My Tree … My friend

im Park an der Ilm

Neue Natur im Park an der Ilm | WiSe2020
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Content Table

01 Video presentation

My tree friend video:

This video is a summary of our concept and the prototype. List of content with time tag:

0:05 Headlines about vandalism in the park
1:20 My tree my friend installation in the park
1:49 Users interacting with the installation
2:10 Media Implementation
2:26 Functionality
3:47 Time-lapse of installation process

https://youtu.be/7BuRil9TKoY

First step for the “New Nature” project, is to define “New Nature”. Hence old and current nature should be perceived. Park an der Ilm faces two main challenges; Natural challenges and vandalism.

01 Natural Challenges

Ilm park is a man-made park, that was created in 1778. Hence, the age factor beside the nature of the land and soil that this park was built on, have a huge impact on how the natural elements of the park are affected by the climate change and other natural challenges that it faces . Wind, rainfall shortage, and flood is a little sample of what this park has faced in these few years.






Natural damage maintenance

All natural damages and possible future damage are dealt with, by (klassik stiftung Weimar) and park's team of gardeners.
Eight full-time gardeners work on regular park maintenance from 7 a.m. in the Ilm Park alone. Watering work, lawn mowing, bed care, path maintenance, cleaning work, prevent old branches from falling, and taking care of natural damage are part of the gardeners' regular maintenance work.

https://www.youtube.com/watch?v=anmhpdj8X6I

02 Vandalism

Ilm park has been affected by visitors' actions on many aspects and in many ways. Buildings, monuments, and sculptures faced vandalism for many years.

These are some Newspaper headlines about vandalism acts that took place in the Ilm park:

Thüringische Landeszeitung - 2011
"vandalism at franz liszt nobody lends a hand anymore"

Thüringen Im Blick - 2019
"Weimar: Unknown people decorate the Shakespeare monument in the Ilmpark"

Thüringer Allgemeine - 2019
"Artist group pelts Goethe's garden house with toilet paper"

Thüringer Allgemeine - 2020
" Fingers were broken off again at the Liszt memorial: The Klassik Stiftung is increasingly registering vandalism damage in Ilmpark and more rubbish."

"Since the **corona restrictions** came into effect, the amount of damage has increased tremendously."

-Stefan Hupel

Vandalism has been happening by the surrounding community and not tourists ?

03 Vandalism and disconnection

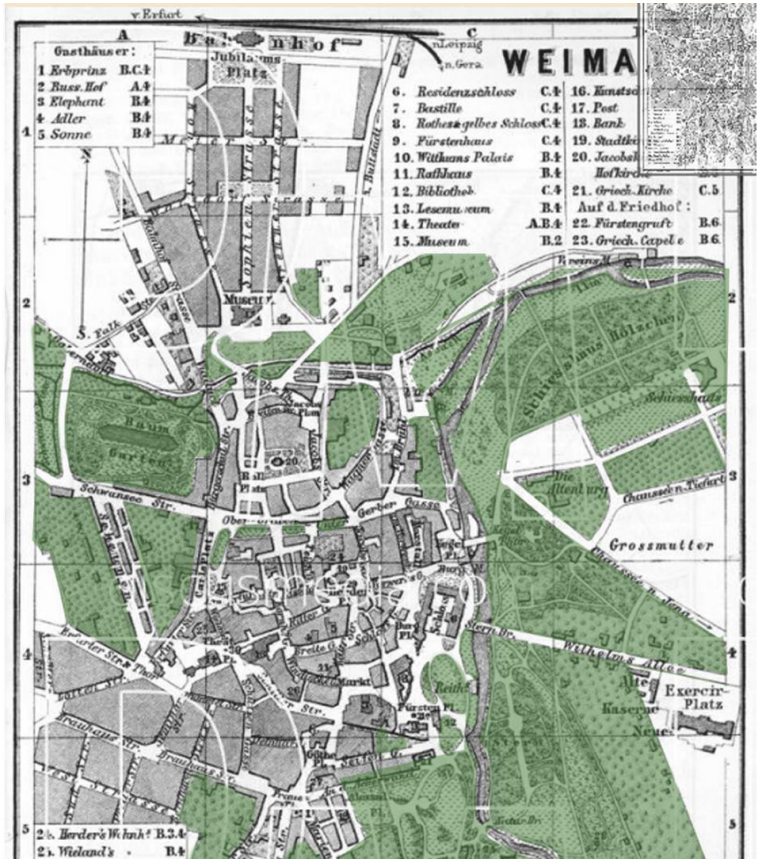
1872 – Winslow Homer's Snap the whip

2018

The way urban cities evolved, forced humans to disconnect more and more from nature. People are distant from real nature physically and emotionally. Life was built around nature and its resources, now nature has no place in their life. People nowadays consider the concrete cities that they are born in, their "natural" inhabitation. This all leads to disconnection.

