Ahsanullah University of Science & Technology
Department of Computer Science & Engineering
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CSE 3216
Microcontroller Based System Design Lab

Project Final Report

Project Name: ***Automated Attendance System***

Submitted To

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Objective

Automated Attendance System are commonly used systems to mark the presence in offices and schools. This project has a wide application in schools, colleges, business organizations, offices where marking of attendance is required accurately with time. By using the password input, the system will become more secure for the users.

Social Values

This system will be very helpful as it saves time to take attendance and it will be more secure and no one can give other's attendance. As it is a very cheap device,every institution can easily use it. This device will save all data inside a memory and it will help to track every students

Required Components

These following parts and tools are required for building this project

- Arduino Mega 2560R3
- RTC Module (DS3231 or DS1307)
- 20 X 4 LCD
- Hex Keypad
- Buzzer
- LED
- 10K Potentiometer

Design

The circuit diagram is given below.

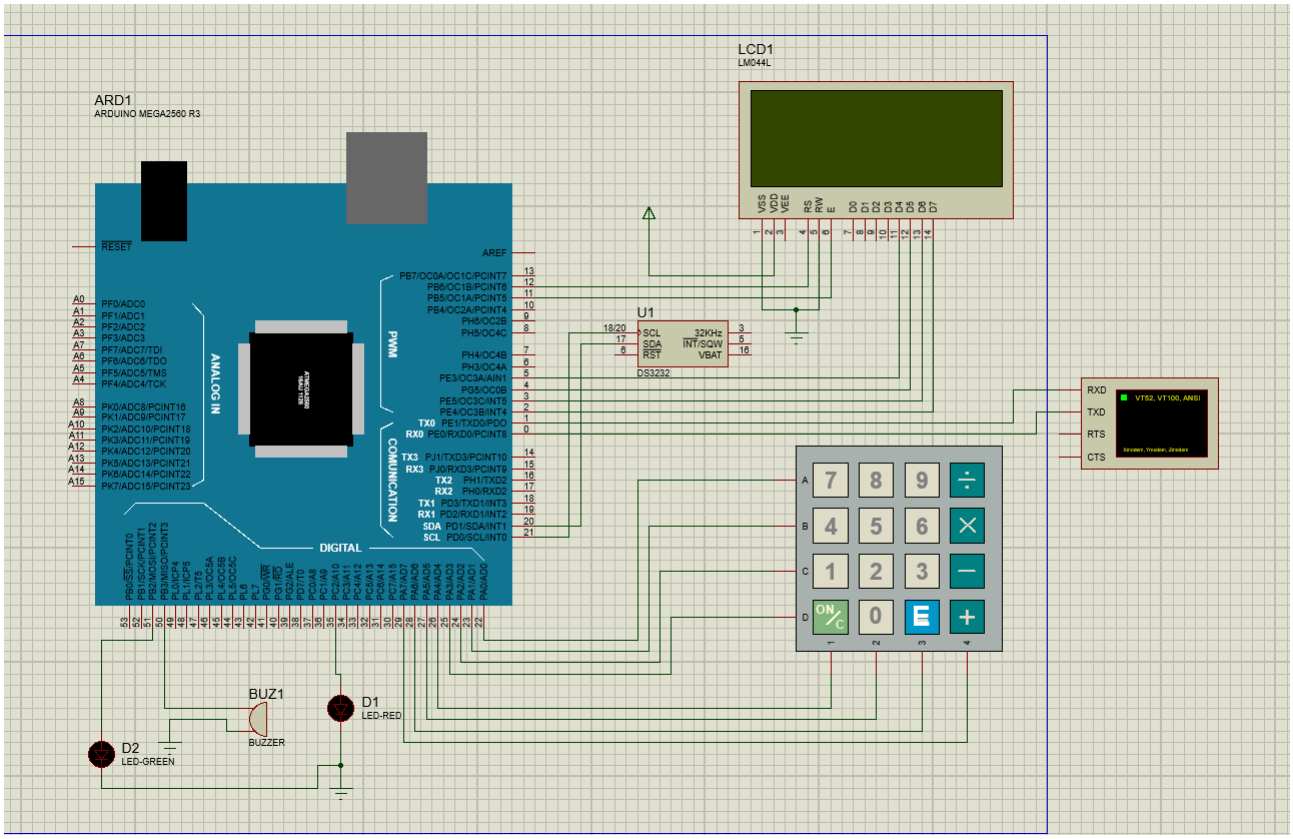


Figure 1: Diagram for Automated Attendance System

Working Procedure

The working of the Password Based Automated Attendance System. In this project, we have used a DS3231 RTC Module for time and date display. We used 1 LED for power indication, 1 buzzer for different function indication. We have interfaced 20*4 LCD which displays everything whenever the password is entered as star, or registering attendance or downloading data to SD Card.

The components that take password input from the environment is

- HEX Keypad

The components that will show output

- 20x4 LCD Display

There are some letter command that we will take input using HEX keypad and will do basic control.

