# Path of Life - Opening Up Jeroen Hol - B3.1



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# Abstract

This report is about a part of the project 'Path of Life'. 'Path of Life' is a project in which employees of the TU/e and the Eindhoven Student Chapel work together. Their goal is making an (permanent) exhibition within the chapel showing the path of life. The target group (visitors) are of any age, gender, cultural background and religion.

Part of the project described in this report is a stage of the path of life; a port. The port is 'Opening Up', the second stage of life. This port was chosen due to personal interest, being in this phase myself. Moreover I saw more opportunities regarding integrating technology compared to other stages.

This project will be used in the future as research and as input in discussions. The main problem addressed in this report, is the definition of opening up combined with an appropriate design.

# Introduction

'Path of Life in Mixed Reality' (Vissers, et al., 2012) [1] is initiated by several employees of the Technical University of Eindhoven, School of Design in China and the Sint-Catharina Church in Eindhoven (Eindhoven Student Chapel). This team has been able to define seven stages in life which everyone goes through, no matter what gender you are, what age, your religion or social background. To substantiate this, the problem statement is: are there cross-cultural components and is it possible to have those possible deeply rooted cultural dimensions in an interactive installation?

The design challenge is to make seven (interactive) installations which envision and explain the stages as they are defined. My personal challenge is designing one of those seven stages. What kind of elements (feeling) does the installation have to create? Does the installation fit into the target group, namely; any kind of visitor?

# Path of Life in Mixed Reality

Path of life exists of seven stages and three phases. All those phases and stages can't be associated with time. Every one of us meets those stages on different moments in their life, one faster than the other. The only certain factor is the order you go through the ports.

## **STAGES**

Seven stages have been defined in Path of Life. Any cultural background can be associated with them.

| 1. | Origin and entering      | I   |
|----|--------------------------|-----|
| 2. | Opening up               | I   |
| 3. | Union                    | II  |
| 4. | Connection               | II  |
| 5. | Creation                 | II  |
| 6. | Letting go and maturing  | III |
| 7. | Farewell and destination | 111 |

All the stages are divided into three groups; phases. Those phases (see picture below) have been defined (Vissers, et al., 2012) [1] to emphasize the 'goals' of life. Everyone is familiar with them and one way or the other everyone can be related to them.

- I. Depending on love
- II. Taking power
- III. Preparing for death

Path of

|            |             |                  |              |              | Childhood:<br>Visitors go in here unaware of wf<br>going through. Tiles are lighted r<br>symbolise influence from friends<br>Moreover the hopscotch path reg<br>game known by everyone. |
|------------|-------------|------------------|--------------|--------------|---|
| I: depend  | ing on love | II: taking power | III: prepari | ng for death | -   |
| childhood  |             | adolescence      | retin        | ement        | Opening up:<br>This is the process from childhoo<br>cence. A video is projected on a  |
|            |             | age              |              |              | enabling visitors to go through a   |
| origin a   | openin      | creation         | farewel      | letting      | and ESK considering opening up  |
| ind enteri | d nb        | connection       | I and dest   | go and m     | Adolescence:  |
| Ðu         |             | union            | ination      | atruing      | This stage is represented by a n<br>people aware of their life. Only<br>reached this state, you are awar  |

Figure 1 overview of 'path of life'

ing ar

## FOCUS

The focus of this project will be on the stage 'opening up', which can be seen as a transition between the first and second phase.

Opening up is the second stage defined in the Path of Life. It is a stage in life in which 'maturity' is a great factor, it's all about standing on our own feet. You'll be an individual in a very big complex system called 'society'. Based on this fact, 'opening up' gives us the opportunity/choice to reach out for one of the next stages. Either 'union', 'connection' or 'creation' or a combination of those three. All those stages exist of an element called 'adolescence' and can be described as 'taking power' in life. Opening up therefore consists of three elements; childhood – opening up – adolescence.

The installation in the church will have to represent the three elements shown above. Visitors walk through the installation [time] and witness the three elements. In the end awareness has to be created; a reflection on your own life.