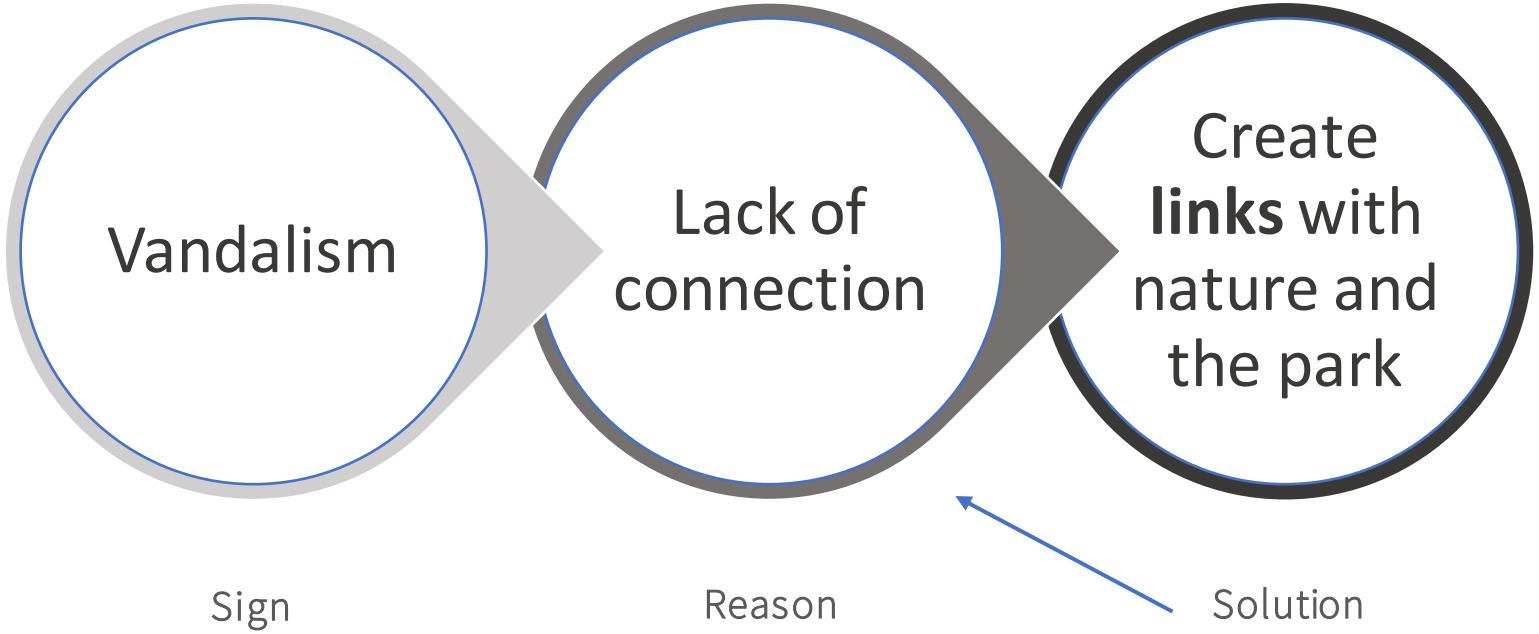
"Weimar is actually a park in which a city is located."

Writer Adolf Stahr, 1871



Weimar city-plan
1884

Weimar city-plan
2018



The analysis shows us that the park faces a very big and unsolved issue (Vandalism). Vandalism is a sign of lack of communication.

Old Nature Vandalism is a big sign of disconnection and antipathy to this park. People are getting more and more disconnected generally from nature and specifically from Ilm park. This disconnection is the main issue.

Nature One essential part of "Nature" is the relationship and connection between nature itself and the living inhabitants in it.

