PROCESS REPORT 'THUISJES'

FINAL BACHELOR PROJECT

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Squad
Social interactions with shared systems

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SUMMARY

This report discusses the design process the 'thuisjes' concept, an interface proposal for interacting with the Philips Hue lighting system in family homes.

The aim of this project consists of exploring user interactions and interface design of a smart connected system that is shared by multiple users. To orientate on the project's context, literature was analyzed and context mind maps were made. Based on personal skills, knowledge and interest, the context of family home lighting systems was chosen and a first ideation session was performed. Hereafter the design goal was formulated: deliver an interface for a family home lighting system that increases the family home feeling through its use. The family home feeling was defined throughout the whole process.

Understanding of the context and use of a lighting system was built through the construction of personas and scenarios based on existing products. By analyzing the scenarios, types of interaction were extracted. According to these interaction types, the functionalities of the interface were defined. With these insights a first concept was constructed. Hereafter concept was judged according to the qualities of the home feeling. From this evaluation the qualities and weaknesses of the concept were revealed and weaknesses are discussed and taken care of.

All knowledge gained up until this point was used for designing a new concept and the two were compared. Although the new concept was more innovative, the first concept was chosen, mainly for feasibility.

Prototyping brought the concept to life and according to the projects goal, a functioning prototype demonstrated the interaction with the lighting system, as well as the look and feel of the proposed product. The final concept was presented at the final demo day, where valuable feedback on shared use, product qualities and design and the feasibility of the real product was gained. But as this presentation moment was not suitable for an in-depth user evaluation examining if the thuisjes can have a positive influence on the family home feeling, a co-constructing stories user evaluation will be performed. The insights of the user involvement will help to conclude whether to project goal is met. Lastly the quality of the design process is discussed and a conclusion on the content of the design process up until now is given.

PROLOGUE

The way towards this final bachelor project has been a bumpy one. Well, bumpy, compared to my high school years the bumps of my bachelor studies were more like mountains with an alpine character. The most beautiful peak was the academic year of 2016/2017, where I did an internship at the Intelligent Lighting Institute of the TU/e and worked on two installations for the GLOW festival. Next to that I did a board year for the association ESMG Quadrivium, where I was allowed to lead the symphony orchestra through 2 beautiful concerts. I loved every minute of the year and put my passion and soul into every activities I organized. According to the people around me, until Christmas I had become the glow-girl. For the rest of the year I was the girl from Ensuite. I made plans for my final bachelor project, was working on a glow project again and made plans for a master abroad. From up here everything looked perfectly beautiful and promising.

But, after summer holidays I started studying again. Within one week after my board year, I had to be a student again. But I wasn't. Studying as a rehab from the intensive board year did not work well, I fell down the mountain and the doctor told me I was burned out. A few months I stayed where I was, somewhere in a sloping autumn valley. Soon winter came and everything got dark and cold, mom was diagnosed with cancer and I wasn't able to start finishing my bachelors again. So we lived at home together. And we could recover together. Luckily we did, both of us. After that half year the sun showed itself more and more, warmed me up and encouraged me to have a good look around. I noticed I crawled up, halfway from the mountain the tops don't seem that high and the valleys that low, the landscape changed to a more friendly one, more like the Ardennen. It seemed I was well on my way home…

Starting as a student again, I chose to study in a squad that I knew would fit me: Social interactions with smart systems. Actually everything in the name interests me. Social interactions, interactions that make you more social, more human, in a world where technology is playing a bigger role in everyday life more and more. Like these smart systems. I sometimes catch myself thinking that all this technology and these smart systems are more of an enemy to being human then that it suits my everyday life. But this was the project to design something social, something suiting, something that is just perfectly nice. During the project market also Harms enthusiasm to see me again after a year convinced me to choose for this project, and I am grateful he accepted my handshake. It gave me confidence I could start studying again with the peace of mind.

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INTRODUCTION

"*Smart, connected, interactive systems become increasingly popular in our home and professional environments. Such systems are characterized by their ability to connect different devices and information sources to provide more dynamic and customized services. Think of areas as media and entertainment, lighting and climate, kitchen and household appliances, security, mobility, calendar and planning, and healthcare. Because of their interactivity, smart systems offer great opportunities in terms of flexibility, adaptability and personalization. Interaction, however, seems often to be designed for individual use, on devices optimized for personal interaction (for instance a smart phone), while actual use is much more social, and interaction with such shared systems often influences multiple users at once.*" – Harm van Essen

The design challenge of the squad 'social interactions with smart systems' therefore is defined as follows: explore improved user interactions and interface design of a smart connected system that is shared by multiple users.

The approach of the squad is to first build a thorough understanding of the social and every-day aspects of the context, next to a theoretical knowledge from fields as psychology and social sciences. From there improvements of user interactions can be identified and more suitable interface designs can be suggested.

1. EXPLORING THE PROJECTS SCOPE
iteration 1

These first weeks of the project were filled with a number of explorations of the projects scope. A pressure cooker assignment was given to get familiar with shared system design. The goal of this assignment was to use the theories of social translucence (Erickson, Kellogg, 2000) the action exploration model (Bakker, Niemantsverdriet, 2016) and the concepts of intelligibility and accountability (Bellotti, Edwards, 2001) to analyze every day shared systems.

1.1 EXPLORATION

I took the time to explore and redefine my vision of design and identity as a designer (see appendix A). To link my vision on design to the project, I searched for examples of calm technology (Weiser and Brown, 1996) implementations in shared use interfaces. The following examples were analyzed in the action exploration model (Niemantsverdriet, 2018): Mediated intuition by Emar Vegt (Eggen, van Mensvoort, 2008). This is a soundscape which enables office workers to perceive the 'printing weather' at an office printer on a different floor in the office. Another example was the Dangling String (Weiser and Brown, 1996), a visualization of network use in an office. Also the library loaning system of the TU/e, and the Philips hue lighting system in a family home were analyzed.

Next to this, contexts of interest were explored and searching for opportunities to contribute my expertise to began. Mind mapping (Michalko, 2006) enabled me to create overviews of the contexts and identify aspects of interest within these contexts. The mind maps of a library, office, family home, kitchen and theatre can be found in appendix B.

Some aspects of interest were further defined as design opportunities: a recommendation system for libraries, a recommendation system for experiences, dinner invitations based on the use of your spice storing shelf etc. But all of them were sooner or later put aside because of insecurity to choose.

1.2 CHOICE OF CONTEXT

Therefore all contexts and concepts were rated according to two scales: context accessible to test vs inaccessible to test and suitable for peripheral interaction vs unsuitable for peripheral interaction. These scales were chosen to guarantee the feasibility of the project and to make sure that the context would match the students' vision on design.
The office and living room contexts scored highest but as the library context still felt as the favourite, no decisions were made yet.
After a visit to Eindhoven's public library, which generated no enthusiasm whatsoever, the decision was made to stick to the context closest to previous work and thereby closeds to the students' expertise: home lighting.

1.3 IDEATION

To start ideating, the ideation method 'roses and rattlesnakes' (Michalko, 2006) was chosen. This method demands to formulate a clear goal that the idea you want to generate fulfills. In this case the goal was formulated to 'increase the home feeling through lighting interaction'. From this ideation session (appendix C) not only the goal of the project was defined, but also a first rough interface design was sketched.
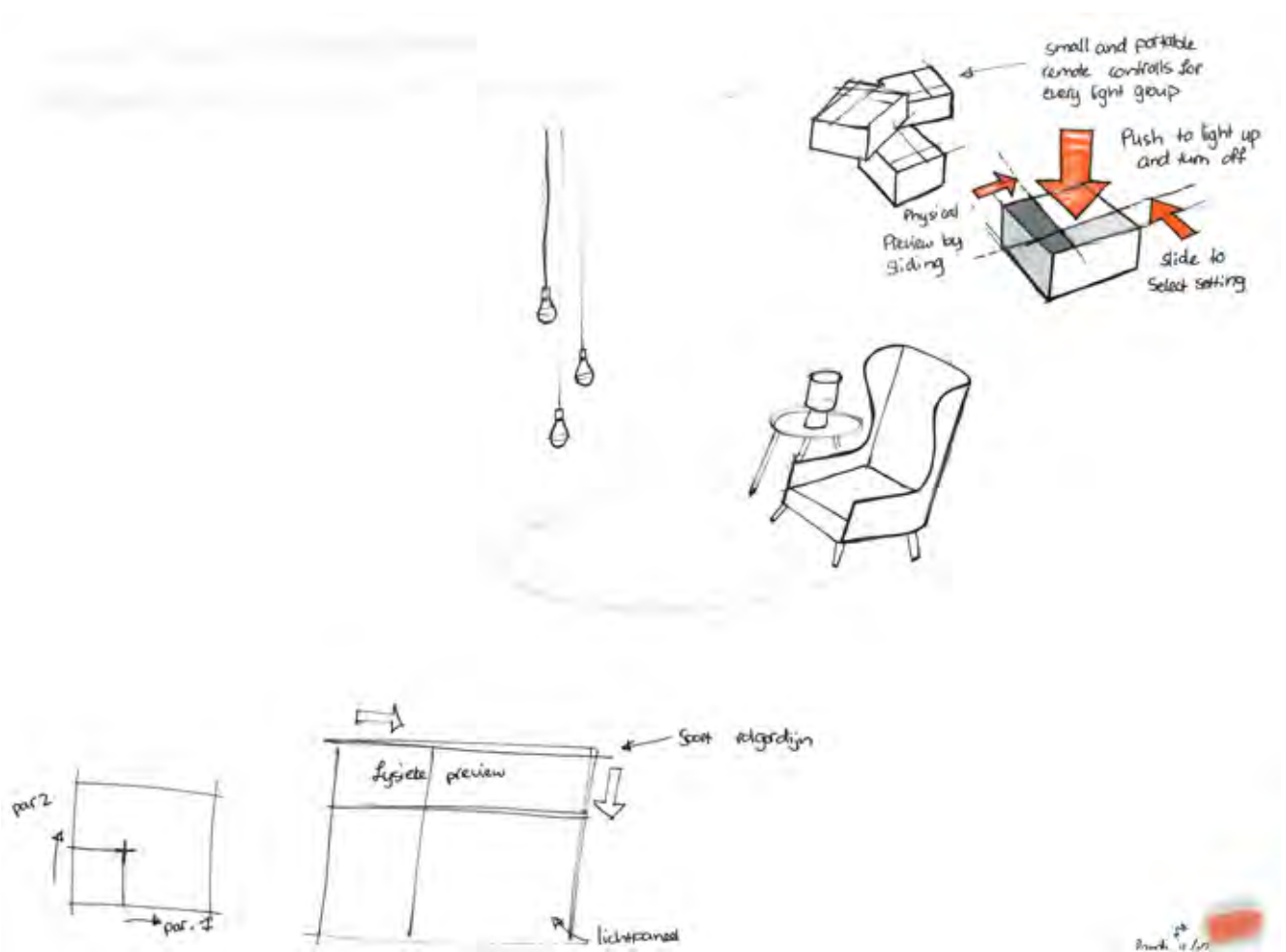
Fig 1: first ideation of an interface to control home lighting

1.4 PROJECT GOAL DEFINITION

At the end of this iteration, the projects goal was defined: deliver an interface for the IKEA tradfri or Philips Hue lighting system that demonstrates interaction with the light, while increasing the family home feeling. Goal for the deliverables was to deliver an interface that communicates the look and feel of a finished product and serves as a demonstrator for the concept. It should demonstrate most of the functionalities of the concept as possible.

2. DEFINING THE HOME FEELING

2.1   MIND MAPPING

The process of defining the home feeling and describing it in a way that enabled designing for it, was a process on its own, reoccurring through to the entire design process. But as this 'home feeling' is the backbone of the design process, it is described here. References will be made throughout the report.

First several mind maps were made to explore the family home context and feeling (fig. 2). The map is a collection of abstract feelings, emotions, behaviour descriptions and examples of habits, showing things that are associated with 'home' on many different levels: from personal memories to cliché images. To extract a definition on a level that gives specific aspects to design for, examples of descriptions were searched for.

Fig. 2: Family home mind map, words of interest are underlined

2.2   HYGGE

The first description of particular feelings that seem to catch a home feeling was the concept of 'Hygge'. A Danish word that means something like 'coziness, gezelligheid' and apparently is not just a word to describe how nice, peaceful and pleasant a situation, place or thing is; it is said to be a way of living, a feeling to proceed always and everywhere. 'The hygge manifesto' (fig. 3) was taken as an inspiration. It describes conditions to turn every situation into a hyggelige situation: a situation to feel at ease and at home (Wiking, 2016).

Fig. 2: Family home mind map, words of interest are underlined

Visualisations of the 'hygge' feeling were brought together in a mood board. It appeared that the home feeling is something appealing to consumers as many companies are happy to praise their products in a 'home-feeling-generating' commercial. A number of television commercials were collected and an analysis of how this home feeling is created was made. The moodboard can be viewed via this link:

https://pin.it/lgtxtyom45g24g

What is seen from the video's is that **showing love** in small things and **sharing** is most important for creating this feeling.

2.3 IKEA'S HOME FEELING

Wondering what visions companies would have on this home feeling, a big Swedish furniture company stood out with a trendy research about current home feeling, presenting helpful, but also somewhat commercial conditions. According to IKEA (2016) a home should provide feelings of **Privacy, Security, Comfort, Ownership and Belonging**.

Fig. 4: stills from PLUS, Auping and IKEA commercials

2.4   BASIC HUMAN NEEDS

Although the definition of IKEA brought together different aspects of the home feeling on an even level, still these definitions all together felt like loose fragments that have no scientific backbone. Scientific literature would help to get the overview on how these feelings or preferences are grounded in human nature. These feelings can then be taken as topics to design for, guiding the use of the product towards a 'home feeling enhancing' product.

The basic human needs (Maslow 1954) describe the fundamental ingredients necessary to live a satisfactory life. Much research on this topic has been done, so to make sure the theory was understood correctly a small literature research was performed. The following needs were found: safety needs, belongingness and love needs, esteem needs, needs for self-actualization and the desires to know and understand. For a more elaborate explanation please see appendix D.

Now the Hygge concept and the IKEA vision can be mapped to the basic human needs, to see which aspects contribute to fulfilling (parts of) which basic human needs.

Privacy, security, comfort, shelter and atmosphere are fitted under fulfillment of security needs.

Love and belonging needs explain the 'hygge' preferences of equality, togetherness and harmony, and of course explains IKEA's belonging as well.

The esteem need explains the hygge preference of presences, gratitude, truce and pleasure and also ownership can partly be placed under this need, as well as under the self-actualization need.

2.5   FINAL DEFINITION

Linking the concepts of Hygge and the home feeling of IKEA to the basic human needs gave an overview of what a good home has to offer a person concerning their quality of life.

An ideal family home offers a feeling of fulfillment of the security need. It offers a place of comfort and shelter from the rest of the world, a place where you can have your privacy. It is a gently embracing place that makes you feel you can let your guard down, you can always return to and therefore a place that offers you a place of protection and security in life.

Also, the feeling of home should be the warm feeling of being loved. The feeling of understanding, joy and pleasure to be with the people you care about. Home invites to show affection to others and affection is shown to you in many different, little ways. All of this creates a feeling of relatedness and belonging to that place.

Lastly, the home feeling houses feelings of ownership: you are in charge of your own house. It gives feelings of competence and effectivity, the feeling that you are free to do whatever you like in your own home. It is your personal little castle.