For this stage more extensive research has been done. Most of it can't be directly related to the concept but has been of value in the process. For example the cross-religious components which have been defined by Sosis (Sosis, 2005) [2] are:

- 1. Belief in supernatural agents and counter intuitive concepts
- 2. Communal participation in costly ritual
- 3. Separation of the scared and the profane
- 4. Importance of adolescence as the life history phase is the most appropriate for the transmission of religious beliefs and values.

The most important part for me are the rituals. Rituals guarantee effective communication between different generations (Boateng, 1983) [3]. Moreover it ensures peaceful transition and understanding from youth to adulthood. Moreover rituals can be amplified through the incorporation of 'rhythmic drivers' such as music or instruments (Bloch, 1989) [4].

Rituals are important for the transition between childhood and adolescence, but moreover it's important to make people comply with their new situation.

# **Project aspects**

The people who've written the paper 'Path of Life' and defined the several stages are also the designers of the installations in the future. Since the paper was written, a master student has joined the team for his graduation project and a bachelor student for several months. They will use the project for the context and come up with their own design implementation. One member of the team is closely related to the chapel and also one of the initiators of the project. He had the idea of making such an exhibition, the rest of the team is helping him out with putting it on paper and making the designs.

The project doesn't have a real schedule. There have been meetings in which they are orientating the project. Because everyone of the project is working on this project as an hobby, there is no time pressure and therefore not a specific planning. There is a mission though; making interactive installations in the Eindhoven Student Chapel which let you experience deeply rooted cultural dimensions. The ground floor of the ESK will be used for this exhibition, including the stair house upfront. It is not sure whether it will be a permanent exhibition or a temporary exhibition, such as GLOW Eindhoven.



Figure 2 floor plan Eindhoven Student Chapel

A budget has not been decided upon yet. Budget will be available to make the installations, but it is yet not sure where this money will come from (sponsors/financing etc).

# Positioning of the project

The created concept is an interactive installation which is a cross cultural representation of opening up. Walking through the installation can be referred to as time, the only constant factor in the whole path of life. It's not sure how much time, the only fact is that you're moving up in time (represented by a lightrail).

Within the installation are three elements; childhood – opening up – adolescence. Those elements represent opening up.



Figure 3 visualisation of opening up.

## **CHILDHOOD**

In the concept, childhood is referred to by a hopscotch playground. Hopscotch is a children's game which was already founded in the late 17<sup>th</sup> century (Anon., n.d.)[5]. I chose for hopscotch, because almost everyone recognizes the pattern. Though every country has its own edition, the pattern and function is recognized. The hopscotch game is integrated in a bigger floor consisting of luminous tiles. The floor unconsciously refers to childhood, people know how the game works and reminds them that they played it in their childhood. The essence of the hopscotch, is to play hopscotch. Although, it also gives you freedom to combine it with the rest of the floor.



Figure 4 From left to right: Hopscotch in Alaska, Aruba, France and a modern version

Childhood is a phase everyone goes through, one faster than the other. Legally the ages varies between ages 16-21 but in some African cultures 'children' are considered adult at the age of 13 years old. (Anon., n.d.) [6]. Though everyone has his own time for this phase, they all have their characteristics. Children make decisions, one better than the other. Influenced by external factors like family and friends or taking full responsibility.



Figure 5 scenario floor with tiles

Visitors who approach the floor, trigger the infrared sensor. The lights in the hopscotch floor are switched on brightly if the sensor is triggered. Every other light around the hopscotch is dimmed and randomly fades in and out; one at a time. Visitors have the choice of following the hopscotch path, randomly walking around or doing a bit of both. These choices represent childhood. The randomly fading in and out of different tiles represent the external factors. Visitors might approach them, not always sure why they made that certain choice. The combination of hopscotch, the rest of the floor and the 'external factors' are the visualisation of childhood on an abstract level.

Every tile which is being stepped upon is fully brightened, making a visible path followed by the visitor. At the end of childhood (floor), the visitors enter an empty floor, this is the place where the next stage will start; opening up, the transition between childhood and adolescence. It also offers visitors to look back on the path they walked.