NEW NATURE Our aim is to solve this issue by creating an abstract way to communicate to nature as a community through this project.

"In Nature we never see anything isolated, but everything in **connection** with something else."

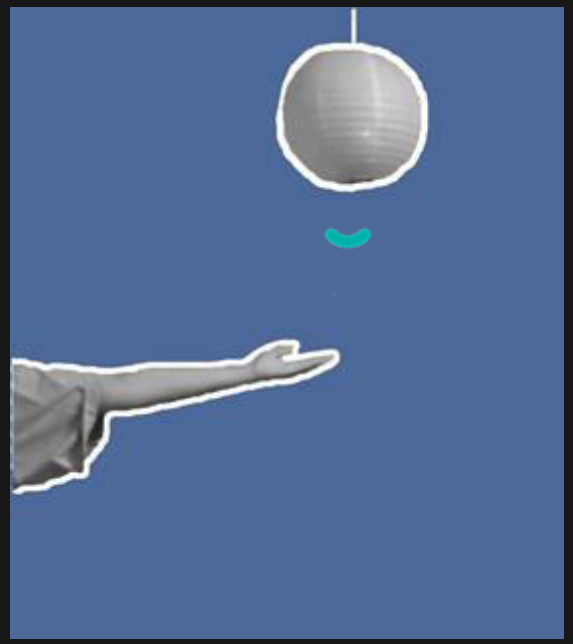
-Goethe

Our Project is located, where the main circulation of the walking paths in this part of the park are intersected, near the main entrance across Bauhaus University.

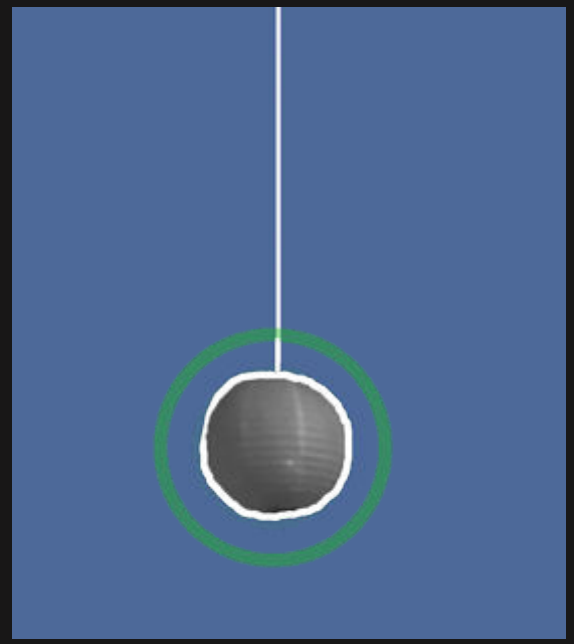
Not only the shape of the tree itself, but also a high potential of visitor on this site because it is also near many important places or monuments where people can visit.

Furthermore, it can be seen from above, when you are on the second floor of Mensa as well. And it can also be seen from outside the park in night when the tree lights turn on.

07 Functionality | Day MODE (light > 5)



Program can be activated by placing the hand under the ball



The activated ball will approach the user and starts recording, with green LED light blinking to indicate that it is recording

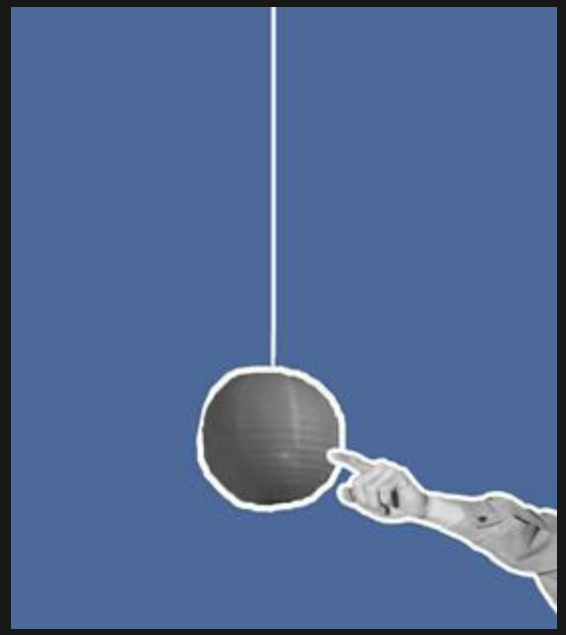
07 Functionality | Day MODE (light > 5)

