微處理機實習

Lab7

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一、 實驗目的

此次實驗利用程式邏輯的編寫操作 GPIO 上的 LCD 畫面捲動其他元件的搭配操作。

二、 遭遇的問題

沒有未能解決的問題。

三、 解決方法

- 實驗一 Bouncing ball

```
#include <stdio.h>
#include <math.h>
#include "NUC100Series.h"
#include "MCU_init.h"
#include "SYS_init.h"
#include "LCD.h"
#include "Draw2D.h"
#include "Scankey.h"


int dx[] = {0, 1, 1, -1, -1, 1, -1};
int dy[] = {0, -1, 1, -1, 1, 0, 0};
// STOP, RU, RD, LU, LD, R, L


void Buzz()
```

```
17 {
18     PB11=0; // PB11 = 0 to turn on Buzzer
19     CLK_SysTickDelay(10000);     // Delay
20     PB11=1; // PB11 = 1 to turn off Buzzer
21     CLK_SysTickDelay(10000);     // Delay
22 }
23
24 int32_t main (void)
25 {
26     int i = 0, keyPressed = 0;
27     int idx = 0;
28     uint16_t r;
29     uint16_t x, y;
30     uint16_t fgColor, bgColor;
31     OpenKeyPad();
32     SYS_Init();
33     init_LCD();
34     clear_LCD();
35
36     x = 64;     // circle center x
37     y = 32;     // circle center y
38     r = 3;     // circle radius
39
40     bgColor = BG_COLOR;
41     while(1) {
42
43         int nextX = x + dx[idx];
44         int nextY = y + dy[idx];
45
```

```
46          if ( nextY <= 4 ) {
47              if ( idx == 1 ) idx = 2;
48              else if ( idx == 3 ) idx = 4;
49              Buzz();
50          }
51
52          if ( nextY >= 59 ) {
53              if ( idx == 2 ) idx = 1;
54              else if ( idx == 4 ) idx = 3;
55              Buzz();
56          }
57
58          if ( nextX <= 4 ) {
59              if ( idx == 3 ) idx = 1;
60              else if ( idx == 4 ) idx = 2;
61              else if ( idx == 6 ) idx = 5;
62              Buzz();
63          }
64
65          if ( nextX >= 123 ) {
66              if ( idx == 1 ) idx = 3;
67              else if ( idx == 2 ) idx = 4;
68              else if ( idx == 5 ) idx = 6;
69              Buzz();
70          }
71
72          x = nextX;
73          y = nextY;
74
```

```
75          CLK_SysTickDelay(20000);
76          i=ScanKey();
77          fgColor = FG_COLOR;
78          clear_LCD();
79          draw_Circle(x, y, r, fgColor, bgColor); //
                draw a circle
80
81          if( i == 0 ) {
82              keyPressed = 0;
83              continue;
84          }
85
86          if(keyPressed) {
87              continue;
88          }
89
90          keyPressed = 1;
91
92          if ( i == 5 ) idx = 0;
93
94          if ( idx != 0 ) continue;
95
96          if ( i == 4) idx = 6;
97          else if ( i == 6 ) idx = 5;
98          else if ( i == 1 ) idx = 3;
99          else if ( i == 3 ) idx = 1;
100         else if ( i == 7 ) idx = 4;
101         else if ( i == 9 ) idx = 2;
102 }
```

```
}
```