## **OPENING UP**

Opening up is mainly associated with study/work, leaving parental house, your own life, being responsible for the things you do. It's a process combining childhood and adolescence, connecting them. This phase of life is projected on fly curtains. The fly curtains visually block the adolescence part of the installation. In this context adolescence is seen as being responsible for your own actions and being an integrated individual in a complex society. You grow up and at a certain moment you are aware that you're ready for the next phase; adolescence. After you've left the hopscotch, the projection is activated and makes the visuals visible.



Figure 6 visualisations of opening up

The projections on the curtains are visuals and videos of how the designer interprets opening up. For the future there is an option which makes it possible that visitors upload their photos. Photos can be about what they've recently experienced in this phase and what reminds them of this phase. It is a giant mood board of opening up.

Opening up to me, is taking your responsibility. You don't always have to have the behaviour of an adult, but you need to know the consequences and take responsibility over them. You're able to analyse social situations well and adapt your behaviour accordingly. Furthermore, it is a phase of awareness, being aware of your role in a complex society.

## ADOLESCENCE

Adolescence can be interpreted in several different ways. The most common one is age: once you've reached 18 you're allowed to drive a car (in Europe). Though this is a way to define adolescence, this still differs from 13 years old in Africa to 21 in America (Anon., n.d.) [6].

Other ways of defining adulthood are physiology, psychological, personal character or social status (Anon., n.d.) [7].

The concept deals with adolescence as a moment of awareness, aware of what you are, which competencies you're good at. Moreover it's about responsibility, being the responsible one for all of your actions, you can't blame your parents anymore. For me, adolescence is about being a single player in a bigger game. Your whole life you're trying to be part of an extremely complex system (society).

The installation ends with an mirror, placed in such a way that visitors can look back. They see what they've walked through and which path they took. It is a moment of awareness and reflection. In my point of view, you only know if you're an adult, if you have reached the phase adulthood.

The vision of this whole project is "using scientific and engineering methods to capture and represent essential aspects of a particular culture to support cultural development". The mission of opening up is creating awareness, a moment of reflection where you are in life right now and what this entails. I want this installation to be a part which fits into the rest of the exhibition. Moreover it should be selfexplanatory, people should go through the installation and experience for themselves what they are going through.



Figure 7 overview of the concept. The yellow represents a light bar moving from left to right, representing time [forward]

## **Process**

# ORIENTATION

Figure 8 visualisation of the design process

I've done this project as a SDL activity within my B3.1 semester. The main goal of this project is making a basis for the future project and the appliance of integrating technology. The appliance of integrating technology is important for my C-verdict and therefore a main component I will be focusing on.



Figure 9 time schedule 'path of life'

I started the project by joining in with a meeting. The meeting was to get to know everyone, get insights in what is already there and an introduction on the project. The meeting helped to understand the paper which is written by this project team. It gave me more insight about the project and what the real goals are. The meeting was helpful, it gave me a start position in the project.

Having read the paper and participated in two meetings, I could start my own research and think about my own interpretation of the project. What do I want to present and what do I want the design the represent?

## ANALYSIS

My first thoughts were based on an overview of the project which could be placed at the beginning of the exhibition. A map which shows the different stages of life, making people familiar with them before they enter the exhibition. This could be connected to an app making the map interactive, giving it a score or personal input.

This wasn't really what I wanted due to time; the other projects should be available and finished before this project can be made. (see timetable above)

Retreating from my first thought, I analysed all the stages one by one. Comparing them to the first ideas from the paper, I got a feeling what is expected by the project. My interest gradually shifted to 'opening up', the phase I'm in myself. I had some interesting ideas and I therefore decided to focus on them.

Opening up, what is it? With a brainstorm, I wrote everything down which I could come up with, regarding opening up. Taking it literally like a door, to a more abstract interpretation, like a flower. The main problem with those thoughts is, they represent opening up, but what is opening up in your path of life, what does it entail?

