Arduino Digital Clock

A Project

Presented to the Faculty of the

School of Management and Information Technology

Information Systems Program

De La Salle – College of Saint Benilde

Manila

In Partial Fulfillment

of the Requirements for the subject

ELECTIVE 1: EMBEDDED SYSTEMS

Submitted By:

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Professor

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RUBRICS FOR
EMBEDDED SYSTEMS – FINAL PROJECT

Project Title: Arduino Digital Clock

Name of Students	Project Rating 50%	Presentation Rating 50%	Total Rating 100%
Dahilig, Ralph Lance M.			

PROJECT CRITERIA	Highly Implemented	Satisfactory Implemented	Fairly Implemented	Partially Implemented	Not Implemented
Functionality Does the proposed design consists of adequate and suitable features?	20	17	14	11	8
Accuracy Are the expected operations can be executed correctly?	20	17	14	11	8
Usability Does proposed product design can be easily operated and appealing to the user.	20	17	14	11	8
Hardware and Software Design Does the project use the appropriate hardware and software components to perform the required processes?	20	17	14	11	8
Documentation Are the required parts of the document present?	20	17	14	11	8
TOTAL					
PRESENTATION CRITERIA	**Highly Achieved**	**Satisfactory Achieved**	**Fairly Achieved**	**Partially Achieved**	**Not Achieved**
Video Presentation Is the video demo clear, organized, and well-presented?	30	26	22	18	14
Voice Quality, Delivery, & Content Explains clearly and understandably	50	43	36	29	22
Time Management Finishes within the prescribe time with appropriate pacing	20	17	14	11	8
TOTAL					
REMARKS					

A. INTRODUCTION

Time is very essential to everyone and its value is considered to be as one of the most precious resources that no one can get or turn back to. Leading to the problem of time management, managing it poorly or well will certainly have an impact on one`s life. Good time management will help oneself to improve, whether it`s work or at home and will ensure you to make the most out of every moment in time.

B. PROJECT DESCRIPTION

The project is about a Digital Arduino Clock and would simply assist and help the user to keep track of his/her time and would have an option to set an alarm if needed. The digital clock helps manage time for routine activities from waking up in the morning and setting schedules in advance.

C. SCOPE AND LIMITATION OF THE PROJECT

The project is capable of storing the present time and date automatically with the help of the RTC DS1302 Module keeping it up to date and making it accurate. The display is shown through a 16x2 LCD with an I2C adapter. The alarm is controlled by 4 push buttons, which in button 1 the user is able to set the alarm showing the hour and minute display then followed by the functions for button 2 (hour) and 3 (minute) where in the user can set the time for the alarm and lastly button 4 is when the desired time is set you can exit to the main time display. The last component is the buzzer which produces the sound for the alarm.

However, the project will not cover the following:

- It will not be enclosed in a casing because of limited materials.
- There will be minor bugs with the program due to limited knowledge and experience.
- Program must be supplied with power (battery, adapter, usb cable , etc.)