- At the beginning we will show the date and time using LCD display and there will be a option to go to menu.
- In menu section, four option to select A for Start Attendance, B for Register, C for Delete and D for Home.
- In Start Attendance, user need to input Class Code and proceed. There are clear option for clear display and back option for go back to menu.
- After giving the class code a input will appear for class pin by teacher to verification.
- After Verification student will get the option for joining the class and teacher can finish the class by finish option.
- After joining input for student ID and pin will appear and options for confirm and back will be there. By OK option the attendance of a particular student will store.
- By selecting register option, input option will appear for ID input and after that option for pin will appear for user input.
- In delete option, input option for ID which user want to delete will appear and after the input pin input option will appear for admin user. After confirming the pin selected ID will be deleted.
- Last option class info will show the IDs of presented students. DELETE RECORD option will delete all presented students' IDs. In SHOW ID option user have option to see next and previous contents.

Estimated budget

Equipment	**Quantity**	**Budget(TK)**
Arduino Mega 2560	1	750
RTC Module(DS3231 or DS1307)	1	30
20X4 LCD display	1	300
Hex keypad	1	74
Buzzer	1	15
LED	1	5
10K potentiometer(variable resistance)	1	20
Total		**1194**

Code

```
#include <LiquidCrystal.h>
#include <Keypad.h>
#include <DS3231.h>
#include <EEPROM.h>
#include<Math.h>
#include "RTClib.h"
int buzz=50;
const int rs = 12, en = 11, d4 = 5, d5 = 4, d6 = 3, d7 = 2;
DS3231  rtc(SDA, SCL);
LiquidCrystal lcd(rs, en, d4, d5, d6, d7);
String pin = "";
String c_info_pin = "";
String code = "";
String c_info_code = "";
String id = "";
String admin_pin = "1234";
String student_pin = "";
String submitted_id = "";
String submitted_pin = "";
int classRoom_address = 0, t2;
int deleted_registered_student_address = 0;
const byte ROWS = 4; //four rows
const byte COLS = 4; //four columns
//define the cymbols on the buttons of the keypads
char hexaKeys[ROWS][COLS] = {
  {'7', '8', '9', 'A'},
  {'4', '5', '6', 'B'},
  {'1', '2', '3', 'C'},
  {'S', '0', '=', 'D'}
};
byte rowPins[ROWS] = {22, 23, 24, 25}; //connect to the row pinouts of the keypad
byte colPins[COLS] = {26, 27, 28, 29}; //connect to the column pinouts of the keypad

//initialize an instance of class NewKeypad
Keypad cusKeypad = Keypad( makeKeymap(hexaKeys), rowPins, colPins, ROWS, COLS);
```

```
Time t;
int Screen = 2;
String s;
void setup() {
  pinMode(buzz,OUTPUT);
  pinMode(35,OUTPUT);
  pinMode(51,OUTPUT);


  rtc.begin(); // Initialize the rtc object
  lcd.begin(20, 4);
  lcd.clear();
  //The following lines can be uncommented to set the date and time
  rtc.setDOW(FRIDAY);     // Set Day-of-Week to SUNDAY
  rtc.setTime(20, 37, 0);     // Set the time to 12:00:00 (24hr format)
  rtc.setDate(04, 9, 2020);   // Set the date to January 1st, 2014
  t2 = t.year - 2000;
  Serial.begin(9600);
  //s = rtc.getMonthStr();

  //  Serial.print(t2);
  //  Serial.print(t.year, DEC);

  //Initialize_EEPROM();

  store_multiple_student_info();
  read_student_info();
  read_classroom_info();
  //  insert_Classroom_info(5);
  //  insert_Classroom_info(18);
  //  insert_Classroom_info(31);
  //  insert_Classroom_info(44);
  //  insert_Classroom_info(57);
  //code_kam_kore_na();
}

void loop() {
```

```
73  t = rtc.getTime();
74  char key = cusKeypad.getKey();
75  if (Screen == 2) {                    //
      ____________________Screen 2____________________
76    lcd.clear();
77    ShowDateTime();
78    Display(2, 2, "Press A for menu");
79    while(key != 'A'){
80      key = cusKeypad.getKey();
81      Screen = 3;
82    }
83  }
84  else if (Screen == 3)               //
      ____________________Screen 3____________________
85  {
86    //Screen = 3;
87    lcd.clear();
88    Display(1, 0, "A: Start Attendance");
89    Display(1, 1, "B: Register");
90    Display(1, 2, "C: Delete");
91    Display(1, 3, "D: Home");
92    Display(9, 3, "E:C_INFO");
93    while (true) {
94      key = cusKeypad.getKey();
95      if (key == 'A') {
96        Screen = 5;
97        Serial.println("A");
98        break;
99      } else if (key == 'B') {
100       Screen = 11;
101       Serial.println("B");
102       break;
103     } else if (key == 'C') {
104       Screen = 12;
105       Serial.println("C");
106       break;
107     } else if (key == 'D') {
108       Screen = 2;
109       Serial.println("D");
110       lcd.clear();
111       break;
```

```
112         }
113         else if (key == '=') {
114           Screen = 15;
115           Serial.println("E");
116           break;
117         }
118       }
119
120     }
121     else if (Screen == 5) {                //
        ____________________Screen 5_____________________
122       lcd.clear();
123       Display(0, 0, "Enter ClassCode:");
124       Display(0, 1, "0:3211");
125       Display(0, 2, "1:3213");
126       Display(7, 1, "2:3215");
127       Display(7, 2, "3:3216");
