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Task 2

Elevator system

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Description :

The system for 4 doors and ground, the elevator cart have 5 buttons inside it, one for each door.

Each door have 2 buttons one for up request and the other for down request.

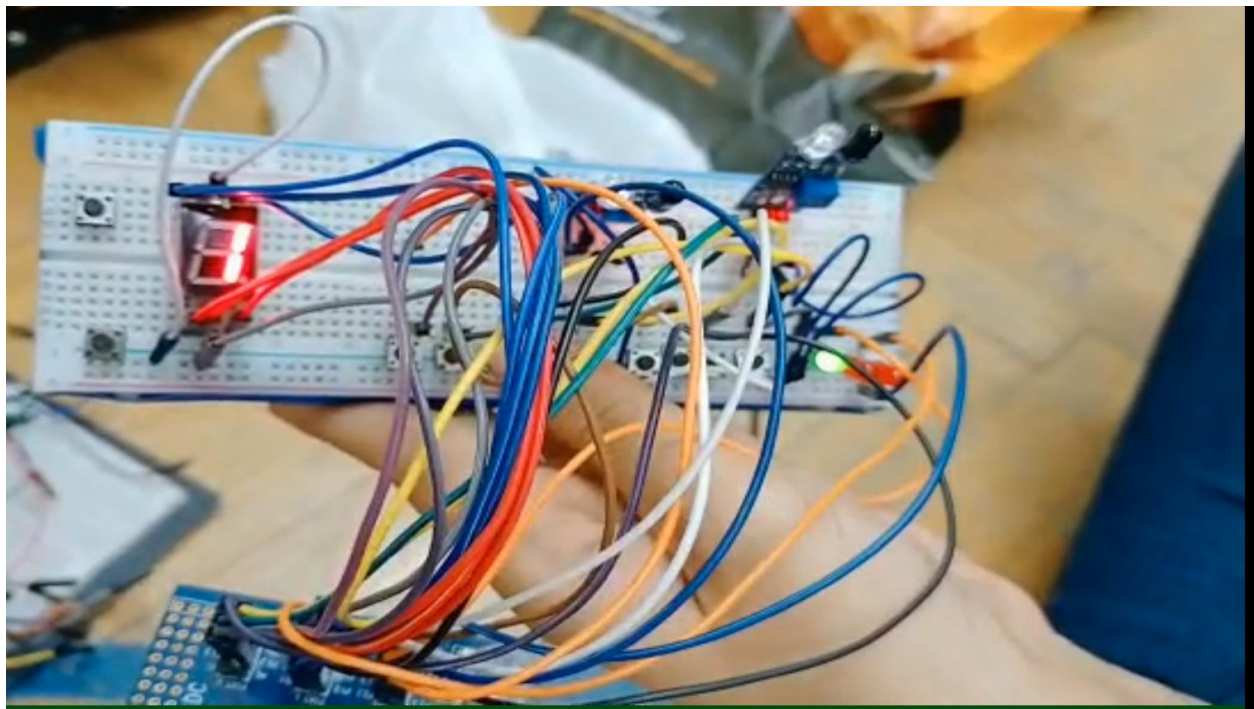
If the number of persons exceeds 4 an alarm should be turned on.

Components:

14 buttons

3 leds

2 ir sensors



```
#include "C8051F020.h"

int floor = 0;

unsigned int up_request[5] = {0,0,0,0,0};

unsigned int floor_request[5] = {0,0,0,0,0};

unsigned int down_request[5] = {0,0,0,0,0};

//unsigned int leds[2] = {0,0};

int i=0;

sbit redled = P2^3;

sbit greenled = P0^7;

int doorstate = 0;

sbit OpenDoor=P2^7;

// inside_buutons

sbit floor0 = P0^2;

sbit floor1 = P0^3;

sbit floor2 = P0^4;

sbit floor3 = P0^5;

sbit floor4 = P0^6;

sbit ir1 = P2^2;

sbit ir2 = P2^5 ;

int enter = 0 ;

int exit = 0 ;

sbit overload = P1^7;

int persons = 0 ;

sbit motor1 = P2^0;

sbit motor2 = P2^1;

sbit floor0_down = P2^4;

sbit floor2_down = P2^6;

void timer0_init(void)

{
```

```

CKCON &= 0xF0; //T0M = 0; Timer 0 uses SysClock/12

TMOD = (TMOD & 0xF0) | 0x01; /* Set T/C0, Mode mode1(tm1=0&tm0=1)*/

    TH0 = 0xFFFF;

    TLO = 0x63BF ; //240ms

    ET0 = 1;

}

void motor_delay()
{
    int i = 0;

    int j = 0;

    for (i=0;i<1000;++i){
        for(j=0;j<100;++j){
            }}}

void delay(){
    int i = 0;

    int j = 0;

    for (i=0;i<500;++i){
        for(j=0;j<100;++j){
            }}

}void door_delay()
{
    int i = 0;

    int j = 0;

    for (i=0;i<1000;++i){
        for(j=0;j<1000;++j){
            if ((ir1 == 0) && (ir2 ==1))
                { if(exit== 0){enter=1;}

                    if(exit==1){persons-- ;exit = 0; delay();}

