Bangladesh University of Engineering and Technology

Course No: CSE 316

Course Name: Microprocessors, Microcontrollers, and Embedded Systems

A Report on Sessional Project

Project Name: *Impurity checker for household water reservoir*

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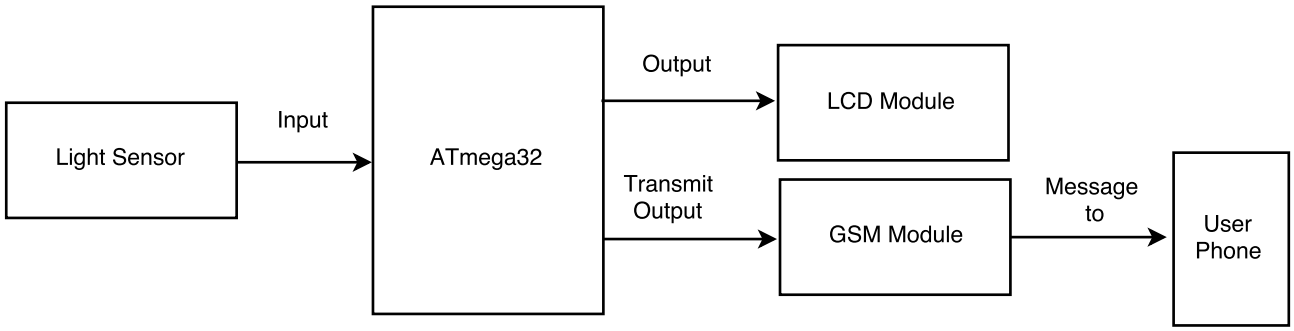
Section: A

Level: 3, Term: 2


Light Sensor
Input
ATmega32
Output
LCD Module
Transmit
Output
GSM Module
Message
to
User
Phone

