

# The UNIVERSITY of MINDANAO

College of Engineering Education

## Microprocessor Systems

Plate # 1

### **Elevator Design**

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Date Submitted	APRIL 5, 2021		

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Score

## Plate No. 1

### I. Course Outcome:

Implement microcontroller-based system using different levels of implementation.

### II. Objective:

To be able to design and implement an elevator using microcontroller and the output will be displayed in an LCD.

### III. Statement of the Problem:

For people to have an easy and convenient way to go up and down in a building specially if the building has many floors is to make use of an elevator. You are going to make a circuit design with program that will do the concept of an elevator and it will do the following functionality:

1. In the LCD Display this will be the OUTPUT:

Elevator				
G	2	3	4	

This 1<sup>st</sup> display will indicate your current location of what you are in. G,2,3,4 signifies the # of floors. If your are going to press like 2 it means you are in the 2<sup>nd</sup> floor. After pressing the # the next will be in step (2).

2. The display will be like this.

Door Opened
-------------

Door Closed
-------------

The Door will be opened for 3-5 secs. After 3-5 secs the door will be closed and will wait for at least 1-2 seconds. Next in step (3).

3. The next display after closing the door is.

Select	
(1) UP	(2) DOWN

If you select either UP or DOWN this will be displayed

Select Floor				
G	2	3	4	

after selecting the floor you wanted to go to then this will be displayed in the LCD.

If UP then

UP [3]
--------

if DOWN then

DOWN [2]
----------

the # in bracket represents the floor you Pass through and will have a 2-3 seconds interval. Like if you are in G floor and you wanted to go to 3<sup>rd</sup> floor so it will be like this UP [2] after 2-3secs UP [3].

4. Once your reach at the floor you wanted to go to. Then this will appear in the LCD.

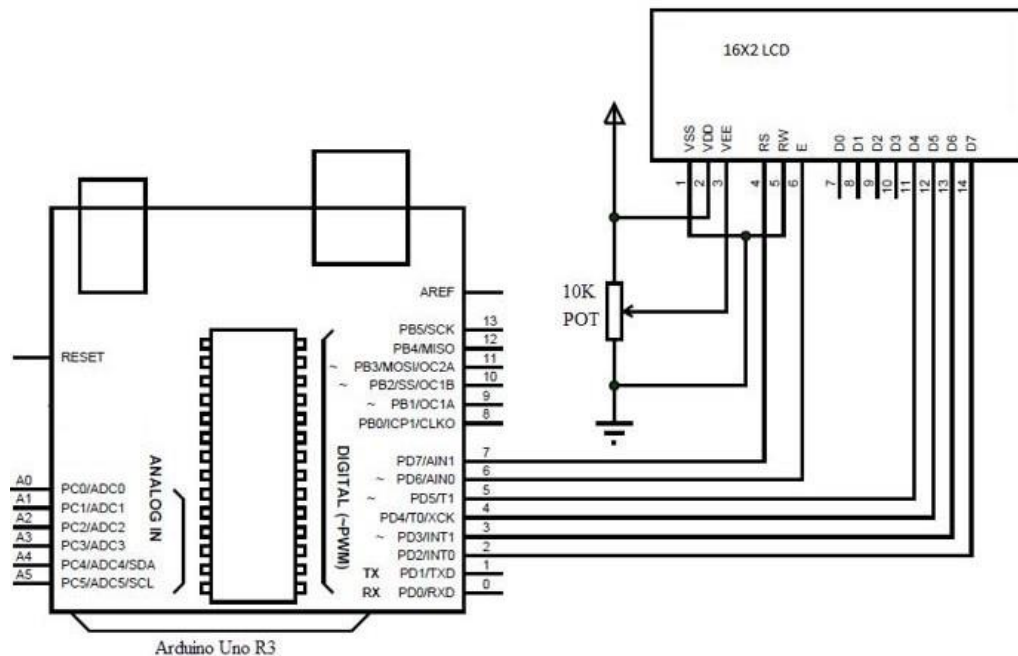
Door Opened
-------------

Door Closed
-------------

When you reach at the desired floor the Door will be Opened then after 3-5 secs the Door will be closed.

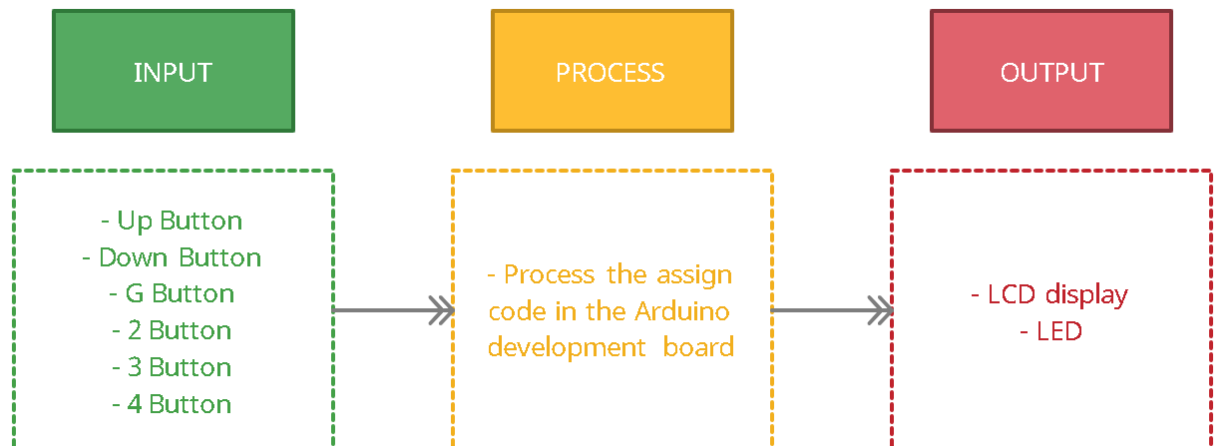
5. Submit the documentation separate from the video presentation.
6. This word file will be your documentation just follow what you need to fill-in. Convert this word file into PDF file after you finalize the documentation.