Each ball can record for one user

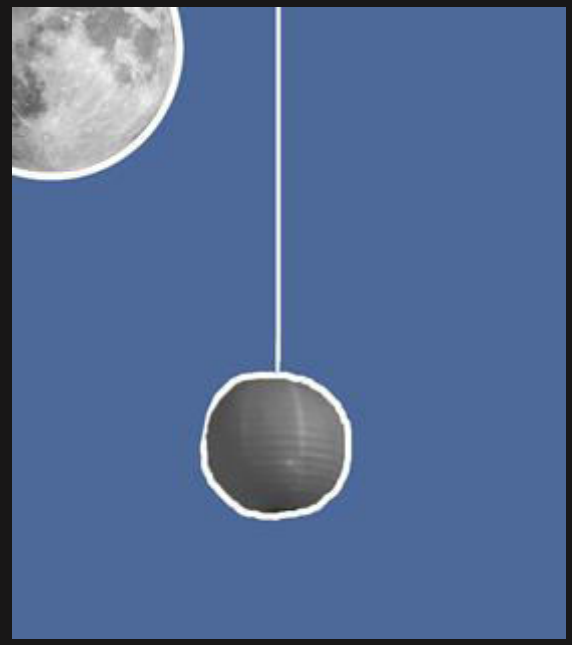
Recording will start playing in a loop directly after the recording

New users can either record new messages or leave a message for previous users, in a new ball

07 Functionality | Night MODE (light < 5)



The ball will delete the recording and reset when light sensor is covered



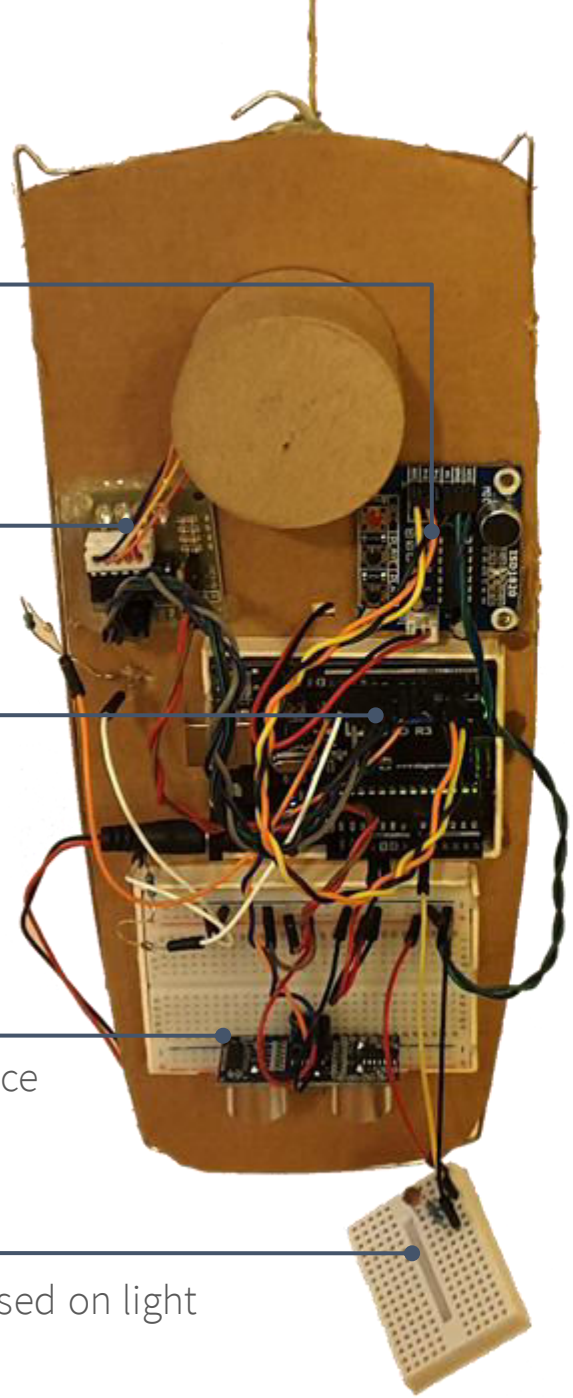
When it is night, light balls will reset and go back up

Audio guide:

Multiple balls are added to introduce the project for users and guide them how to interact with the project. These balls are easy to distinguish from the rest of the balls: by the color .

