EMBEDDED C CODE:

#include"c8051F340.h" /\* Header file \*/

void DelayMs(unsigned int Ms); /\* Forward declarations of functions used \*/

void Write\_Command\_Lcd(unsigned char Command);

void Write\_Data\_Lcd(unsigned char Character);

sbit LCD\_RS=P1^5; /\* Labels for the control signals \*/

sbit LCD\_RW=P1^6;

sbit LCD\_EN=P1^7;

sbit soil=P0^0;

sbit Tank=P0^1;

void main()

{

XBR1=0x40; /\* Enable Crossbar for Port 1 and 3\*/

P0MDIN=0x00; /\* P0 pins configured as Digital Inputs\*/

P2MDOUT=0xFF; /\* Configuring Port 1 and Port 2 as output for the required lines \*/

P1MDOUT=0xE0;

P4MDOUT = 0xFF; /\* All P4 pins configured as Output \*/

while(1)

{ /\*Commands for LCDs \*/

Write\_Command\_Lcd(0x38); /\* 0x38 command is sent to the 8-bit LCD which indicates 2 lines 5x7 matrix display \*/

DelayMs(200);

Write\_Command\_Lcd(0x01); /\* 0x01 command to clear display \*/

DelayMs(200);

Write\_Command\_Lcd(0x0E); /\* 0x0E to turn on display and cursor \*/

DelayMs(200);

Write\_Command\_Lcd(0x85); /\* Address from which message is to be displayed \*/

DelayMs(200);

if(soil==1&&Tank==1) /\* If the soil moisture low, and tank water level is high \*/

{

P4 = 0x80; /\* Motor spins clockwise in full stepping mode \*/

DelayMs(1); /\* Delay for controlling speed \*/

P4 = 0x20;

DelayMs(1);

{ /\* For LCD display \*/

Write\_Data\_Lcd('L');

Write\_Data\_Lcd('O');

Write\_Data\_Lcd('W');

Write\_Command\_Lcd(0xc5); /\* Message displayed from 5th position of the second line \*/

Write\_Data\_Lcd('M');

Write\_Data\_Lcd('O');

Write\_Data\_Lcd('I');

Write\_Data\_Lcd('S');

Write\_Data\_Lcd('T');

Write\_Data\_Lcd('U');

Write\_Data\_Lcd('R');

Write\_Data\_Lcd('E');

}

}

else if(soil==1&&Tank==0) /\* If soil moisture level is low and tank water level is low \*/

{

{

P4 = 0x80; /\* Motor spins anti-clockwise in full stepping mode \*/

DelayMs(1); /\* Delay for controlling speed \*/

P4 = 0x08;

DelayMs(1);

}

Write\_Data\_Lcd('L');

Write\_Data\_Lcd('O');

Write\_Data\_Lcd('W');

Write\_Command\_Lcd(0xc5); /\* Message displayed from 5th position

of the second line \*/

Write\_Data\_Lcd('T');

Write\_Data\_Lcd('A');

Write\_Data\_Lcd('N');

Write\_Data\_Lcd('K');

Write\_Data\_Lcd('W');

Write\_Data\_Lcd('A');

Write\_Data\_Lcd('T');

Write\_Data\_Lcd('E');

Write\_Data\_Lcd('R');

}

else

{

{ /\* If soil moisture level is high \*/

P4 = 0x80;

DelayMs(1); /\* Delay for controlling speed \*/

P4 = 0x08;

DelayMs(1);

} /\*LCD display \*/

Write\_Data\_Lcd('H');

Write\_Data\_Lcd('I');

Write\_Data\_Lcd('G');

Write\_Data\_Lcd('H');

Write\_Command\_Lcd(0xc5); /\* Message displayed from 5th position of

the second line \*/

Write\_Data\_Lcd('M');

Write\_Data\_Lcd('O');

Write\_Data\_Lcd('I');

Write\_Data\_Lcd('S');

Write\_Data\_Lcd('T');

Write\_Data\_Lcd('U');

Write\_Data\_Lcd('R');

Write\_Data\_Lcd('E');

}

}

}

void DelayMs(unsigned int Ms)

{

unsigned int n; /\* Value of Ms = 1 n is for comparing \*/

unsigned int i; /\* i is to generate delay of 1ms \*/

for(n=0;n<Ms;n++)

for(i=0;i<65;i++); /\* Count 65 to generate 1ms delay \*/

}

void Write\_Command\_Lcd(unsigned char Command)

{ /\* Data on Port2 needs to be understood as a command by the LCD \*/

LCD\_RS=0; /\* We write 0 to RS bit \*/

LCD\_RW=0; /\* We write 0 to RW bit \*/

P2=Command; /\* Sending value to be sent on LCD to Port2 \*/

LCD\_EN=1; /\* Sending a high to low pulse on enable signal \*/

DelayMs(50);

LCD\_EN=0;

}

void Write\_Data\_Lcd(unsigned char Character)

{ /\* Data on Port2 needs to be understood as a command by the LCD \*/

LCD\_RS=1; /\* We write 1 to RS bit \*/

LCD\_RW=0; /\* We write 0 to RW bit \*/

P2=Character; /\* Sending character to be displayed to Port2 \*/

LCD\_EN=1; /\* Sending character to be displayed to Port2 \*/

DelayMs(50);

LCD\_EN=0;

}