7. The video will only be at a maximum time of 10 minutes but not less than 5 minutes. What you are going to video is the Proteus Simulation which includes the Circuit making and the Programming in the Arduino Software. The first part and the last part which is function test SHOULD not be time lapsed. You can time lapsed the middle of the presentation.
8. Below is the Circuit Diagram of Arduino to LCD. The Rest is yours to make.

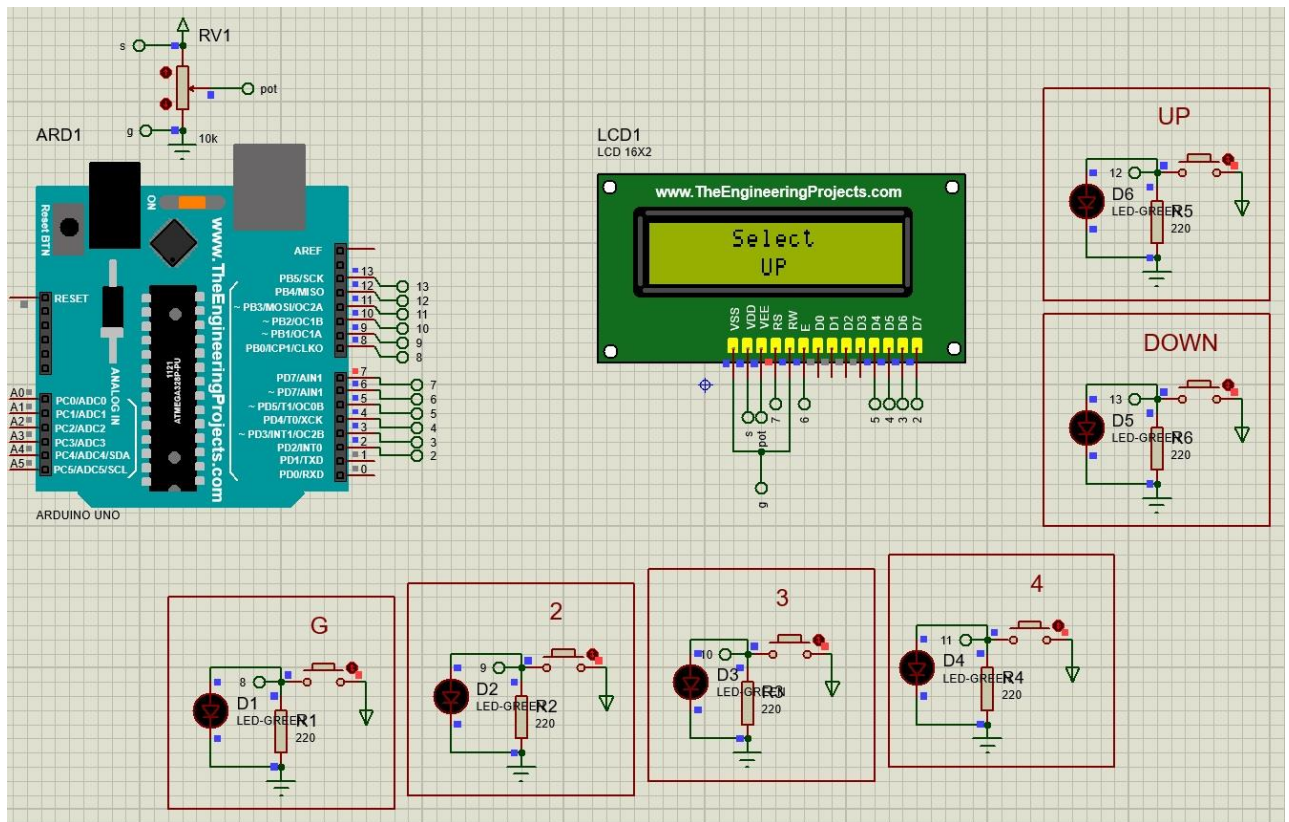


9. You will be graded according to the following criteria.
  - a. Functionality – 50%
  - b. Programming Skills – 30 %
  - c. Submitted Complete Documents – 10%
  - d. Video Presentation – 10%

#### IV. Conceptual Framework:



#### V. Circuit Diagram:



## VI. Source Code:

/\*made by me: I Earl John B. Masaga BSECE student

~Elevator arduino~

LAST MODIFIED: APRIL 5, 2021\*/

#include <LiquidCrystal.h>

LiquidCrystal lcd(7,6,5,4,3,2);

/\*setting of buttons\*/

const int isGround = 8;

const int is2Floor = 9;

const int is3Floor = 10;

const int is4Floor = 11;

const int isUP = 12;

const int isDOWN = 13;

/\*main steup\*/

void setup() {

  lcd.begin(16,2);

  lcd.clear();