128       Display(14, 1, "4:3223");
129       Display(0, 4, "A:OK");
130       Display(5, 4, "B:Clear C:Back");
131
132       while (true) {
133         key = cusKeypad.getKey();
134         if (key == '0' || key == '1' || key == '2' ||
            key == '3' || key == '4') {
135           code = (char)key;
136           Display(17, 0, code);
137         } else if (key == 'A' ) {
138           if (code != "") {
139             Screen = 6;
140             break;
141           }
142
143         }
144
145         else if (key == 'B') {
146           code = " ";
147           //Screen=5;
148           Display(17, 0, code);
149
150
```

```
151       } else if (key == 'C') {
152         Screen = 3;
153         break;
154       }
155     }
156   }
157   else if (Screen == 11) {           //
        _____________________Screen 11_____________________
158     lcd.clear();
159     Display(1, 0, "Register ID:");
160     Display(1, 3, "A:OK B:Clear C:BACK");
161     id = "";
162     while (true) {
163       key = cusKeypad.getKey();
164       if (key == '0' || key == '1' || key == '2' ||
            key == '3' || key == '4' || key == '5' ||
            key == '6' || key == '7'
165           || key == '8' || key == '9') {
166         id += (char)key;
167         Display(14, 0, id);
168       }
169       else if (key == 'A') {
170         if (check_duplicate_register_id(id.toInt()))
              {
171           lcd.clear();
172           Display(4, 1, "DUPLICATE ID");
173           Display(7, 2, "FOUND");
174           tone(buzz,1000);
175           digitalWrite(35,HIGH);
176           delay(1000);
177           digitalWrite(35,LOW);
178           noTone(buzz);
179
180           break;
181         } else {
182           digitalWrite(51,HIGH);
183           delay(1000);
184           digitalWrite(51,LOW);
185           Screen = 14;
186           break;
187         }
```

```
188
189         }
190         else if (key == 'B') {
191           Screen = 11;
192           break;
193         } else if (key == 'C') {
194           Screen = 3;
195           break;
196         }
197
198       }
199     }
200     else if (Screen == 14) {              //
        _____________________Screen 14_____________________
201       lcd.clear();
202       Display(2, 0, "Enter PIN:");
203       Display(1, 3, "A:OK B:Clear C:BACK");
204       student_pin = "";
205       while (true) {
206         key = cusKeypad.getKey();
207
208         if (key == '0' || key == '1' || key == '2' ||
            key == '3' || key == '4' || key == '5' ||
            key == '6' || key == '7'
209           || key == '8' || key == '9') {
210           student_pin += (char)key;
211           for (int i = 0; i < student_pin.length(); i
              ++) {
212             Display(12 + i, 0, "*");
213           }
214
215         }
216         else if (key == 'A' &&  student_pin!="" ) {
217           store_student_info(EEPROM.read(1001) * 5 +
              EEPROM.read(1003));
218           Screen = 2;
219           lcd.clear();
220           Display(4, 1, "Succesfully");
221           Display(5, 2, "Registered");
222           digitalWrite(51,HIGH);
223           delay(2000);
```

```
224           digitalWrite(51,LOW);
225           break;
226         }
227         else if (key == 'B') {
228           Screen = 14;
229           break;
230         }
231         else if (key == 'C') {
232           Screen = 3;
233           break;
234         }
235
236       }
237
238     }
239     else if (Screen == 12) {       //
          _____________________Screen 12_____________________
240       lcd.clear();
241       Display(1, 0, "ID:␣");
242       Display(1, 1, "A:SUBMIT␣B:CLEAR");
243       Display(1, 2, "C:BACK");
244       String submitted_delete_id = "";
245       while (true) {
246         key = cusKeypad.getKey();
247         if (key == '0' || key == '1' || key == '2' ||
              key == '3' || key == '4' || key == '5' ||
              key == '6' || key == '7'
248               || key == '8' || key == '9') {
249
250           submitted_delete_id += (char)key;
251           Display(5, 0, submitted_delete_id);
252         }
253         else if (key == 'A') { //SUBMIT
254           int starting_student_info_address = EEPROM.
                read(1001);
255           bool isFound_ID = false;
256           for (int i = 210; i < 210 +
                starting_student_info_address * 5; i += 5)
                 {
257             if (EEPROM.read(i) == submitted_delete_id.
                  toInt()) {
```

```
258             deleted_registered_student_address = i;
259             isFound_ID  = true;
260             break;
261           }
262         }
263         if (isFound_ID) {
264           Screen = 13;
265           submitted_delete_id = "";
266           break;
267         } else {
268           lcd.clear();
269           Display(1, 1, "NOT␣FOUND");
270           digitalWrite(35,HIGH);
271           delay(2000);
272           digitalWrite(35,LOW);
273           break;
274         }
275       } else if (key == 'B') { //CLEAR
276         submitted_delete_id = "␣␣␣␣";
277         Display(5, 0, submitted_delete_id);
278         submitted_delete_id = "";
279
