#include "mbed.h"

#include "TextLCD.h"

AnalogIn sm1(p15);

AnalogIn sm2(p16);

AnalogIn sm3(p17);

AnalogIn sm4(p18);

DigitalOut relay(p30);

Serial GPRS(p9,p10);

//Serial ZIGBEE(p13,p14);

Serial pc(USBTX, USBRX); // tx, rx

TextLCD lcd(p26, p25, p24, p23, p22, p21); // rs, e, d4, d5, d6, d7

LocalFileSystem local("local");

DigitalOut uart\_activity(LED2);

char a=26,e=0x22,c=0x0d,t;

char num[]="9663202154";

float s1,s2,s3,s4,m1,m2,m3,m4,m;

int b=100,count;

char col1[]="TIMES",col2[]="SM1",col3[]="SM2",col4[]="SM3",col5[]="SM4";

void SensorRead()

{

lcd.locate(0,0);

lcd.printf("sensor readings\r");

s1=sm1.read();

m1=(0.057\*(s1\*1024))+25.072;

lcd.cls();

lcd.printf("Raw SM1=%0.3f",s1);

wait(2);

s2=sm1.read();

m2=(0.057\*(s2\*1024))+25.072;

lcd.cls();

lcd.printf("Raw SM2=%0.3f",s2);

wait(2);

s3=sm3.read();

m3=(0.057\*(s3\*1024))+25.072;

lcd.cls();

lcd.printf("Raw SM3=%0.3f",s3);

wait(2);

s4=sm4.read();

m4=(0.057\*(s4\*1024))+25.072;

lcd.cls();

lcd.printf("Raw SM4=%0.3f",s4);

wait(2);

m=(m1+m2+m3+m4)/4;

lcd.locate(0,0);

lcd.printf("average value is=%f\n\r",m);

wait(2);

}

void xlfile()

{

//Local storage (On board flash memory of 2MB)

count++;

FILE \*fp=fopen("/local/KAEMS.csv","a");

fprintf(fp,"%d,%0.3f,%0.3f,%0.3f,%0.3f,%0.3f\n",count,m1,m2,m3,m4,m);

fclose(fp);

lcd.cls();

lcd.printf("File updated");

wait(2);

}

//Realy control

void RelayControl()

{

if(m>50)

relay=0;

else

relay=1;

wait(2);

lcd.cls();

lcd.locate(0,0);

lcd.printf("Relay Function...");

wait(2);

}

void Upload()

{

//GPRS commands

lcd.cls();

lcd.locate(0,0);

lcd.printf("Updating BMSEMS...");

wait(3);

GPRS.printf("AT+SAPBR=0,1\r\n");

wait(3);

GPRS.printf("AT+SAPBR=3,1,%cCONTYPE%c,%cGPRS%c\r\n",e,e,e,e);

wait(3);

GPRS.printf("AT+SAPBR=3,1,%cAPN%c,%www%c\r\n",e,e,e,e);

wait(3);

GPRS.printf("AT+SAPBR=1,1\r\n");

wait(3);

GPRS.printf("AT+HTTPINIT\r\n");

wait(2);

GPRS.printf("AT+HTTPPARA=%cCID%c,1\r\n",e,e);

wait(2);

GPRS.printf("AT+HTTPPARA=%cURL%c,%chttp://kaems.org/update.php?u=3&t=23&h=34&s1=%f&s2=24&s3=25&s4=26&ph=5&b=%d%c\r\n",e,e,e,m,b--,e);

wait(2);

GPRS.printf("AT+HTTPDATA=1000,5000\r\n");

wait(10);

GPRS.printf("AT+HTTPACTION=1\r\n");

wait(5);

GPRS.printf("AT+HTTPTERM\r\n");

wait(5);

lcd.cls();

lcd.locate(0,0);

lcd.printf("BMSEMS Updated");

wait(3);

}

void SendMessage()

{

lcd.printf("sending message");

if(m<40)

{

GPRS.printf("AT+CMGS=%c%s%c\r\n",e,num,e);

wait(3);

GPRS.printf(" WATER LEVEL IS LOW \nMoisture IS %f \r\n",m);

wait(1);

GPRS.printf("%c",a);

wait(2);

}

if(m>40)

{

GPRS.printf("AT+CMGS=%c%s%c\r\n",e,num,e);

wait(3);

GPRS.printf(" land has sufficient amount of water \n Moisture IS %f \r\n",m);

wait(1);

GPRS.printf("%c",a);

wait(2);

}

}

int main()

{

lcd.locate(0,0);

lcd.printf("SYSTEM IS ON\n\r");

wait(1);

FILE \*fp=fopen("/local/KAEMS.csv","a");

fprintf(fp,"%s,%s,%s,%s,%s\n",col1,col2,col3,col4,col5);

fclose(fp);

while(1)

{

SensorRead();

xlfile();

RelayControl();

Upload();

SendMessage();

wait(2);

}

}