```c
#include<reg52.h>
#include<stdio.h>
float t;
unsigned int key;
unsigned int select=0;
unsigned int child=0;
unsigned int adult=0;
unsigned int childspeed=10;//ml/s
unsigned int adultspeed=20;//ml/s
unsigned int adultt=6;
unsigned int childt=12;
unsigned int vol1,vol2,vol3,vol4=0;
unsigned char code num[]="0123456789";
sbit ctl1=P2^0;
sbit clk1=P2^1;
sbit ctl2=P2^2;
sbit clk2=P2^3;
sbit ctl3=P2^4;
sbit clk3=P2^5;
sbit ctl4=P2^6;
sbit clk4=P2^7;
sbit childclk=P3^2;
sbit adultclk=P3^3;
sbit RS = P3^4;
sbit RW = P3^5;
sbit E = P3^6;
sbit bee=P3^7;
int a=0,b=0,c=0,d=0;//定义个十百千位为0
unsigned int yiquan=500;  //步进电机转动一圈能排除的药液ml
void weishu(int x,int weizhi);
/*******延时函数*******/
void delay(unsigned int z)
{
  unsigned int x,y;
  for(x=z;x>0;x--)
    for(y=110;y>0;y--);
}
/*******写命令函数*******/
void LCD_write_cmd(unsigned char cmd)//cmd为需要写的命令
{
  RS = 0;       //命令模式
  RW = 0;       //写模式
  P0 = cmd; //将命令内容的十六进制送到P0端口
  delay(5);
  E = 1;
  delay(5);
  E = 0;       //使能端，高电平有效，使命令送到LCD1602的DB0~DB7
}
/*******写数据函数*******/
void LCD_write_data(unsigned char dat)//dat为需要写的数据
{
  //while(busytest());//只有当busytest()为0(闲)时才跳出循环    PROTEUS模拟不能加
  RS = 1;       //数据模式
  RW = 0;       //写模式
  P0 = dat;     //将数据内容的十六进制送到P0端口
  delay(5);
  E = 1;
  delay(5);
  E = 0;       //使能端，高电平有效，使命令送到LCD1602的DB0~DB7
}
/*******LCD初始化函数*******/
void LCD_init()
{
  LCD_write_cmd(0x38); //将设置"两行、八位数据、5*7的点阵"命令写入LCD的控制器
  LCD_write_cmd(0x0c); //开显示关光标
  LCD_write_cmd(0x06); //光标右移指令
  LCD_write_cmd(0x01); //清除显示
}
/*******LCD写显示地址函数*******/
void LCD_write_address(unsigned char x,unsigned char y)
{
  x&=0x0f;  //列地址限制在0~15之间
  y&=0x01;  //行地址限制在0~1
  if(y==0)
    LCD_write_cmd(x|0x80);//数据指针=80+地址变量,写入列地址
  else
    LCD_write_cmd((x+0x40)|0x80);    //如果是第二行，将列地址写入
```