D. CONCEPT OF OPERATION

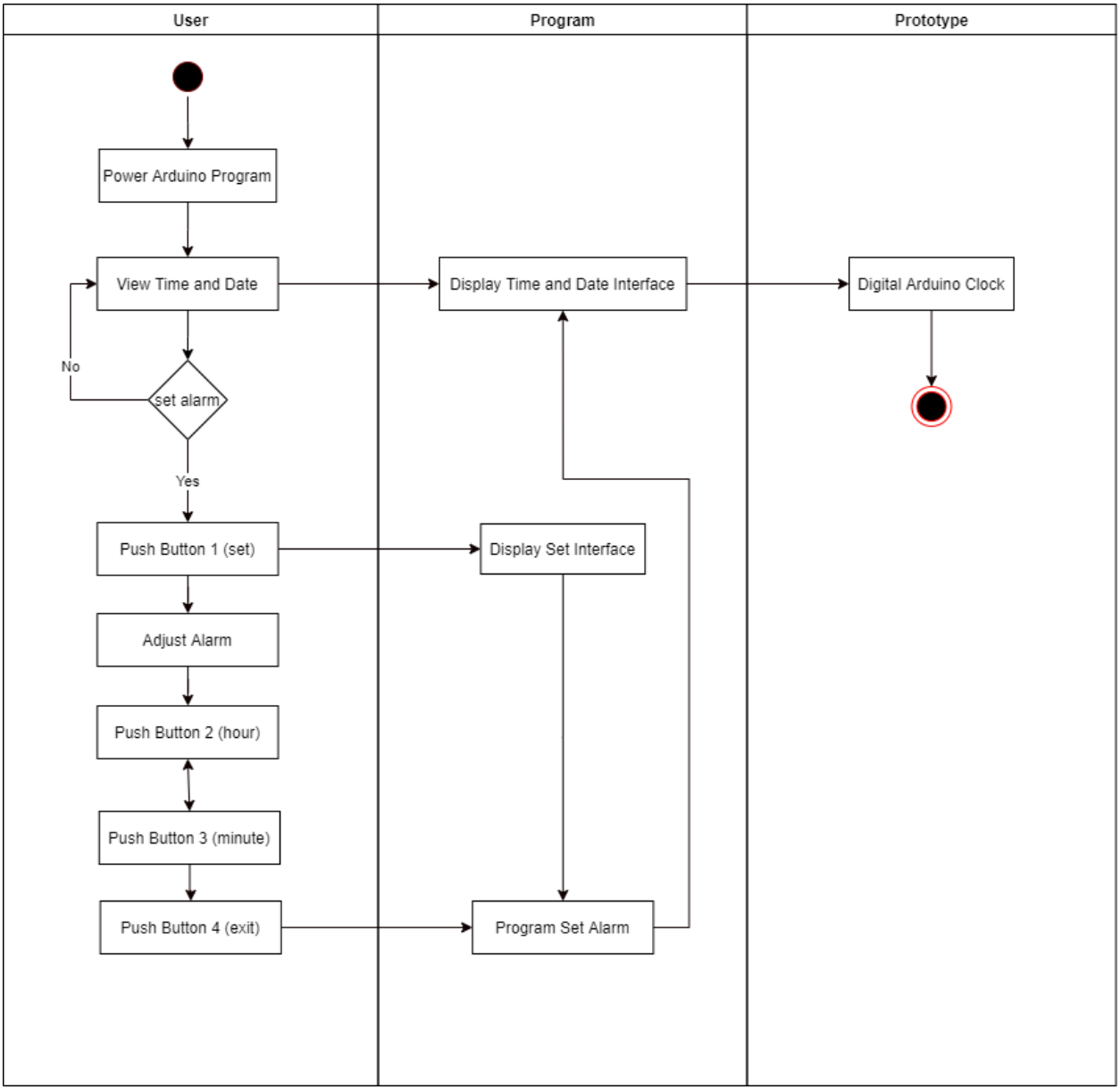

Fig. 1 **System Architecture**

- This figure presents the entire system which includes the user, the technology, and the product itself.
- The Use Case Diagram represents the relationship of the user and the program in which different cases of interaction are showcased.