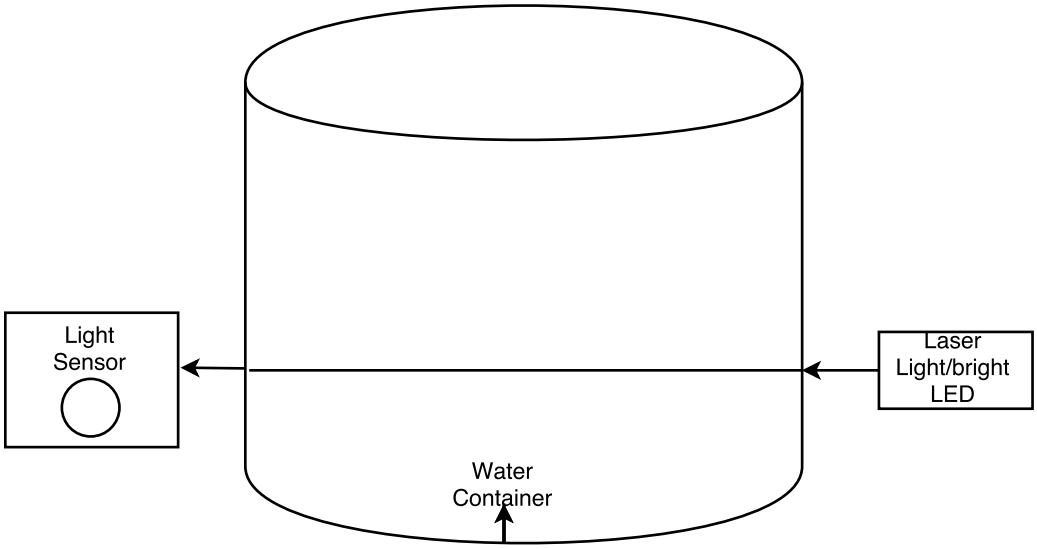


Figure1(a):: Block Diagram of the system