```

```

    }
    if ((ir1 == 1) && (ir2 == 0))
    { if(enter == 0){
    exit=1;
    }

        if(enter==1){
            persons++;
            enter = 0;
            delay();
        }}}

```

```

void motor_delay1()

```

```

{
    int i = 0;
    int j = 0;
    for (i=0;i<1000;++i){
        for(j=0;j<90;++j){
            }}}

```

```

void up()

```

```

{
    motor1 = 1 ;
    motor2 = 0;
    motor_delay();
    motor1 = 0 ;
    motor2=1;
    motor_delay1();
    motor2=0;
}

```

```

void down()

```

```

{

```

```

    motor1 = 0 ;
    motor2 = 1 ;
    motor_delay();
    motor2 = 0 ;
    motor1=1 ;
    motor_delay1();
    motor1=0;
}

void open_door(){
    redled = 1;
    greenled = 0;
        door_delay();
        if (persons > 4 ){overload = 1; open_door(); }
        if (persons< 5) {overload = 0 ;}
    redled =0;
    greenled=1;
}

void requests(void){
    //inside _buttons
    if(!(floor0)){
        floor_request[0]=1;
    }
    if(!(floor1)){
        floor_request[1]=1;
    }
    if(!(floor2)){
        floor_request[2]=1;
    }
    if(!(floor3)){

```

```

        floor_request[3]=1;
    }
    if(!(floor4)){
        floor_request[4]=1;
    }
    if(!(floor0_down)){
        down_request[0]=1;
    }
    if(!(floor2_down)){
        down_request[2]=1;
    }
    if(!(P5&0x01)) {
        up_request[1]=1
    }
    if(!(P5&0x02)) { //P5,"1"
        up_request[2]=1;
    }
    if(!(P5&0x04)) { //"P5,"2"
        up_request[3]=1;
    }
    if(!(P5&0x08)) { //P5,"3"
        up_request[4]=1;
    }

    if((!OpenDoor && !doorstate)) {
        open_door();
    }
}

//executed every 65536 0+count
void timer0_ISR() interrupt 1 {
    TFO = 0 ;

```

```

    requests();
}

void seg_dispaly(floor){
    if(floor==0)    P1 = 0x3F;
    else if(floor==1) P1 = 0x06;
    else if(floor==2) P1 = 0x5B;
    else if(floor==3) P1 = 0x4F;
    else if(floor==4) P1 = 0x66;
}

void main(void){
    // diable the watch dog
    WDTCN = 0x0DE;
    WDTCN = 0x0AD;
    OSCICN = 0x014; // 2MH clock
    // config cross bar
    XBR0 = 0x00;
    XBR1 = 0x00;
    XBR2 = 0x040; // Cross bar enabled , weak Pull-up enabled
    POMDOUT |= 0x80;
    P1MDOUT |= 0x7F;
    P2MDOUT |= 0x00;
    timer0_init();
    EA=1;
    TR0 = 1;
    overload=0;
    redled=0;
    greenled=1;
    requests();
    while(1)

```



```

{
    seg_dispaly(floor);
    i=0;
    for(i=0;i<5;i++){
        if(( floor_request[i] || up_request[i] || down_request[i])&& i>floor )
        {
            while(floor != i )
            {
                doorstate=1;
                up();
                floor++;
                seg_dispaly(floor);
                if( floor_request[floor] || up_request[floor] || down_request[floor] )
                {
                    floor_request[floor]=0;
                    up_request[floor]=0;
                    down_request[floor]=0;
                    doorstate = 0;
                    open_door();
                }
            }
        }
    }
    i=4;
    for( i=4;i>=0;i--){
        if(( floor_request[i] || down_request[i] || up_request[i]) && i< floor ){
            while(floor != i )
            {
                doorstate=1;
                down();
                floor--;
                seg_dispaly(floor);
                if( floor_request[floor] || down_request[floor] || up_request[floor])
                {

```

```
    floor_request[floor]=0;  
    down_request[floor]=0;  
    up_request[floor]=0;  
    doorstate=0;  
    open_door();  
}}}}}
```