280       } else if (key == 'C') { //BACK
281         Screen = 3;
282         break;
283       }
284     }
285   } else if (Screen == 13) {     //
      ____________________Screen 13_____________________
286     lcd.clear();
287     Display(1, 0, "ADMIN␣PIN:␣");
288     Display(1, 1, "A:SUBMIT␣B:CLEAR");
289     Display(1, 2, "C:BACK");
290     String submitted_admin_pin = "";
291     while (true) {
292       key = cusKeypad.getKey();
293
294       if (key == '0' || key == '1' || key == '2' ||
            key == '3' || key == '4' || key == '5' ||
            key == '6' || key == '7'
295           || key == '8' || key == '9') {
```

```
296
297           submitted_admin_pin += (char)key;
298           Display(12, 0, submitted_admin_pin);
299         }
300         else if (key == 'A') { //SUBMIT
301           if (submitted_admin_pin == admin_pin) {
302             //id ta delete krte hbe j address a store
                  kora ache,then porer sob gula info 5
                  ghor kore agay nite hbe, number of
                  student
303             //ek komate hbe[1001]
304             delete_registered_student(
                  deleted_registered_student_address);
305             lcd.clear();
306             Display(1, 1, "STUDENT DELETED");
307             digitalWrite(51,HIGH);
308             delay(2000);
309             digitalWrite(51,LOW);
310             Screen = 3;
311           } else {
312             lcd.clear();
313             Display(1, 1, "WRONG ADMIN PIN");
314             digitalWrite(35,HIGH);
315             tone(buzz,1000);
316             delay(2000);
317             noTone(buzz);
318             digitalWrite(35,LOW);
319             Screen = 12;
320           }
321
322           break;
323
324         } else if (key == 'B') { //CLEAR
325           submitted_admin_pin = "    ";
326           Display(12, 0, submitted_admin_pin);
327           submitted_admin_pin = "";
328
329         } else if (key == 'C') { //BACK
330           Screen = 3;
331           break;
332         }
```

```
333     }
334
335   }  else if (Screen == 6) {      //
        ____________________Screen 6____________________
336     lcd.clear();
337     Display(1, 0, "Enter␣PIN:␣");
338     Display(1, 1, "A:␣Start");
339     Display(1, 2, "B:␣Cancel");
340
341     while (true) {
342       key = cusKeypad.getKey();
343       if (key == '0' || key == '1' || key == '2' ||
            key == '3' || key == '4' || key == '5' ||
            key == '6' || key == '7'
344             || key == '8' || key == '9') {
345         pin += (char)key;
346         Display(11, 0, pin);
347       } else if (key == 'A' && pin != "") {
348         classRoom_address = code.toInt() * 13 + 1;
349         insert_classroom_pin(classRoom_address, pin)
              ;
350         insert_Classroom_info(classRoom_address + 4)
              ;
351         Screen = 7;
352         lcd.clear();
353         Serial.print("A");
354         break;
355       }
356       else if (key == 'B') {
357         pin = "";
358         Screen = 5;
359         Serial.print("B");
360         break;
361       }
362     }
363   } else if (Screen == 7) {      //
        ____________________Screen 7____________________
364     lcd.clear();
365     ShowDateTime();
366     Display(2, 2, "Class␣in␣progress");
367     Display(2, 3, "A:␣Join␣B:␣Finish");
```

```
368     while (true) {
369       key = cusKeypad.getKey();
370       if (key == 'A') {
371         Screen = 8;
372         break;
373       } else if (key == 'B') {
374         Screen = 9;
375         break;
376       }
377     }
378     lcd.clear();
379   } else if (Screen == 8) {        //
      ____________________Screen 8_____________________
380     submitted_id = "";
381     submitted_pin = "";
382     Display(1, 0, "ID:␣");
383     Display(1, 1, "PIN:␣");
384     Display(1, 2, "A:␣NEXT␣B:␣CLEAR");
385     Display(1, 3, "C:␣SUBMIT␣D:␣BACK" );
386     lcd.setCursor(6, 0);
387     bool isMatched = false;
388     while (true) {
389       key = cusKeypad.getKey();
390       if (key == '0' || key == '1' || key == '2' ||
          key == '3' || key == '4' || key == '5' ||
          key == '6' || key == '7'
391           || key == '8' || key == '9') {
392         submitted_id += (char)key;
393         Display(6, 0, submitted_id);
394       }
395       else if (key == 'A') {
396         lcd.setCursor(6, 1);
397         //lcd.blink();
398
399         while (key != 'C') {
400           key = cusKeypad.getKey();
401           if (key == '0' || key == '1' || key == '2'
              || key == '3' || key == '4' || key == '
            5' || key == '6' || key == '7'
402               || key == '8' || key == '9') {
403             submitted_pin += (char)key;
```

```
404             Display(6, 1, submitted_pin);
405           }
406           else if (key == 'B') {
407             Display(6, 1, "    ");
408             submitted_pin = "";
409           } else if (key == 'D') {
410             Screen = 7;
411             break;
412           }
413
414         }
415
416         for (int i = 210; i < 500; i += 5) {
417           if (EEPROM.read(i) == submitted_id.toInt()
                ) {