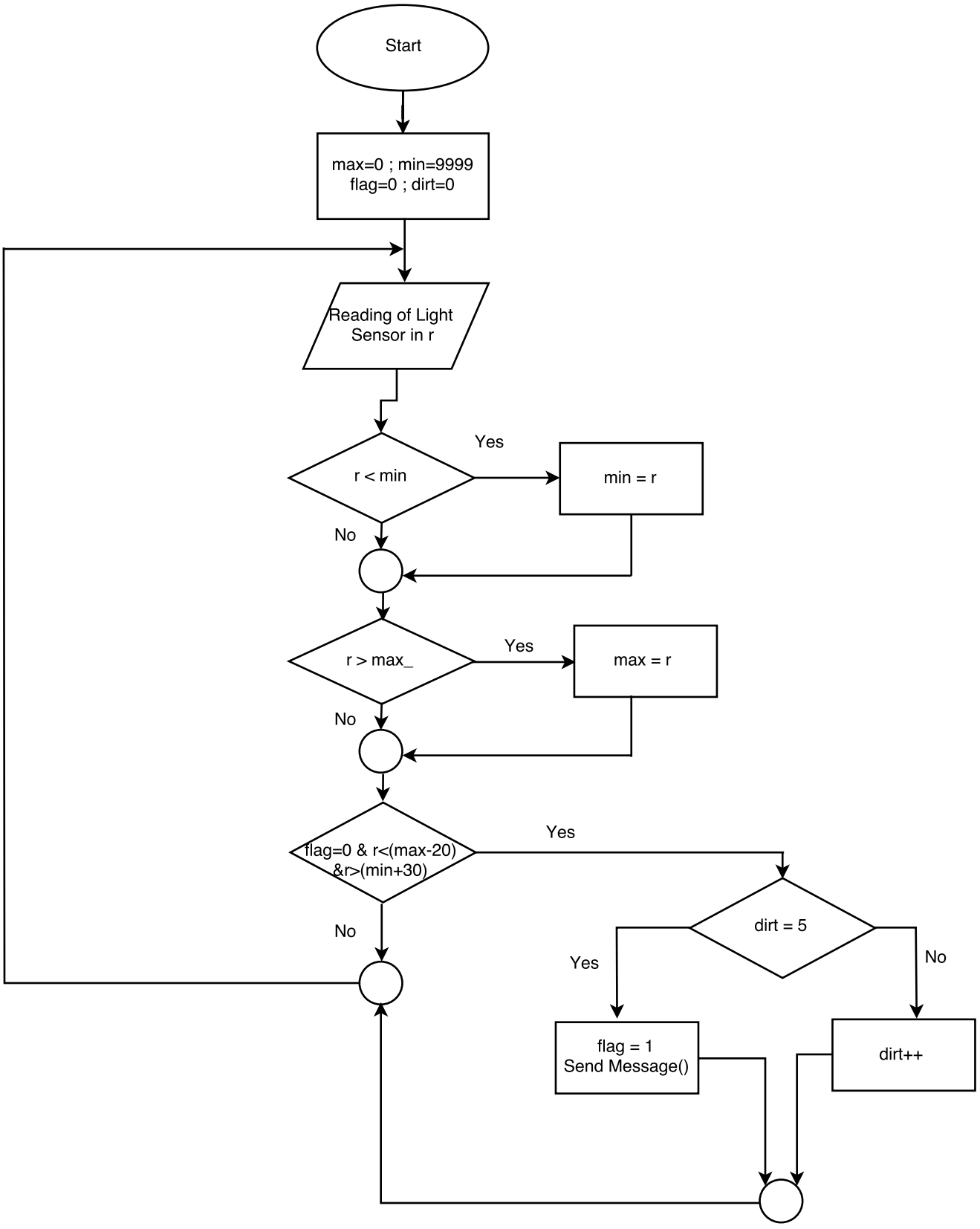
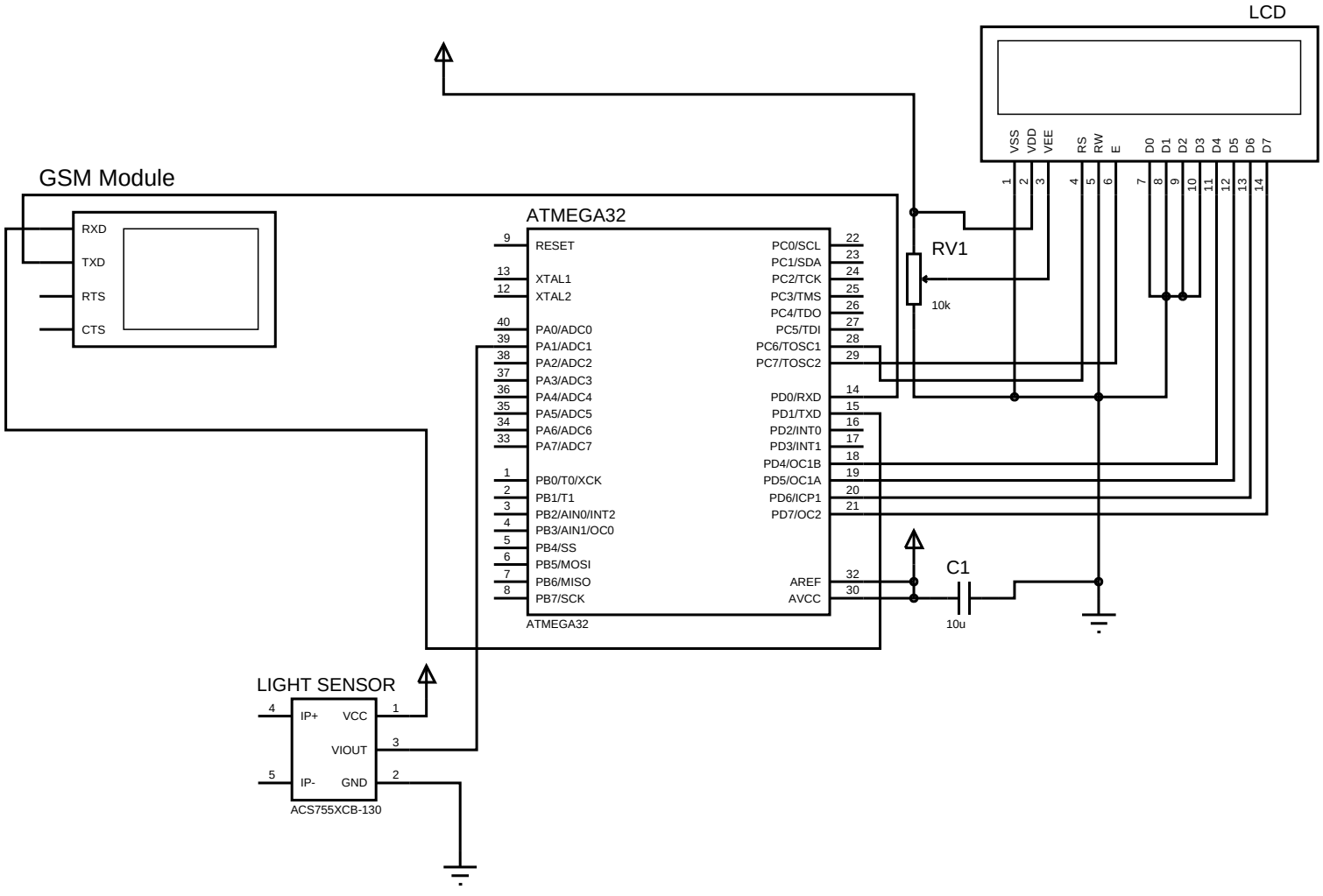