## **IDEA FORMING**

Through conversations with others, looking into the paper, I started defining opening up. With those definitions I again looked at a possible design, now more concrete but still with abstract elements. One of those ideas is a floor which can track your path, it gives visual feedback on how you crossed the floor. Behind this floor are several choices you can make regarding opening up. Those choices are visualised by doors or a mechanical system, like the closing of a camera shutter.

From here on, 3 parts are defined in the project; childhood, opening up and adolescence. Those parts can be seen as individual projects; combining them visualizes the opening up. Because of a wrong interpretation of the project paper, I've always seen opening up as a process which combines childhood and the next three stages; union, creation, connection. In my point of view people have one choice out of three, with the ability of doing another one later on, but never at the same time. Three doors will be placed next to each other. All those doors have the characteristics of the 'port' on them. When approaching a door, the other two doors 'close'; the lights go out. It makes you aware of that you're making an deliberate choice, once you choose to pass this door, the others will be closed for a while.

Though I liked this idea best, the context wasn't right. In a meeting with one of the project members I was told I had a wrong interpretation of the paper. After childhood there is opening up. Opening up makes you an adult first. Then union, creation and connection can be chosen.

Several design decisions have to be taken right now; define what you want to show, how you will do this and make a permanent design.

## **FRAME WORKING**

The concretizing of the idea has ended up in the concept which is there right now. The idea has changed a bit because of the wrong interpretation.

For my own competencies, I chose for integrating technology in the design, through different disciplines. Childhood is represented by electronics only, without any programming. For the opening up I chose for using an Arduino in combination with processing. Moreover I made a real size model of one of the tiles, which uses electronics and Arduino.

I started with brainstorming on the electronics of childhood. I chose for making a scale model of the floor due to financial reasons. Because of this many tiles (over 40) I decided to make a smaller floor with 22 tiles and a piece of the hopscotch path. This will represent the floor and people still have the option of 'walking' a path. There are several options for the prototype if this many tiles have to be lighten and respond on movement.

- Shift registers
- Programming (x-axis; y-axis)
- Electronics



Figure 10 circuit made for prototypes exhibition



Figure 11 visualisation of tiles in combination with the electronics

I used electronics, without program involvement. The whole circuit is based on relays. All the relays are switches which control the LEDs' current, giving them the option of being switched off, dimmed or fully brightened. A relay in the beginning of the floor activates all the LEDs and puts them in a dimmed phase. Once the other tiles are triggered they are fully brightened.

The blue surfaces in the picture above represent the tiles, there are 22 of them. The grey surfaces are the beginning and end of the childhood floor. The right one (beginning) activates all lights, the left one (end) puts all the lights off.



### Figure 12 prototyping

This electronics took the longest time regarding the prototyping. For the casing of the electronics I used the laser cutter, giving me a fast and accurate way of making the tiles out of wood and Plexiglas. Another problem was making the 'mechanical' part, the moving of the tiles. I tried several materials and combinations of them before the tiles worked. The final prototype uses bubble wrap taped to the inside of the wooden box. For the explorations is used pillow stuffing, bubble wrap, Plexiglas, MDF and combinations of those.

Next to the tile floor, Processing is used for showing a video on the 'fly curtain'. The video starts when the last tile is triggered; all lights go out and the video starts playing. The video is a compilation of visuals presenting opening up [see figure 6].

As an extra element for the exhibition I added a real-size tile. The real-size tile gives a more accurate idea of what the concept is and what it will look like in the future. The tile responds on stepping upon it and shows the fading in and out. The tile is 5cm high and the edge of the tile is lightened by LEDs. Moreover the hopscotch tiles have the characteristic numbers used for the game. The sides where the light comes through, has a rough surface, imitating stones used on the street. Moreover this surface will provide more grip on the floor.



Figure 13 prototypes used at the exhibition

The final exhibition was the moment to finish the project, taking all the comments, reactions and observations into consideration for future purposes and reflections.

