

報告標題: lab11, 組別: 48, 姓名學號: 曾千芸109504501 賈子悅110502514

- Screenshots of the code:

1.

```
1  INCLUDE Irvine32.inc
2
3  BoxWidth =3
4  BoxHeight=1
5  .data
6      boxTop    BYTE 0DAh, (BoxWidth - 2) DUP(0C4h),0BFh
7      boxBody   BYTE 0B3h, (BoxWidth - 2) DUP(' '), 0B3h
8      boxBottom BYTE 0C0h, (BoxWidth - 2) DUP(0C4h),0D9h
9      outputHandle DWORD 0
10     bytesWritten DWORD 0
11     count DWORD 0
12     xyPosition COORD <10,5>
13     cellsWritten DWORD ?
14     attributes0 WORD BoxWidth DUP(0Ch)
15     attributes1 WORD (BoxWidth-1) DUP(0Eh),0Ah
16     attributes2 WORD BoxWidth DUP(0Bh)
```

boxTop, boxBody, and boxBottom define the character, because the edge (┌┐└┘), boxWidth should minus 2 for the (—) and (' '). attributes0, attributes1, and attributes2 define the color.

2.

```
17  .code
18  main PROC
19
20      INVOKE GetStdHandle, STD_OUTPUT_HANDLE ; Get the console output handle
21      mov outputHandle, eax ; save console handle
22      call Clrscr ; 畫出box的第一行
23
24      INVOKE WriteConsoleOutputAttribute,
25      outputHandle, ; output handle
26      ADDR attributes0, ; write attributes
27      BoxWidth, ; number of cells
28      xyPosition, ; first cell coordinates
29      ADDR cellsWritten
30
31      INVOKE WriteConsoleOutputCharacter,
32      outputHandle, ; console output handle
33      ADDR boxTop, ; pointer to buffer
34      BoxWidth, ; size of buffer
35      xyPosition, ; first cell coordinates
36      ADDR cellsWritten ; output count
37      inc xyPosition.Y ; 座標換到下一行位置
38      mov ecx, (BoxHeight) ; number of lines in body
```

```

39      L1: push ecx ; save counter 避免invoke 有使用到這個暫存器
40      INVOKE WriteConsoleOutputAttribute,
41      outputHandle, ; output handle
42      ADDR attributes1, ; write attributes
43      BoxWidth, ; number of cells
44      xyPosition, ; first cell coordinates
45      ADDR cellsWritten
46
47      INVOKE WriteConsoleOutputCharacter,
48      outputHandle, ; console output handle
49      ADDR boxBody, ; pointer to buffer
50      BoxWidth, ; size of buffer
51      xyPosition, ; first cell coordinates
52      ADDR cellsWritten ; output count
53

```

First, invoke the function which can print the characters and color. Second, print the above, then go to the next line. Third, define ecx as the height of the image-2 (subtract the above and the bottom so it remains the middle). Next, repeat L1 until ecx equals to zero.

Similarly, invoke the function which can print out characters and color at the bottom, then go to the next line until finish printing out the middle part.

3.

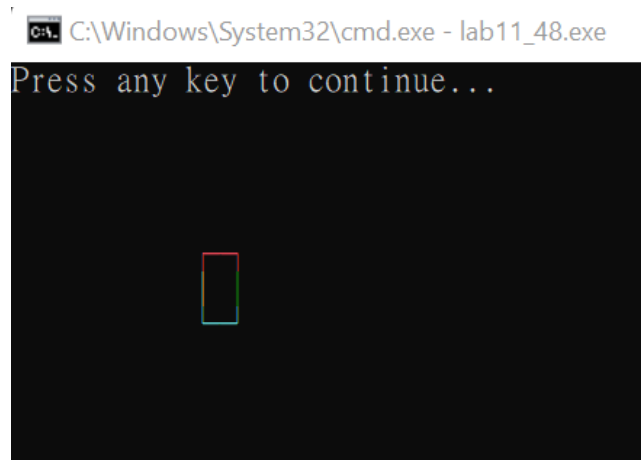
```

54     inc xyPosition.Y    ; next line
55     pop ecx    ; restore counter
56     loop L1
57
58     INVOKE WriteConsoleOutputAttribute,
59     outputHandle,    ; output handle
60     ADDR attributes2,    ; write attributes
61     BoxWidth,    ; number of cells
62     xyPosition,    ; first cell coordinates
63     ADDR cellsWritten
64
65     ; draw bottom of the box
66     INVOKE WriteConsoleOutputCharacter,
67     outputHandle,    ; console output handle
68     ADDR boxBottom,    ; pointer to buffer
69     BoxWidth,    ; size of buffer
70     xyPosition,    ; first cell coordinates
71     ADDR cellsWritten    ; output count
72
73     call WaitMsg
74     call Clrscr
75     exit
76 main ENDP
77 END main

```

Eventually, invoke the function which can print character and color at the bottom, then end the function.

- **screenshots of the result**



- **Thoughts about the lab:**

At the beginning of the lab, we had trouble figuring out how to change the type of the console output. The console output indicated Chinese words are not in correct type. We met a big problem that we cannot input chcp 437 in the terminal due to using Visual Studio code. However, TA's helped us to find out how to solve the above difficulties. In this project, Thanks to the TA that taught us about the use of cmd in the debug file, we successfully input chcp 437 and change the word into picture.