Figure 2 : Flow Chart of working principle


LCD
VSS
VDD
VEE
RS
RW
E
D0
D1
D2
D3
D4
D5
D6
D7
GSM Module
RXD
TXD
RTS
CTS
ATMEGA32
RESET
XTAL1
XTAL2
PA0/ADC0
PA1/ADC1
PA2/ADC2
PA3/ADC3
PA4/ADC4
PA5/ADC5
PA6/ADC6
PA7/ADC7
PB0/T0/XCK
PB1/T1
PB2/AIN0/INT2
PB3/AIN1/OC0
PB4/SS
PB5/MOSI
PB6/MISO
PB7/SCK
PC0/SCL
PC1/SDA
PC2/TCK
PC3/TMS
PC4/TDO
PC5/TDI
PC6/TOSC1
PC7/TOSC2
PD0/RXD
PD1/TXD
PD2/INT0
PD3/INT1
PD4/OC1B
PD5/OC1A
PD6/ICP1
PD7/OC2
AREF
AVCC
ATMEGA32
RV1
10k
C1
10u
LIGHT SENSOR
IP+
VCC
VIOUT
IP-
GND
ACS755XCB-130

Features implemented :

1. Detecting the impurity of water
2. Sending warning message to user

What is turbidity of water:

Turbidity is the cloudiness or haziness of a fluid caused by large numbers of individual particles that are generally invisible to naked eyes, similar to smoke in air. The measurement of turbidity is a key test of water quality.

Measurement of turbidity :

The particles suspended in the water will scatter a light beam focused on them. The scattered light is then measured at various angles from the incident light path. This is now accepted as a more precise measure of turbidity. When less light is being reflected by sediment the turbidity of a fluid is lower.

Working principle of light sensor

Model : MOD-00063
Operating voltage : 5 V
Light sensor consists of a board of LDR (Light dependent resistor). It has three pins namely VCC, GND and OUT. This light sensor gives analog output. We will get the output using the OUT pin .

Working principle of GSM Module:

MODEL : SIM900
Operating Voltage: 5V
GSM stands for global system for mobile communication. This technology lets user to communicate with others across the mobile networks hence it offers a vast area of coverage.
The TX Pin of the module is connected with the RX pin of micro controller and RX pin is connected with the TX pin of microcontroller.

GSM does serial communication with micro controller. So the signal transmitter by ATmega will be received by GSM and which is sent by GSM will be received by ATmega. But in our project , we need to only send signal from ATmega to GSM .

Purity measurement :

The reading in light sensor will be maximum when the water is clean and it will decrease with the addition of dirt.

Water	**Light**	**Reading**
Clean Water	Room light	R=minimum
Clean Water	Bright LED	R=maximum
Water with dirt	Bright LED	R<=maximum-20

Actually , this minimum and the maximum value is not fixed. It varies with the change of room light (will be different in sunny weather and in rainy day). So, for our project, we initially fixed the minimum value without switching on the bright LED and the maximum value switching on the LED through the clean water .
When the reading is decreased by 20 or more than the maximum value then we can mark the water as impure.
If the bright LED is switched off, then the reading is deceased to minimum level. So a checking is also added to ensure that due to sudden change of light may not give wrong information about the purity of water.
If consecutive five readings give the decreased value then a warning message is sent to user.

Header Used:

16x2 LCD (Liquid Crystal Display) module can be used in 8 bit or 4 bit mode. In our project, we use the 4 bit mode. We've used "lcd.h" header for different features.
Used Functions:
Lcd4_Init : To initialize the pins
Lcd4_Clear: To clear the screen of LCD display
Lcd4_Set_Cursor: To set the cursor to write at a particular position in the LCD

Lcd4_Write_String: To show any string in the display

Problems faced :

There are two pins in GSM module named RXD and 900R pin . Both of them are used to receive data. But when we are using TXD pin, it was not working. So after some tries, we changed the connection to 900R pin, then it worked successfully. Again , we've used Robi sim in our GSM module. While we were trying to send message to another operator other than robi we didn't get successful results. There may be some network issues.

Due to unavailability of PH meter, we could not check the PH level of the water.

YouTube Link of project:

https://www.youtube.com/watch?v=R-pLgDSSXQ0&feature=youtu.be