Night mode :

Every night the balls come back up to its original place and reset its memory card and turns on the lights. Balls will be interactive again after it is day again, allowing new users to interact and record new audios each new day. And keeps the park alive with lights in night, which can be visible from outside the park.



Audio Recorder

Stepper Driver

Arduino

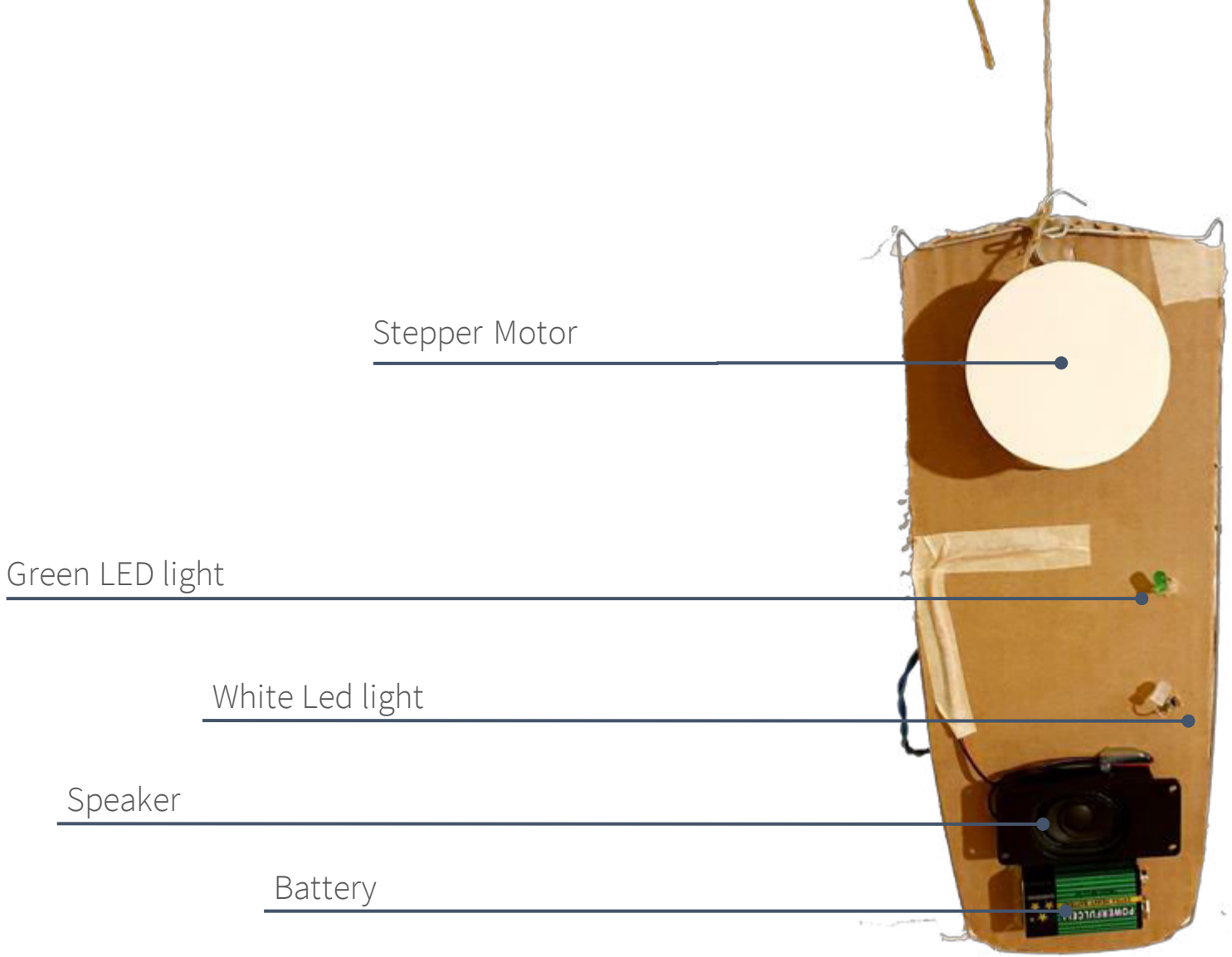
Ultrasonic sensor

Light balls will approach the users (based on the distance reading)