3. LIGHTING UP THE FAMILY HOME
iteration 2

The second iteration was about gaining understanding of the context. A family living room was imagined and personas were constructed. In this way the context started to come alive, which made it much easier to imagine how these people would live.

3.1 PERSONA'S

With the persona's (appendix E), the home feeling as defined at that moment (see 2.2) and the first sketch in mind, the concept was developed further. At the midterm demo day the process until now was presented, as well as the first interface design: little remotes for everyone in the household, with a function to lock a light when you don't want it to be changed.
Feedback from the midterm demo day steered even more towards envisioning the behaviour of the family and defining the feeling the interface has to convey.

Fig. 5: Storyboard as presented on the midterm demo day

3.2 SCENARIOS

To finally get started with desgning 4 quick design explorations, based on existing products, were described and evaluated through scenario writing.

By comparing the interactions in the scenario's, opportunities to create or improve the home feeling in family living rooms were identified. The following designs were evaluated:

Philips hue system
The house is equipped with Philips hue light, and connected to the hue hub. This means that all lights can be programmed, and interacted with through the app. The app enables you to change the colour, brightness and hue of the light. For this project only the parameters warm/cold light and brightness are chosen: so no other colours than white. Because the app is not always the most easy way to access your light settings, also wall mounted switches are installed. These can turn on and off the light, dim and switch between 4 different scenes (Philips Hue, n.d.).

One remote shared by everyone
This light system is derived from the IKEA tradfri series (IKEA, n.d.-b), where 10 lightbulbs can be controlled via 1 remote control. It is chosen to imagine what it would be like when 10 bulbs in the living room and dining room are connected to one remote control, that usually lies on the side table in the living room. Everyone in the family is allowed to use the remote. The rest of the lights in the house are also grouped per room and can be controlled with a remote control, but these are wall mounted, to give the remotes a fixed position.

One remote per person
This scenario is a thought experiment. Curiosity asks what interactions are possible and likely to happen when everyone carries around their own remote with the following functionalities: change a single light in temperature and brightness. So no grouping of lamps, no scenes to choose from and only personal interfaces.

One remote per lamp
This is an improvised scenario using a system that works like the following: all lamps have their own remote control. This remote can be clicked to the lamp itself with a magnet, or can just laying around near the lamp (IKEA, n.d.-b). Also people can take the remote with them. The light can be switched in the same way as the previous scenarios: warm white, neutral white and cold white, all dimmable from maximum bright to off.

Because the scenarios are too elaborate to present in the report they can be found in appendix F

3.3 SCENARIO ANALYSIS

Reflecting on the scenario's began to see which of the proposed designs meet the home feeling criteria (2.1) best. First all interactions were rated on a scale from red to green, indicating how much the interactions were liked by the designer. Comparing the 4 scenarios in this way is a bit like comparing apples to oranges, but it gave a clear view on the differences in use. After that the plusses and minuses of the four interfaces were discussed.

3.3.1 PHILIPS HUE SYSTEM:
9 green, 15 yellow, 6 orange

+ very flexible: you can change the lighting quickly by just choosing a light recipe, change a single light or control them all at ones.
- Changing the light takes effort: take your phone, open it up, don't get distracted by everything going on on your phone, open the app and then you still have to change the light with sliders and knobs.
- Always depending on your phone: when your battery is low, you can't change the light anymore as you were used to.
- Lighting in the room feels more distant: because everyone controls it with their own intimate device. The phone is private for everyone, the lighting feels more distant then when you would interact with a common interface. I think for the person controlling the light, the interaction feels more intimate than a regular light switch, as your phone, the most intimate piece of technology you carry with you, is the interface. But because

the phone plays such an intimate role in everyone's life, it will not be easily shared as a lighting control device, which makes the use of the lighting system less of a shared experience.

3.3.2 ONE REMOTE SHARED BY ALL:
2 green, 18 yellow, 7 orange, 2 red

- Many times there is no interaction with the light because there is a lack of flexibility: the light is on or off, and sufficient for everyone: You only turn it on or off when you need to. This is due to the large group of lamps linked to the remote control. Of course also temperature can be changed, but because you would change the lighting of the whole room, just for yourself, and light is sufficient the way it is, it is not done very often, and when it is done it is done by one of the parents or commissioned by one of the parents.
+ The family members have to ask each other to change the light when they want to: sometimes someone is far from the remote but needs the light, therefore the one closes to the remote is asked to use it. This is because there is just one remote. It makes the people in the room depending on each other.
- Because the light is less flexible (the grouping of lamps is large) there is less flexibility to play around and thereby help some a little bit by changing their light. An adjustment could be that the grouping of the lights is smaller: in that case the light is more flexible, and allows for more changes. One remote that can control multiple groups of lamps would be a good suggestion. Thereby everyone present in the room has to use that one control, but the light settings can be more

Fig. 7: the process of rating the interactions described in the scenario's

versatile. This would give the family home an extra dimension of togetherness: you use the light remote all together and depend on each other for using it.

3.3.3 ONE REMOTE PER PERSON
17 green, 8 yellow, 5 orange, 2 red

+   As everyone has their own remote, everyone is able to change the light so the lighting becomes everyone's responsibility. This gives an empowered feeling that everyone can influence the environment.

+   as everyone has a remote, you can easily ask someone to change the light for you, when you have your hands full of stuff/ are not in the same place as your remote

-    Easy to loose and forget.

Remark: this system really has to become part of your routine: everyone can use their remotes differently. For example Jesse always carries his remote in his pocket, so he always can be in charge of the light. Lisa is a bit more chaotic and sometimes forgets she took it with her, or loses it in the house. Therefore she sometimes uses one of the remotes of the boys that is laying around in the living room.

+   Also parents will make rules for the use of the remotes: although it can be fun to play with, the boys only can play with the light for the time that Claire makes lemonade. And Jasper is allowed to play with the light when he goes to sleep, as it makes him less afraid of monsters in the dark.

+   it would be elegant to make a rule that when you leave the house, you put the remote on the window pane in the corridor next to the door, so you can easily find it when you come in, and you know who is home and who is not, as the remotes of the people who are out are on the window pane.

-    The light can become more in the foreground: as everyone can change and you have to change the lights all independently, it is quite a task to light up a living room. It takes too much time.

+   It gives a lot of freedom to the family: maybe someone leaves their remote always on the living room table, so that remote, after time, becomes the living room remote, and that person only takes his remote when he really needs it for him/herself (f.e. when going to bed)

3.3.4 ONE REMOTE PER LAMP:
6 green, 11yellow, 3 orange and 12 red

-    It takes a lot of time and effort to control each light separately. Therefore many lights are not used.

-    The placing of the remotes is a difficult thing: sometimes you want to control a light from a distance, and you need the light from the lamp you want to switch on to find the remote of the lamp. Which is impossible of course. Therefore it would be useful to take the remote with you or leave it at the place you need to switch it. but this takes planning and also taking into account others living in the house. Therefore many times you can't access the lighting control when you want to.

+   it is very easy to tweak the light when you are the only one using the light. This personal lighting can give a feeling of ownership and power.

Based on this thorough reflection the 'one remote per person' was chosen for further development, as it promised the most playful and dynamic opportunities for use and therefore just stood out as most fun.

At the end of this iteration, the design decisions made were the following:

The product was going to be a remote control for a lighting system like IKEA tradfri or Philips hue, which would enable the user to switch the lights on and off, and change the colour temperature of white light. Every member of the family has one remote and they can interact with every light in the family home. The product itself and in particular interactions with the product and family members should increase the home feeling.

4. FUNCTIONS AND FEELINGS
iteration 3

4.1   ANALYZING LIGHTING USE

At the beginning of this iteration the rough outline of the concept was defined, so now the specific functionalities and requirements of the interface needed to be designed. To do so accurately, the desiger has to understand how a family home is lit up and how this lighting is used.

A quick dive into interior lighting showed 4 types of indoor lighting: General lighting, accent lighting, task lighting and mood lighting. (Signify, 2014) (IKEA Nederland, 2017).

As these four types of lighting groups have different functionalities, controlling them can be specifically designed for its distinct uses. To understand the use of these lighting groups better, the scenarios were analyzed again.

Four types of interaction were extracted: Play, switching on/off, selecting a (more or less) necessary setting for that particular moment and setting atmosphere lighting. For a detailed description, please see Appendix G: ways of use. After that all interactions in the scenarios were counted per person. This showed a distribution of which family member did what kind of interactions and which sort of use is most common.

4.2   DEFINING REQUIREMENTS

The table shows that switching the light on or off is most common and from the scenarios can be learned that mostly the general lighting is used with these interactions. Think of switching on the light in the corridor to get your coat and switching off the light again when you leave the house. These interactions demand a very quick and easy control of the general lighting, so the user does not has to choose which lamps to operate. Choice between on or off is sufficient.

When choosing necessary settings, task lighting is used mostly. These are situations like choosing daylight-mimicking light for applying make-up or choose 'concentration light' for studying. These interactions ask for a quick turning on of a specific light group or lamp and the choice between colour temperatures and brightness.

	Play	on/off	necessary setting	create atmosphere
Claire	-	10	6	3
Jesse	-	9	7	-
Lisa	-	9	7	1
Luuk	1	2	2	1
Jasper	2	2	2	1

Table 1: types of interaction per person
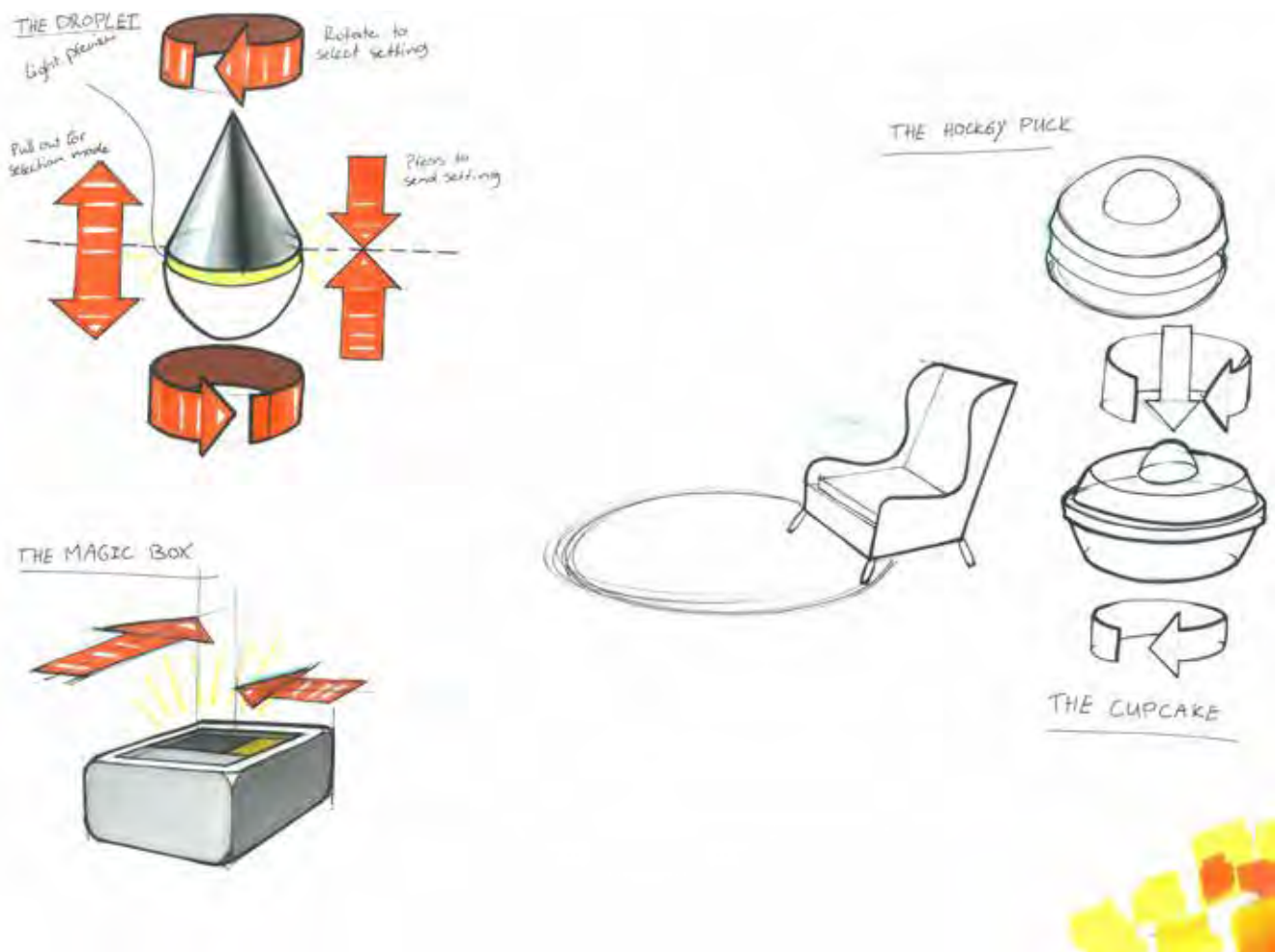
Fig. 8: Designing forms and interactions

For choosing atmosphere lighting, for example to set a scene for a cozy dinner, precise control over specific light groups and individual lamps is needed. This detailed control enables the users to tweak lights to their preference. Also a preset or memory of the previous setting (before the light was switched off) can be helpful when settings are used more often.

As playing with the light is not first priority of this design process, and playing will be possible within every interaction possibility, it is decided to not let this type of interaction guide the requirements of the interface. Therefore the interface will not be specifically designed to play with.