/\*set all buttons to low input\*/

  pinMode(isGround, INPUT);

  digitalWrite(isGround, LOW);

  pinMode(is2Floor, INPUT);

  digitalWrite(is2Floor, LOW);

  pinMode(is3Floor, INPUT);

  digitalWrite(is3Floor, LOW);

  pinMode(is4Floor, INPUT);

  digitalWrite(is4Floor, LOW);

```

pinMode(isUP, INPUT);
digitalWrite(isUP, LOW);
pinMode(isDOWN, INPUT);
digitalWrite(isDOWN, LOW);
}
/*variables section or the parameters for our loops*/

/*display of current floor*/
String isCurrent = "Ground";
/*current floor*/
int isOption = 1; /* number 1 is ground */

/*case switch*/
int isSwitch = 0;
/*variable that will break the while loop*/
int isPasser = 0;
/*the one that can disable the buttons*/
int isGood = 0;

/*important variables for stacking of button press*/
int isInline1 = 0;
int isInline2 = 0;
int isInline3 = 0;
int isInline4 = 0;

/*beginning of the process*/
void loop() {
  /*default display*/
  lcd.clear();
  lcd.setCursor(2,0);
  lcd.print("Current Floor");
  lcd.setCursor(4,1);
  lcd.print(isCurrent);
  delay(2000);

  /*this loop will give the user limited time of selection of up and down*/
  for(int i = 0; i<=30; i++){
    /*condition for every floor*/
    if(isOption==1){
      lcd.clear();
      lcd.setCursor(5,0);
      lcd.print("Select");
      lcd.setCursor(7,1);
      lcd.print("UP");
      delay(100);
      /*condition for disabling buttons*/
      if(digitalRead(isDOWN)==HIGH){
        isGood = 0;
      }else if(digitalRead(isUP)==HIGH){
        isGood = 1;
      }
    }else if(isOption==4){

```

```

    lcd.clear();
    lcd.setCursor(5,0);
    lcd.print("Select");
    lcd.setCursor(6,1);
    lcd.print("DOWN");
    delay(100);
    if(digitalRead(isUP)==HIGH){
        isGood = 0;
    }else if(digitalRead(isDOWN)==HIGH){
        isGood = 1;
    }
}
else if(isOption==2){
    lcd.clear();
    lcd.setCursor(5,0);
    lcd.print("Select");
    lcd.setCursor(1,1);
    lcd.print(" UP  DOWN");
    delay(100);
    if(digitalRead(isUP)==HIGH || digitalRead(isDOWN)==HIGH){
        isGood = 1;
    }
}
else if(isOption==3){
    lcd.clear();
    lcd.setCursor(5,0);
    lcd.print("Select");
    lcd.setCursor(1,1);
    lcd.print(" UP  DOWN");
    delay(100);
    if(digitalRead(isUP)==HIGH || digitalRead(isDOWN)==HIGH){
        isGood = 1;
    }
}
}

/*if is "isGood" true, it will proceed to this part*/
if(isGood==1){
    /*display of the elevator door*/
    lcd.clear();
    delay(500);
    lcd.setCursor(4,1);
    lcd.print("Door Opened");
    delay(3000);
    lcd.setCursor(4,1);
    lcd.print("Door Closed");
    delay(1500);
    /*setting the default parameter for our while loop*/
    isPasser = 1;
    isGood = 0;
    /*again isPasser is there to prevent the while loop to function*/
    while(digitalRead(isGround)==LOW && digitalRead(is2Floor)==LOW && digitalRead(is3Floor)==LOW
&& digitalRead(is4Floor)==LOW && isPasser == 1){
        /*display the selection floors*/
        lcd.clear();

```

```

    lcd.setCursor(3,0);
    lcd.print("Select Floor");
    lcd.setCursor(1,1);
    lcd.print("G  2  3  4");
    delay(100);

/*conditions to capture the g, 2, 3, 4, button press*/
if(digitalRead(isGround)==HIGH && isOption == 1){
    /*Ground*/
    isSwitch = 1;
    /*for loop to give limited time to the user if ever daghan tao musulod sa elevator*/
    for(int i = 0; i<=40; i++){
        lcd.clear();
        lcd.setCursor(3,0);
        lcd.print("Select Floor");
        lcd.setCursor(1,1);
        lcd.print("G  2  3  4");
        delay(100);
        /*if statements for capturing button press in the given limited time*/
        if(digitalRead(is2Floor)==HIGH){
            isInline2 = 1;
        }else if(digitalRead(is3Floor)==HIGH){
            isInline3 = 1;
        }else if(digitalRead(is4Floor)==HIGH){
            isInline4 = 1;
        }
    }
}
else if(digitalRead(is2Floor)==HIGH && isOption == 1){
    /*2nd Floor*/
    isSwitch = 2;
    for(int i = 0; i<=40; i++){
        lcd.clear();
        lcd.setCursor(3,0);
        lcd.print("Select Floor");
        lcd.setCursor(1,1);
        lcd.print("G  2  3  4");
        delay(100);
        if(digitalRead(isGround)==HIGH){
            isInline1 = 1;
        }else if(digitalRead(is3Floor)==HIGH){
            isInline3 = 1;
        }else if(digitalRead(is4Floor)==HIGH){
            isInline4 = 1;
        }
    }
}
else if(digitalRead(is3Floor)==HIGH && isOption == 1){
    /*3rd Floor*/
    isSwitch = 3;
    for(int i = 0; i<=40; i++){
        lcd.clear();