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78  }
79  /*******LCD显示函数*******/
80  void display(unsigned char x,unsigned char y,unsigned char buf) //x：列 y：行，buf：显示的字符
81  {
82    LCD_write_address(x,y);//先将地址写入
83    LCD_write_data(buf);  //再写入要显示的数据
84  }
85  //LCD清屏函数
86  void reset(){
87    LCD_write_cmd(0x01);
88  }
89  //键盘扫描子程序
90  unsigned char getkey(){
91    unsigned char k=19;//如果没有键按下，返回无效值，此值可为除了0到15外任意值
92    unsigned char h,l,z;
93    static  pressed=0;
94         P1=0x0f;
95      if(P1!=0x0f){
96        if(pressed==0){
97        pressed=1;
98        h=P1&0x0f;       //保存行扫描状态
99        P1=0xf0;         //开始列扫描
100       l=P1&0xf0;       //保存列扫描状态
101       z=h|l;       //得出键值
102       switch(z)
103   {
104     case 0xe7:k=1;break;
105     case 0xd7:k=2;break;
106     case 0xb7:k=3;break;
107     case 0x77:k=10;break; //开始=10
108     case 0xeb:k=4;break;
109     case 0xdb:k=5;break;
110     case 0xbb:k=6;break;
111     case 0x7b:k=11;break;//泵号/模式=11
112     case 0xed:k=7;break;
113     case 0xdd:k=8;break;
114     case 0xbd:k=9;break;
115     case 0x7d:k=12;break;//速度=12
116     case 0xee:k=13;break;//返回/清除=13
117     case 0xde:k=0;break;
118     case 0xbe:k=14;break;//确认=14
119     case 0x7e:k=15;break;//容积=15
120   }
121 }
122
123 }
124   else{
125   pressed=0;
126 }
127   return(k);
128 }
129 //输入数字子程序
130 int number(){
131   unsigned char in=0;int n=0;unsigned char index=0;//定义标志位为0
132   a=b=c=d=0;
133   display(15,1,0x20);
134   display(14,1,0x20);
135   display(13,1,0x20);
136   display(12,1,0x20);
137   while(1){     //开始输入数字
138   if((b!=0||c!=0||d!=0)||a!=0)display(15,1,num[a]);
139   else  display(15,1,0x20);
140   if((c!=0||d!=0)||b!=0)display(14,1,num[b]);
141   else  display(14,1,0x20);
142   if(c!=0||d!=0)display(13,1,num[c]);
143   else  display(13,1,0x20);
144   if(d!=0)display(12,1,num[d]);
145   else  display(12,1,0x20);
146     in=getkey();
147     if(in==14)
148     {n=(a+(10*b)+(100*c)+(1000*d));break;}       //按OK得出数字 跳出循环
149     if(in<=9)
150     {switch(index)
151     {case 0:a=in;index=index+1;break;
152      case 1:b=a;a=in;index=index+1;break;
153       case 2:c=b;b=a;a=in;index=index+1;break;
154       case 3:d=c;c=b;b=a;a=in;index=index+1;break;
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```
    }
}   if(in==13)
    {switch(index)
      {case 0:break;
       case 1:a=0;index=index-1;break;
       case 2:a=b;b=0;index=index-1;break;
       case 3:a=b;b=c;c=0;index=index-1;break;
       case 4:a=b;b=c;c=d;d=0;index=index-1;break;
      }
}
  }
  return(int)(n);
}//
//显示adultspeed
void as(int x){
   display(0,x,'a');
   display(1,x,'d');
   display(2,x,'u');
   display(3,x,'l');
   display(4,x,'t');
   display(5,x,'s');
   display(6,x,'p');
   display(7,x,'e');
   display(8,x,'e');
   display(9,x,'d');
}
//显示childspeed
void cs(int x){
   display(0,x,'c');
   display(1,x,'h');
   display(2,x,'i');
   display(3,x,'l');
   display(4,x,'d');
   display(5,x,'s');
   display(6,x,'p');
   display(7,x,'e');
   display(8,x,'e');
   display(9,x,'d');
}
//显示mode
void md(){
   display(0,0,'m');
   display(1,0,'o');
   display(2,0,'d');
   display(3,0,'e');
}
void wk(int x,int y){
   display(x,y,'w');
   display(x+1,y,'o');
   display(x+2,y,'r');
   display(x+3,y,'k');
}
void wt(int x,int y){
   display(x,y,'w');
   display(x+1,y,'a');
   display(x+2,y,'i');
   display(x+3,y,'t');
}

//泵选择程序
void beng(){
  unsigned char input=0;unsigned char bengnum=0;unsigned int vol=0;unsigned char mode=0;
   reset();
  while(1){
   display(0,0,'p');
   display(1,0,'u');
   display(2,0,'m');
   display(3,0,'p');
  weishu(bengnum,1);
  input=getkey();
  if(input==13&&bengnum!=0&&vol!=0&&mode!=0)
  {mode=0;}
  if(input==13&&bengnum!=0&&vol!=0&&mode==0)
  {vol=0;}
  if(input==13&&bengnum!=0&&vol==0&&mode==0)
  { switch(bengnum){
    case 1:ctl1=1;break;
```

```
      case 2:ctl2=1;break;
      case 3:ctl3=1;break;
      case 4:ctl4=1;break;
    }
    bengnum=0;}
    if(input==13&&bengnum==0&&vol==0&&mode==0)
    {break;}
    if(bengnum==0){
    display(0,0,'p');
     display(1,0,'u');
     display(2,0,'m');
     display(3,0,'p');
      bengnum=number();
    }
    if(input==15&vol==0&&bengnum!=0){
     reset();
     display(0,0,'v');
     display(1,0,'o');
     display(2,0,'l');
      vol=number();
      switch(bengnum){
        case 1:vol1=vol;break;
        case 2:vol2=vol;break;
        case 3:vol3=vol;break;
        case 4:vol4=vol;break;
    }
    reset();}
    if(bengnum!=0&&input==11&&mode==0){
     reset();
     md();
     mode=number();
      if(mode==1){
      switch(bengnum){
      case 1:clk1=0;break;
      case 2:clk2=0;break;
      case 3:clk3=0;break;
      case 4:clk4=0;break;
      }
     display(15,0,'d');
     display(14,0,'l');
     display(13,0,'i');
     display(12,0,'h');
     display(11,0,'c');}}
      if(mode==2){
      switch(bengnum){
      case 1:clk1=1;break;
      case 2:clk2=1;break;
      case 3:clk3=1;break;
      case 4:clk4=1;break;
      }
     display(15,0,'t');
     display(14,0,'l');
     display(13,0,'u');
     display(12,0,'d');
     display(11,0,'a');}
    if(input==14&&mode!=0&&bengnum!=0&&vol!=0){switch(bengnum){
      case 1:ctl1=0;break;
      case 2:ctl2=0;break;
      case 3:ctl3=0;break;
      case 4:ctl4=0;break;
      default:bengnum=0;
    }
      break;}
    if(input==13){break;}
  }
    reset();}
  //设置儿童成人速度程序
  void set(){
    unsigned char shuru=0;unsigned char xuanze=0;unsigned int sudu=0;
    reset();
    while(1){
    as(0);cs(1);
    weishu(childspeed,1);
    weishu(adultspeed,0);
    shuru=getkey();
    if(shuru==12){
      reset();
```

