3.5 方块触底显示_物联网 / 嵌入式工程师 - 慕课网

> 慕课网慕课教程 3.5 方块触底显示涵盖海量编程基础技术教程，以图文图表的形式，把晦涩难懂的编程专业用语，以通俗易懂的方式呈现给用户。

```
int move_down(int num,int mode)
{
    if((dynamic_y + (4 - shape[num][mode][17]) - 1 >= 29) || judge_shape(num,mode,dynamic_x,dynami
    {

            store_current_shape();


            init_new_shape();


            print_next_shape();

            return 1;
    }

    erase_last_shape(num,mode,dynamic_x,dynamic_y);
    dynamic_y++;
    print_mode_shape(num,mode,dynamic_x,dynamic_y,dynamic_color);

    return 0;
}
```

```
int judge_shape(int num,int mode,int x,int y)
{
    int m_line = y - 6;
    int m_column = x - 12;

    int i = 0;

    for(;i < 16;i++){
            if(i != 0 && i%4 == 0)
            {
                    m_line++;
                    m_column = x-12;

            }

            if(shape[num][mode][i] == 1){

                    if(matrix[m_line][m_column] != 0){
                            return 1;
                    }
            }
            m_column += 2;
    }
    return 0;
}


void init_new_shape()
{
        dynamic_num = next_num;
        dynamic_mode = next_mode;
        dynamic_color = next_color;

        dynamic_x = init_x;
        dynamic_y = init_y;

        print_mode_shape(next_num,next_mode,dynamic_x,dynamic_y,dynamic_color);
}
```

```
#include "user_print.h"

int next_num = 0;
int next_mode = 0;
int next_color = 0;


int init_x = 24;
int init_y = 6;


int next_x = 46;
int next_y = 8;


int dynamic_x = 0;
int dynamic_y = 0;


int dynamic_num = 0;
int dynamic_mode = 0;
int dynamic_color = 0;


int tm = 800000;

int score_x = 45;
int score_y = 18;
int level_x = 45;
int level_y = 22;


int matrix[24][28] = {0};


int shape[7][4][18] =
{
    {
            {1,1,0,0, 1,1,0,0, 0,0,0,0, 0,0,0,0, 2,2},
            {1,1,0,0, 1,1,0,0, 0,0,0,0, 0,0,0,0, 2,2},
            {1,1,0,0, 1,1,0,0, 0,0,0,0, 0,0,0,0, 2,2},
            {1,1,0,0, 1,1,0,0, 0,0,0,0, 0,0,0,0, 2,2},
    },
    {
            {1,0,0,0, 1,0,0,0, 1,0,0,0, 1,0,0,0, 3,0},
            {1,1,1,1, 0,0,0,0, 0,0,0,0, 0,0,0,0, 0,3},
            {1,0,0,0, 1,0,0,0, 1,0,0,0, 1,0,0,0, 3,0},
            {1,1,1,1, 0,0,0,0, 0,0,0,0, 0,0,0,0, 0,3},
    },
    {
            {0,1,0,0, 1,1,1,0, 0,0,0,0, 0,0,0,0, 1,2},
            {1,0,0,0, 1,1,0,0, 1,0,0,0, 0,0,0,0, 2,1},
            {1,1,1,0, 0,1,0,0, 0,0,0,0, 0,0,0,0, 1,2},
            {0,1,0,0, 1,1,0,0, 0,1,0,0, 0,0,0,0, 2,1}
    },
    {
            {1,1,0,0, 0,1,1,0, 0,0,0,0, 0,0,0,0, 1,2},
            {0,1,0,0, 1,1,0,0, 1,0,0,0, 0,0,0,0, 2,1},
            {1,1,0,0, 0,1,1,0, 0,0,0,0, 0,0,0,0, 1,2},
            {0,1,0,0, 1,1,0,0, 1,0,0,0, 0,0,0,0, 2,1},
    },
    {
            {0,1,1,0, 1,1,0,0, 0,0,0,0, 0,0,0,0, 1,2},
            {1,0,0,0, 1,1,0,0, 0,1,0,0, 0,0,0,0, 2,1},
            {0,1,1,0, 1,1,0,0, 0,0,0,0, 0,0,0,0, 1,2},
            {1,0,0,0, 1,1,0,0, 0,1,0,0, 0,0,0,0, 2,1},
    },
    {
            {0,0,1,0, 1,1,1,0, 0,0,0,0, 0,0,0,0, 1,2},
            {1,0,0,0, 1,0,0,0, 1,1,0,0, 0,0,0,0, 2,1},
            {1,1,1,0, 1,0,0,0, 0,0,0,0, 0,0,0,0, 1,2},