Photo sensor

Switching between Day and Night mode (based on light value)

Frontside


Stepper Motor
Green LED light
White Led light
Speaker
Battery

Backside

Audio Recorder ISD 1820 and speaker	4
Stepper Motor + Stepper Driver	2,6
Arduino uno	7,3
Breadboard	1.25
Ultrasonic Sensor	1,7
Photo Sensor	0.4
LED Light (White & Green)	0.10 / 4 pieces
Battery 9v	2.08
Cardboard	0.56
Lantern	1 / piece
One ball price in Euro	19.99

Protected from vandalism?

This project is like any other element in the park is subjected to a possibility of being affected by vandalism. However, two of the project's features make the possible damage easy to manage and fix; price and ease of installation.

Vandalism or piece of Art?

This project mainly aims to connect the people to the park and encourage them to communicate through it. This can also be a place where people express their feelings in a unique way, that is discouraged to do in other parts of the park "graffiti and painting".

Graffiti ≠ Vandalism

Graffiti = Art

This sketch controls an individual light ball of the "My tree... my friend" project, in two different modes; Day and Night mode. Light values that will be taken from the light sensor will affect which mode will be executed.

Day Mode: This mode allows the ball to interact with people, if the user place his hand under the ball for 5 seconds. Ultrasonic sensor will detect the decrease in the distance between the ball and floor underneath it, which means that another object is between them (the hand). After that the ball will approach the user, start recording, and play it repeatedly until light value decreases and night mode begins.

Night Mode (reset): At night while there is no potential interaction with any user, balls will go back up with light effects. Allowing new users to use the ball again in the next day. This night mode could also be activated by simply covering the photosensor, as a reset button.

Audio Guide: Audio guide modules will use the same code, but the record code will only execute once (the guidance audio record).

10 Code explanation | Declare Variables

```
// STEPPER motor
#include <Stepper.h>
const int stepsPerRevolution = 200;
Stepper myStepper( stepsPerRevolution, 8, 9, 10, 11);


// ULTRASONIC sensor
const int trigPin = 6; // movement based on distance value from the ultrasonic sensor
const int echoPin = 7;
float distance;
```

DC Step motor and Ultrasonic sensor.

```
// Controling loop
////for day program
boolean stopp = true;
////for night program
boolean stopp2 = true;
```

“Stopp” and “Stopp2” are used to control how many times the loops will be executed. “Stopp=true” will allow the day mode to be executed once, and at the end of the code it will change to “false’ to prevent repeating the code.And it will be true again in the night part of the code. Same for stopp2 but for the night mode.

```
// Light sensor
int light = 30;

// Light
boolean greenlight = false;
boolean whitelight = false;
```

Initializing the light value (sensor) with 30, so the program will start first with the day mode.

```
// Timer for recording
int timer = 20;

//Audio device
int REC = 2;
int PLAY_E = 3;
int FT = 5;
int playTime = 20000;
int recordTime = 20000;
```

Recording and audio playing part.

```
void setup() {

  // STEPPER motor
  Serial.begin(9600);
  myStepper.setSpeed(60);

  // ULTRASONIC sensor
  pinMode(trigPin, OUTPUT);
  pinMode(echoPin, INPUT);

  // Light sensor
  //pinMode(light , INPUT);

  // LED Light
  pinMode(12, OUTPUT);
  pinMode(13, OUTPUT);

  //Audio device
  pinMode(REC, OUTPUT);
  pinMode(PLAY_E, OUTPUT);
  pinMode(FT, OUTPUT);

}
```

Code explanation::

DC Step motor and Ultrasonic sensor.