```
      md();
      xuanze=number();}
    if(xuanze!=0&&sudu==0){
     if(xuanze==1){cs(0);}
     if(xuanze==2){as(0);}
      sudu=number();
     if(xuanze==1){childspeed=sudu;}
     if(xuanze==2){adultspeed=sudu;}
   }
    if(shuru==14&&sudu!=0){break;
    }
    if(shuru==13){break;}
  }
    reset();}
  //数字个十百千数计算显示
  void weishu(int x,int weizhi)
    {
    unsigned int ge,shi,bai,qian=0;
    qian=x/1000;
    bai=(x%1000)/100;
    shi=(x%100)/10;
    ge=(x%10);
    if((shi!=0||bai!=0||qian!=0)||ge!=0)display(15,weizhi,num[ge]);
    if((bai!=0||qian!=0)||shi!=0)display(14,weizhi,num[shi]);
    if(bai!=0||qian!=0)display(13,weizhi,num[bai]);
    if(qian!=0)display(12,weizhi,num[qian]);
  }
  //完成警报
  void alert1(){
     if(ctl1==0&&clk1==0&&childclk==0)
    {vol1=vol1-2;}
     if(adultclk==0&&ctl1==0&&clk1==1)
    {vol1=vol1-2;}
    if((vol1<0||vol1==0)&&ctl1==0)
    {vol1=0;bee=1;ctl1=1;}
    if(ctl1==1)
    {wt(2,0);bee=0;}
    if(ctl1==0)
      wk(2,0);
  }
  void alert2(){
     if(ctl2==0&&clk2==0&&childclk==0)
    {vol2=vol2-2;}
     if(adultclk==0&&ctl2==0&&clk2==1)
    {vol2=vol2-2;}
    if((vol2<0||vol2==0)&&ctl2==0)
    {vol2=0;bee=1;ctl2=1;}
    if(ctl2==1)
    {wt(12,0);bee=0;}
    if(ctl2==0)
    wk(12,0);
  }
  void alert3(){
     if(ctl3==0&&clk3==0&&childclk==0)
    {vol3=vol3-2;}
     if(adultclk&&ctl3==0&&clk3==1)
    {vol3=vol3-2;}
    if((vol3<0||vol3==0)&&ctl3==0)
    {vol3=0;bee=1;ctl3=1;}
    if(ctl3==1)
    {wt(2,1);bee=0;}
    if(ctl3==0)
    wk(2,1);
  }
  void alert4(){
     if(ctl4==0&&clk4==0&&childclk==0)
    {vol4=vol4-2;}
     if(adultclk&&ctl4==0&&clk4==1)
    {vol4=vol4-2;}
    if((vol4<0||vol4==0)&&ctl4==0)
    {vol4=0;bee=1;ctl4=1;}
    if(ctl4==1)
    {wt(12,1);bee=0;}
    if(ctl4==0)
    wk(12,1);
  }
  //主程序
```

```
386   void main()
387   { TMOD=0x11;
388     TH0=(65536-20000)/256;//定时器10ms
389     TL0=(65536-20000)%256;
390     TH1=(65536-20000)/256;
391     TL1=(65536-20000)%256;
392     EA=1;ET0=1;TR0=1;ET1=1;TR1=1;bee=0;
393     LCD_init();
394     while(1){
395       display(0,0,'1');
396       display(0,1,'3');
397       display(10,0,'2');
398       display(10,1,'4');
399       alert1();
400       alert2();
401       alert3();
402       alert4();
403       key=getkey();
404       if(key==12)
405       set();
406       if(key==11)
407       beng();
408     }
409   }
410   void timer0() interrupt 1 //成年人速度
411   { TH0=(65536-20000)/256;
412     TL0=(65536-20000)%256;
413     adult++;;
414     if(adult==adultt)
415     { adult=0;
416       adultclk=~adultclk;
417     }
418   }
419   void timer1() interrupt 3 //儿童速度
420   { TH1=(65536-20000)/256;
421     TL1=(65536-20000)%256;
422     child++;
423     if(child==childt)
424     { child=0;
425       childclk=~childclk;
426     }
427   }
428
429
430
431
432
433
434
435
```