E. PRESENTATION OF THE PROJECT PROTOTYPE

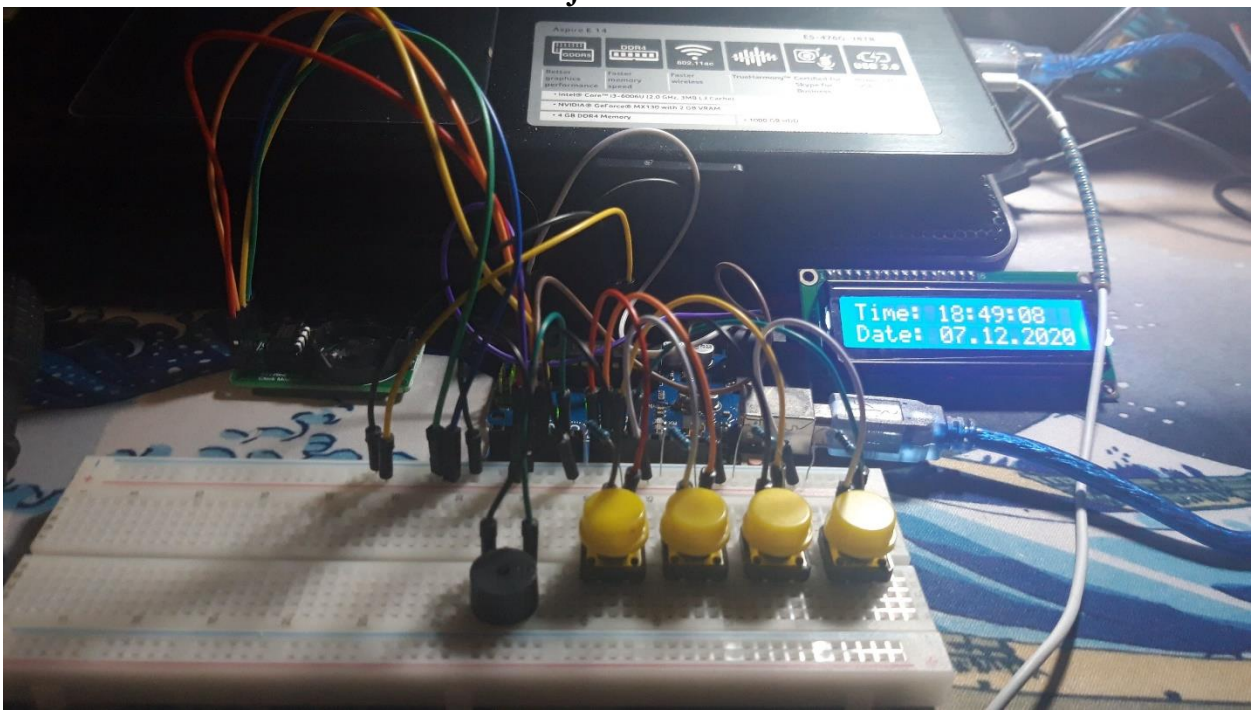

Fig. 2 Power Arduino + Program