## REFLECTION

Not my biggest mission this project, but my biggest challenge; self-directed learning. The uncertainty and vagueness of this project was a big challenge. Vague because it's a difficult subject on which there are a lot of opinions. Uncertain because I'm the only one with time pressure. The meetings I planned weren't always very useful, as the project was in a start-up phase and not clear yet.

Self-directed learning has been up to par concerning time management and personal goals. Though, in a more vague situation and not a project with a real framework I found myself struggling with time management and achieving goals.

For the future I want to do this otherwise, these situations also occur at a job, internship, study association etc. I will have to be the one who runs the project along with the rest as I need to finish the project in time. I will have to plan more meetings than I did now. I need something, thus I need to command/ask the rest of the team to help me out. This can be done by arranging better meetings; agenda, chairman and prepare well.

Concerning the project as a whole, in the future I should have a go/no go moment. Analyse what you need at a certain moment, where you want to go and how to reach your goal. If you can't meet up to those expectations, cancel the project or take another direction. The project went well now, but I could have done more if I knew what my real goal was, except integrating technology.

I learned a lot on the prototyping this semester, especially everything on electronics. I deliberately chose for using integrating technology this semester as it was my conditional. It was not as easy as I thought I would have been. Integrating technology is not only applying technology, it is something which improves the concept. In the future I will have to do even more on this competency area. Integrate the technology even more than I did now, a real added value to the design. One way of doing this is more research on technologies, what the possibilities are.

The electronics in the concept were a lot of work and a great part of the design process. I chose for multiple disciplines within electronics; components, Arduino, coding and Processing. I've achieved my biggest mission: getting familiar with electronics and other disciplines which coincide with it. Not always very easy and not very time efficient. I'm a designer who wants to do things perfect compared to the time available. Electronics is my goal to learn, not only apply, but learn too. I've been ignoring this part because I wasn't familiar with it and afraid the prototype wouldn't turn out as Ihoped.

I spent a lot of time on the electronics (light tiles), though I could have done it more efficient through coding with grids or shift registers. This decision is not a bad decision, I've chosen this option for my competency development. In my bachelor I still want to start working with shift registers and more advanced coding (assignment or project) but I now at least have a good basis.

Last semester I used prototyping to visualize my project as 'museum quality', visually attractive. I now needed a fast form of prototyping, to present function . I used the laser cutter for this, it enabled me to make fast, precise prototypes. I used the laser cutter a lot, but for the future it's also something to be careful with. MDF cut with a laser represents fast, easy, simple prototypes; not always what you want your prototype to be. For the future I have a lot to learn, but I've seen a lot on self-directed learning and integrating technology this semester. Integrating technology doesn't only consist of electronics, in my future project I want to get familiar with the other aspects too, such as mechanics.

## CONCLUSION

This project is a basis for research and further discussion. If this project is used as inspiration, it is important to examine the feeling created. This project is intended to create a feeling of awareness.

1) The concept should create a moment of self-reflection, making you think about the phase you are in. I want it to make visitors aware of their situation and make them reflect on their own life.

To examine those feelings, another prototype has to be made. The prototype will have to be real size and let people really experience the installation. The prototype which was made for this project is used for explaining and representing the project, it doesn't create a mood or sphere. It did represent the playfulness of the tiles, which I didn't expect. People (randomly) start pressing the tiles. Whenever I asked 'why', answers were given such as: 'it was randomly', 'shortest way' etc. It made people think about what they are doing.

2) My current prototype is not a prototype which can create the wanted mood. This prototype is made for the visualization of the project, explaining the concept. To create a feeling for the visitors, a Wizard of Oz is an option. The most important element is doing this in a darkened room/surrounding, making the visuals well visible on the curtains. In this way you can really show the visuals to the visitors and present the fly curtains as a 'wall' between childhood and adolescence.

Moreover this kind of prototype enables you to examine the experience visitors go through. It's important to ask the right questions; ask indirect questions which they can't answer with 'yes' or 'no'. Users should express the feeling they have through words. Additionally pen and paper can be provided for drawings or mood boards.