```

```

    lcd.setCursor(3,0);
    lcd.print("Select Floor");
    lcd.setCursor(1,1);
    lcd.print("G  2  3  4");
    delay(100);
    if(digitalRead(isGround)==HIGH){
        isInline1 = 1;
    }else if(digitalRead(is2Floor)==HIGH){
        isInline2 = 1;
    }else if(digitalRead(is4Floor)==HIGH){
        isInline4 = 1;
    }
}
}
else if(digitalRead(is4Floor)==HIGH && isOption == 1){
    /*4th Floor*/
    isSwitch = 4;
    for(int i = 0; i<=40; i++){
        lcd.clear();
        lcd.setCursor(3,0);
        lcd.print("Select Floor");
        lcd.setCursor(1,1);
        lcd.print("G  2  3  4");
        delay(100);
        if(digitalRead(isGround)==HIGH){
            isInline1 = 1;
        }else if(digitalRead(is3Floor)==HIGH){
            isInline3 = 1;
        }else if(digitalRead(is2Floor)==HIGH){
            isInline2 = 1;
        }
    }
}
}
else if(digitalRead(isGround)==HIGH && isOption == 2){
    /*Ground*/
    isSwitch = 5;
    for(int i = 0; i<=40; i++){
        lcd.clear();
        lcd.setCursor(3,0);
        lcd.print("Select Floor");
        lcd.setCursor(1,1);
        lcd.print("G  2  3  4");
        delay(100);
        if(digitalRead(is2Floor)==HIGH){
            isInline2 = 1;
        }else if(digitalRead(is3Floor)==HIGH){
            isInline3 = 1;
        }else if(digitalRead(is4Floor)==HIGH){
            isInline4 = 1;
        }
    }
}
}
}

```



```

else if(digitalRead(is2Floor)==HIGH && isOption == 2){
    /*2nd Floor*/
    isSwitch = 14;
    for(int i = 0; i<=40; i++){
        lcd.clear();
        lcd.setCursor(3,0);
        lcd.print("Select Floor");
        lcd.setCursor(1,1);
        lcd.print("G  2  3  4");
        delay(100);
        if(digitalRead(isGround)==HIGH){
            isInline1 = 1;
        }else if(digitalRead(is3Floor)==HIGH){
            isInline3 = 1;
        }else if(digitalRead(is4Floor)==HIGH){
            isInline4 = 1;
        }
    }
}
else if(digitalRead(is3Floor)==HIGH && isOption == 2){
    /*3rd Floor*/
    isSwitch = 6;
    for(int i = 0; i<=40; i++){
        lcd.clear();
        lcd.setCursor(3,0);
        lcd.print("Select Floor");
        lcd.setCursor(1,1);
        lcd.print("G  2  3  4");
        delay(100);
        if(digitalRead(isGround)==HIGH){
            isInline1 = 1;
        }else if(digitalRead(is2Floor)==HIGH){
            isInline2 = 1;
        }else if(digitalRead(is4Floor)==HIGH){
            isInline4 = 1;
        }
    }
}
else if(digitalRead(is4Floor)==HIGH && isOption == 2){
    /*4th Floor*/
    isSwitch = 7;
    for(int i = 0; i<=40; i++){
        lcd.clear();
        lcd.setCursor(3,0);
        lcd.print("Select Floor");
        lcd.setCursor(1,1);
        lcd.print("G  2  3  4");
        delay(100);
        if(digitalRead(isGround)==HIGH){
            isInline1 = 1;
        }else if(digitalRead(is3Floor)==HIGH){
            isInline3 = 1;
        }
    }
}

```

```

    }else if(digitalRead(is2Floor)==HIGH){
        isInline2 = 1;
    }
}
else if(digitalRead(isGround)==HIGH && isOption == 3){
    /*Ground*/
    isSwitch = 8;
    for(int i = 0; i<=40; i++){
        lcd.clear();
        lcd.setCursor(3,0);
        lcd.print("Select Floor");
        lcd.setCursor(1,1);
        lcd.print("G  2  3  4");
        delay(100);
        if(digitalRead(is2Floor)==HIGH){
            isInline2 = 1;
        }else if(digitalRead(is3Floor)==HIGH){
            isInline3 = 1;
        }else if(digitalRead(is4Floor)==HIGH){
            isInline4 = 1;
        }
    }
}
else if(digitalRead(is2Floor)==HIGH && isOption == 3){
    /*2nd Floor*/
    isSwitch = 9;
    for(int i = 0; i<=40; i++){
        lcd.clear();
        lcd.setCursor(3,0);
        lcd.print("Select Floor");
        lcd.setCursor(1,1);
        lcd.print("G  2  3  4");
        delay(100);
        if(digitalRead(isGround)==HIGH){
            isInline1 = 1;
        }else if(digitalRead(is3Floor)==HIGH){
            isInline3 = 1;
        }else if(digitalRead(is4Floor)==HIGH){
            isInline4 = 1;
        }
    }
}
else if(digitalRead(is3Floor)==HIGH && isOption == 3){
    /*3rd Floor*/
    isSwitch = 15;
    for(int i = 0; i<=40; i++){
        lcd.clear();
        lcd.setCursor(3,0);
        lcd.print("Select Floor");
        lcd.setCursor(1,1);
        lcd.print("G  2  3  4");
    }
}