418             String temp_pin = "";
419             for (int j = i + 1; j < i + 5; j++) {
420               temp_pin += EEPROM.read(j);
421             }
422             if (temp_pin == submitted_pin) {
423               Serial.println("ID & PIN Matched");
424               isMatched = true;
425               break;
426             }
427           }
428         }
429         if (isMatched) {
430
431           if (store_student_attendance(
                classRoom_address, submitted_id)) {
432             lcd.clear();
433             Display(1, 0, "Attendance Given of");
434             Display(4, 1, "ID:");
435             Display(7, 1, submitted_id);
436             Screen = 7;
437             delay(1000);
438             break;
439           } else {
440             lcd.clear();
441             Display(8, 1, "ERROR");
442             Display(1, 2, "Already Attendent");
```

```
443             Display(4, 3, "in the Class");
444             delay(1000);
445             Screen = 7;
446             break;
447           }
448         } else {
449           lcd.clear();
450           Display(8, 1, "ERROR");
451           Display(0, 1, "ID or PIN Mismatched");
452           submitted_id = "";
453           submitted_pin = "";
454           delay(1000);
455           Screen = 8;
456           lcd.clear();
457           break;
458
459         }
460       }
461       else if (key == 'B') {
462         submitted_id = "";
463         Display(6, 0, "    ");
464       }
465       else if (key == 'D') {
466         Screen = 7;
467         break;
468       }
469
470     }
471
472
473   } else if (Screen == 9) {                //
      ____________________Screen 9_____________________
474     lcd.clear();
475     Display(0, 1, "Enter PIN: ");
476     Display(1, 2, "A: OK");
477     Display(1, 3, "B: Back");
478     String str = "";
479     String pass = "";
480     while (true) {
481       key = cusKeypad.getKey();
```

```
482       if (key == '0' || key == '1' || key == '2' ||
            key == '3' || key == '4' || key == '5' ||
            key == '6' || key == '7'
483           || key == '8' || key == '9') {
484         pass += (char)key;
485         Display(10, 1, pass);
486       } else if (key == 'A') {
487         lcd.clear();
488         bool isMatched = false;
489         Serial.println(get_classroom_pin(code.toInt
              ()));
490         if (get_classroom_pin(code.toInt()) == pass.
              toInt()) {
491           isMatched = true;
492         }
493         if (isMatched) {
494           while (true) {
495             Display(1, 0, "Class has finished");
496             Display(1, 1, "A: Home");
497             key = cusKeypad.getKey();
498             if (key == 'A') {
499               Screen = 2;
500               break;
501             }
502           }
503           break;
504         } else {
505           while (true) {
506             Display(1, 0, "Classcode or PIN");
507             Display(1, 1, "was not matched");
508             Display(1, 2, "A: OK");
509             key = cusKeypad.getKey();
510             if (key == 'A') {
511               Screen = 7;
512               break;
513             }
514           }
515         }
516         lcd.clear();
517         break;
518       } else if (key == 'B') {
```

```
519           Screen = 7;
520           break;
521         }
522       }
523
524     }
525     else if (Screen == 15) {              //
          _____________________Screen 15_____________________
526       lcd.clear();
527       Display(0, 0, "Enter␣ClassCode:");
528       Display(0, 1, "0:3211");
529       Display(0, 2, "1:3213");
530       Display(7, 1, "2:3215");
531       Display(7, 2, "3:3216");
532       Display(14, 1, "4:3223");
533       Display(0, 4, "A:OK");
534       Display(5, 4, "B:Clear␣C:Back");
535       //key = '';
536       while (true) {
537         key = cusKeypad.getKey();
538         if (key == '0' || key == '1' || key == '2' ||
              key == '3' || key == '4') {
539           c_info_code = (char)key;
540           Display(17, 0, c_info_code);
541         } else if (key == 'A' ) {
542
543           if (c_info_code != "") {
544             Screen = 16;
545             break;
546           }
547
548
549         }
550
551         else if (key == 'B') {
552           c_info_code = "␣";
553           Screen = 15;
554           Display(17, 0, c_info_code );
555
556
557         } else if (key == 'C') {
```

```
558           Screen = 3;
559           break;
560         }
561       }
562     }
563     else if (Screen == 16) {      //
          ____________________Screen 16____________________
564       lcd.clear();
565       Display(1, 0, "Enter␣PIN:␣");
566       Display(1, 1, "A:␣SUBMIT");
567       Display(1, 2, "B:␣CLEAR");
568       Display(10, 2, "C:␣BACK");
569       while (true) {
570
571         key = cusKeypad.getKey();
572         if (key == '0' || key == '1' || key == '2' ||
              key == '3' || key == '4' || key == '5' ||
              key == '6' || key == '7'
573               || key == '8' || key == '9') {
574           c_info_pin += (char)key;
575           Display(11, 0, c_info_pin);
