```csharp
1   using System;
2   using System.Collections.Generic;
3   using System.ComponentModel;
4   using System.Data;
5
6   using System.Drawing;
7   using System.Drawing.Imaging;   //需使用
8
9   using System.Linq;
10  using System.Text;
11  using System.Windows.Forms;
12
13  namespace image1
14  {
15      public partial class Form1 : Form
16      {
17          Bitmap bmp;
18
19          public Form1()
20          {
21              InitializeComponent();
22          }
23
24          private void button1_Click(object sender, EventArgs e)
25          {
26              if (openFileDialog1.ShowDialog() == DialogResult.OK)
27              {
28                  pictureBox1.Image = Image.FromFile(openFileDialog1.FileName);
29                  pictureBox2.Image = Image.FromFile(openFileDialog1.FileName);
30                  bmp = (Bitmap)Image.FromFile(openFileDialog1.FileName);
31              }
32          }
33
34          private void button2_Click(object sender, EventArgs e)
35          {
36              int r, g, b,gray;
37              int h, w;
38
39              Bitmap gray1=new Bitmap(bmp.Width,bmp.Height);
40
41              w = bmp.Width;
42              h = bmp.Height;
43
44              for (int i = 0; i < w; i++)
45              {
46                  for (int j = 0; j < h; j++)
47                  {
48                      r = bmp.GetPixel(i, j).R;
49                      g = bmp.GetPixel(i, j).G;
50                      b = bmp.GetPixel(i, j).B;
51                      gray = (byte)(0.299 * r + 0.587 * g + 0.114 * b);
52                      gray1.SetPixel(i, j, Color.FromArgb(gray, gray, gray));
53                  }
```

```
54                    }
55                    pictureBox1.Image = gray1;
56               }
57
58          private void button3_Click(object sender, EventArgs e)
59          {
60               //要使用指標需打開unsafe  (在專案->屬性->建置->容許不安全的程式碼打勾)
61
62               BitmapData bd;
63               IntPtr imgPtr;
64               int w, h;
65               int stride;
66               int widthByte;
67               int skipByte;
68               int[,,] rgbData;
69
70               w = bmp.Width;
71               h = bmp.Height;
72
73
74               bd = bmp.LockBits(new Rectangle(0, 0, w,h), ImageLockMode.ReadOnly,
                        PixelFormat.Format24bppRgb);
75
76               imgPtr = bd.Scan0;
77
78               stride = bd.Stride;
79
80               widthByte = w * 3;
81
82               skipByte = stride - widthByte;
83
84               rgbData = new int[w,h, 3];
85
86               unsafe
87               {
88                    //---------------------------先存入陣列
                          裡-----------------------
89                    byte* p = (byte*)(void*)imgPtr;
90                    for (int j = 0; j < h; j++)
91                    {
92                        for (int i = 0; i < w; i++)
93                        {
94                            rgbData[i, j, 2] = p[0];
95                            p++;
96                            rgbData[i, j, 1] = p[0];
97                            p++;
98                            rgbData[i, j, 0] = p[0];
99                            p++;
100                       }
101                       p += skipByte;
102                   }
103               }
104          unsafe
```

```
105              {
106                  //------------------------進行灰階處              ↵
                      理------------------------
107
108                  byte* p = (byte*)(void*)imgPtr;
109                  for (int j = 0; j < h; j++)
110                  {
111                      for (int i = 0; i < w; i++)
112                      {
113                          double gary = (rgbData[i, j, 0]* 0.299 + rgbData[i, j, 1]* ↵
                          0.587 + rgbData[i, j, 2]* 0.114);
114                          p[0] = (byte)gary;
115                          p++;
116                          p[0] = (byte)gary;
117                          p++;
118                          p[0] = (byte)gary;
119                          p++;
120                      }
121                      p += skipByte;
122                  }
123              }
124          bmp.UnlockBits(bd);
125          Refresh();
126
127          pictureBox2.Image = bmp;
128          }
129      }
130 }
131
```