```

```

delay(100);
if(digitalRead(isGround)==HIGH){
    isInline1 = 1;
}else if(digitalRead(is2Floor)==HIGH){
    isInline2 = 1;
}else if(digitalRead(is4Floor)==HIGH){
    isInline4 = 1;
}
}
}
else if(digitalRead(is4Floor)==HIGH && isOption == 3){
    /*4th Floor*/
    isSwitch = 10;
    for(int i = 0; i<=40; i++){
        lcd.clear();
        lcd.setCursor(3,0);
        lcd.print("Select Floor");
        lcd.setCursor(1,1);
        lcd.print("G  2  3  4");
        delay(100);
        if(digitalRead(isGround)==HIGH){
            isInline1 = 1;
        }else if(digitalRead(is3Floor)==HIGH){
            isInline3 = 1;
        }else if(digitalRead(is2Floor)==HIGH){
            isInline2 = 1;
        }
    }
}
else if(digitalRead(isGround)==HIGH && isOption == 4){
    /*Ground*/
    isSwitch = 11;
    for(int i = 0; i<=40; i++){
        lcd.clear();
        lcd.setCursor(3,0);
        lcd.print("Select Floor");
        lcd.setCursor(1,1);
        lcd.print("G  2  3  4");
        delay(100);
        if(digitalRead(is2Floor)==HIGH){
            isInline2 = 1;
        }else if(digitalRead(is3Floor)==HIGH){
            isInline3 = 1;
        }else if(digitalRead(is4Floor)==HIGH){
            isInline4 = 1;
        }
    }
}
else if(digitalRead(is2Floor)==HIGH && isOption == 4){
    /*2nd Floor*/
    isSwitch = 12;
    for(int i = 0; i<=40; i++){

```

```

    lcd.clear();
    lcd.setCursor(3,0);
    lcd.print("Select Floor");
    lcd.setCursor(1,1);
    lcd.print("G  2  3  4");
    delay(100);
    if(digitalRead(isGround)==HIGH){
        isInline1 = 1;
    }else if(digitalRead(is3Floor)==HIGH){
        isInline3 = 1;
    }else if(digitalRead(is4Floor)==HIGH){
        isInline4 = 1;
    }
}
}
else if(digitalRead(is3Floor)==HIGH && isOption == 4){
    /*3rd Floor*/
    isSwitch = 13;
    for(int i = 0; i<=40; i++){
        lcd.clear();
        lcd.setCursor(3,0);
        lcd.print("Select Floor");
        lcd.setCursor(1,1);
        lcd.print("G  2  3  4");
        delay(100);
        if(digitalRead(isGround)==HIGH){
            isInline1 = 1;
        }else if(digitalRead(is4Floor)==HIGH){
            isInline4 = 1;
        }else if(digitalRead(is2Floor)==HIGH){
            isInline2 = 1;
        }
    }
}
else if(digitalRead(is4Floor)==HIGH && isOption == 4){
    /*4th Floor*/
    isSwitch = 16;
    for(int i = 0; i<=40; i++){
        lcd.clear();
        lcd.setCursor(3,0);
        lcd.print("Select Floor");
        lcd.setCursor(1,1);
        lcd.print("G  2  3  4");
        delay(100);
        if(digitalRead(isGround)==HIGH){
            isInline1 = 1;
        }else if(digitalRead(is3Floor)==HIGH){
            isInline3 = 1;
        }else if(digitalRead(is2Floor)==HIGH){
            isInline2 = 1;
        }
    }
}
}

```

```
}
```

```
/*main process*/
```

```
switch(isSwitch){
```

```
case 1:
```

```
/*isSwitch is set to zero for preventing the program to jump to this switch statement*/
```

```
isSwitch = 0;
```

```
/*as you can see isPasser is set to zero for it to break the while loop kanina*/
```

```
isPasser = 0;
```

```
/*condition that will capture the bonus presses or you can say presses of the other users*/
```

```
if(isInline2 == 1){
```

```
/*this is the fun part that i used, manipulation of variables in every loop using the isInline variable*/
```

```
isInline2 = 0;
```

```
/*this go to satement will loop to the next floor*/
```

```
goto is2Tile;
```

```
}else if(isInline3 == 1){
```

```
isInline3 = 0;
```

```
goto is3Tile;
```

```
}else if(isInline4 == 1){
```

```
isInline4 = 0;
```

```
goto is4Tile;
```

```
}
```

```
/*if no presses in the given limited time, it ends here, changing the variable of the isCurrent*/
```

```
isCurrent = "Ground";
```

```
/*going back to the default display*/
```

```
loop();
```

```
/*this break statement is optional but it is a good practice for programmers to set break points*/
```

```
break;
```

```
case 2:
```

```
is2Tile:
```

```
lcd.clear();
```

```
lcd.setCursor(4,1);
```

```
lcd.print("UP [G]");
```

```
delay(2000);
```

```
lcd.setCursor(4,1);
```

```
lcd.print("UP [2]");
```

```
delay(1000);
```

```
lcd.setCursor(4,1);
```

```
lcd.print("Door Opened");
```

```
delay(3000);
```

```
lcd.setCursor(4,1);
```

```
lcd.print("Door Closed");
```

```
delay(1000);
```

```
isOption = 2;
```

```
isSwitch = 0;
```

```
isPasser = 0;
```

```
if(isInline3 == 1){
```

```
isInline3 = 0;
```

```
goto is3Tile_2;
```

```
}else if(isInline4 == 1){
```

```
isInline4 = 0;
```

```
goto is4Tile_2;
```

```

}else if(isInline1 == 1){
    isInline1 = 0;
    goto is1Tile_2;
}
isCurrent = "2nd Floor";
loop();
break;
case 3:
is3Tile:
lcd.clear();
lcd.setCursor(4,1);
lcd.print("UP [G]");
for(int i = 2; i<=3; i++){
    delay(2000);
    lcd.setCursor(4,1);
    lcd.print("UP [");
    lcd.setCursor(8,1);
    lcd.print(i);
    lcd.setCursor(9,1);
    lcd.print("]");
}
delay(1000);
lcd.setCursor(4,1);
lcd.print("Door Opened");
delay(3000);
lcd.setCursor(4,1);
lcd.print("Door Closed");
delay(1000);
isOption = 3;
isSwitch = 0;
isPasser = 0;
if(isInline4 == 1){
    isInline4 = 0;
    goto is4Tile_3;
}else if(isInline2 == 1){
    isInline2 = 0;
    goto is2Tile_3;
}else if(isInline1 == 1){
    isInline1 = 0;
    goto is1Tile_3;
}
isCurrent = "3rd Floor";
loop();
break;
case 4:
is4Tile:
lcd.clear();
lcd.setCursor(4,1);
lcd.print("UP [G]");
for(int i = 2; i<=4; i++){
    delay(2000);
    lcd.setCursor(4,1);