3) Input from the user is another option. Right now the designer decides what is projected on the fly curtains, but this is not always relevant or personal for the visitors. Visitors should be able to present their own interpretation of opening up. Adding an feature giving visitors the opportunity to upload pictures with their smartphone will make this installation more interactive and could create a network in the exhibition.

4) An important thing I've learned in this project is also the hardest thing; the cross cultural emphasis of the project. There will be restrictions when setting up a 'path of life', everyone has his own feeling and interpretation of the project. The designs and presentation will have to be coherent with this. I recommend the team to have a solid framework in which they will work.

This restriction also made it hard for me to define a real target group, there are so many possibilities based on research, that out ruling some wouldn't be fair.

5) The project has been able to define a feeling which has to be created by the installation, a sphere visitors have to go through. Though a mood is created, the prototype didn't offer the opportunity of testing this; it's something which can be done in the future.

## Indexes

## **SOURCES**

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[All figures are made for this report. Figure 4, 6 are pictures from Google images]

## **PROCESSING (VIDEO)**

import processing.video.\*;
import processing.serial.\*;

```
Movie myMovie;
Serial myPort; // Create object from Serial class
```

```
int val; // Data received from the serial port boolean vidPlays = false;
```

```
void setup() {
  size(1280, 800, P2D);
  background(0);
  // Load and play the video in a loop
  myMovie = new Movie(this, "pol#2.mpg");
```

```
// I know that the first port in the serial list on my mac
// is always my FTDI adaptor, so I open Serial.list()[0].
// On Windows machines, this generally opens COM1.
// Open whatever port is the one you're using.
String portName = Serial.list()[0];
myPort = new Serial(this, "COM4", 9600);
```

```
}
```

```
void movieEvent(Movie myMovie) {
 myMovie.read();
}
void draw() {
 tint(255, 20);
 if (vidPlays == true) {
  image(myMovie, 0, 0);
 }
 if (myPort.available() > 0) { // If data is available,
                            // read it and store it in val
  val = myPort.read();
  println(val);
                      // debug purpose
 }
 if (val == 49) {
                       // If the serial value is 0,
  vidPlays = true;
  myMovie.jump(10);
  println("Video 1 will play now");
  background(0);
 }
 if( val == 50){
                            // If the serial value is not 0,
  vidPlays = true;
  myMovie.jump(1);
  println("Video will play now");
 }
 if( val == 51){
                            // If the serial value is not 0,
```

```
vidPlays = true;
  myMovie.loop();
  println("video 3 will play now");
 }
 if( val == 52){
                           // If the serial value is not 0,
  vidPlays = true;
  myMovie.jump(45);
  println("Video 4 will play now");
 }
}
ARDUINO (VIDEO)
const int switchPin1 = 2;
                                     // Switch connected to pin 4
const int switchPin2 = 3;
const int switchPin3 = 4;
const int switchPin4 = 5;
int buttonHigh = 1;
int lastbuttonHigh = 1;
void setup() {
 pinMode(switchPin1, INPUT);
                                      // Set pin 0 as an input
 pinMode(switchPin2, INPUT);
 pinMode(switchPin3, INPUT);
 pinMode(switchPin4, INPUT);
 Serial.begin(9600);
                               // Start serial communication at 9600 bps
}
void loop() {
if (digitalRead(switchPin1) == HIGH){
 buttonHigh = 1;
}
 if (digitalRead(switchPin2) == HIGH){
 buttonHigh = 2;
 }
 if (digitalRead(switchPin3) == HIGH){
 buttonHigh = 3;
 }
if (digitalRead(switchPin4) == HIGH){
 buttonHigh = 4;
 }
if(buttonHigh != lastbuttonHigh){
Serial.println(buttonHigh);
lastbuttonHigh = buttonHigh;
}
}
```