4.3   SKETCHING THE INTERFACE

With the requirements pinned down, ideating and sketching began. First forms and interactions with the interface were designed (fig. 8). Important design requirements were the ability to select brightness and colour temperature quick and easy.
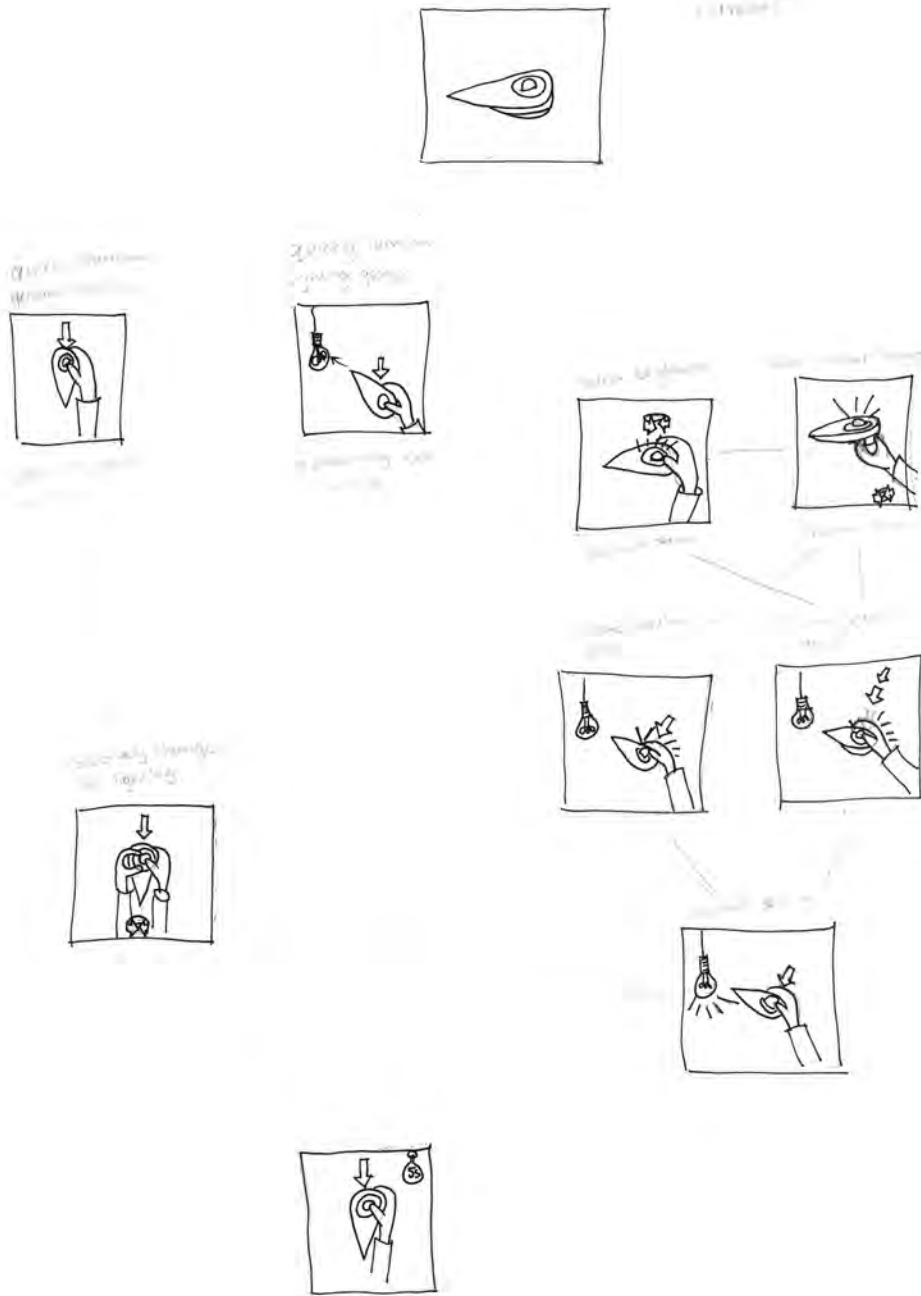
Fig. 9: interaction flowchart.

4.4   STORYBOARDS

Envisioning the use of the interface was done by making story boards (Greenberg, Carpendale, Buxton, & Marquardt, 2012). Hereby interaction pathways became clear, describing the full functionality of the interface as a part of the lighting system (Fig. 9).

4.5 EVALUATING

With the storyboard being the most detailed concept proposal up until now, the usability of the concept was evaluated in the following way: The positives and negatives of the 'one remote per person' (3.3.3) were taken back again and re-evaluated. All positives were incorporated in the concept, as well as one negative: the small remotes are still easy to loose and to forget and it is not desirable to carry them around everywhere you go.

But usability was not the only aspect to reflect on: did the concept also fulfill the goal of the project, to increase the home feeling when using it? Therefore the home feeling was updated (2.3) with concrete criteria. When linking the home feeling criteria to the concepts, more strengths and weaknesses were identified.

+   own remote, easy to change for everyone: empowers everyone to change the environment and make it comfortable for themselves and others.
        Positive to Ownership, equality and comfort

-      As everyone can change the light very easily, the setting you chose can also be overruled easily at any time.
Negative to security, shelter and ownership

+ many remotes lying around so easy to ask someone to change the light for you
Positive to Togetherness, harmony

-      Easy to loose and forget
Negative to ownership and comfort as it demands too much effort to take it with you all the time

+ parent will make rules because it is fun to play with now and then
Positive to presence, pleasure, gratitude and belonging

-      It is needed to make rules about playing because disco lighting is not preferred
Rules are needed for security and harmony

Two bottlenecks stand out from this reflection: one is the ease of changing. The remotes magnify equality and a feeling of ownership, because every remote is perfectly the same and thereby gives the users the exact same interaction possibilities. Therefore it creates possibilities for conflict. The following questions come to mind: Who is allowed to change a setting and when? When would it be desirable to overrule a setting? Should the interface inhibit overruling (which would decrease equality)? Or should the interface present additional information so it is easier to judge whether the light can be changed?

In many of these situations, people fix these conflicts themselves, or even prevent a conflict to occur. It is an option to build in 'thresholds', so more effort has to be done to overrule a setting. Another possibility is to assign different functionalities to single remotes, or assign a hierarchy to them, so the system inhibits overruling. But as this inhibits the functionality of the prototype in most of the situations, these adjustments are probably unwanted and would cause even more conflict or confusion. Therefore at this moment in de design process it is chosen to trust the abilities of the user to not fight about a light setting. Therefore no adjustmets to prevent these conflicts were made to the concept.

Another bottleneck is the location. It is not desirable to carry the remote with you all the time, but it is needed to switch on and off the light all the time. Therefor it is decided to only use the remotes in the living room, kitchen and bedrooms, as people spend most of their time at home in these rooms. This limits the number of locations the remotes can be laying around to 3.

To conlcude this interation the conceptual interface proposal is definded as follows: all remotes have the same functionalities (as described in figure 9) and all family members have their own remote, that can only be used in the kitchen, living room and bedrooms.

5. AN ARTISTIC SIDE-STEP?
iteration 4

When reflecting on the previous iteration, it is learned that the qualities of the proposed interface are a fraction of the qualities the home feeling (2.3) proposes and that these qualities may be not addressing shortcomings of already available lighting systems. Also, shared use could be facilitated in other (possibly better) ways.

With this knowledge and understanding development of a new concept was started. This time the description of the home feeling (2.3) was the first starting point, instead of already existing lighting system interfaces.

The aspects of comfort, togetherness and pleasure were chosen and ideatin delivered the rough concept of the puppet master: every room in the house would have its own interface which would be an abstracted character holding several presets. The user would be the puppet master and can choose a preset by rotating the form elements of the character. Figure 10 shows the brainstorm of the puppet master concept. Figure 11 shows possible shapes of the characters. The more form elements a 'puppet' has, the more presets it can hold.
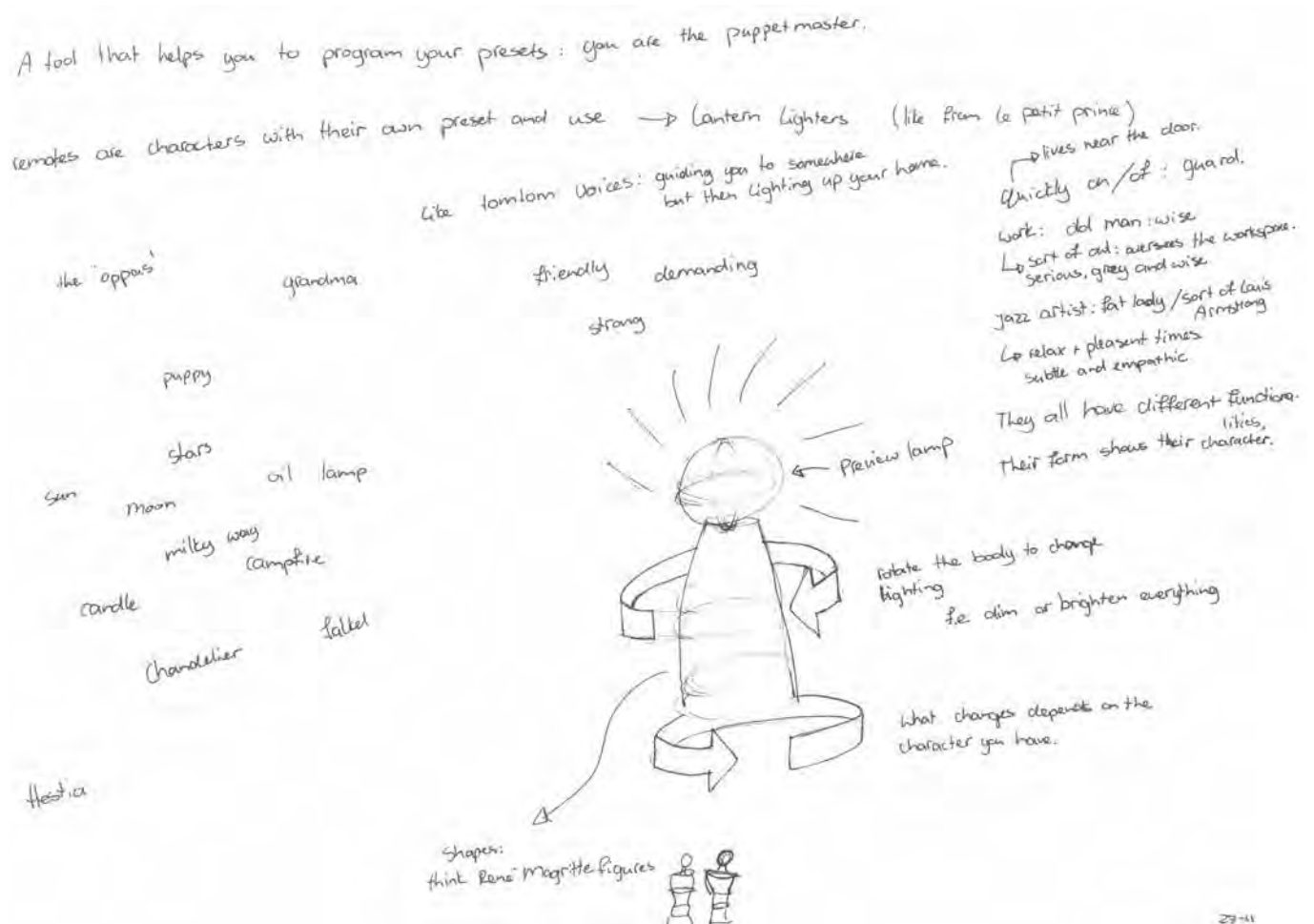
Fig. 10: Brainstorm of the puppet master concept

The two concepts were compared to each other. The puppet master concept would need a lot more development before it would be comparable to the previous concept. Also the prototyping of the puppets would demand skills and time that were not available. So due to a fair amount of pragmatism, the old concept was chosen for further develompent.
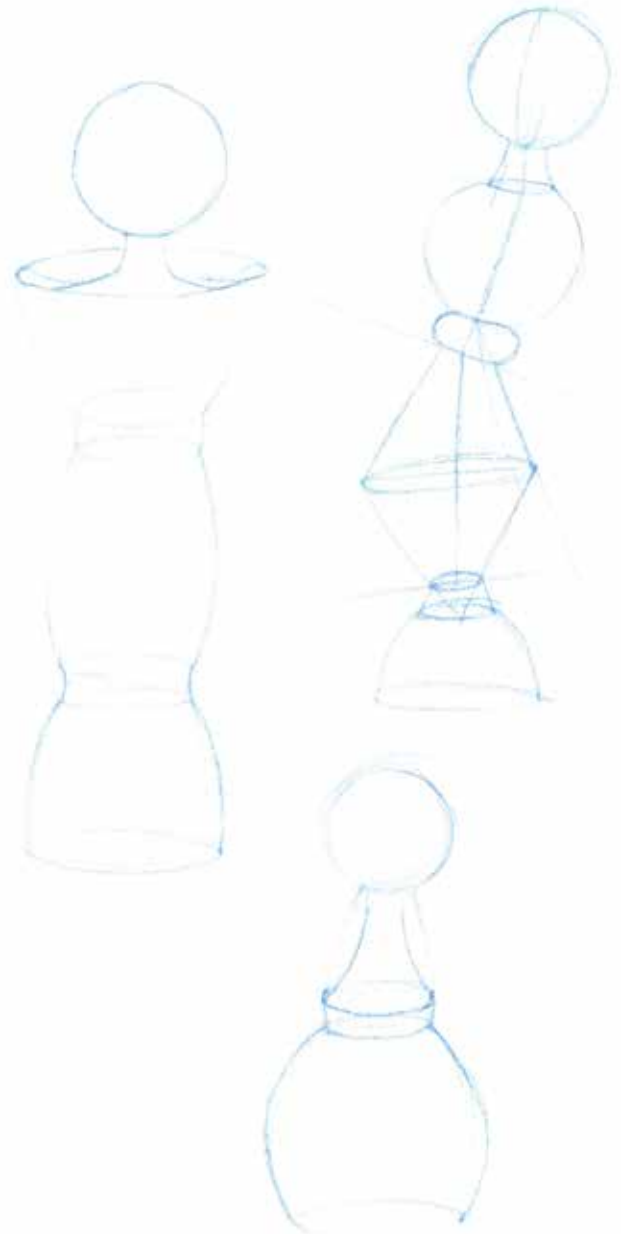
Fig. 11: Possible shapes of the characters

6. THE REAL DEAL
iteration 5

The goal of this iteration was to deliver a proof of concept that integrates as many aspects of the design as possible. Therefore, making it real, physical and functioning was required. As described in the project goal (1) the prototype should communicate the look and feel of a finished product and should demonstrate most of the functionalities of the concept as possible.

During this iteration many design activities were performed parallel to each other as many design decisions had to be made with input from all aspects of the design.

6.1 INFRASTRUCTURE

First the infrastructure of the prototype was defined. The Philips Hue lighting system was chosen for several reasons: first of all the hardware is easily available for prototyping at the TU/e, but Philips also encourages the development for applications for the system and therefore provides information about their lamps, known issues with Philips hue and a developers guide. As this information is available for free, many people build applications and many example codes are shared.

The processor of the interface is a Particle Photon. This little Wi-Fi device is built for creating IoT projects and became popular because of its open source platform and broad possibilities. Therefore also many example codes are available.

The infrastructure works as follows: sensors give input to the Photon where after it sends commands to the Hue bridge via Wi-Fi, the Hue bridge controls the hue lamps (fig. 12).

6.2 FORM AND INTERACTION EXPLORATIONS

Different sensors proscribe different interactions: a potentiometer demands to be rotated, a simple click button just needs to be pressed and sliders need to slided. Sketches were made to explore the use of all these sensors (fig 13). Simplicity and clarity of use were the most important selection criteria for interaction but also the type of output the sensors give were taken into account: sliders and potentiometers give an analogue output and therefor would afford the user to select all values between the minimum and maximum of the parameter. Although this would be elegant, the broad range of possibilities (as both colour temperature and brightness are variable) it would not be necessary, nor complementary to the simple and clear character of the prototype.

Also, for the prototype this would mean that the RGB values for controlling the preview LED should be mapped to the HSB values for controlling the lamps, which would be a big challenge when taking the coding skills of the student into account.

The click buttons were chosen as they give a digital output, which afford a step-by-step walk through of the settings. Mapping the LED output to the hue lights is more straight forward because only a small amount of values need to be mapped.