```

```

    lcd.print("UP [");
    lcd.setCursor(8,1);
    lcd.print(i);
    lcd.setCursor(9,1);
    lcd.print("]");
}
delay(1000);
lcd.setCursor(4,1);
lcd.print("Door Opened");
delay(3000);
lcd.setCursor(4,1);
lcd.print("Door Closed");
delay(1000);
isOption = 4;
isSwitch = 0;
isPasser = 0;
if(isInline3 == 1){
    isInline3 = 0;
    goto is3Tile_4;
}else if(isInline2 == 1){
    isInline2 = 0;
    goto is2Tile_4;
}else if(isInline1 == 1){
    isInline1 = 0;
    goto is1Tile_4;
}
isCurrent = "4th Floor";
loop();
break;
case 5:
is1Tile_2:
lcd.clear();
lcd.setCursor(4,1);
lcd.print("DOWN [2]");
delay(2000);
lcd.setCursor(4,1);
lcd.print("DOWN [G]");
delay(1000);
lcd.setCursor(4,1);
lcd.print("Door Opened");
delay(3000);
lcd.setCursor(4,1);
lcd.print("Door Closed");
delay(1000);
isOption = 1;
isSwitch = 0;
isPasser = 0;
if(isInline2 == 1){
    isInline2 = 0;
    goto is2Tile;
}else if(isInline3 == 1){
    isInline3 = 0;

```

```

    goto is3Tile;
}else if(isInline4 == 1){
    isInline4 = 0;
    goto is4Tile;
}
isCurrent = "Ground";
loop();
break;
case 6:
is3Tile_2:
lcd.clear();
lcd.setCursor(4,1);
lcd.print("UP [2]");
delay(2000);
lcd.setCursor(4,1);
lcd.print("UP [3]");
delay(1000);
lcd.setCursor(4,1);
lcd.print("Door Opened");
delay(3000);
lcd.setCursor(4,1);
lcd.print("Door Closed");
delay(1000);
isOption = 3;
isSwitch = 0;
isPasser = 0;
if(isInline4 == 1){
    isInline4 = 0;
    goto is4Tile_3;
}else if(isInline2 == 1){
    isInline2 = 0;
    goto is2Tile_3;
}else if(isInline1 == 1){
    isInline1 = 0;
    goto is1Tile_3;
}
isCurrent = "3rd Floor";
loop();
break;
case 7:
is4Tile_2:
lcd.clear();
lcd.setCursor(4,1);
lcd.print("UP [2]");
for(int i = 3; i<=4; i++){
    delay(2000);
    lcd.setCursor(4,1);
    lcd.print("UP [");
    lcd.setCursor(8,1);
    lcd.print(i);
    lcd.setCursor(9,1);
    lcd.print("]");

```



```

}
delay(1000);
lcd.setCursor(4,1);
lcd.print("Door Opened");
delay(3000);
lcd.setCursor(4,1);
lcd.print("Door Closed");
delay(1000);
isOption = 4;
isSwitch = 0;
isPasser = 0;
if(isInline3 == 1){
    isInline3 = 0;
    goto is3Tile_4;
}else if(isInline2 == 1){
    isInline2 = 0;
    goto is2Tile_4;
}else if(isInline1 == 1){
    isInline1 = 0;
    goto is1Tile_4;
}
isCurrent = "4th Floor";
loop();
break;
case 8:
is1Tile_3:
lcd.clear();
lcd.setCursor(4,1);
lcd.print("DOWN [3]");
delay(2000);
lcd.setCursor(4,1);
lcd.print("DOWN [2]");
delay(2000);
lcd.setCursor(4,1);
lcd.print("DOWN [G]");
delay(1000);
lcd.setCursor(4,1);
lcd.print("Door Opened");
delay(3000);
lcd.setCursor(4,1);
lcd.print("Door Closed");
delay(1000);
isOption = 1;
isSwitch = 0;
isPasser = 0;
if(isInline2 == 1){
    isInline2 = 0;
    goto is2Tile;
}else if(isInline3 == 1){
    isInline3 = 0;
    goto is3Tile;
}else if(isInline4 == 1){