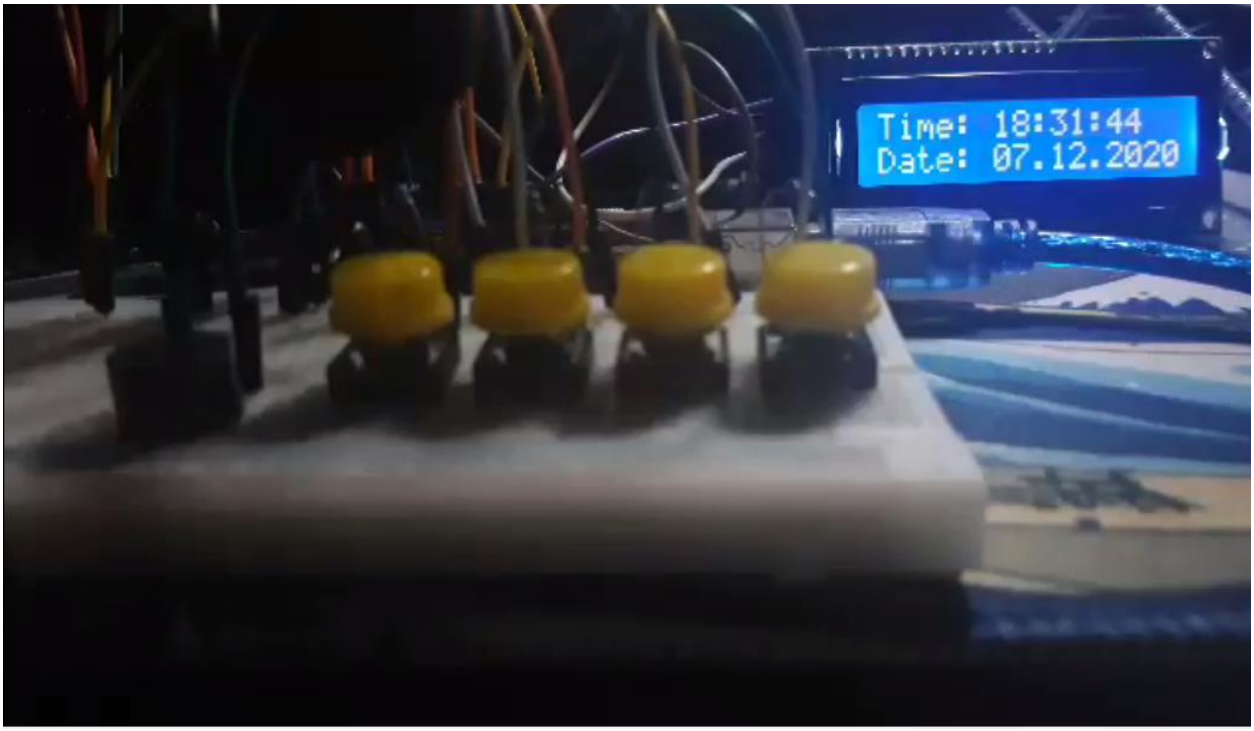

Fig. 3 Time and Date Interface

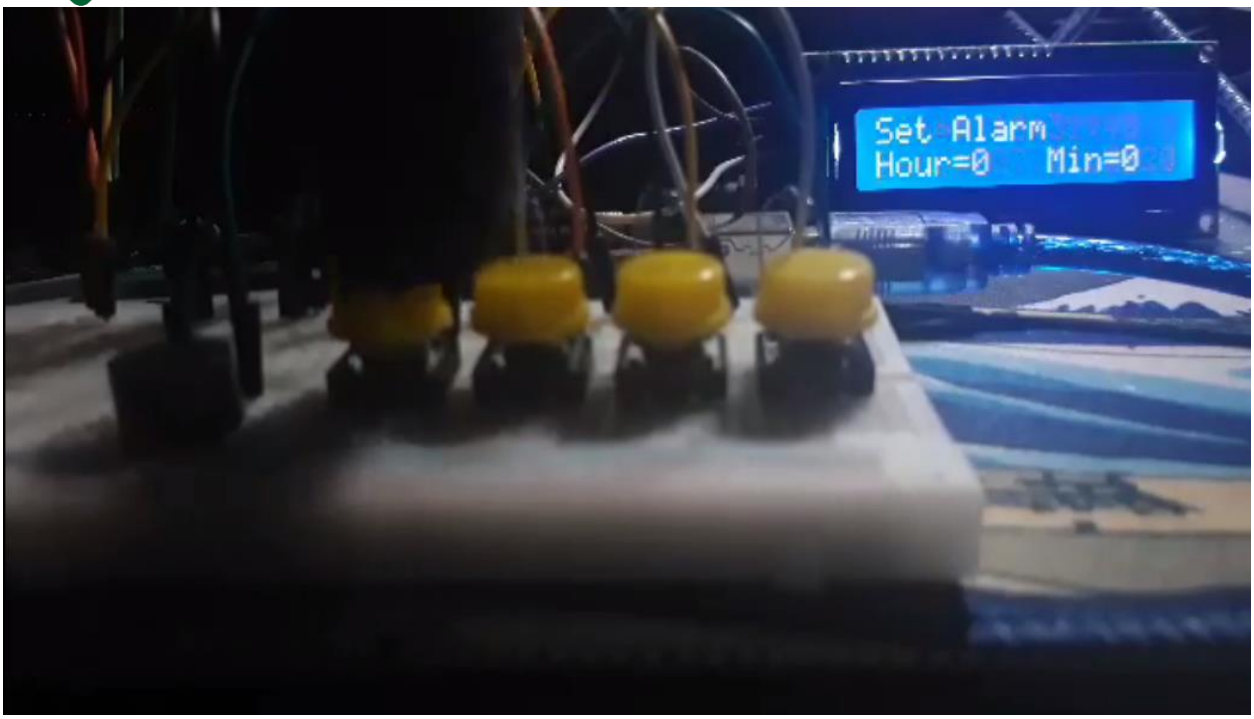

Fig. 4 Set Alarm