## ARDUINO (RGB LED)

```
#define drukSensor A0
int ledR = 9;
int ledG = 10;
int ledB = 11;
int NumberOfActivations = 0;
int fadeSpeed = 10;
int Activated = 0;
int timeInactive = 0;
//RGB Values color stage 1
int ledR1 = 255;
int ledG1 = 255;
int ledB1 = 255;
int ledR2 = 2;
int ledG2 = 2;
int ledB2 = 255;
void setup() {
 pinMode(drukSensor, INPUT);
pinMode(ledR, OUTPUT);
pinMode(ledG, OUTPUT);
pinMode(ledB, OUTPUT);
Serial.begin(9600);
}
// the loop routine runs over and over again forever:
void loop() {
// stage 1, the programm remains in this stage until 10 HIGH reads of drukSensor (to prevent any
faulty reads)
 while (NumberOfActivations < 10){
  for (int NumberOfSteps = 150; NumberOfSteps > 0; NumberOfSteps --){
   analogWrite(ledR, (ledR1/255 * NumberOfSteps));
   analogWrite(ledG, (ledG1/255 * NumberOfSteps));
   analogWrite(ledB, (ledB1/255 * NumberOfSteps));
   if (analogRead(drukSensor) > 300){
   NumberOfActivations ++;
   }
   delay(fadeSpeed);
  }
  for (int NumberOfSteps = 0; NumberOfSteps < 150; NumberOfSteps ++){
   analogWrite(ledR, (ledR1/255 * NumberOfSteps));
   analogWrite(ledG, (ledG1/255 * NumberOfSteps));
   analogWrite(ledB, (ledB1/255 * NumberOfSteps));
   if (analogRead(drukSensor) > 300){
   NumberOfActivations ++;
   }
   delay(fadeSpeed);
  }
```

}

// stage 2, the programm remains in this stage for at least 10 LOW reads of drukSensor (to make sure the tile is unpressed again)

```
if (NumberOfActivations > 0){
  for (int NumberOfSteps = 255; NumberOfSteps > 100; NumberOfSteps --){
   analogWrite(ledR, (ledR1/255 * NumberOfSteps));
   analogWrite(ledG, (ledG1/255 * NumberOfSteps));
   analogWrite(ledB, (ledB1/255 * NumberOfSteps));
   if (digitalRead(drukSensor) == LOW){
   NumberOfActivations ++;
   }
   if (analogRead(drukSensor) > 300 && NumberOfActivations > 20) {
    break;
   }
   delay(fadeSpeed);
   Serial.println("stage 2 is bezig" );
  }
  for (int NumberOfSteps = 100; NumberOfSteps < 255; NumberOfSteps ++){</pre>
   analogWrite(ledR, (ledR1/255 * NumberOfSteps));
   analogWrite(ledG, (ledG1/255 * NumberOfSteps));
   analogWrite(ledB, (ledB1/255 * NumberOfSteps));
   if (digitalRead(drukSensor) == LOW){
   NumberOfActivations ++;
   }
   if (analogRead(drukSensor) > 300 && NumberOfActivations > 20) {
    break;
   }
   delay(fadeSpeed);
  }
}
// stage 3, the programm only enters this stage when at least 10 LOW reads were done in stage 2 and
when the current read of drukSensor is HIGH
 while (NumberOfActivations > 20 && analogRead(drukSensor) > 300){
   analogWrite(ledG, ledG2);
   analogWrite(ledB, ledB2);
   timeInactive = 0;
   Activated = 1;
   Serial.print("stage 3");
   delay(500);
```

}

//stage 4, as soon as there has been a LOW read of drukSensor within stage 3 the programm enters
this stage in which it remains the same brightness for 5 seconds and after that fades to black
if(Activated == 1){
 delay(5000);

```
for (int NumberOfSteps = 255; NumberOfSteps > 100; NumberOfSteps --){
    analogWrite(ledR, (ledR2/255 * NumberOfSteps));
    analogWrite(ledB, (ledB2/255 * NumberOfSteps));
    if (digitalRead(drukSensor) == LOW){
    NumberOfActivations ++;
    }
    delay(fadeSpeed/155*255);
}
Activated = 0;
}
```

}