576         } else if (key == 'A' &&  c_info_pin != "") {
577           if (get_classroom_pin(c_info_code.toInt())
                == c_info_pin.toInt()) {
578             Screen = 17;
579             c_info_pin = "";
580             lcd.clear();
581             break;
582           }
583           else {
584             lcd.clear();
585             Display(1, 2, "WRONG␣PIN");
586             delay(2000);
587             Screen = 16;
588             break;
589
590           }
591
592         }
593         else if (key == 'B') {
594           Screen = 15;
```

```
595           c_info_pin = "";
596           break;
597         }
598         else if (key == 'C') {
599           Screen = 3;
600           break;
601         }
602       }
603     }
604     else if (Screen == 17) {          //
        ____________________Screen 17____________________
605       lcd.clear();
606       Display( 0, 0, "Class Info Settings");
607       Display(1, 1, "A:SHOW ID");
608       Display(1, 2, "B:DELETE RECORD");
609       Display(1, 3, "C: BACK");
610       while (true) {
611         key = cusKeypad.getKey();
612         if (key == 'A') {    //show id
613           Screen = 18;
614           break;
615         }
616         else if (key == 'B') {     //delete record
617           delete_student_attendance_details(
              c_info_code.toInt());
618           lcd.clear();
619           Display(1, 1, "Record Deleted");
620           delay(2000);
621           break;
622         }
623         else if (key == 'C') {     //back
624           Screen = 3;
625           break;
626         }
627       }
628
629
630     }
631     else if (Screen == 18)       //
        ____________________Screen 18____________________
632     {
```

```
633       lcd.clear();
634       read_student_attendance_details(c_info_code.
            toInt());
635       Display(0, 3, "A:Next␣B:Prev␣C:Back");
636       while (true) {
637         key = cusKeypad.getKey();
638         if (key == 'A') { //next
639
640         } else if (key == 'B') { //prev
641
642         } else if (key == 'C') { //back
643           Screen = 17;
644           break;
645         }
646       }
647     }
648
649 }
650
651 void ShowDateTime()
652 {
653   lcd.setCursor(2, 0);
654   lcd.print("Time:␣␣");
655   lcd.print(rtc.getTimeStr());
656
657   lcd.setCursor(2, 1);
658   lcd.print("Date:␣");
659   lcd.print(rtc.getDateStr());
660 }
661 void Display(int col, int row, String msg)
662 {
663   lcd.setCursor(col, row);
664   lcd.print(msg);
665 }
666
667 void Initialize_EEPROM()
668 {
669   //System Info
670   //EEPROM.write(1000,5);      //Number of Classroom
671   EEPROM.write(1001, 0);     //Number of registered
        Student
```

```
672   EEPROM.write(1002, 0);    //Classroom Code
        starting address
673   EEPROM.write(1003, 210);  //Student info Starting
        address
674
675
676   EEPROM.write(0, 11);    // 3211
677   EEPROM.write(13, 13);    // 3213
678   EEPROM.write(26, 15);    // 3215
679   EEPROM.write(39, 16);    // 3216
680   EEPROM.write(52, 23);    // 3223
681
682   for (int i = 1000; i < 1004; i++) {
683     Serial.println(EEPROM.read(i));
684   }
685 }
686 void   insert_classroom_pin(int address, String pin)
      {
687   Serial.print("32");
688   Serial.println(EEPROM.read(address - 1));
689   for (int i = address, j = 0; i < address + 4; i++,
        j++) {
690     EEPROM.write(i, (pin[j] - 48));
691     Serial.print(i);
692     Serial.print("->");
693     Serial.println(EEPROM.read(i));
694   }
695
696 }
697 void insert_Classroom_info(int info_address)      //
      info address should be 0/13/26/39/52
698 {
699
700   String s = rtc.getMonthStr();
701   int monthDecimal = 0;
702   if (s == "January")
703     monthDecimal = 1;
704   else if (s == "February")
705     monthDecimal = 2;
706   else if (s == "March")
707     monthDecimal = 3;
```

```
708   else if (s == "April")
709     monthDecimal = 4;
710   if (s == "May")
711     monthDecimal = 5;
712   else if (s == "June")
713     monthDecimal = 6;
714   else if (s == "July")
715     monthDecimal = 7;
716   else if (s == "August")
717     monthDecimal = 8;
718   if (s == "September")
719     monthDecimal = 9;
720   else if (s == "October")
721     monthDecimal = 10;
722   else if (s == "November")
723     monthDecimal = 11;
724   else if (s == "December")
725     monthDecimal = 12;
726   t2 = t.year - 2000;
727   EEPROM.write(info_address, (t.date));
728   EEPROM.write(info_address + 1, monthDecimal);
729   //Serial.print(EEPROM.read(info_address+1));
730   EEPROM.write(info_address + 2, t2);
731   EEPROM.write(info_address + 3, (t.hour));
732   EEPROM.write(info_address + 4, (t.min));
733   EEPROM.write(info_address + 5, 1);
734   EEPROM.write(info_address + 6, 0);
735   //      EEPROM.write(,0);
736
737
738
739 }
740 bool check_duplicate_register_id(int id) {
741   for (int i = 210; i < 210 + EEPROM.read(1001) * 5;
        i += 5) {
742     if (EEPROM.read(i) == id) {
743       return true;
744     }
745   }
746   return false;
747 }
```

```
748 void store_student_info(int
      student_info_storing_address) {
749   Serial.print("Student␣Storing␣Address:␣");
750   Serial.println(student_info_storing_address);