```

```

        isInline4 = 0;
        goto is4Tile;
    }
    isCurrent = "Ground";
    loop();
    break;
case 9:
    is2Tile_3:
    lcd.clear();
    lcd.setCursor(4,1);
    lcd.print("DOWN [3]");
    delay(2000);
    lcd.setCursor(4,1);
    lcd.print("DOWN [2]");
    delay(1000);
    lcd.setCursor(4,1);
    lcd.print("Door Opened");
    delay(3000);
    lcd.setCursor(4,1);
    lcd.print("Door Closed");
    delay(1000);
    isOption = 2;
    isSwitch = 0;
    isPasser = 0;
    if(isInline3 == 1){
        isInline3 = 0;
        goto is3Tile_2;
    }else if(isInline4 == 1){
        isInline4 = 0;
        goto is4Tile_2;
    }else if(isInline1 == 1){
        isInline1 = 0;
        goto is1Tile_2;
    }
    isCurrent = "2nd Floor";
    loop();
    break;
case 10:
    is4Tile_3:
    lcd.clear();
    lcd.setCursor(4,1);
    lcd.print("UP [3]");
    delay(2000);
    lcd.setCursor(4,1);
    lcd.print("UP [4]");
    delay(1000);
    lcd.setCursor(4,1);
    lcd.print("Door Opened");
    delay(3000);
    lcd.setCursor(4,1);
    lcd.print("Door Closed");
    delay(1000);

```

```

isOption = 4;
isSwitch = 0;
isPasser = 0;
if(isInline3 == 1){
    isInline3 = 0;
    goto is3Tile_4;
}else if(isInline2 == 1){
    isInline2 = 0;
    goto is2Tile_4;
}else if(isInline1 == 1){
    isInline1 = 0;
    goto is1Tile_4;
}
isCurrent = "4th Floor";
loop();
break;
case 11:
is1Tile_4:
lcd.clear();
lcd.setCursor(4,1);
lcd.print("DOWN [4]");
for(int i = 3; i>=2; i--){
    delay(2000);
    lcd.setCursor(4,1);
    lcd.print("DOWN [");
    lcd.setCursor(10,1);
    lcd.print(i);
    lcd.setCursor(11,1);
    lcd.print("]");
}
delay(2000);
lcd.setCursor(4,1);
lcd.print("DOWN [G]");
delay(1000);
lcd.setCursor(4,1);
lcd.print("Door Opened");
delay(3000);
lcd.setCursor(4,1);
lcd.print("Door Closed");
delay(1000);
isOption = 1;
isSwitch = 0;
isPasser = 0;
if(isInline2 == 1){
    isInline2 = 0;
    goto is2Tile;
}else if(isInline3 == 1){
    isInline3 = 0;
    goto is3Tile;
}else if(isInline4 == 1){
    isInline4 = 0;
    goto is4Tile;
}

```

```

    }
    isCurrent = "Ground";
    loop();
    break;
case 12:
    is2Tile_4:
    lcd.clear();
    lcd.setCursor(4,1);
    lcd.print("DOWN [4]");
    for(int i = 3; i>=2; i--){
        delay(2000);
        lcd.setCursor(4,1);
        lcd.print("DOWN [");
        lcd.setCursor(10,1);
        lcd.print(i);
        lcd.setCursor(11,1);
        lcd.print("]");
    }
    delay(1000);
    lcd.setCursor(4,1);
    lcd.print("Door Opened");
    delay(3000);
    lcd.setCursor(4,1);
    lcd.print("Door Closed");
    delay(1000);
    isOption = 2;
    isSwitch = 0;
    isPasser = 0;
    if(isInline3 == 1){
        isInline3 = 0;
        goto is3Tile_2;
    }else if(isInline4 == 1){
        isInline4 = 0;
        goto is4Tile_2;
    }else if(isInline1 == 1){
        isInline1 = 0;
        goto is1Tile_2;
    }
    isCurrent = "2nd Floor";
    loop();
    break;
case 13:
    is3Tile_4:
    lcd.clear();
    lcd.setCursor(4,1);
    lcd.print("DOWN [4]");
    delay(2000);
    lcd.setCursor(4,1);
    lcd.print("DOWN [3]");
    delay(1000);
    lcd.setCursor(4,1);
    lcd.print("Door Opened");

```

```

delay(3000);
lcd.setCursor(4,1);
lcd.print("Door Closed");
delay(1000);
isOption = 3;
isSwitch = 0;
isPasser = 0;
if(isInline4 == 1){
    isInline4 = 0;
    goto is4Tile_3;
}else if(isInline2 == 1){
    isInline2 = 0;
    goto is2Tile_3;
}else if(isInline1 == 1){
    isInline1 = 0;
    goto is1Tile_3;
}
isCurrent = "3rd Floor";
loop();
break;
case 14:
isSwitch = 0;
isPasser = 0;
if(isInline3 == 1){
    isInline3 = 0;
    goto is3Tile_2;
}else if(isInline4 == 1){
    isInline4 = 0;
    goto is4Tile_2;
}else if(isInline1 == 1){
    isInline1 = 0;
    goto is1Tile_2;
}
isCurrent = "2nd Floor";
loop();
break;
case 15:
isSwitch = 0;
isPasser = 0;
if(isInline4 == 1){
    isInline4 = 0;
    goto is4Tile_3;
}else if(isInline2 == 1){
    isInline2 = 0;
    goto is2Tile_3;
}else if(isInline1 == 1){
    isInline1 = 0;
    goto is1Tile_3;
}
isCurrent = "3rd Floor";
loop();
break;