            {1,1,0,0, 0,1,0,0, 0,1,0,0, 0,0,0,0, 2,1}
    },
    {
            {1,0,0,0, 1,1,1,0, 0,0,0,0, 0,0,0,0, 1,2},
            {1,1,0,0, 1,0,0,0, 1,0,0,0, 0,0,0,0, 2,1},
            {1,1,1,0, 0,0,1,0, 0,0,0,0, 0,0,0,0, 1,2},
            {0,1,0,0, 0,1,0,0, 1,1,0,0, 0,0,0,0, 2,1}},
};



#ifndef _USER_CONTROL_H_
#define _USER_CONTROL_H_

extern int getch();
```

```
extern void alarm_us(int n);

#endif



#include "user_control.h"
#include "user_print.h"
#include <stdio.h>
#include <termios.h>
#include <signal.h>
#include <time.h>
#include <sys/time.h>
#include <stdlib.h>


int getch()
{
        struct termios tm,tm_old;

        tcgetattr(0,&tm_old);

        cfmakeraw(&tm);

        tcsetattr(0,0,&tm);

        int ch = getchar();

        tcsetattr(0,0,&tm_old);

        return ch;
}


void alarm_us(int n)
{
        struct itimerval value;


        value.it_value.tv_sec = 0;
        value.it_value.tv_usec = n;


        value.it_interval.tv_sec = 0;
        value.it_interval.tv_usec = n;

        setitimer(ITIMER_REAL,&value,NULL);
}



#ifndef _USER_PRINT_H_
#define _USER_PRINT_H_

extern int next_num;
extern int next_mode;
extern int next_color;

extern int next_num;
extern int next_mode;
extern int next_color;


extern int next_x;
extern int next_y;


extern int init_x;
extern int init_y;


extern  int dynamic_x;
extern  int dynamic_y;


extern  int dynamic_num;
extern  int dynamic_mode;
extern  int dynamic_color;


extern int shape[7][4][18];


extern int matrix[24][28];

extern void print_mode_shape(int n,int m,int x,int y,int c);
extern void print_next_shape();
```

```
extern void erase_last_shape(int n,int m,int a,int b);
extern int move_down(int num,int mode);
extern void store_current_shape();
extern void init_new_shape();
extern int judge_shape(int num,int mode,int x,int y);
#endif



#include <stdio.h>
#include <sys/time.h>
#include <stdlib.h>
#include <signal.h>
#include "user_print.h"




void print_mode_shape(int n,int m,int x,int y,int c)
{
    int i = 0;
    int xx = x;
    int yy = y;
    for(i = 0;i < 16;i++)
    {

        if(i != 0 && i%4 == 0)
        {
            yy += 1;
            xx = x;
        }

        if(shape[n][m][i] == 1){
            printf("\033[%d;%dH\033[%dm[]\033[0m",yy,xx,c);
        }
        xx += 2;
    }
    fflush(NULL);
}




void erase_last_shape(int n,int m,int a,int b)
{
    int i = 0;
    int xx = a;
    int yy = b;

    for(i = 0;i < 16;i++){
        if(i != 0 && i%4 == 0){
            yy++;
            xx = a;
        }
        if(shape[n][m][i] == 1){
            printf("\033[%d;%dH  \033[0m",yy,xx);
        }
        xx += 2;
    }
    fflush(NULL);
}


void print_next_shape()
{

    erase_last_shape(next_num,next_mode,next_x,next_y);

    next_num = random()%7;
    next_mode = random()%4;
    next_color = random()%7 + 40;


    print_mode_shape(next_num,next_mode,next_x,next_y,next_color);

    fflush(NULL);
}


void store_current_shape()
{
    int m_line = dynamic_y - 6;
    int m_column = dynamic_x - 12;
```

```
    int i = 0;