751   EEPROM.write(student_info_storing_address, id.
        toInt());
752   Serial.print("Stored␣id␣:␣");
753   Serial.println(EEPROM.read(
        student_info_storing_address));
754   for (int i = student_info_storing_address + 1, j =
         0; i <= student_info_storing_address + 4; i++,
        j++) {
755     EEPROM.write(i, (student_pin[j] - 48));
756     Serial.print(i);
757     Serial.print("->");
758     Serial.println(EEPROM.read(i));
759   }
760   student_pin = "";
761   id = "";
762   EEPROM.write(1001, EEPROM.read(1001) + 1);
763 }
764
765 void read_student_info()
766 {
767   int count = 1;
768   int starting_address = EEPROM.read(1003);    //210
769   //Serial.print(" id:------>");
770   Serial.println(EEPROM.read(starting_address));
771   int number_of_student = EEPROM.read(1001);  // 3
772   Serial.print("Number␣OF␣Student:␣");
773   Serial.println((number_of_student));
774   int last_address = number_of_student * 5 + 210 -
        1;
775   for (int i = starting_address; i <= last_address;
        i++) {
776     if (i % 5 == 0) {
777       Serial.print("Stored␣Id␣:␣");
778       Serial.print(i);
779       Serial.print("␣->␣");
780       Serial.println(EEPROM.read(i));
781     }
```

```
782     else {
783       Serial.print(i);
784       Serial.print("␣->␣");
785       Serial.println(EEPROM.read(i));
786     }
787
788
789   }
790
791 }
792
793 void read_classroom_info()
794 {
795   for (int i = 0; i < 5; i++) {
796     String pin = "";
797     String Date = "";
798     String inserted_time = "";
799     int no_of_attended_student;
800     Serial.print("Classroom␣Code␣:");
801     Serial.print(i * 13);
802     Serial.print("␣->32");
803
804     Serial.println(EEPROM.read(i * 13));
805     for (int j = i * 13 + 1, k = 1; j < (i * 13) +
          13; j++, k++) {
806       if (k <= 4) {
807         pin += EEPROM.read(j);
808       } else if (k >= 5 && k <= 7) {
809         Date += EEPROM.read(j);
810         Date += '-';
811       } else if (k == 8 || k == 9) {
812         Date[Date.length() - 1] = '␣';
813         //Date = Date[Date.size()-1];            //
              split last character
814         //Date = Date.substr(0,Date.size()-1);
815         inserted_time += EEPROM.read(j);
816         inserted_time += ':';
817       } else if (k == 10) {
818         //inserted_time-=inserted_time[inserted_time
              .length()-1];       //split last character
```

```
819           if (EEPROM.read(j) == 1 || EEPROM.read(j) ==
                '1') {
820             inserted_time += " AM";
821           } else {
822             inserted_time += " PM";
823           }
824         } else if (k == 11) {
825           no_of_attended_student = EEPROM.read(j);
826         }
827       }
828       //print everything in the console
829       Serial.print("PIN : ");
830       Serial.println(pin);
831       Serial.print("Date : ");
832       Serial.println(Date);
833       Serial.print("Time : ");
834       Serial.println(inserted_time);
835       Serial.print("Number of attended student : ");
836       Serial.println(no_of_attended_student);
837       Serial.println();
838     }
839 }
840
841 bool store_student_attendance(int classRoom_address,
      String submitted_id) {
842   Serial.print("ClassRoom_address: ");
843   Serial.println(classRoom_address);
844   int attendance_address = classRoom_address + 10;
845   int number_of_student_attendance = EEPROM.read(
        attendance_address);
846   int classcode = EEPROM.read(classRoom_address - 1)
        ;
847   Serial.print("Class Code : 32");
848   Serial.println(classcode);
849   int starting_attendance_address;
850   if (classcode == 11) {
851     starting_attendance_address = 500;
852   } else if (classcode == 13) {
853     starting_attendance_address = 550;
854   } else if (classcode == 15) {
855     starting_attendance_address = 600;
```

```
856   } else if (classcode == 16) {
857     starting_attendance_address = 650;
858   } else if (classcode == 23) {
859     starting_attendance_address = 700;
860   }
861   // have to check if the id already in the
        attendance list
862   for (int i = starting_attendance_address; i <=
        starting_attendance_address +
        number_of_student_attendance; i++) {
863     if (EEPROM.read(i) == submitted_id.toInt()) {
864       Serial.println("Id has alreay in the database"
          );
865       return false;
866     }
867   }
868
869
870   int storing_address = starting_attendance_address
        + number_of_student_attendance;
871   EEPROM.write(storing_address, submitted_id.toInt()
        );
872   EEPROM.write(attendance_address,
        number_of_student_attendance + 1);
873   Serial.print("Number Of Student attendance :");
874   Serial.println(EEPROM.read(attendance_address));
875   Serial.print("Storing Address :");
876   Serial.println(storing_address);
877   return true;
878 }
879
880 void read_student_attendance(int starting_address)
881 {
882   for (int i = starting_address; i <=
        starting_address + 50; i++) {
883     Serial.print(i);
884     Serial.print(" -> ");
885     Serial.println(EEPROM.read(i));
886   }
887 }
888
```