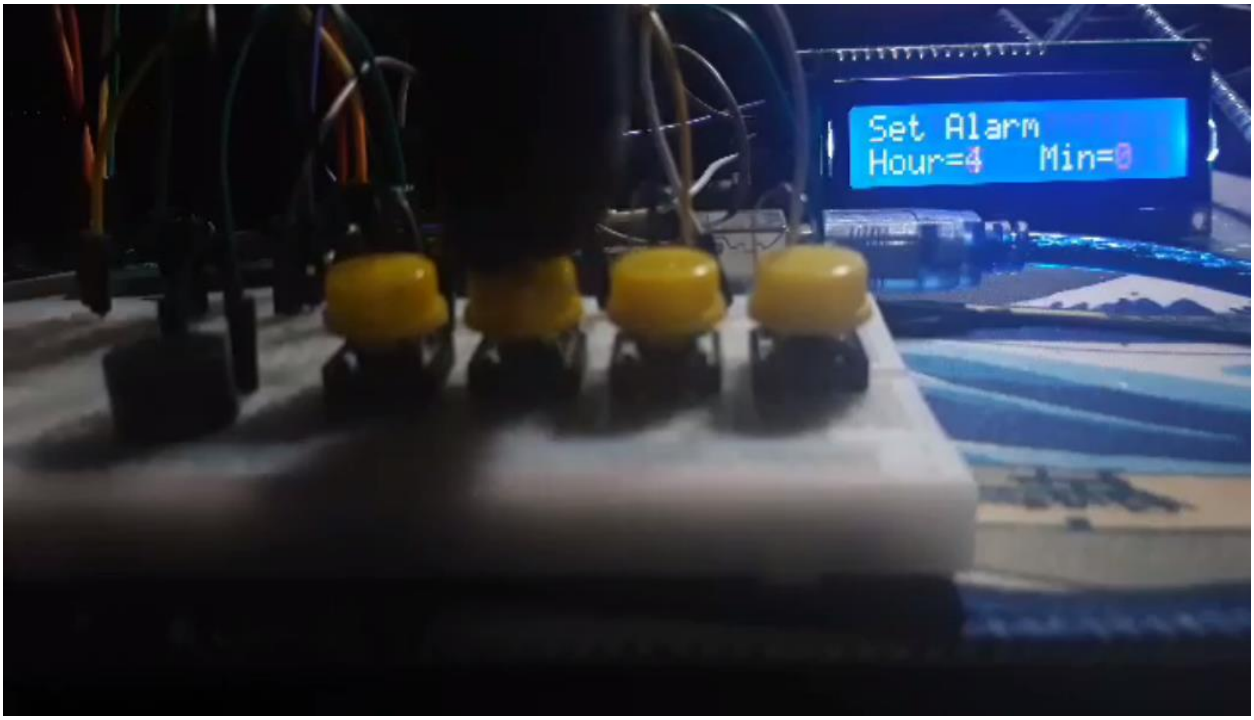

Fig. 5 Adjust alarm push button 2 (hour)

Fig. 5 Adjust alarm push button 3 (minute)

