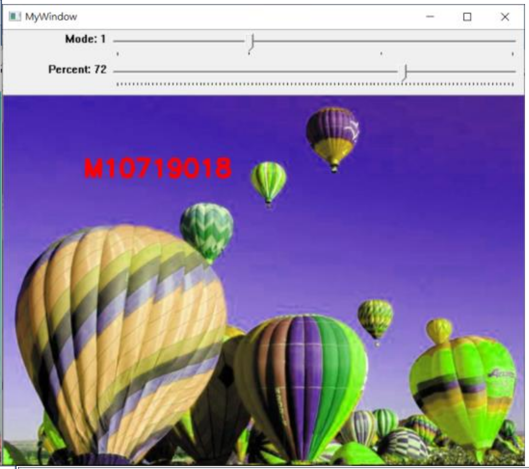
Mode: 0

Percent: 72


MyWindow

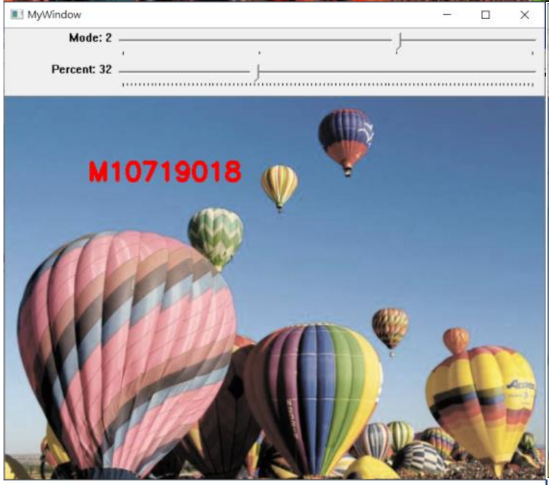
Mode: 1

Percent: 32


MyWindow

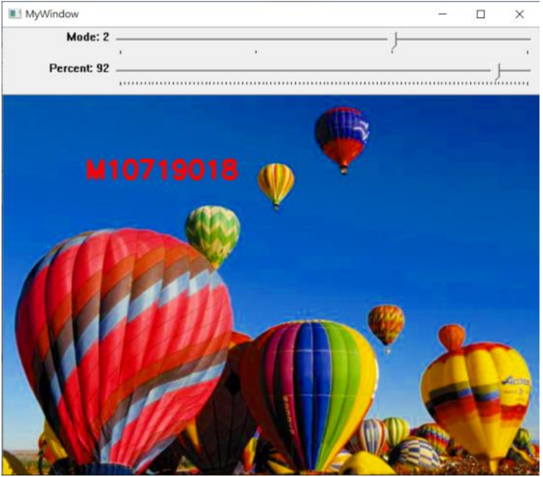
Mode: 1

Percent: 72


MyWindow

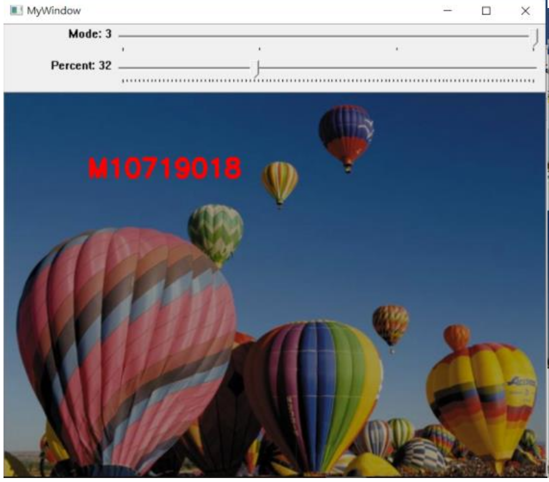
Mode: 2

Percent: 32


MyWindow

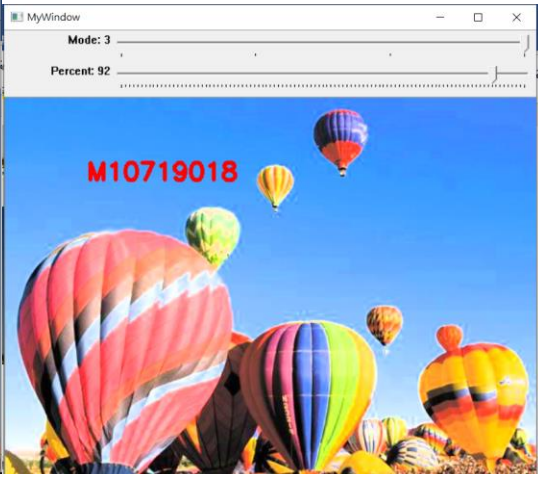
Mode: 2

Percent: 92


MyWindow

Mode: 3

Percent: 32


MyWindow

Mode: 3

Percent: 92