- 實驗二 Bouncing ball | Black Rectangle

```
#include <stdio.h>
#include <stdlib.h>
#include <math.h>
#include "NUC100Series.h"
#include "MCU_init.h"
#include "SYS_init.h"
#include "LCD.h"
#include "Draw2D.h"
#include "Scankey.h"

uint16_t fgColor, bgColor;
int seed = 0;
const int INF = 0x3f3f3f;
int dx[] = {0, 1, 1, -1, -1, 1, -1};
int dy[] = {0, -1, 1, -1, 1, 0, 0};
int idx = 0;
// STOP, RU, RD, LU, LD, R, L


int posX = 0, posY = 0;

void Buzz()
{
    PB11=0; // PB11 = 0 to turn on Buzzer
```

```
25      CLK_SysTickDelay(10000);      // Delay
26      PB11=1; // PB11 = 1 to turn off Buzzer
27      CLK_SysTickDelay(10000);      // Delay
28  }
29
30  void generateREC() {
31      posX = rand() % 122;
32      seed++;
33      posY = rand() % 29;
34      return;
35  }
36
37  void checkTouch(int *onRandom, int *x, int *y) {
38      int x0 = posX;
39      int x1 = posX + 5;
40      int y0 = posY;
41      int y1 = posY + 5;
42      int isTouch = 0;
43
44      if ( !(*onRandom) ) {
45          return;
46      }
47
48      if ( (*y - y1) <= 3 || y0 - *y <= 3 ) {
49          if ( *x <= x1 && *x >= x0 ) {
50              isTouch = 1;
51          }
52      }
53
```

```
54      else if ( *x - x1 <= 3 || x0 - *x <= 3 ) {
55          if ( *y <= y1 && *y >= y0 ) {
56              isTouch = 1;
57          }
58      }
59
60      if ( isTouch ) {
61          Buzz();
62          *x = 64;
63          *y = 58;
64          *onRandom = 0;
65          idx = 0;
66      }
67      return;
68  }
69
70  int32_t main (void)
71  {
72      int i = 0, keyPressed = 0, onRandom = 0;
73      uint16_t r;
74      int x, y;
75
76      OpenKeyPad();
77      SYS_Init();
78      init_LCD();
79      clear_LCD();
80
81      x = 64;     // circle center x
82      y = 58;     // circle center y
```

```
83      r = 3;     // circle radius
84
85      bgColor = BG_COLOR;
86      while(1) {
87          int nextX = x + dx[idx];
88          int nextY = y + dy[idx];
89
90          seed++;
91          seed %= INF;
92          srand(seed);
93
94          if ( nextY <= 4 ) {
95              if ( idx == 1 ) idx = 2;
96              else if ( idx == 3 ) idx = 4;
97              Buzz();
98          }
99
100         if ( nextY >= 59 ) {
101             if ( idx == 2 ) idx = 1;
102             else if ( idx == 4 ) idx = 3;
103             Buzz();
104         }
105
106         if ( nextX <= 4 ) {
107             if ( idx == 3 ) idx = 1;
108             else if ( idx == 4 ) idx = 2;
109             else if ( idx == 6 ) idx = 5;
110             Buzz();
111         }
```

```
112
113         if ( nextX >= 123 ) {
114             if ( idx == 1 ) idx = 3;
115             else if ( idx == 2 ) idx = 4;
116             else if ( idx == 5 ) idx = 6;
117             Buzz();
118         }
119
120         x = nextX;
121         y = nextY;
122
123         checkTouch(&onRandom, &x, &y);
124
125         CLK_SysTickDelay(20000);
126         i=ScanKey();
127         fgColor = FG_COLOR;
128         clear_LCD();
129         if ( onRandom ) draw_Rectangle(posX, posY,
                posX + 5, posY + 5, fgColor, bgColor);
130         draw_Circle(x, y, r, fgColor, bgColor); //
                draw a circle
131
132         if( i == 0 ) {
133             keyPressed = 0;
134             continue;
135         }
136
137         if(keyPressed) {
138             continue;
```

```
139             }
140
141             keyPressed = 1;
142
143             if ( i == 5 ) idx = 0;
144             if ( i == 8 ) {
145                 onRandom = 1;
146                 generateREC();
147             }
148
149             if ( idx != 0 ) continue;
150
151             if ( i == 4) idx = 6;
152             else if ( i == 6 ) idx = 5;
153             else if ( i == 1 ) idx = 3;
154             else if ( i == 3 ) idx = 1;
155             else if ( i == 7 ) idx = 4;
156             else if ( i == 9 ) idx = 2;
157       }
158   }
```

四、 未能解決的問題

沒有未能解決的問題。