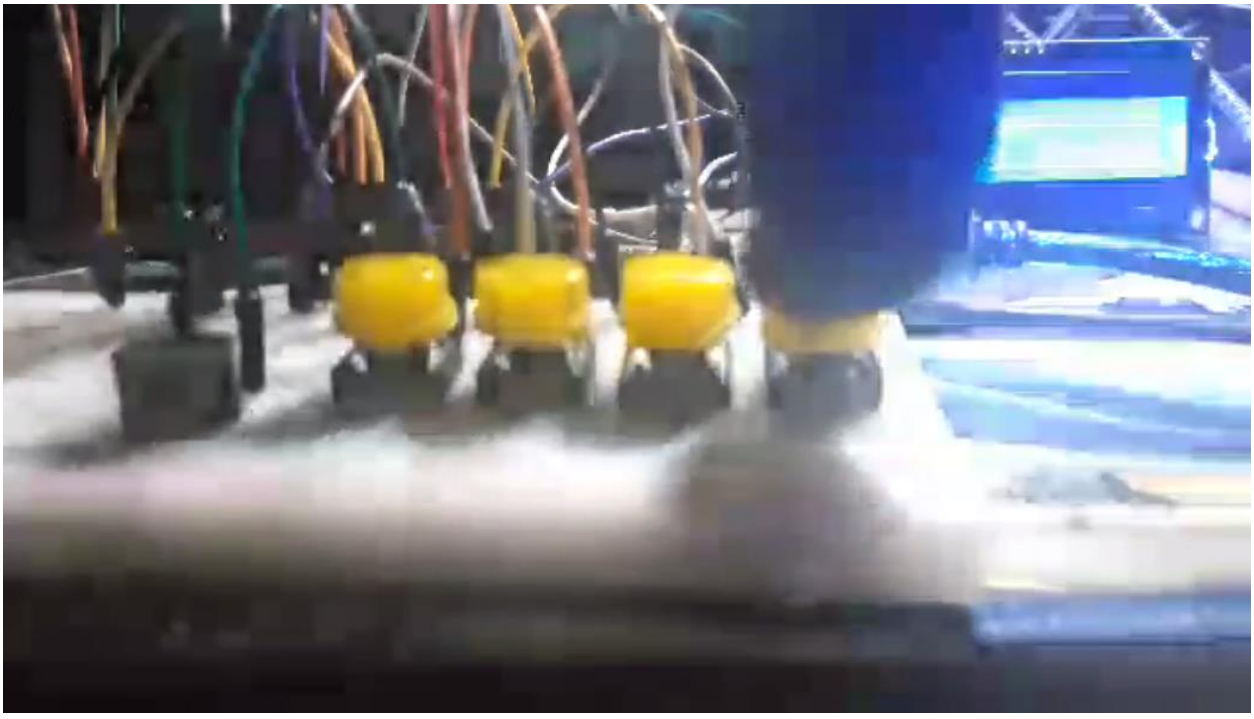

Fig. 5 Exit alarm push button 4 (exit)

F. HARDWARE COMPONENTS

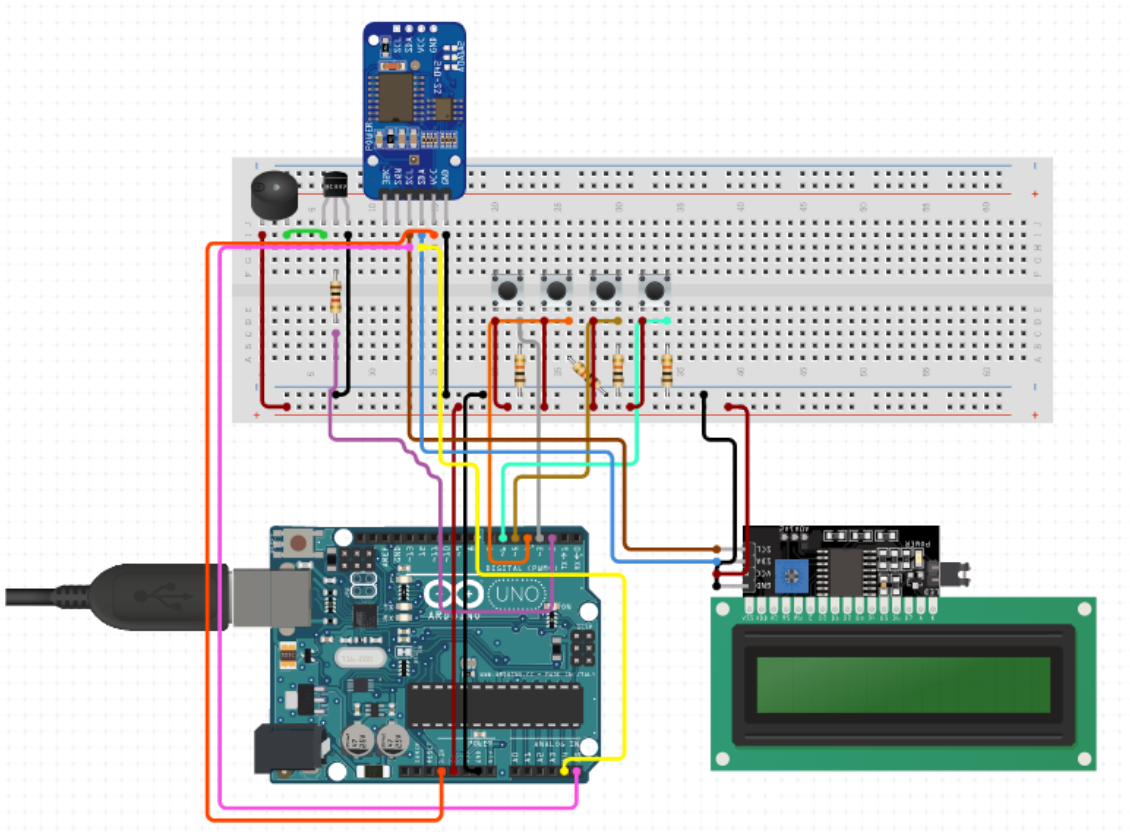

Fig. 4. **Circuit Diagram**

RTC Module (DS1302 used in the prototype)

