```c
1   // password based door lock system in 8051 microprocessor
2
3   #include <reg51.h>
4
5   // connected pins
6   // keypad rows
7   sbit keyrow1=P2^0;
8   sbit keyrow2=P2^1;
9   sbit keyrow3=P2^2;
10  sbit keyrow4=P2^3;
11  //keypad column
12  sbit keycolumn1=P3^0;
13  sbit keycolumn2=P3^1;
14  sbit keycolumn3=P3^2;
15
16  // motor pins
17  sbit motorpin1=P3^3;
18  sbit motorpin2=P3^4;
19
20  // led pins
21  sbit rs=P3^5;
22  sbit rw=P3^6;
23  sbit en=P3^7;
24
25  //functions
26  void lcdcmd(unsigned char);
27  void lcddat(unsigned char);
28  void lcddisplay(unsigned char *q);
29  char keypad();
30  void check();
31  void delay(unsigned int);
32  unsigned char pin[] = {"12345"};
33  unsigned char Epin[5];
34
35  // main function
36  void main()
37  {
38      lcdcmd(0x0F);   //decimal value: 15
39      lcdcmd(0x38);   //decimal value: 56
40      lcdcmd(0x01);   //decimal value: 1
41
42      while (1)
43      {
44          unsigned int i = 0;
45          lcdcmd(0x80);   //decimal value: 128
46          lcddisplay("ENTER PIN NUMBER");
47          delay(1000);
48          lcdcmd(0xc0);   //decimal value: 192
49          while (pin[i] != '\0')
50          {
51              Epin[i] = keypad();
52              delay(1000);
53              i++;
54          }
55          check();
56      }
57  }
58
59  //delay function
60  void delay(unsigned int j)
61  {
62      int a, b;
63      for (a = 0; a < j; a++)
64      {
65          for (b = 0; b < 10; b++);
66      }
67  }
68
69  // lcd commands functions
70  void lcdcmd(unsigned char A)
71  {
72      P1 = A;
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 73          rs = 0;
 74          rw = 0;
 75          en = 1;
 76          delay(1000);
 77          en = 0;
 78     }
 79
 80     //lcd data function
 81
 82     void lcddat(unsigned char i)
 83     {
 84          P1 = i;
 85          rs = 1;
 86          rw = 0;
 87          en = 1;
 88          delay(1000);
 89          en = 0;
 90     }
 91
 92     //lcd display charecters
 93
 94     void lcddisplay(unsigned char *q)
 95     {
 96          int k;
 97          for (k = 0; q[k]!='\0'; k++)
 98          {
 99              lcddat(q[k]);
100          }
101          delay(10000);
102     }
103
104     // keypad char functions
105
106     char keypad()
107     {
108          int x = 0;
109          while (x == 0)
110          {
111              // first row
112              keyrow1 = 0;
113              keyrow2 = 1;
114              keyrow3 = 1;
115              keyrow4 = 1;
116              if (keycolumn1 == 0)
117              {
118                  lcddat('*');
119                  delay(1000);
120                  x = 1;
121                  return '1';
122              }
123              if (keycolumn2 == 0)
124              {
125                  lcddat('*');
126                  delay(1000);
127                  x = 1;
128                  return '2';
129              }
130              if (keycolumn3 == 0)
131              {
132                  lcddat('*');
133                  delay(1000);
134                  x = 1;
135                  return '3';
136              }
137              // second row
138              keyrow1 = 1;
139              keyrow2 = 0;
140              keyrow3 = 1;
141              keyrow4 = 1;
142
143              if (keycolumn1 == 0)
144              {
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145                 lcddat('*');
146                 delay(1000);
147                 x = 1;
148                 return '4';
149             }
150         if (keycolumn2 == 0)
151         {
152                 lcddat('*');
153                 delay(1000);
154                 x = 1;
155                 return '5';
156         }
157         if (keycolumn3 == 0)
158         {
159                 lcddat('*');
160                 delay(1000);
161                 x = 1;
162                 return '6';
163         }
164
165         // third row
166         keyrow1 = 1;
167         keyrow2 = 1;
168         keyrow3 = 0;
169         keyrow4 = 1;
170         if (keycolumn1 == 0)
171         {
172                 lcddat('*');
173                 delay(1000);
174                 x = 1;
175                 return '7';
176         }
177         if (keycolumn2 == 0)
178         {
179                 lcddat('*');
180                 delay(1000);
181                 x = 1;
182                 return '8';
183         }
184         if (keycolumn3 == 0)
185         {
186                 lcddat('*');
187                 delay(1000);
188                 x = 1;
189                 return '9';
190         }
191
192         // forth row
193         keyrow1 = 1;
194         keyrow2 = 1;
195         keyrow3 = 1;
196         keyrow4 = 0;
197
198         if (keycolumn1 == 0)
199         {
200             lcddat('*');
201             delay(1000);
202             x = 1;
203             return '*';
204         }
205         if (keycolumn2 == 0)
206         {
207                 lcddat('*');
208                 delay(1000);
209                 x = 1;
210                 return '0';
211         }
212         if (keycolumn3 == 0)
213         {
214                 lcddat('*');
215                 delay(1000);
216                 x = 1;
```

```
217                    return '#';
218                }
219            }
220    }
221
222    // password check function
223
224    void check()
225    {
226        if (pin[0] == Epin[0] && pin[1] == Epin[1] && pin[2] == Epin[2] && pin[3] == Epin[3] && pin[4] ==
       Epin[4])
227        {
228            delay(1000);
229            lcdcmd(0x01);   //decimal value: 1
230            lcdcmd(0x81);   //decimal value: 129
231            lcddisplay("PIN CORRECT");
232            delay(1000);
233            motorpin1 = 1;
234            motorpin2 = 0;
235            lcdcmd(0xc1);       //decimal value: 193
236            lcddisplay("DOOR OPENED");
237            delay(10000);
238            motorpin1 = 1;
239            motorpin2 = 0;
240            lcdcmd(0x01);     //decimal value: 1
241        }
242        else
243        {
244            lcdcmd(0x01);    //decimal value: 1
245            lcdcmd(0x80);    //decimal value: 128
246            lcddisplay("WRONG PIN");
247            delay(1000);
248            lcdcmd(0x01);      //decimal value: 1
249        }
250    }
```