Fig. 12: Infrastructure of the lighting system
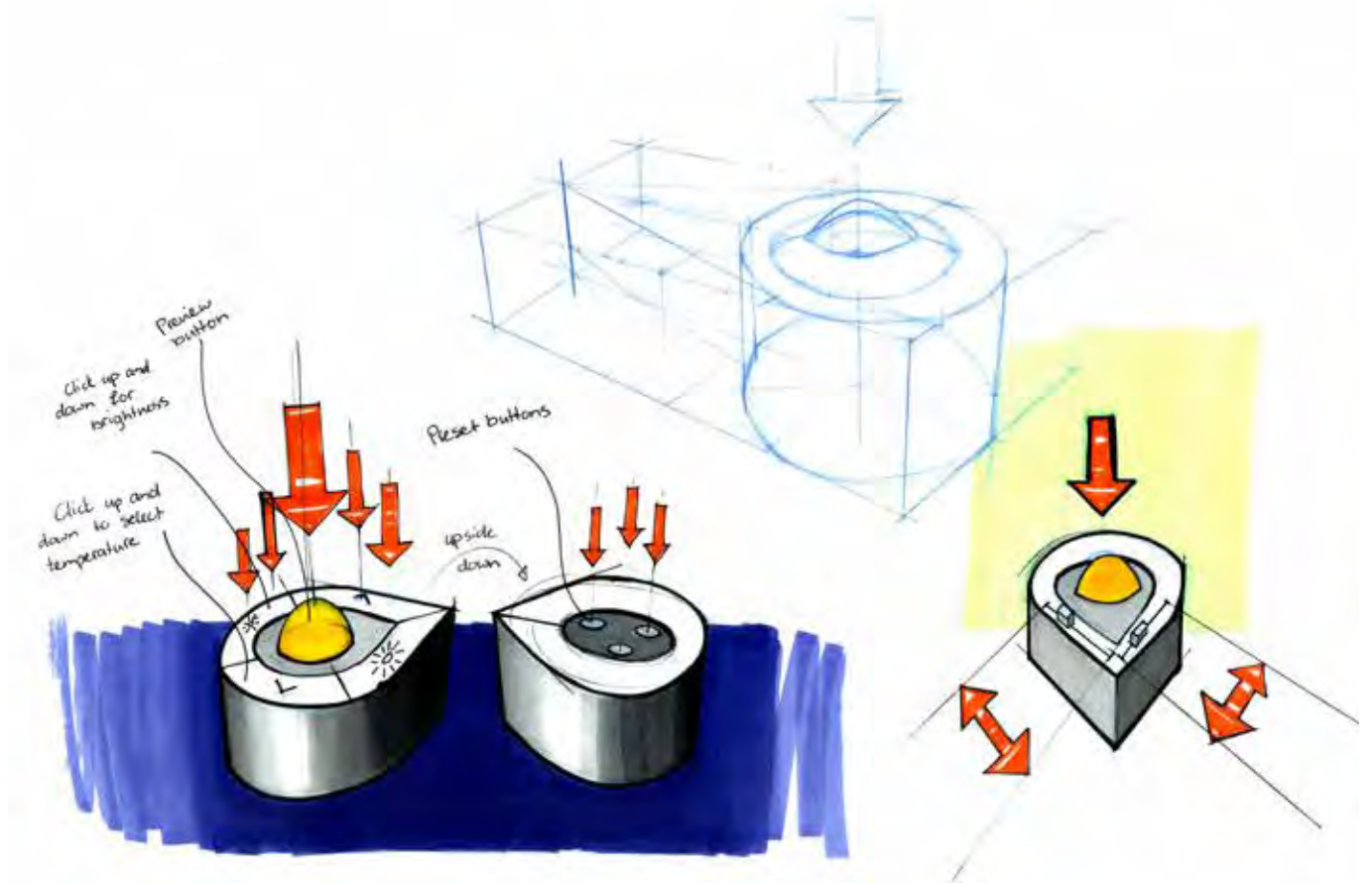
Fig. 13: Form and interaction explorations

During this process all functionalities of the prototype were pinned down: an on/off switch, send function, selection of colour temperature and brightness, memory buttons and a preview LED should all be incorporated. It was decided that the prototype would be able to control only one lamp, to demonstrate its place in the system. Functionalities to control multiple lamps and functionalities facilitating shared use will be explained in the final concept (5.5).

6.3 PRACTICAL IMPLEMENTATION

The electronics were fitted on a breadboard for easy testing and programming. Step by step switches were added and the functionalities were built in code. See appendix H for the final code. Figure 14 shows the breadboard prototype.

The hardware was finalized (a battery board and battery were added, see appendix I for a list of all hardware) and puzzling began to fit all hardware in as little space as possible.
Technical sketches explored the measurements of the electronics, proscribing the measurements of the outside as shown in figure 15.

A construction was designed so that the print board that holds all switches, would be placed over the sockets of the battery board. A little print board for the switches on the bottom was made and everything was put together. A schematic overview of the electronics can also be found in appendix I.
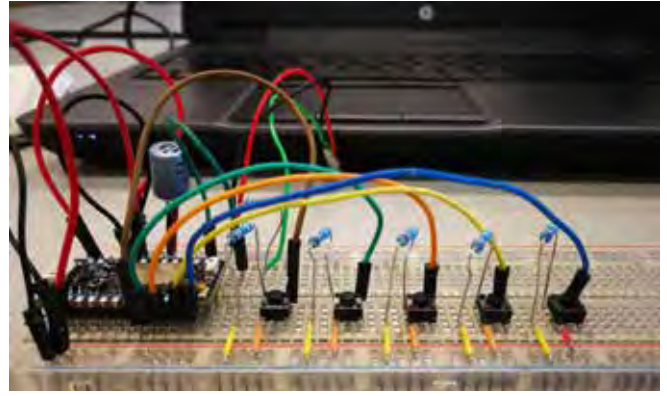
Fig 14: breadboard prototyping

The biggest drawback during prototyping was that it appeared impossible to neatly fit a 'lid' on the prototype that would shield the electronics. The lid should look like the coloured ones on the dummy models (fig. 22). Ideally the lid would be glued on the prototype tightly, but no pressure should be put on the photon, because the setup and reset buttons should not be activated during use. Also gluing the lid would make it impossible to open the prototype for recharging the battery and using the setup button if needed. Therefore it was chosen to leave the lid off, and let the dummy models show what the real product would look like.
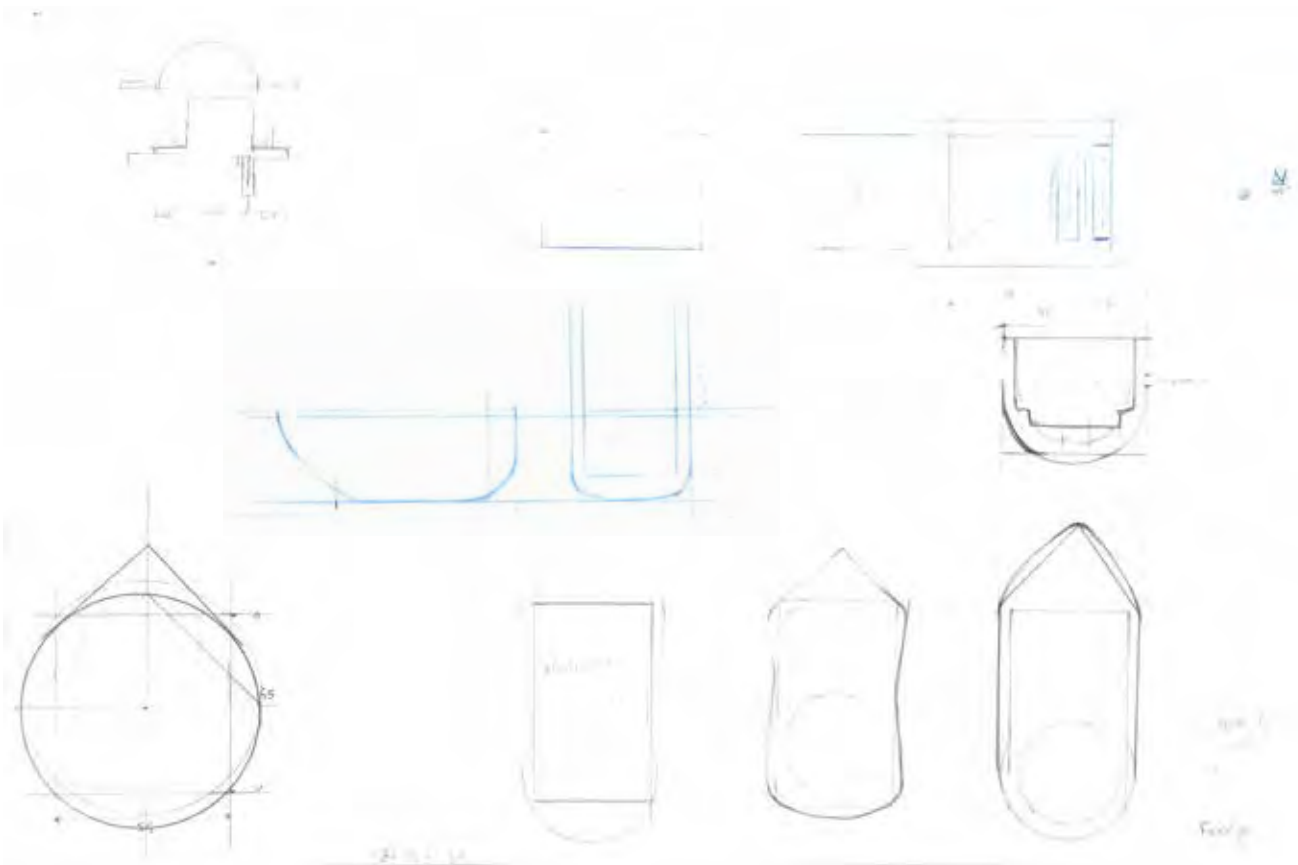
Fig. 15: technical drawings of the inside and outside of the final prototype.
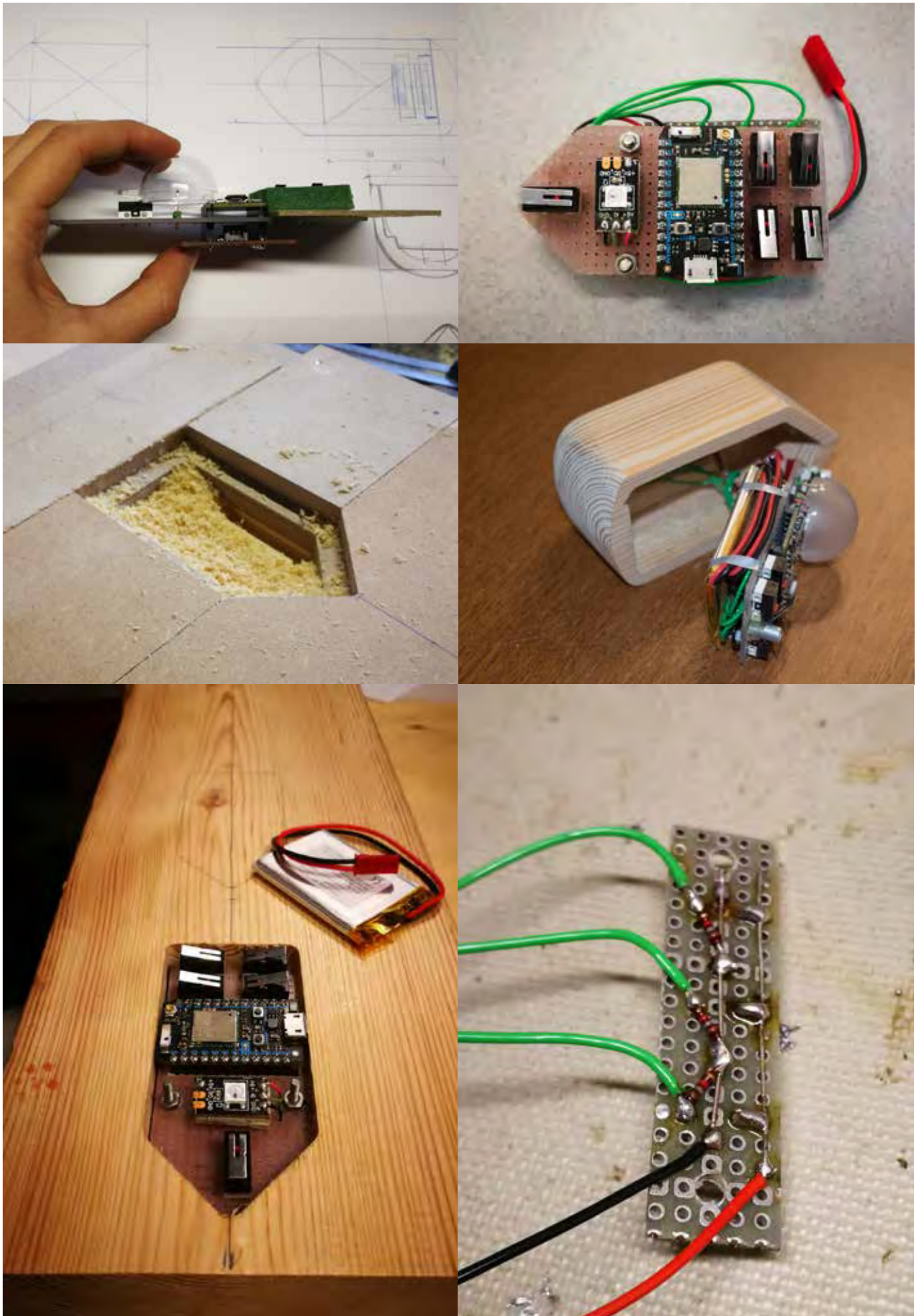
Fig. 16: a collage of the making process

6.4 AESTHETIC DECISIONS

The sketches in figure 15 also show aesthetic explorations of the final prototype. The placing of the switches and preview light were chosen for aesthetic reasons, but also to create an intuitive interaction. When selecting a light setting, users move their attention from the rear to the front by first selecting colour temperature and brightness with the four switches and then 'shooting' the setting towards the lamp with the big preview button. To afford the shooting, the pointy front was made. A happy coincidence of this decision is the similarity in shape with a little house when put upwards.

Inspiration for the look and feel come from wooden children's toys. The warm feeling makes wooden toys pleasant to touch and the contrast of the grains and their imperfections create the natural, simple and organic feel that is desired. Wood was chosen to be the perfect material to convey the home feeling.

Fig. 17: a collage of wooden toys inspiration (https://pin.it/5xiymfari7dhlw)

6.5 THE FINAL CONCEPT: 'Thuisjes'

Imagine yourself coming home. Your perfect home embraces you and offers you comfort and shelter from the rest of the world. It offers you a place of security. Also, home is a place where you are together with your family in harmony. It offers you a place you are loved and can share love, so everyone in the family feels this quality of belonging. Lastly, your home offers you ownership: you are in charge of your living space.

Thuisjes aim to increase this family home feeling through lighting. These little and individual remotes, designed to interact with the Philips hue lighting system enable you to control the lights in your living room, kitchen and bedrooms (fig. 18). Every member of the family can have one of their own.

It works as follows: To turn on the light, the big button should be pressed for two seconds and lights will burn in their previously used setting. The lamps can be chosen by pointing at them: to turn on general lighting, the 'thuisje' should be pointed downwards. For quickly turning on an individual lighting group the remote should be pointed towards one of the lights of the lighting group, and to select a single light, pointing at the lamp, double click and then holding the button for 2 seconds is required. For turning off the lights the same holds. When the lights are switched on, the remote is pointed downwards and the button is hold for 2 seconds, the blackout function will be activated: all lights will turn off.

For more precise control the colour temperature or brightness of the lamp(group) can be selected before sending the setting the lamp. Simply click the brightness and temperature buttons to browse through the settings: the preview light will show the settings. When a suitable setting is found, point towards a lamp and click the big button to 'shoot' the setting to the lamps.

If a room is lit up the way you like it, this scene can be programmed as a preset. Just hold one of the memory buttons on the back of the remote for two seconds. The preview light will fade out and in again to let you know the setting is saved and therefore will be accessible under that button. Three scenes can be memorized and the buttons can be re-programmed the exact same way.