- RTC simply means Real Time Clock, this module remembers the present Time and Date
- It contains a time-keeping chip that contains a real-time clock/calendar with 31 bytes of static RAM

I2C LCD 16x2

- A display module that is able to display 16 characters per line (2)
- The I2C works along the 2 wires SCL and SDA which synchronizes the data transfer between the devices

Push Button Switches

- Operates with momentary action depending on the program

Piezzo Buzzer

- Produces sound when electric signal is applied

G. ARDUINO SOURCE CODE

```
#include <Wire.h>

#include <LiquidCrystal_I2C.h>


LiquidCrystal_I2C lcd(0x27, 16, 2);


#include <DS1302.h>

DS1302 rtc(2, 3, 4);


 int Hour;

 int Min;

 int h;

 int m;


 int bset = 8;

 int bhour = 9;

 int bmin = 10;

 int bexit = 11;


 int buttonforset = 0;

 int buttonforhour = 0;

 int buttonformin = 0;

 int buttonforexit = 0;

 int activate=0;


 int buzzer = 6;

 Time t;
```

```
void setup() {
    pinMode(bset, INPUT);
    pinMode(bhour, INPUT);
    pinMode(bmin, INPUT);
    pinMode(bexit, INPUT);

    rtc.halt(false);
    rtc.writeProtect(false);

    lcd.begin();
}
void loop() {
 if (activate == 0) {
    lcd.setCursor(0, 0);
    lcd.print("Time: ");
    lcd.setCursor(6, 0);
    lcd.print(rtc.getTimeStr());
    lcd.setCursor(0, 1);
    lcd.print("Date: ");
    lcd.setCursor(6, 1);
    lcd.print(rtc.getDateStr());
    t = rtc.getTime();
    Hour = t.hour;
    Min = t.min;
    buttonforset = digitalRead(bset);
   }
```

```
if (buttonforset == HIGH) {
    activate =1;
    lcd.clear();
    }
 while(activate== 1){
    lcd.setCursor(0,0);
    lcd.print("Set Alarm");
    lcd.setCursor(0,1);
    lcd.print("Hour= ");
    lcd.setCursor(9,1);
    lcd.print("Min= ");
    buttonforhour = digitalRead(bhour);

 if (buttonforhour == HIGH){
     h++;
     lcd.setCursor(5,1);
     lcd.print(h);
     if (h>23){
     h=0;
     lcd.clear();
     }
     delay(100);
     }
     buttonformin = digitalRead(bmin);
```

```
if (buttonformin == HIGH){
    m++;
    lcd.setCursor(13,1);
    lcd.print(m);
    if (m>59){
    m=0;
    lcd.clear();}
    delay(100);
    }
    lcd.setCursor(5,1);
    lcd.print(h);
    lcd.setCursor(13,1);
    lcd.print(m);
    buttonforexit = digitalRead(bexit);

if (buttonforexit == HIGH){
    activate = 0;
    lcd.clear();
    }
}

if (Hour== h && Min== m) {
   tone(6,400,300);
}
delay (500);
}
```

H. VIDEO PRESENTATION OF THE PROTOTYPE

a. Create a youtube channel (*if you don't have one yet*). Take a **short video demo** (maximum of 10 minutes) of your **final project (working prototype)** and have each member of the group explain portion of the program and circuit. This will be the basis of your individual presentation (no need for synchronous Q & A).

Paste a **clickable link** of your youtube video demo here:
https://youtu.be/rylDPFjTLyk

DESIGNER'S PROFILE ***(Sample Layout ONLY / You can use your own)***

Dahilig, Ralph Lance M.

OBJECTIVE:

I want to become a successful programmer.

PERSONAL INFO

- **Nickname** : Ralph
- **Age** : 21
- **Birthday** : June 11, 1999
- **Birthplace** : Caloocan
- **Religion** : Catholic
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EDUCATIONAL BACKGROUND

- **College** : BS Information System
  De La Salle University – College of Saint Benilde
  Manila
  2018 - present
- **High school** : School Name: Notre Dame of Greater Manila
  Location: Grace Park, Caloocan City
  Inclusive years: 2006 - 2018

SPECIAL SKILLS & INTERESTS

- Programming
- Cycling