LED light

Using REC, Play_E for looping function and FT.

```
void loop() {
```

```
// ULTRASONIC sensor

float duration;
digitalWrite(trigPin, LOW);
delayMicroseconds(2);

digitalWrite(trigPin, HIGH);
delayMicroseconds(10);
digitalWrite(trigPin, LOW);

duration = pulseIn(echoPin, HIGH);
distance = (duration / 2) * 0.0344 / 100;
delay(5000); // if user stood there more than 5sec the program will change
```

Code explanation:: void loop ()

- The Ultrasonic sensor will give a reading each 5 seconds, to execute the rest of the program only if the user kept his hand under the ball for 5 seconds.

```
// Movement loop
//// In Day
if ( light >= 18 ) {

  Serial.print ("DAY");
  if ( stopp == true) {
    stopp2 = true;

    Serial.println("Day program: system is able to interact with users :)");
    Serial.println("DOWN");
    Serial.print("Distance = ");
    Serial.print(distance);
    Serial.println(" m");

    if (distance <= 1.3) {
      Serial.print ("very near distance");

      // turn green light on after it approaches the user
      greenlight = true;

      for (int i = 0 ; i <= 30; i++) {
        // step revolution in DOWNWARD direction:
        myStepper.step(stepsPerRevolution);
        // turn white light on when WHILE approaching the user
        digitalWrite(12, HIGH);
      }
      digitalWrite(12, LOW);
      stopp = false;
```

- "stopp=true" means the day mode could be executed.
- In the day (when light is more than 18), ultrasonic sensor will give us a reading each 5 seconds until the reading changes (<1.3). (<1.3) means that a hand is placed there for five seconds, and movement, light, recording, and playing code will start.
- "i<30" is the amount of which the ball will move. Yellow light will be on the same amount of time that the ball takes to reach the user.
- "stopp=false" means that the day code has been executed once and it will not be executed again (until the reset happens at night).

```
    //Audio device
    ////(Recording)
    digitalWrite(REC, HIGH);
    Serial.println("It is now recording");
    // turn green light on (PULSING) after it approaches the user (means recording started)
    if (greenlight == true) {
      for ( int y = 0; y < 5; y++) {

        digitalWrite(13, HIGH);
        delay(1000);
        digitalWrite(13, LOW);
        delay(1000);
      }
    }
    //delay(recordTime);
    digitalWrite(REC, LOW);

    // blink white light after recording finishes
    whitelight  = true;
  }
  else {
    light = 30;
  }
}
greenlight = false;
```

After the ball moves down the Recording part will start for up to 10 seconds. Green LED will be activated only while recording. So the light is used as an indication for the users to what is happening.

```
////(playing audio)
if (whitelight == true) {
  if ( light > 18 ) {

    for (int i = 0; i <= 255; i++) {
      analogWrite(12, i);
      delay(10);
    }

    Serial.println("play recording");
    digitalWrite(PLAY_E, HIGH);
    delay(50);
    digitalWrite(PLAY_E, LOW);
    //delay(500);

    for (int i = 255; i >= 0; i--) {
      analogWrite(12, i);
      delay(10);
    }
```