Fig. 18: home setting as presented at the demo day.

fig. 19: functionalities of a 'thuisje'

But people do not live alone in family homes, and not all people would use the remotes in the same way. Therefore thuisjes are designed to be flexible. The thuisjes should come with an application to assign functionalities to the individual remotes and thereby personalize the use: the little brother of the family can be given full functionality in his own bedroom, but selected functionalities in the living room and kitchen. Or one of the remotes can be made a living room remote, only functioning in the living room. Another one for the kitchen etc.

6.6 HOME FEELING IN THE FINAL CONCEPT

The look and feel of the wooden remotes aim to create a feeling of comfort and pleasure, as the surface is pleasant to touch and the form of the remote fun to use due to its 'shooting' interaction. The flexibility of the thuisjes give two important qualities of the home feeling: togetherness and belonging. The way the thuisjes find their way into a home, so the particular use and habits it can build within a family will create a feeling of togetherness and belonging. Other qualities of the home feeling depend on the way the thuisjes are used.

When the thuisjes are owned by the separate family members and all family members have the same functionalities in their own remote, the thuisjes complement a feeling of equality. This equality can spark feelings of empowerment: everyone can be in charge of the light and has therefore the same power of the lighting system. Also a feeling of togetherness might be created as everyone can take part in interacting with the lighting system in the same way.

When the family members personalize the functionalities of the thuisjes so they fit their personal use best, the feeling of equality will decrease, but a sense of ownership of the thuisje will take its place. Maybe also a feeling of ownership over the light will increase as the personal functionalities allow the user to select their favorite light more effective. Therefore also a feeling of comfort might be increased.

When thuisjes are assigned to a room instead of a person, and functionality of the thuisje is assigned to the room, the use possibly increases a feeling of togetherness. The remote will be shared by everyone occupying the room. This also might strengthen a feeling of equality.

Lastly, thuisjes are metaphorically a family on their own. Therefore every user will not only be part of the family living in the house, but also take part of the family live of the thuisjes themselves, which might, again, strengthen feelings of togetherness.

6.7 DEMO DAY

The final concept was presented at the Demo Day and valuable feedback was gained on different levels of the design:

Shared use

The concept as it is presented does not suggest that it is designed from a shared use perspective. What happens when two or more family members control the lights of the same room? The thuisjes do not give any specific social information that would facilitate a smooth shared use.

Product qualities and design

Many positive reactions were given on the look and feel of the design. Almost all visitors touch, or ask if it is allowed to touch the prototype and dummy models as they look inviting to hold. The soft and warm feel of the wood is a great success. Also, the shooting of the setting to the lamp is liked by the visitors as it is a fun and playful interaction.

An improvement of the design would be to place the memory buttons in a triangle instead of a line. In this way the product would not tumble to its side when placed on its bottom side.

It is also suggested to explore the shape of the remotes a bit more and create variations so all remotes look more different from each other. This would enhance the individual character of the remotes and make the family of thuisjes more playful.

Feasibility of the real product

Not all functionalities of the concept are demonstrated in the prototype. The ones that are missing are the selection of lighting groups and individual lamps. To build these in, a thuisje needs information on location (in which room is the remote) and direction (where is it pointed to). To build implementations of social information a thuisje should also know who he is, which other remotes there are and what setting they last send.

Other suggestions

A suggested functionality of a personal thuisje would be to save a light setting from a room and sent it out in a different room. This creates the possibility to take a lighting setting from a moment that you want to remember with you, turning the remote into a precious memory box.

6.8 Evaluation

Although the final concept is evaluated at the demo day to some extent, it cannot be concluded yet whether the final concept fulfills the design goal as stated in chapter 1. Therefore an in depth user evaluation still needs to be done.

The goal of the user evaluation is formulated as follows: Evaluate if the proposed design increases the home feeling (2.5) when using it at home. Definitions of the home feeling will be explored and the influence of the product on this feeling will be evaluated. The user evaluation method will be co-constructing stories (Buskermolen & Terken, 2012), merged with an association exercise. For a detailed description of the user evaluation, please see appendix J.

Fig. 20: demo day table, Fig. 21: happy visitors, Fig. 22: the family of thuisjes (dummy models)

7. FUTURE WORK

7.1 ASSIGNING FUNCTIONALITIES

Firstly it is suggested to develop all elements of the thuisjes concept, which include an application to assign functionalities to the individual thuisjes. It should be explored if a smartphone application is desirable for this use. Maybe a docking station for the remotes can also play a part in this.

7.2 ITERATION ON FORM & FEELING

As suggested during the demo day, an iteration of the design of the thuisjes would be useful. The thuisjes family can be given more character, the placing of the memory buttons can be fixed and a solution for the lid (as described in 5.2) should be found.

7.3 TECHNICAL FEASIBILITY FOR REAL LIFE USE

Lastly, and most importantly, the complete system should be developed. Communication of the location of a remote should be explored. Maybe the use of an ultrasonic sound transmitter in the rooms, and a receiver in the remote could be an option. Maybe the lamps itself can transmit a pattern in infrared light and the remote could be built to receive this. Or maybe the remotes itself should be way smarter than they are now. They could communicate with each other via the particle cloud, which they have access to due to the Wi-Fi connection.

DISCUSSION

CONCLUSION

HOME FEELING

When reflecting on the quality of the design process, the approach of design activities in relation to the process of defining the home feeling is questioned. During this design process, exploring the home feeling was done more or less after the design of the interface. The design of the interface originated from the scenarios which were mainly based upon the functionalities of already existing systems. The home feeling only began to develop towards a concrete definition at the time it was used for evaluation of the third iteration. From there on the process focused on linking and keeping the concept and home feeling together. The home feeling could have been described at a concrete level earlier: preferably at the beginning of the design process in that way the qualities, where should have been designed with, would have been more clear and maybe the final concept would have been less paradoxical and more shared.

But, when looking at the 'puppet master concept'(5) a clear similarity to the thuisjes' way of use can be pointed out: the distribution of remotes per room. As the puppet master concept was designed from the quality togetherness and fun, these qualities will also be present in this way of use.

IDEATION

The amount of Ideation results in this design process was a bit poor. More concepts could have been generated to provide a choice in concepts. Comparing concepts usually underlines the qualities of a concept which is highly valuable for reflecting on the fulfillment of the design goal. The possibility to compare concepts to each other would have made the designer more confidant in the concept that was chosen in the end.

Does the final concept meet the design goal as stated in chapter one, to increase the family home feeling through light? Since an in depth user evaluation still needs to be done, this is hard to say. From the demo day feedback it can be stated that the look and feel of the thuisjes check the box of creating a coziness, but the rest is still a question mark. When the results of the user evaluation are analyzed and interpreted, this conclusion will be elaborated.

EPILOGUE

Wauw, so, finally here I am, at the end of this project report wherein in try to describe the last half year as objective as possible. But of course it didn't feel that way at all.

As you can see from the first iteration, it took quite a while before I formulated myself a design goal. Or actually, before I was confident enough in my interests and skills to set myself a challenge that I would have to meet in the end.

Throughout the project, the three words 'I have to' came creeping in and settled themselves under my skin. They caused me thinking I had to take bigger steps to meet my project planning. During the second and third iteration this worked. The pressure of 'I have to' kept me motivated. I used the scenarios I wrote for different design activities, they were a solid railing I could hold on to.

I felt like I was walking in the right direction. With the writing of the scenario's, I found the river 'the Maas' and I walked downstream for a while. At the end of iteration 3, the bigger and bigger steps took me to a beautiful viewpoint. I stayed there for a weekend, taking in the nice view and enjoying the altitude. On Monday 'I have to' was telling me to take a giant leap down, on Tuesday it just pushed me over the edge. I fell into the river and due to the shock of falling down I almost forgot how to swim. Luckily I asked Harm to help me get out of the water, and he did. He offered me a warm blanked and learned me to only take tiny steps from now on. Although they feel small, they kept me moving in a straight line.

Yolanda helped me to make the small steps less hesitant, and during the week before the demo day I caught myself taking firm and determent baby steps towards the deadline. At the demo day, the coaches, students, visitors, friends and family showed me where I was. I had a good look around and saw I a beautifully flat and friendly landscape again. Although a bit swampy at certain places, it is the landscape where I grew up, where I lived before I went out to climb the Alpes. The project had guided me back home.

ACKNOWLEDGEMENTS

Firstly I want to thank Harm van Essen for the valuable coaching. As you can read in the epilogue, you did not only coach me on the content of the projects, but also helped me getting my studies back on track. Thank you for giving the peace of mind and the confidence that I would be able to finish this project in a beautiful way.

Then a thank to the rest of the coaches for sharing their expertise with the students. Although I could have made more use of your expertise during the process, I felt at home in the squad.

I would also like to thank Emmie Knoester for being the perfect final bachelor sidekick. I really needed someone to discuss my design decisions with, someone to have lunch with every day and just someone who gave me the feeling I would be missed when I would not be at our desk. Working together with you very motivating.

Ben van Lier needs to be thanked for his help with coding. You proved yourself to be a great teacher with a lot of patience and passion for coding. I will remind you of that when you will consider a career switch again.

Also my dad deserves a big thank. Of course the loving support during the whole process was very valuable to me, but the biggest help was that we build the prototypes together. I admire the knowledge you have on woodworking and electronics and I am grateful you shared some of that with me.

Lastly I want to thank a few very dear friends who reminded me that life holds more than just studying: Indre Kalinauskaite, thanks a lot for your loving words, your strictness when telling me I should not allow myself to study during weekends. Thanks to Paul Meulendijks for always making me smile, joking around with me and giving me the confidence that I understand what I am doing.

You all guided me back home.

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APPENDIX A: PDP

VISION

Interaction design is creating relationships between people and their men-made surroundings. Nowadays, we no longer live in a physical living space only. We spent a lot of our time in digital environments. Our living environment becomes more and more connected with the digital, developing towards a hyperconnected society (Eranti 2018). The interaction between this data and us, happens mostly through visual notifications on single user devices through which we navigate by tiny finger movements (for example smartphones). This way of interacting asks for focused attention the whole day, making attention a scarce good (Weiser, 1996).

I believe that we as designers can do better than designing a dystopian society where technology demands people to interact with their surroundings through full-attention-asking, non-intuitive interactions and where people have to fight against the ongoing stream of digital information all the time. I believe we have to redesign relationship between the physical and the digital, in such way that we can intuitively interact with our surroundings, physical as well as digital, in a meaningful and unobtrusive way.

This is where the principles of calm technology (Weiser, 1996) come into practice, and will guide us while designing ambient communication, helping to create a society where the relationbetween the physical and digital world is balanced, and can be accessed in through our connected environment: the merged living environment of cyberphysical space (Rosenius, 2017).

IDENTITY

I grew up in a farmhouse that my dad was (and still is) renovating into a true family home. The slow transformation of the rooms and the difference in atmosphere it brought was always most interesting to me. I think here my interest in living environments and how surroundings influence human behavior is rooted, that now results in the interest in designing a calm and intertwined digital and physical living environment.

As described in my vision, one of the major challenges of today is to design this balanced cyberphysical space (fig. 1).

This multidisciplinary challenge of asks for multidisciplinary teams to tackle it. I would like to work towards the profile of interaction designer in one of those teams, designing the generative content that is brought into spaces. This content can be of different modalities, I believe light and/or sound fit ambient communication best. Therefore a good understanding of light and sound in architecture, human perception and human (and crowd) behavior is important, as the knowledge, skills and attitudes required to successfully run a design process. Herein collaboration with experts of other disciplines is one of the most important skills to possess.

LEARNING GOALS

Balanced working
As this is the first major project I do after a year of recovering from a burnout, it is most important to create a new and healthy working rhythm. During the previous projects, I systematically did too much activities next to each other, without taking the time to step back relax. This has to change in order to become and stay healthy, mentally as well

Fig. 1) Revised model of cyberphysical space, Rosenius (2017)

as physically, and is therefore my most important goal for this semester.

I have to perform this design project structured, by careful creating a project planning, derive weekly and daily schedules from it and reflect on them every end of the day. A working rhythm of 45min of studying and 15 min break time will hopefully get me back on track. It also will help me to train my concentration span and enable me to direct my attention throughout a day in a better way. With careful planning I have to find a balance between striving for a satisfying project outcome, while preserving time and energy to socialize, sport, make music and recharge form studying.

Communication

As described in my professional identity, I am a collaborator. I function best working in a (multi-disciplinary) design team. But in order to collaborate, I have to communicate appropriately in every situation. Therefore I want to focus on developing different communication skills further:

-        Writing: improve English writing by immediately documenting activities in text, and let others (preferably native speakers) check my reports.

-        Sketching: implement the skills and attitude as developed in the exploratory sketching course in the design project.

-        Visual identity: document my process in a visually appealing way and create a consistent visual identity.

Human behavior and crowd behavior

What information do people need when interacting with a system, what information do they use, how do they decide to do a certain action, and is this a thought process or a subconscious guiding? This semester I want to investigate social behavior and, if possible, crowd behavior. I want to understand the decision making processes when interacting with a shared system.

Balanced working

As this is the first major project I do after a year of recovering from a burnout, it is most important to create a new and healthy working rhythm. During the previous projects, I systematically did too much activities next to each other, without taking the time to step back relax. This has to change in order to become and stay healthy, mentally as well as physically, and is therefore my most important goal for this semester.
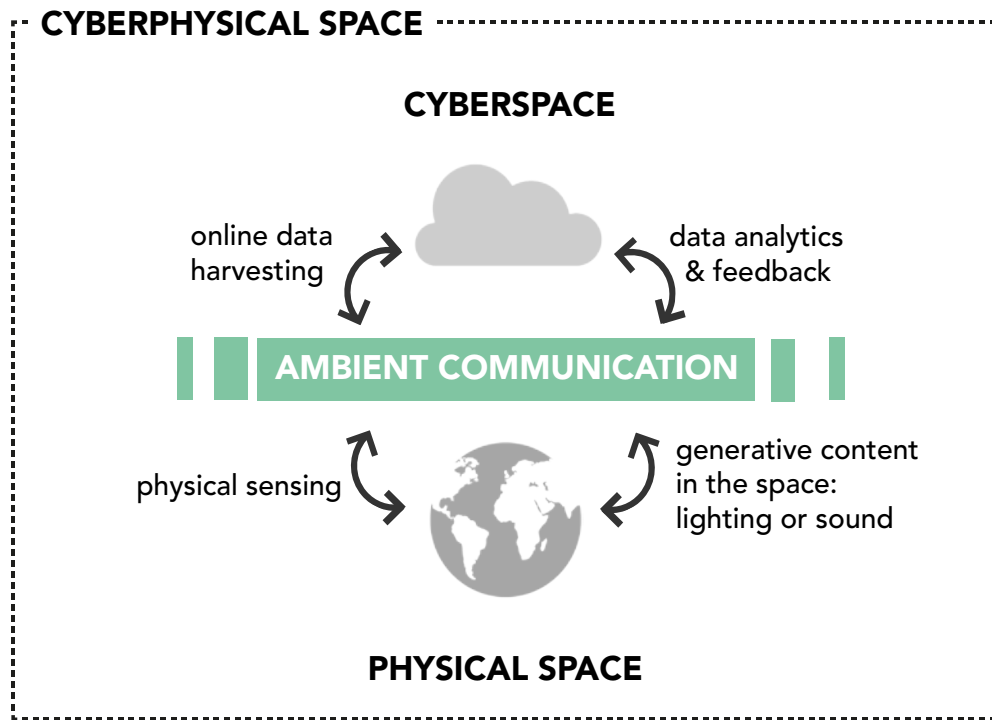
I have to perform this design project structured, by careful creating a project planning, derive weekly and daily schedules from it and reflect on them every end of the day. A working rhythm of 45min of studying and 15 min break time will hopefully get me back on track. It also will help me to train my concentration span and enable me to direct my attention throughout a day in a better way. With

careful planning I have to find a balance between striving for a satisfying project outcome, while preserving time and energy to socialize, sport, make music and recharge form studying.