    for(i = 0;i < 16;i++)
    {

        if(i != 0 && i % 4 == 0)
        {
            m_line++;
            m_column = dynamic_x - 12;
        }


        if(shape[dynamic_num][dynamic_mode][i] == 1)
        {
            matrix[m_line][m_column] = dynamic_color;
            matrix[m_line][m_column + 1] = dynamic_color;
        }
        m_column += 2;

    }

}

void init_new_shape()
{
    dynamic_num = next_num;
    dynamic_mode = next_mode;
    dynamic_color = next_color;

    dynamic_x = init_x;
    dynamic_y = init_y;

    print_mode_shape(next_num,next_mode,dynamic_x,dynamic_y,dynamic_color);
}


int judge_shape(int num,int mode,int x,int y)
{
    int m_line = y - 6;
    int m_column = x - 11;

    int i = 0;

    for(;i < 16;i++){

        if(i != 0 && i%4 == 0){
            m_line++;
            m_column = x-12;

        }

        if(shape[num][mode][i] == 1){
            if(matrix[m_line][m_column] != 0){
                return 1;
            }
        }
        m_column += 2;
    }
    return 0;
}

int move_down(int num,int mode)
{
    if((dynamic_y + (4 - shape[num][mode][17]) - 1 >= 29) || judge_shape(num,mode,dynamic_x,dynami
    {

        store_current_shape();


        init_new_shape();


        print_next_shape();

        return 1;
    }

    erase_last_shape(num,mode,dynamic_x,dynamic_y);
    dynamic_y++;
    print_mode_shape(num,mode,dynamic_x,dynamic_y,dynamic_color);

    return 0;
}
```

```
#include <stdio.h>
#include <termios.h>
#include <signal.h>
#include <time.h>
#include <sys/time.h>
#include <stdlib.h>
#include "user_print.h"
#include "user_control.h"


extern int tm;

extern int score_x;
extern int score_y;
extern int level_x;
extern int level_y;

void print_start_ui()
{

        printf("\33[2J");
        int i;

        for(i = 0;i < 47;i++){
                printf("\33[%d;%dH\33[43m \33[0m",5,i+10);
                printf("\33[%d;%dH\33[43m \33[0m",30,i+10);
        }

        for(i = 0;i < 26;i++){
                printf("\33[%d;%dH\33[43m  \33[0m",i+5,10);
                printf("\33[%d;%dH\33[43m  \33[0m",i+5,40);
                printf("\33[%d;%dH\33[43m  \33[0m",
                                i+5,56);
        }

        for(i=0;i < 17;i++){
                printf("\33[%d;%dH\33[43m \33[0m",12,40+i);
        }



        printf("\33[%d;%dH分数:\33[0m",score_y,score_x);

        printf("\33[%d;%dH等级:\33[0m",level_y,level_x);

        fflush(NULL);
}

void init_game_ui()
{

         print_start_ui();


        getch();


        srand(time(NULL));

        dynamic_num = random()%7;
        dynamic_mode = random()%4;
        dynamic_color = random()%7+40;

        dynamic_x = init_x;
        dynamic_y = init_y;


        print_mode_shape(dynamic_num,dynamic_mode,dynamic_x,dynamic_y,dynamic_color);

        print_next_shape();
        printf("\33[?25l");
}


void sig_handler(int signum)
{

     move_down(dynamic_num,dynamic_mode);

}

int main()
{
    init_game_ui();
```

```
    signal(SIGALRM,sig_handler);


    alarm_us(tm);

    while(1);
    return 0;
}
```

全文完