```

```

case 16:
  isSwitch = 0;
  isPasser = 0;
  if(isInline3 == 1){
    isInline3 = 0;
    goto is3Tile_4;
  }else if(isInline2 == 1){
    isInline2 = 0;
    goto is2Tile_4;
  }else if(isInline1 == 1){
    isInline1 = 0;
    goto is1Tile_4;
  }
  isCurrent = "4th Floor";
  loop();
  break;
}
}
}
}
}
}

```

## VII. Materials and Costs:

Materials	Quantity	Cost
Arduino Uno	1	1147.50 php
Button	6	317.52 php
LCD 16x2	1	160 php
LED Green	6	356.4 php
Potentiometer	1	30 php
Resistor	6	30 php
		Total Cost
		2041.42 php

## VIII. Results and Discussion:

- Assuming that the user is outside the elevator and is going to use it.



Figure 1 – Current location

- In Figure 1 show the LCD display of the device where your current location is.

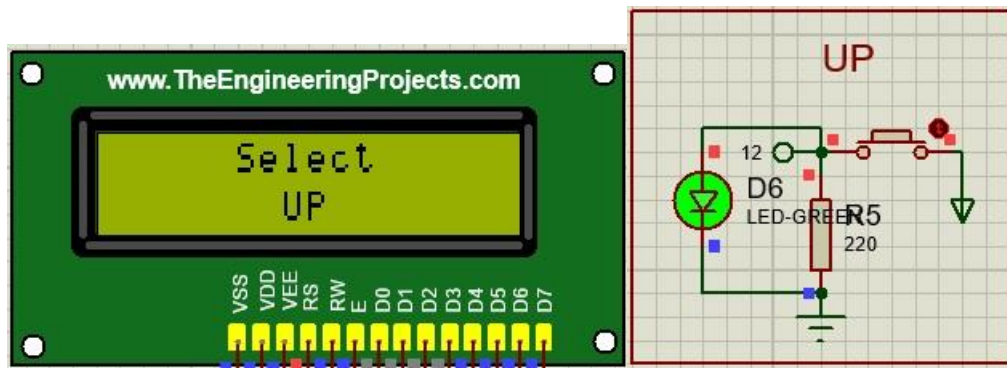


Figure 2 – UP display

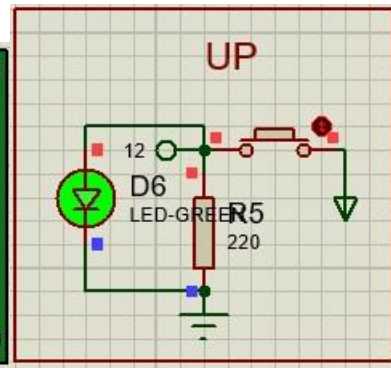


Figure 2.1 – UP Button

- In Figure 2 show the LCD display the selection UP or DOWN. It will only display “Select Up” if you are in Ground Floor, display “Select Up or Down” if you are in 2<sup>nd</sup> floor or 3<sup>rd</sup> floor, and display “Select Down” if you are in 4<sup>th</sup> floor. In Figure 2.1, the green LED indicates the pressed up button.



Figure 3 – Door Open



Figure 3.1 – Door Close

- After the up button is pressed. The elevator door opens for the user to enter and then closes.
- Assuming that the user is inside the elevator.



Figure 4 – Floor Selection

- In Figure 4 show the LCD display of the device where you can select the floor you want to go.

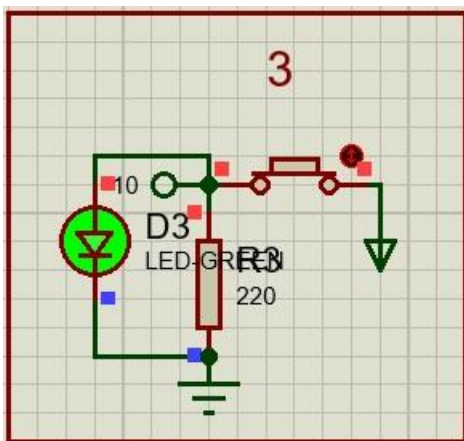


Figure 5 – 3<sup>rd</sup> button

- In figure 5 shows that the user wants to go to Floor 3 and the led indicates that the button is pressed.



Figure 6 – UP[G]



Figure 6.1 – UP [2]



Figure 6.2 – UP [3]

- In Figure 6 shows that the elevator started to move, Figure 6.1 shows the floor you Pass through and lastly Figure 6.2 shows that you are now in Floor 3.





Figure 7 – Door Open



Figure 7.1 – Door close

- The elevator starts to open in Floor 3, because this is what the user chose earlier, and then the elevator door closes.



Figure 8 – Current Floor 3

- Finally, at Figure 3 show the LCD display of the device where you get off the elevator.

### Conclusions:

In conclusion, coding is hard because it takes time and persistence. You need patience when you code because without it you won't last. Programming is hard and sometimes you will have bugs or difficult problems to overcome. If it's always easy, then you aren't challenging yourself, and you aren't growing as a programmer. The hours I spent making this project is not building the circuitry but solving puzzles and problems. Since so much of our environment is automated, computer programming is important today. Humans need to be able to monitor how people and computers communicate. We use computer programming to harness the computational power of computers and machines because they are so powerful and accurate.