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- Writing: improve English writing by immediately documenting activities in text, and let others (preferably native speakers) check my reports.
- Sketching: implement the skills and attitude as developed in the exploratory sketching course in the design project.
- Visual identity: document my process in a visually appealing way and create a consistent visual identity.

Human behavior and crowd behavior

What information do people need when interacting with a system, what information do they use, how do they decide to do a certain action, and is this a thought process or a subconscious guiding? This semester I want to investigate social behavior and, if possible, crowd behavior. I want to understand the decision making processes when interacting with a shared system.

Interaction

The goal of my project is to design a meaningful and pleasant relation between users and a shared system. By combining my knowledge, intuition, skills and attitudes I developed over the past four years, I have to prove that I can be an interaction designer. If possible, I would like to bring the principles of calm technology into practice, designing an ambient information system.

Realization

Designing a prototype that works and shows the outcome of the design project will be a challenge I will have to tackle this semester. A combination of the knowledge and skills obtained during my internship and the prototyping experience gathered while working for the TU/e Lightlab will help me with this. But still I will need the help of experts in the fields of programming, electronics and maybe even machine learning.

If the context of the design project will not enable me to design a working prototype that covers the experience of the concept, I am going to learn simulation software that will enable me to simulate my concept and thereby express the use and experience of my concept in a digital way.

APPENDIX B: CONTEXT MIND MAPS

Theatre

digitaliseren — Physical: tear
koartje knippen
ie rang
looking forward — best spots
desired — Tickets
buy
present

imagination
different world
decor   Lights   Coulissen
making off — deus ex machina
wizard of oz
visible for everyone — plankenkoorts
centre of attention
Podium — spotlight

warm lights   jazzy music
welcome
luxurious   red line
review
Bar — foyer
exited
amazed
Bread drink

costumes   talent
story   actors   play — shakespeare
performance — sing
dance
jokes   emotion — energy — magic
idol
entertainment   Linkse hobby
immersive — atmosphere
focus   forget everything else

fun   happy
night out
audience   escape
different perspective
clap
listen + look   mirror
silent
laughing

stairs
hall   seating
find your seat
Signs
asking   'excuse me'   number + row
Balcony   Big   rich
tussen de rijen door, mensen voeten opstaan   even onerun   velvet
moved / touched
memory

actueel   political engagement
opinions   education

office

discussions   employer
cupboard   table   chairs
people — window cleaner
hierarchy   cleaner
seating spot
power sockets

smell
lighting   Artificial — natural
atmosphere   lamps
temperature   heating
sound / acoustics

Library   folders   become paper
internet
supermarket — functional machines — telephone
elevator
toilet   coffee

Increase the home feeling through <u>Lighting</u> interaction

koken:

Seperate settings

Zient voelen

uit doen

schakelaar

kruiden, ingredienten, fornuis, pan, proeven, lekker, vies, afwassen, bestek, met handen eten oven, gezin, delen, keuken, schort, boodschappenlijstje, groenten snijden, veganistisch... toetje, meenemen, uitgebreid, mislukken, rommel, opruimen en schoon maken, recepten, ambacht, traditie, cultuur, identiteit, prutteleen, geur, afhalen, roeren, pittig, zout, zoet, gezond

Ambacht: Veel oefenen, echt een vaardigheid die al jaren lang wordt geleerd en door wordt gegeven.

⤷ eigen ambacht creeeren in het licht bedienen.

Beeldtaal

kruiden/ingrediënten: vormen samen het gerecht en zijn onomteerbaar

Bakken, koken, snijden, roeren

Parameters van de lichtsetting zijn vergelijkbaar

Increase the 'home' feeling by lighting

Analogy: forest

uitloten

| bomen | bladeren modder vogels
| trees, | leaves, mud, birds, varens, vochtig, | paddenstoelen, | wandelschoenen, hond,
regen, mos, beestjes, jeuk, koud, boomklimmen, boswachter, bankje, tever, wandelpad, route, wind, wolken, zon, regen groen, bruin, geel

▷ Beïnvloed elkaar sterk: elkaars gedrag is leidend voor het ecosysteem
  Boompje verpieterd: lampje dooft.

Elk familielid/huisgenoot heeft een eigen boom, iedereen is verantwoordelijk om het 'familie-bos' te onderhouden en goed voor de boom te zorgen. Samen is er meer bos om van te genieten: De een moet water geven, de ander snoeien, de ander hangt vogelhuisjes etc.

Paddenstoelen: prooi verzamelen om eten te hebben ⇄ licht verzamelen om sfeer te hebben.
  iedereen brengt iets op tafel

Licht ▷intiem

fysieke plek: ruimte afhankelijk
het licht zelf : activiteit afhankelijk
kleur/dynamiek etc.

dress your Light

combinaties van shading bepaald licht setting

shading van lampen: stoffen/materialen over het licht heen   soort metafoor/visualisatie van
afdekken/doorlaagen/projectie op het plafond   de situatie

lamp: fysiek   licht: medium   interactie

ik ideo + zwaarlotg

verlichting

Prndt 11/10

APPENDIX D: BASIC HUMAN NEEDS

Basic human needs (according to Maslow, 1954)
The safety needs
Security, stability, dependency, protection,
freedom from fear, from anxiety and chaos, threads and uncertainty.
Need for structure, for order, for law, for limits,
Preference for known instead of unknown, for familiarity,
strength in the protector
Trust: "Confidence or faith that some other, upon whom must depend, will not act in ways that occasion us painful consequences"

The belongingness and love needs
A positive connection: the need to have relationships in which we feel positively connected to other individuals or groups, such as close family ties, intimate friendships, love relationships, and relationships to communities.
A place in the group
The giving and receiving of affection
Belonging: close social ties,
Relatedness: I feel close to the people I care about

The esteem needs
	A stable and firmly based high evaluation of oneself, for self-respect and self-esteem.
	From the inside: Positive Identity
Desire for competence (feeling of being good at what you do) or mastery, strength, achievement, adequacy, mastery competence, confidence in the face of the world, independence and freedom.
This includes the aspects of effectiveness and control (people express themselves and expect a response)
Popularity: I have impact on others
Also Autonomy and independence: to do what you want to do, the way you do it, and freedom.
From the outside: prestige, dignity or appreciation, reputation, status, dominance, recognition, attention, importance
satisfaction of esteem needs leads to self-confidence and feeling necessary in the world, as opposed to feelings of helplessness, inferiority and discouragement
Self-enhancement: Feeling good about oneself, putting oneself first and keeping a positive view of the self

Independence or autonomy, freedom
Autonomy: I can do what I want, the way I want it

The Need for Self-Actualization
Self-enhancement: Feeling good about oneself, putting oneself or others first and improving the self.
Self- actualization needs: Fulfillment of own nature
What a man can be, he must be. To become everything a man is capable of becoming

The desires to know and understand
Curiosity, desire to experience new situations, preference of the new and the unknown, seek for absence of boredom.
	Comprehension of Reality,
Understanding: make meaning from experience
Stimulation: I experience new activities

APPENDIX E: PERSONAS

A perfectly normal dutch family with mom, dad and 3 children, little boy of 8, boy of 10 and a sister of 13.

Dad: we call him Jesse. Works 4 days a week, from Monday to Thursday, Friday is daddy-day. He loves the children and his wife, but also his job. He lives in the city, in a decent and safe family neighborhood, with nice cafes and restaurants just a 5 min bike away. As he travels to his job by public transport, he does not get a lot of fresh air or physical exercise through the day. Therefore the family has another member: the dog. A friendly golden retriever needs to get out at least 3 times a day. And that is partly dads responsibility.

Mom: we call her Claire. As an active wife she works 3 days a week, and two days just for the kids and household. She tries to be home as much as possible, especially when the youngest kids come home during the lunchbreak, and when they come home from school. The times she is home and the children are not, she usually goes sporting with a friend, or does voluntary work at the second hand shop.

Little boy of 8 years old: Jasper. He is in group 5 of primary school, learns to multiply all numbers under 10 but likes more to play outside with his friends. He goes to swimming lessons every week, and already passed diploma A and B! after he has passed diploma C, he may choose what kind of sports he want to do.

Boy of 10 years old: Luuk. Luuk is in group 7 of primary school and has to write a 'werkstuk' about basketball next week. Although he is sportive and basketball is his favorite sports, he takes guitar lessons every week, and loves when his dad plays a song for him. He wants to be just as good at playing guitar as dad is, and maybe even better!

Girl of 13 years old: Lisa. She said her primary school goodbye last year, and now cycles to her high school every day together with her friends. Days are long as she has to start at 8.30 and comes home at 4 o'clock. After that she finishes her homework. Lisa loves to play piano and has lessons every week. Now she gets older, she wants to learn to sing too, so she can join the school band when she reaches the fourth year.

Because everyone is busy studying, working and sporting, the family time in the evening is scarce, but of high importance to the family.

APPENDIX F: SCENARIOS

PHILIPS HUE SYSTEM

Monday morning in the beginning of October. The alarm goes at 7.00 for Jesse, Claire and Lisa.

Jesse programmed the hue lamps of the family in their bedrooms to wake them up gently, so they start **to light up when the alarm goes off.**

They get up, Jesse and Claire take a shower and get dressed while Lisa does her makeup and decides what to wear that day.

When Jesse and Claire enter the bathroom, Claire switches on the light herself, with the switch mounted to the wall, to see where she is walking, and because they need the light when showering. After showering she blow-dries her hair in front of the mirror, therefore she switches on the mirror light with the remote switch next to the door as soon as she steps out of the shower, also mounted to the wall. When she is ready she switches off the bathroom light, and while leaving the bathroom she switches off the light.

Lisa brightens up the lamp of her dressing table herself, **with the Philips hue app. She searches for the lamp in the app, clicks on it and puts it on** bright, cold light, just like daylight, so she can see the colors of her clothes and her makeup just the way others will see them during the day.

When, after showering Jesse takes his clothes out of their wardrobe, the wardrobe lighting inside switches on as soon as he opens the door.

Claire and Jesse get dressed and when they leave the **bedroom the light is programmed to switch off.**

Jesse and Claire head downstairs.

They switch on the light in the corridor upstairs, and the staircase light, with a wall mounted remote. Claire turns the light off again to make sure the boys won't wake up from the light yet.

ONE REMOTE FOR ALL

Monday morning in the beginning of October. The alarm goes at 7.00 for Jesse, Claire and Lisa.

They turn on their bedside lamps with the remote that lies on their bedside table. Lisa likes bright cold light, as it wakes her up quickly.

They get up, Jesse and Claire take a shower and get dressed while Lisa does her makeup and decides what to wear that day.

When Jesse and Claire enter the bathroom, Claire switches on the light, with the switch mounted to the wall. This switches on the bathroom light and the mirror light. After showering she blow-dries her hair in front of the mirror. Herefore she brightens up the light with the remote switch next to the door while she steps out of the shower. While leaving the bathroom she switches off the light with the remote next to the door.

Lisa brightens up the lamp of her dressing table herself, **with the remote on her dressing table. She puts it on bright, cold light, just like daylight, so she** can see the colors of her clothes and her makeup just the way others will see them during the day.

When, after showering Jesse takes his clothes out of their wardrobe, the wardrobe lighting inside switches on as soon as he opens the door.

Claire and Jesse get dressed and when they leave the bedroom Jesse **light with the wall mounted remote.**

Jesse and Claire head downstairs.

While Jesse walks through the corridor he clicks **the lights on and lights up the corridor for Claire.** Claire turns the light off again to make sure the boys won't wake up from the light yet.

PERSONAL REMOTE FOR ALL

Monday morning in the beginning of October. The alarm goes at 7.00 for Jesse, Claire and Lisa.

These family members turn on their bedside lamps **with their own remote that lies on their bed side.** They all choose their own preference.

They get up, Jesse and Claire take a shower and get dressed while Lisa does her makeup and decides what to wear that day.

When Jesse and Claire enter the bathroom, Claire **switches on the general light with her remote, and puts in near the sink.** After showering she blow-dries her hair in front of the mirror, therefore she **switches on the mirror light as soon as she plugs in the blow-dryer, as her remote lies next to it.** While leaving the bathroom she **switches off the lights with her remote, by pointing at them and push the off button.**

Lisa brightens up the lamp of her dressing table herself with the remote that was on her bedside table. She puts it on bright, cold light, just like daylight, so she can see the colors of her clothes and her makeup just the way others will see them during the day.

When, after showering Jesse takes his clothes out of their wardrobe, the wardrobe lighting inside switches on as soon as he opens the door.

Claire and Jesse get dressed and when they leave the bedroom Jesse takes his **remote with him and switches off the light.**

Jesse and Claire head downstairs.

While Jesse walks through, the corridor he clicks **the lights on and lights up the corridor for Claire.** Claire turns the light off again to make sure the boys won't wake up from the light yet.

ONE REMOTE PER LAMP

Monday morning in the beginning of October. The alarm goes at 7.00 for Jesse, Claire and Lisa.

Jesse, Claire and Lisa turn on their bedside table lamps with the remotes of the lamps, tapping on **the surface to select the right colour and turning the knob for the right intensity.** Lisa chooses warm white bright, to peacefully wake up, Jesse and Claire choose neutral white, but less bright.

They get up, Jesse and Claire take a shower and get dressed while Lisa does her makeup and decides what to wear that day.

When Jesse and Claire enter the bathroom, Claire switches on the light (tab and rotate), with the remote stuck to the wall. After showering she blow-dries her hair in front of the mirror, therefore she switches on the mirror light as soon as she plugs in the blow-dryer, **with the knob on the side of the bathroom sink.** When she is ready she switches off the mirror light by turning the knob down, and while leaving the bathroom she turns the knob on the bathroom wall to switch off the light.

Lisa brightens up the lamp of her dressing table. She browses through the knob on her dressing table. **She browses through the knob on her dressing table. She browses through the knob by tapping the knob on her table,** when selected cold light, she turns it up completely, just like daylight, so she can see the colors of her clothes and her makeup just the way others will see them during the day.

When, after showering Jesse takes his clothes out of their wardrobe, the wardrobe lighting inside switches on as soon as he opens the door. Claire and Jesse get dressed and when they leave the bedroom Claire first switches off the bedside table lamps. Therefore she has to walk over to the lamps and turn the knob down. The general lighting of the bedroom is controlled by a knob on the door frame.

Jesse and Claire head downstairs.

They switch on the light in the corridor upstairs, and the staircase light, with a wall mounted knobs. As

At 7.15, When Jesse and Claire usually head downstairs, the light is programmed to switch on: Claire turns on the light in the living room using the remote on the side table. She chooses neutral white above the breakfast table, and so all the lamps in the room switch on in the same setting.

Jesse walks the dog for 15 minutes and Claire heads to the kitchen table for breakfast, makes tea and coffee.