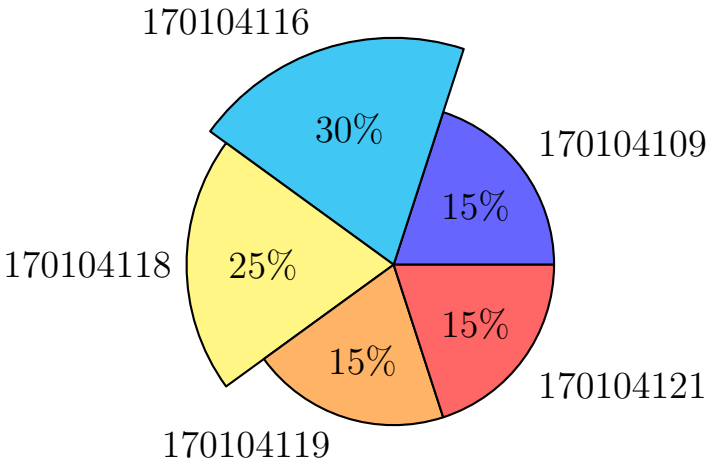
```
889 void read_student_attendance_details(int code)
      //  0/1/2/3/4
890 {
891   int classCode = code * 13;
892   int starting_address, no_of_attendent_student;
893   if (classCode == 0) {
894     starting_address = 500;
895     no_of_attendent_student = EEPROM.read(classCode
        + 11);
896
897   } else if (classCode == 13) {
898     Serial.print("class selected: 13");
899     Serial.println();
900
901     starting_address = 550;
902
903     no_of_attendent_student = EEPROM.read(classCode
        + 11);
904   } else if (classCode == 26) {
905     starting_address = 600;
906     no_of_attendent_student = EEPROM.read(classCode
        + 11);
907   } else if (classCode == 39) {
908     starting_address = 650;
909     no_of_attendent_student = EEPROM.read(classCode
        + 11);
910   } else if (classCode == 52) {
911     starting_address = 700;
912     no_of_attendent_student = EEPROM.read(classCode
        + 11);
913   }
914   String ids = "";
915   int j = 1, row = 0;
916   lcd.clear();
917   Serial.println(no_of_attendent_student);
918   float temp = no_of_attendent_student;
919   temp = ceil(temp / 5);
920
921   for (int i = starting_address; i <
       starting_address + no_of_attendent_student; i++)
        {
```

```
922       //500-506
923       if (j <= 4) {
924         ids += EEPROM.read(i); // 116,
925         ids += ',';          //
926         j++;
927         Serial.print("If er j :");
928         Serial.println(j);
929       } else {
930         Serial.println(ids);
931         Serial.print("Else er j :");
932         Serial.println(j);
933         j = 1;
934         Serial.print("Row :");
935         Serial.println(row);
936         ids += EEPROM.read(i);
937         ids += ',';
938         Display(0, row, ids); //109,110,112,114,115,
939         row++;                //116,117,118
940         Serial.print("new Row :");
941         Serial.println(row);
942         ids = "";
943
944
945       }
946     }
947     if (j <= 5) {
948       Display(0, row, ids);
949     }
950 }
951
952
953
954 void delete_student_attendance_details(int code)
955 {
956   int classCode = code * 13;
957   EEPROM.write(classCode + 11, 0);
958 }
959
960 void code_kam_kore_na() {
961   for (int i = 0; i < 65; i++) {
962     Serial.print(i);
```

```
963       Serial.print("␣->␣");
964       Serial.println(EEPROM.read(i));
965     }
966
967     for (int i = 210; i < 240; i++) {
968       Serial.print(i);
969       Serial.print("␣->␣");
970       Serial.println(EEPROM.read(i));
971     }
972 }
973
974 void store_multiple_student_info()
975 {
976     for (int starting_address = 210, id = 109;
          starting_address <= 270; starting_address += 5,
          id++) { //13 times [109-121]
977       EEPROM.write(starting_address, id);
978       Serial.print("ID␣:␣");
979       Serial.print(starting_address);
980       Serial.print("␣->␣");
981       Serial.println(EEPROM.read(starting_address));
982       String pin = String(id);
983       for (int i = starting_address + 1, k = -1; i <=
            starting_address + 4; i++, k++) {
984         if (k == -1) {
985           EEPROM.write(i, 0);
986           Serial.print(i);
987           Serial.print("->");
988           Serial.println(EEPROM.read(i));
989         } else {
990           EEPROM.write(i, (pin[k] - 48));
991           Serial.print(i);
992           Serial.print("->");
993           Serial.println(EEPROM.read(i));
994         }
995
996       }
997       Serial.println();
998     }
999     EEPROM.write(1001, 13);
1000
```

```
1001 }
1002 int get_classroom_pin(int classroom_code)
1003 {
1004   String pin = "";
1005   int pin_starting_address = classroom_code * 13 +
         1;
1006   for (int i = pin_starting_address; i <
         pin_starting_address + 4; i++) {
1007     pin += EEPROM.read(i);
1008   }
1009   return pin.toInt();
1010 }
1011
1012 void delete_registered_student(int starting_address)
1013 {
1014   int number_of_student = EEPROM.read(1001);
1015   int last_registerd_address_id = 210 +
         number_of_student * 5 - 5;
1016
1017   for (int i = starting_address, j = 0; i <
         starting_address + 5; i++, j++) {
1018     EEPROM.write(i, EEPROM.read(
           last_registerd_address_id + j));
1019   }
1020   EEPROM.write(1001, number_of_student - 1);
1021   read_student_info();
1022 }
```

Members Contribution



Difficulties

Difficulties we faced in our project:

- There was a big issue in storing data because we could not add external SD module in our Proteus simulation. That is why we use EEPROM instead.
- EEPROM allows us to store one data against one address. That means we can store upto value 255 in EEPROM, That causes difficulties in storing large data.

Future Work

- We will try to implement external SD module in our project. So administrator user can use data through their personal devices.
- We will try to add Bio-metric system in our project for more security access.
- We will try to increase efficiency and feasibility in our project.

Conclusion

The purpose of making this device to help teacher to save their time of taking attendance. The activity of this system cannot be manipulated by non-admin. So the data in this system will accurate which will help teachers or employer to keep track of their active system user.

Changes from the initial proposal

In our initial project proposal, the uses of fingerprint scanner is replaced by password input system. We have also replaced SD card module with EEPROM of arduino.