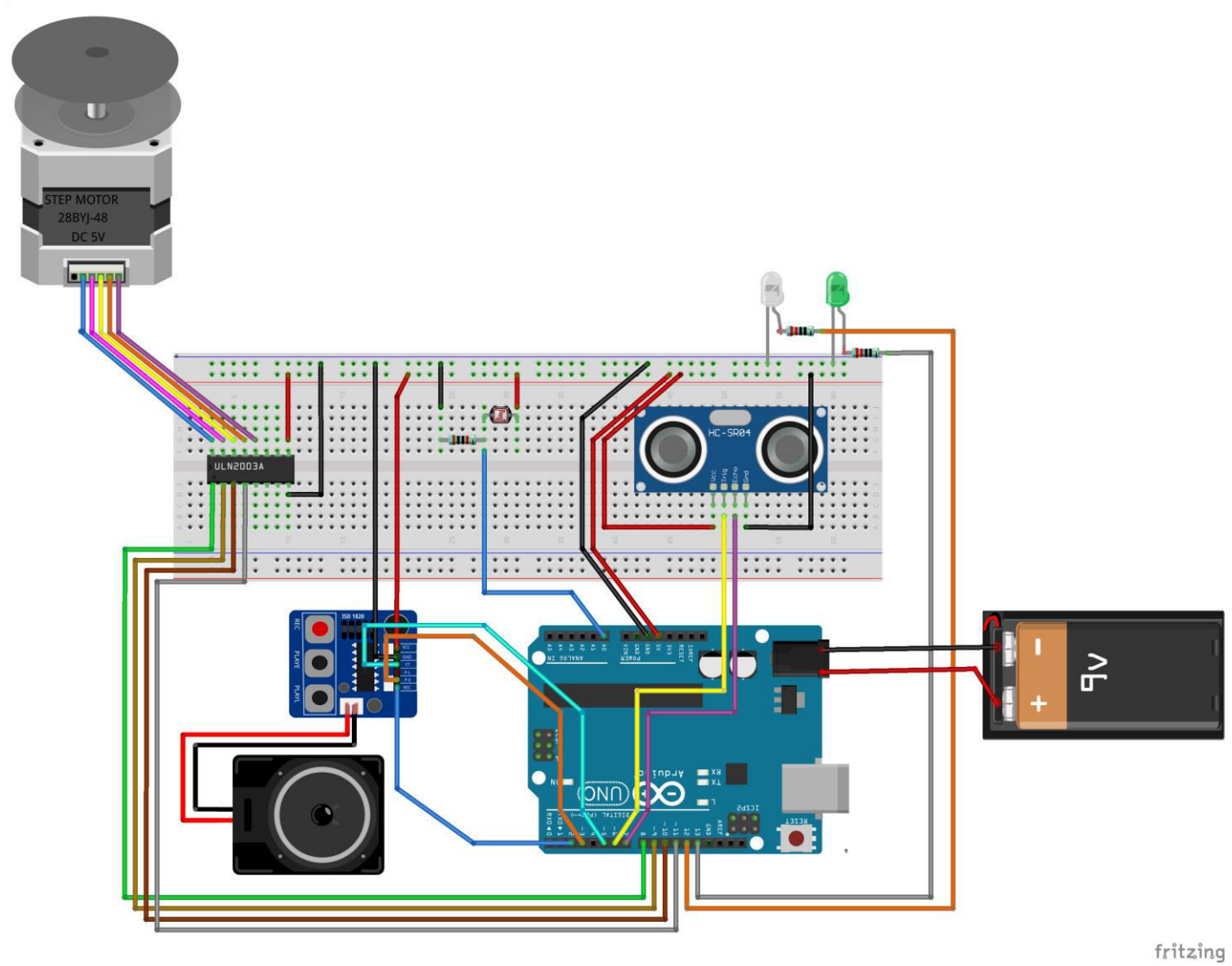
Audio playing part. White LED light will be activated. The recording will keep playing over and over again (until night mode starts).

```
      }

      //Light sensor
      light = analogRead(A0);
      //light = analogRead(A0);
      //mlight = map(light, 150, 1000, 0, 255);
      Serial.print("light value: ");
      Serial.println(light);
    }

    if ( light <= 18 ) {
      whitelight = false;
      Serial.println("stop playing recording");
      digitalWrite(12, LOW);
      stopp2 = true;
    }
    //Light sensor
    light = analogRead(A0);
    //light = analogRead(A0);
    //mlight = map(light, 150, 1000, 0, 255);
    Serial.print("light value: ");
    Serial.println(light);
  }
}
```

Light sensor value. When it is less than 18 the day program will stop and night mode will start.

```
  }

  //// At Night
  if ( light < 18 ) {
    //Fading white light
    for (int i = 0; i <= 255; i++) {
      analogWrite( 12, i);
      delay(500);
    }
    for (int i = 255; i >= 0; i--) {
      analogWrite( 12, i);
      delay(500);
    }
    if ( stopp2 == true) {

      Serial.println("Night program... :)");
      Serial.println("UP");

      //reset the memory card
      //Serial.println("resetting");
      //resetFunc();

      for (int i = 0 ; i <= 30; i++) {
        // step revolution in the other direction:
        myStepper.step(-stepsPerRevolution);
      }
      stopp2 = false;
    }

    // Reset stopp values after it is day again
    if ( light > 18 ) {
      stopp = true;
      whitelight = true;
    }
    //Light sensor
    light = analogRead(A0);
    Serial.print("light value: ");
    Serial.println(light);

  }

}
```

- Night mode. The ball will go up, the recording will stop playing. The white light will be activated during the night with fading effect.
- “Stopp” will be “true” again so the day program could be used again when night mode ends.
- When the light value is more than 18, DAY mode will be again activated.


STEP MOTOR
28BYJ-48
DC 5V
ULN2003A
HC-SR04
9v
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THANKS!

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