Jesse takes his coat in the hallway downstairs, he turns the light on when he walks in, grabs his jacket and turns the light off when he walks out, all with to wall-mounted switches, one on the beginning of the hallway, the other on the end. When he comes home again it's the same but other way around.

At 7.30 Claire comes to wake up the boys.

The night lights on the bedside tables of the boys are programmed too: the start to light up at 7.30. When Claire comes to wake them up she turns on all the lights in their bedroom with the wall mounted switch that has different scenes programmed to it. it, she sets them to 'wake up and dress light'; bright neutral light so they won't fall asleep again and can dress themselves. When the boys are dressed they turn off their bedroom lights with the wall mounted switch.

and tell Lisa that she has to hurry up to join her parents for breakfast. Lisa packs her backpack, heads downstairs and takes her place on the breakfast table.

When she is done dressing up and heads downstairs, **she turns the light in her bedroom off with one click in the app.**

She makes lunch and eats her cereals and at 8.00 she has to leave for school, as her friend Rosa is already waiting for her at the other end of the street. The boys finish breakfast and after that, Claire cycles them to school, while Jesse also heads off for work.

At 7.15, When Jesse and Claire head downstairs, they have to turn on the lights in the living room. **Claire does not want to put effort in it** so she only clicks on the lamps above the side table in the livingroom on warm, white and the breakfast table light to neutral bright. In this way the living room is sort of **welcoming and the breakfast table just is perfectly sufficient.**

Jesse walks the dog for 15 minutes and Claire heads to the kitchen table for breakfast, makes tea and coffee.

Jesse takes his coat in the hallway downstairs, he **turns the light on** when he walks in, grabs his jacket and turns the light off when he walks out, all with **the knob he carries in his pocket.** When he comes home again it's the same but other way around.

At 7.30 Claire comes to wake up the boys.

The boys switch on their bedside lamps with the remote and turns on all the lights in their bedrooms with the wall remote and sets the light to bright neutral. so they won't fall asleep again and can dress themselves. When the boys are dressed they **take their own remote and turn off their bedroom lights with one click.**

At 7.30 Claire comes to wake up the boys.

When Claire comes to wake them up she takes her remote and turns on all the lights in their bedrooms on 'wake up and dress light'; bright neutral light so they won't fall asleep again and can dress themselves. When the boys are dressed they **take their own remote and turn off their bedroom lights with one click.**

and tell Lisa that she has to hurry up to join her parents for breakfast. Lisa packs her backpack, heads downstairs and takes her place on the breakfast table. When she is done dressing up and heads downstairs, **she turn around halfway the staircase because she forgot to take her remote** and she puts the light in her bedroom off with one click.

She makes lunch and eats her cereals and at 8.00 she has to leave for school, as her friend Rosa is already waiting for her at the other end of the street. The boys finish breakfast and after that, Claire cycles them to school, while Jesse also heads off for work.

At 7.15, Jesse and Claire usually head downstairs, they have to turn on the lights in the living room. Claire walks through the living room, turning knobs to have some light. She only turns the knob of the 3 lights above the side table in the living room, default setting neutral, full bright. Above the breakfast table she chooses for neutral light also, using the knob they stuck to the lamp itself. Because it is still dark outside, she also lights up the lamp on the dining room cupboard.

Jesse walks the dog for 15 minutes and Claire heads to the kitchen table for breakfast, makes tea and coffee.

Jesse takes his coat in the hallway downstairs, **leaves the door of the corridor open to have enough light** to grab his jacket. When he goes out the door he turns on the light in the corridor, because the knob is stuck to the door frame of the corridor. In this way the corridor is lit when he comes back. When he comes home **he leaves the light on, for the rest of the family when they have to go out.**

At 7.30 Claire comes to wake up the boys.

The boys usually turn on their bedside table lamps themselves when they hear their alarms, using the knob on the lamps itself. When Claire comes to wake them up she turns on all the lights in their bedroom with the knob stuck to the door frame. She chooses bright neutral light so they won't fall asleep again and can dress themselves. When the boys are dressed they turn off their bedside table lights and bedroom lights by turning the knobs of the lamps counterclockwise.

and tell Lisa that she has to hurry up to join her parents for breakfast. Lisa packs her backpack, heads downstairs and takes her place on the breakfast table. When she is done dressing up and heads downstairs, she puts the light in her bedroom off by turning the different knobs. This always bothers Lisa when she is in a hurry.

She makes lunch and eats her cereals and at 8.00 she has to leave for school, as her friend Rosa is already waiting for her at the other end of the street. The boys finish breakfast and after that, Claire cycles them to school, while Jesse also heads off for work.

At 7.15, When Jesse and Claire usually head downstairs, **the light is programmed to switch on:** Claire **turns on the light in the living room using the remote** on the side table. She chooses neutral white above the breakfast table, **and so all the lamps in the room switch on in the same setting.**

Jesse walks the dog for 15 minutes and Claire heads to the kitchen table for breakfast, makes tea and coffee.

Jesse takes his coat in the hallway downstairs, he **turns the light on** when he walks in, grabs his jacket and turns the light off when he walks out, all with to wall-mounted remote, one on the beginning of the hallway, the other on the end. When he comes home again it's the same but other way around.

At 7.30 Claire comes to wake up the boys.

When Claire comes to wake them up she takes her remote and turns on all the lights in their bedrooms on 'wake up and dress light'; bright neutral light so they won't fall asleep again and can dress themselves. When the boys are dressed they take their own remote and turn off their bedroom lights with one click.

and tell Lisa that she has to hurry up to join her parents for breakfast. Lisa packs her backpack, heads downstairs and takes her place on the breakfast table.

When she is done dressing up and heads downstairs, **she puts the lights in her bedroom off; one remote for the dressing light and one for the bedside table light.**

She makes lunch and eats her cereals and at 8.00 she has to leave for school, as her friend Rosa is already waiting for her at the other end of the street. The boys finish breakfast and after that, Claire cycles them to school, while Jesse also heads off for work.

At 7.15, When Jesse and Claire head downstairs, downstairs in the dining room, brighter neutral light above the breakfast table. The lamps in the corner are also soft, cold white. The lamps above the side table in the living room are soft and warm, just like the lamp in the corner of the living room. During breakfast they all brighten up, in a time span of 45 min, the time the family takes on the breakfast table.

Jesse walks the dog for 15 minutes and Claire heads to the kitchen table for breakfast, makes tea and coffee.

Jesse takes his coat in the hallway downstairs, he turns the light on when he walks in, grabs his jacket and turns the light off when he walks out, all with to wall-mounted switches, one on the beginning of the hallway, the other on the end. When he comes home again it's the same but other way around.

At 7.15, When Jesse and Claire usually head downstairs, **any light is sufficient, they just tab it ones to let the lights light up in default setting.** Claire turns the light off again to make sure the boys won't wake up from the light yet.

At 7.15, When Jesse and Claire usually head downstairs, Claire turns the light off by turning the knob of the lamps to have some light. She only turns the knob of the lamp on the dining room cupboard.

Jesse walks the dog for 15 minutes and Claire heads to the kitchen table for breakfast, makes tea and coffee.

Jesse takes his coat in the hallway downstairs, **leaves the door of the corridor open to have enough light** to grab his jacket. When he goes out the door he turns on the light in the corridor, because the knob is stuck to the door frame of the corridor. In this way the corridor is lit when he comes back. When he comes home **he leaves the light on, for the rest of the family when they have to go out.**

At 7.30 Claire comes to wake up the boys.

The boys usually turn on their bedside table lamps themselves when they hear their alarms, using the knob on the lamps itself. When Claire comes to wake them up she turns on all the lights in their bedroom with the knob stuck to the door frame. She chooses bright neutral light so they won't fall asleep again and can dress themselves. When the boys are dressed they turn off their bedside table lights and bedroom lights by turning the knobs of the lamps counterclockwise.

and tell Lisa that she has to hurry up to join her parents for breakfast. Lisa packs her backpack, heads downstairs and takes her place on the breakfast table. When she is done dressing up and heads downstairs, she puts the light in her bedroom off by turning the different knobs. This always bothers Lisa when she is in a hurry.

She makes lunch and eats her cereals and at 8.00 she has to leave for school, as her friend Rosa is already waiting for her at the other end of the street. The boys finish breakfast and after that, Claire cycles them to school, while Jesse also heads off for work.

[handwritten note: Number of actions required for single setting]

Claire switches on the light in the corridor downstairs with the wall mounted switch, so the boys can find their shoes and jackets.

As Jesse is the last one leaving the house, he takes his phone and turns off all the light at ones, right at the doorstep, before closing the door and going to work.

Claire also goes to work by bike for half a day.

Just before lunch she comes home, opens the door and turns the light on in the corridor, with the wall mounted switch. As she walks into the living room, she takes her phone and selects the light setting 'lunch': the lights in the living room and kitchen takes the remote on the side table and switches the light to soft neutral. The lights in the living room and kitchen turn on, creating a cozy and relax atmosphere, complementing the natural daylight in the room.

During lunch break, the boys and Claire are back home and eat with each other. The boys will go back to school on Monday afternoon and Claire does grocery shopping for the rest of the week.

When they leave the house again, Claire turns off the light of the whole house with the app, just like Jesse this morning. When she comes back, with two large shopping bags, she puts one down to turn on the light in the corridor with the wall mounted switch and opens the door. After she closed the door, she walks to the kitchen. There she opens the fridge, which gives her enough light to store her groceries. Then she walks over to the wall mounted switch in the kitchen to turn on the light, although any light that activates 'work' so she can store the groceries is sufficient for this activities, she presses the knob that don't have to be in the fridge. This turns on the light in a cold white setting.

and does some other household tasks.

At half past three the boys come home from school.

Therefore Claire makes the boys a glass of lemonade and they sit down in the living room. As the boys are very noisy and active because they were telling their mom about the cool game they played during sport class, Claire wants to calm down the boys a bit.

She tells the boys to sit down on the couch and takes the ipad from the side table and opens the hue app. Then she selects the scene 'Calm', which lights up the living room and kitchen in a soft and peaceful way.

Claire switches on the light in the corridor downstairs with the wall mounted remote, so the boys can find their shoes and jackets.

As Jesse is the last one leaving the house, he checks the rooms in the house and turns off the lights with the different remotes, before closing the door and going to work.

Claire also goes to work by bike for half a day.

Just before lunch she comes home, opens the door and turns the light on in the corridor, with the wall mounted switch. She walks into the living room, takes the remote on the side table and switches the light to soft neutral. The lights in the living room and kitchen turn on, all in simple and soft white, complementing the natural daylight in the room.

During lunch break, the boys and Claire are back home and eat with each other. The boys will go back to school on Monday afternoon and Claire does grocery shopping for the rest of the week

When they leave the house again, Claire turns off the light in the living room with the remote on the table, and the wall mounted ones in the corridor. When she comes back, with two large shopping bags, she presses the wall mounted remote with her elbow to switch on the light in the corridor and walks to the kitchen. There she opens the fridge, which gives her enough light to store her groceries. Then she walks over to the living room to take the remote and places it in the kitchen. She turns on the light in default setting: bright neutral, so she can store the groceries that don't have to be in the fridge.

and does some other household tasks.

At half past three the boys come home from school.

Therefore Claire makes the boys a glass of lemonade and they sit down in the living room. As the boys are very noisy and active because they were telling their mom about the cool game they played during sport class, Claire wants to calm down the boys a bit.

She tells the boys to sit down on the couch and takes the remote lying on the living room table. She takes the remote lying on the kitchen counter and selects soft warm light. Which lights up the living room and kitchen in a soft and by overruling the others setting and create some peaceful way.

Claire switches on the light in the corridor downstairs so the boys can find their shoes and jackets. When leaving, everyone puts their remote on the window pane near the door. As Jesse is the last one leaving the house, he checks the rooms, clicking the lights off with his remote before closing the door and going to work.

Claire also goes to work by bike for half a day.

Just before lunch she comes home, opens the door and turns the light on in the corridor, with the wall mounted switch. She walks into the living room, takes the remote from the window pane. As she walks into the living room, she takes some time to light up the space, carefully the way she likes it, creating a cozy and relax atmosphere, complementing the natural daylight in the room.

During lunch break, the boys and Claire are back home and eat with each other. The boys will go back to school on Monday afternoon and Claire does grocery shopping for the rest of the week

When they leave the house again, Claire asks the boys to turn off the lights, as it is a nice task for them. When she comes back, with two large shopping bags, she puts one down to open the door and switch on the light in the corridor. After she closed the door she walks to the kitchen and quickly and effortlessly she clicks randomly in the space. Some lights turn on in default setting. She walks back to take the groceries and stores them in the fridge and cupboards.

and does some other household tasks.

At half past three the boys come home from school.

Therefore Claire makes the boys a glass of lemonade and they sit down in the living room. As the boys are very noisy and active because they were telling their mom about the cool game they played during sport class, Claire wants to calm down the boys a bit.

She tells the boys to go and sit in the living room. When she comes with some lemonade, she switches on the lamp in the corner of the living room to warm white, she does the same with the lamp above the couch. The lamps above the side table she switches to bright warm light. All with the remotes on the lamps itself.

The light in the corridor downstairs is still on, so the boys can find their shoes and jackets. As Jesse is the last one leaving the house, he checks the rooms, the last one leaving the house, he checks the rooms, upstairs and downstairs and turns all the knobs of all the lamps burning, before closing the door and going to work

Claire also goes to work by bike for half a day.

Just before lunch she comes home, opens the door and turns the light on in the corridor, with the knob on the door frame. As she walks into the living room, she only turns the knobs that she walks past: the knob on the side table for the lamps above it, the knob on the side table for the lamps above it, the lamp above the dining table. And the 3 lamps in the corner on her way to the kitchen. From this one she only lights up the highest one.

During lunch break, the boys and Claire are back home and eat with each other. The boys will go back to school on Monday afternoon and Claire does grocery shopping for the rest of the week

When they leave the house again, Claire turns off the light of the whole house when she walks to the corridor downstairs. When she comes back, with two large shopping bags, she puts one down to open the door and switch on the light in the corridor. After she closed the door she walks to the kitchen. There she opens the fridge, which gives her enough light to store her groceries. Then she walks over to the lamp above the dining table and tabs once: default setting is more than sufficient for storing the groceries.

and does some other household tasks.

At half past three the boys come home from school.

Therefore Claire makes the boys a glass of lemonade and they sit down in the living room. As the boys are very noisy and active because they were telling their mom about the cool game they played during sport class, Claire wants to calm down the boys a bit.

She tells the boys to both take their remotes and light up the living room the way they want to, with the rule that they are finished when she comes with the lemonade. The boys play around teasing each other by overruling the others setting and create some

Then the boys go and play outside, or sporting, or when it rains they play inside in the living room, with friends or just with each other. But they always have to be home at 5 in the late afternoon.

On a rainy day they play inside. Jasper is allowed to have an hour of screen time before dinner, and he takes the ipad from the side table in the living room. He plays a game on his own on the couch, while Luuk is practicing guitar playing in the living room too.

Usually, Lisa comes home around 4 o'clock and has tea with her mom.

As the boys are playing in the living room, Lisa and her mom sit at the dining table. Lisa is tired form a long school day and she wants to relax.

As the light setting is still on the 'calm down the boys' mode, she takes her phone and changes the dining room to a warmer setting: 'relax'.

Then she starts to do her homework on the kitchen table. After half an hour she is losing her concentration and grabs her phone for distraction. As Claire walks into the kitchen to start cooking she sees that Lisa is distracted. She asks what subject Lisa is working on and while they talk about French verbs.

Claire takes her phone and changes the light to 'work'. This gives Lisa the light concentrate better. Although Claire finds this light a bit cold to cook, she finds it more important that Lisa has the proper study lighting, so she can finish her homework before dinner.

Claire starts cooking around 5 and the family eats around 6, when Jesse comes home from work.

At this time Lisa is done studying and helps her mom to dress the table for dinner. Apart from the plates, cutlery and glasses she also takes her phone and opens the hue app. She changes the light from 'work' to 'dinner': the lights in the living room are warm and the lights in the dining room are warm and cozy. But as the boys are still in the living room, she quickly adjusts the brightness to give the boys more light. Because of this rapid change in light, the boys look up from their activities and see that dinner is ready.

As Claire fills the plates of the boys, Jesse takes his

Then the boys go and play outside, or sporting, or when it rains they play inside in the living room, with friends or just with each other. But they always have to be home at 5 in the late afternoon.

On a rainy day they play inside. Jasper is allowed to have an hour of screen time before dinner, and he takes the ipad from the side table in the living room. He plays a game on his own on the couch, while Luuk is practicing guitar playing in the living room too.

Usually, Lisa comes home around 4 o'clock and has tea with her mom.

As the boys are playing in the living room, Lisa and her mom sit at the dining table. Lisa is tired form a long school day and she wants to relax.

As the light setting is still soft and warm she takes the remote from the kitchen counter and brightens up the light a bit.

Then she starts to do her homework on the kitchen table. After half an hour she is losing her concentration and grabs her phone for distraction. As Claire walks into the kitchen to start cooking she sees that Lisa is distracted. She asks what subject Lisa is working on and while they talk about French verbs.

Claire takes the remote on the kitchen counter and changes the light to bright cold white. This gives Lisa the light concentrate better. Although Claire finds this light a bit cold, and the boys have less cozy light in the living room, she finds it more important that Lisa has the proper study lighting, so she can finish her homework before dinner.

Claire starts cooking around 5 and the family eats around 6, when Jesse comes home from work.

At this time Lisa is done studying and helps her mom to dress the table for dinner. Apart from the plates, cutlery and glasses she also takes the remote and changes the light from cold and bright white to warm softer white. As the boys are still in the living room, they notice the change in lighting and understand that dinner is ready.

As Claire fills the plates of the boys, Jesse takes his

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random setting.

Then the boys go and play outside, or sporting, or when it rains they play inside in the living room, with friends or just with each other. But they always have to be home at 5 in the late afternoon.

On a rainy day they play inside. Jasper is allowed to have an hour of screen time before dinner, and he takes the ipad from the side table in the living room. He plays a game on his own on the couch, while Luuk is practicing guitar playing in the living room too.

Usually, Lisa comes home around 4 o'clock and has tea with her mom.

As the boys are playing in the living room, Lisa and her mom sit at the dining table. Lisa is tired form a long school day and she wants to relax.

As the light setting is still on the 'random play mode' Claire takes her remote and cleans the lighting a bit, creating a coherent and relaxing setting for her daughter.

Then she starts to do her homework on the kitchen table. After half an hour she is losing her concentration and grabs her phone for distraction. As Claire walks into the kitchen to start cooking she sees that Lisa is distracted. She asks what subject Lisa is working on and while they talk about French verbs.

Claire takes the remote that is on the table and changes the dining table light to bright cold white. This gives Lisa the light concentrate better. As she changed only one light, the rest of the room still feels the same so the boys are not bothered by the changed light.

Claire starts cooking around 5 and the family eats around 6, when Jesse comes home from work.

At this time Lisa is done studying and helps her mom to dress the table for dinner. Apart from the plates, cutlery and glasses she also takes her remote. She changes the light to a warm and comfy dinner light setting: the lights in the living room are warm and cozy, the lights in the dining room and notice the boys are still in the living room and notice the change in lighting they understand and dinner is ready.

As Claire fills the plates of the boys, Jesse takes his

Then the boys go and play outside, or sporting, or when it rains they play inside in the living room, with friends or just with each other. But they always have to be home at 5 in the late afternoon.

On a rainy day they play inside. Jasper is allowed to have an hour of screen time before dinner, and he takes the ipad from the side table in the living room. He plays a game on his own on the couch, just under the light above the couch. As the light reflects on the screen of the ipad, he dims the light with the knob, that is placed just within reach.

Usually, Lisa comes home around 4 o'clock and has tea with her mom.

Luuk is practicing guitar playing in the living room too. He sits in the big chair in the living room, and therefore turns on the light above the chair, to bright neutral: now he can see his music sheets clearly.

As the boys are playing in the living room, Lisa and her mom sit at the dining table. Lisa is tired form a long school day and she wants to relax.

Lisa is tired form a long school day and she wants to relax. As the light setting in the dining room is still on neutral, she turn it to warm white.

Then she starts to do her homework on the kitchen table.

After half an hour she is losing her concentration and grabs her phone for distraction. As Claire walks into the kitchen to start cooking she sees that Lisa is distracted. She asks what subject Lisa is working on and while they talk about French verbs.

Claire walks to the light above the table and changes it to cold and bright white. This gives Lisa the light concentrate better. As it is only one light Lisa is using, the others in the room are not bothered by the cold light.

Claire starts cooking around 5 and the family eats around 6, when Jesse comes home from work.

At this time Lisa is done studying and helps her mom to dress the table for dinner. Apart from the cutlery and glasses she also changes the lighting in the dining room: the lamp above the table to neutral and bright, the lamp on the cupboard to warm white and bright, and the 3 lights in the corner also warm white half bright. Lisa asks the boys to join the table, and they do so.

As Claire fills the plates of the boys, Jesse stands up from the table to turn off the lights above the couch and chair in the living room, to save energy.

phone and dims the light in the living room to save energy.

At the dinner table the family takes the time to be together, and after dinner, the children clean up the table and fill the dishwasher while Jesse walks the dog.

Then the family members watch some tv, usually de wereld draait door, news and weather report.

When Claire switches on the tv and sits down on the couch, she also takes the ipad and changes the light to 'relax' again.

Today Jesse is not interested in the talkshow guests on television. Instead of watching tv he sits in the lounge chair next to the tv and takes the ipad to browse through a magazine

When Jesse sits in the chair, he feels a bit in the dark, as the light above the chair is set to a dim and warm light. But it is sufficient for what he is doing, as the ipad gives light itself, so everything is clearly visible. Therefore he does not bother to open the app, change the light and read along.

After the weather report (at 8), Jasper has to go to bed.

He walks to the staircase and switches on the staircase light and the light of the corridor upstairs, with the wall mounted light switch. In the bathroom he does the same. When he has brushed his teeth and he enters his bedroom, the light is already programmed to a soft warm light.

Jesse goes upstairs to tuck him in. Luuk goes with him, as he has to go to bed too.

When Jesse comes to read a bedtime story for Jasper, he brightens up the light at Jaspers bedside table a bit, with the wall mounted dimmer, so Jesse will have enough light to read. When the story is over and after a goodnight kiss he leaves the room and dims the light again, until the lamp barely gives any light, so Jasper can sleep with a safe feeling.

Then he walks to Luuks room and does the same, only Luuk does not need a sleeping light anymore.

At the dinner table the family takes the time to be together, and after dinner, the children clean up the table and fill the dishwasher while Jesse walks the dog.

Then the family members watch some tv, usually de wereld draait door, news and weather report.

When Claire switches on the tv and sits down on the couch, she also takes the remote of one of the boys from the side table and dimms the light in the dining room.

Today Jesse is not interested in the talkshow guests on television. Instead of watching tv he sits in the lounge chair next to the tv and takes the ipad to browse through a magazine

When Jesse sits in the chair, he feels a bit in the dark, as the light above the chair is set to a dim and warm light. It is sufficient for what he is doing, as the ipad gives light itself, so everything on the ipad is clearly visible. But it is no effort to brighten the light a bit, with the remote he carries in his pocket.

After the weather report (at 8), Jasper has to go to bed.

He takes his remote and 'shoots' the light of the staircase on, while making shooting sounds. Also the light of the corridor gets shot. In the bathroom he pretends fighting against a big monster in the dark, and of course he wins! he leaves the light on for Luuk when he has brushed his teeth. In his bedroom, he puts the remote on his bedside table and clicks the light on warm white.

Jesse goes upstairs to tuck him in. Luuk goes with him, as he has to go to bed too.

When Jesse comes to read a bedtime story for Jasper, he brightens up the light at Jaspers bedside table a bit, with Jaspers remote. When the story is over to read. When the story is over and still gives Jesse enough light to read. When the story is over and after a goodnight kiss he dims the light again, with his own remote, until the lamp barely gives any light, so Jasper can sleep with a safe feeling. Also knowing he can beat all monsters with his own remote.

Then Jesse walks to Luuks room and does the same,

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bit to save energy. This makes Lisa feel some of the effort was for nothing...

At the dinner table the family takes the time to be together, and after dinner, the children clean up the table and fill the dishwasher while Jesse walks the dog.

Then the family members watch some tv, usually de wereld draait door, news and weather report.

When Claire switches on the tv, sits down on the couch, and turns on the light above the couch, with the knob just within reach. She selects warm white and dims it a bit. The room give a relaxing atmosphere.

Today Jesse is not interested in the talkshow guests on television. Instead of watching tv he sits in the lounge chair next to the tv and takes the ipad to browse through a magazine

When Jesse sits in the chair, he has no light. He sets the light above the chair to neutral half bright, so he can read from the ipad.

After the weather report (at 8), Jasper has to go to bed.

He walks to the staircase and switches on the staircase light and the light of the corridor upstairs, with the wall mounted light switch. In the bathroom he does the same. When he has brushed his teeth and he enters his bedroom, he turns on the light with the knob near the door frame. Then he walks to his bed side table lamp and turns it on (bright neutral default setting) Then he walks back to the door frame to switch off the big light of the room.

Jesse goes upstairs to tuck him in. Luuk goes with him, as he has to go to bed too.

When Jesse comes to read a bedtime story for Jasper, he changes the lighting to warm white. This makes the room more cozy and still gives Jesse enough light to read. When the story is over and after a goodnight kiss he dims the light until the lamp barely gives any light, so Jasper can sleep with a safe feeling. Then carefully walks to the door and leaves the room.

Then he walks to Luuks room and does the same.

When he heads downstairs he switches off the light in the corridor upstairs and the staircase light with the wall mounted switch downstairs.

At half past 8 Lisa has her piano lesson.

She turns on the light in the corridor downstairs to grab her coat, and after a last glance at the mirror in the corridor she switches off the light with the wall mounted switch, closes the door and cycles to her piano lesson.

She opens the door, switches on the light in the corridor downstairs using the wall mounted switch and hangs her coat on the coatrack. When she enters the living room she switches off the light in the corridor.

As her mom noticed the light in the corridor switching on, she knows Lisa is home again. Therefore she walks to the kitchen and makes tea.

and when she comes back at half past 9 the boys are already to bed.

When Claire walks to the kitchen she asks Jesse, who was reading something on the ipad, as Jesse already has the ipad in his hands and Claire then does not have to find her phone on the dark bar in the kitchen, which she left there while cooking, to switch on the light in the kitchen. Jesse switches on the light in the kitchen, a soft warm light, because he knows Claire does not like bright and cold light in the evening.

Lisa finds a place on the couch and has a little chat with her dad. Then her mom joins them with the tea. Lisa tells about her lesson, about the difficult but very cool piece her teacher gave her and the little concert she will perform at school soon. After tea she goes upstairs, to bed.

Staircase and corridor lighting upstairs, turns them on with the wall mounted switch. Same with the bathroom light which **☐** turns off when she leaves. When she enters her bedroom she leaves the door open, to have some light from the corridor, she takes the remote from her bedside table and sets it to soft warm. Then she walks to the wall mounted switch of the corridor to switch the light off. In bed she usually stays awake for some time, because she wants to check facebook on her phone, or is chatting with a friend, when she puts away her phone she also turns off the light with the remote on her bedside table.

When he heads downstairs he switches off the light in the corridor upstairs and the staircase light with the wall mounted remote downstairs.

At half past 8 Lisa has her piano lesson.

She turns on the light in the corridor downstairs to grab her coat, and after a last glance at the mirror in the corridor she switches off the light with the wall mounted switch, closes the door and cycles to her piano lesson.

She opens the door, switches on the light in the corridor downstairs using the wall mounted switch and hangs her coat on the coatrack. When she enters the living room she switches off the light in the corridor.

As her mom noticed the light in the corridor switching on, she knows Lisa is home again. Therefore she walks to the kitchen and makes tea.

and when she comes back at half past 9 the boys are already to bed.

Claire walks to the kitchen where the light is still on.

Lisa finds a place on the couch and has a little chat with her dad. Then her mom joins them with the tea. Lisa tells about her lesson, about the difficult but very cool piece her teacher gave her and the little concert she will perform at school soon. After tea she goes upstairs, to bed.

Staircase and corridor lighting upstairs, turns them on with the wall mounted switch. Same with the bathroom light which **☐** turns off when she leaves. When she enters her bedroom she leaves the door open, to have some light from the corridor, she takes the remote from her bedside table and sets it to soft warm. Then she walks to the wall mounted switch of the corridor to switch the light off. In bed she usually stays awake for some time, because she wants to check facebook on her phone, or is chatting with a friend, when she puts away her phone she also checks facebook or is chats with a friend. When she goes to sleep she puts her phone next to her remote on her bedside table and switches off the light.

When he heads downstairs he switches off the light in the corridor upstairs and the staircase light with his remote.

At half past 8 Lisa has her piano lesson.

She takes her remote from the side table and go upstairs.

She takes her remote from the side table and switches on the light in the corridor downstairs to grab her coat, and after a last glance at the mirror in the corridor she closes the door and cycles to her piano lesson, with the remote still in her pocket.

She opens the door, looks at the windowpane for her remote but can't find one, as everyone is home. Nervous she searches her pockets and finds the remote in her jacket. Then she switches on the light in the corridor downstairs. When she enters the living room she switches off the light in the corridor.

and when she comes back at half past 9 the boys are already to bed.

When Claire walks to the kitchen she asks Jesse, who always carries his remote in his pocket, if he can switch on the light in the kitchen, so Claire does not have to find her remote on the dark bar in the kitchen, which she left there while cooking. Jesse switches on the light in the kitchen, a soft warm light, because he knows Claire does not like bright and cold light in the evening.

As her mom noticed the light in the corridor switching on, she knows Lisa is home again. Therefore she walks to the kitchen and makes tea.

Lisa finds a place on the couch and has a little chat with her dad. Then her mom joins them with the tea. Lisa tells about her lesson, about the difficult but very cool piece her teacher gave her and the little concert she will perform at school soon. After tea she goes upstairs, to bed.

Staircase and corridor lighting upstairs, turns them on and off with her remote. Same with the bathroom light, no need to leave a light on and a door open for light, as she can control her lights form any place. She dims her light to warm soft white and checks facebook or is chats with a friend. When she goes to sleep she puts her phone next to her remote on her bedside table and switches off the light.

only Luuk does not need a sleeping light anymore. When he heads downstairs he switches off the light in the corridor upstairs and the staircase light with his remote.

At half past 8 Lisa has her piano lesson.

He takes the remote with him downstairs, so he, or someone else downstairs can use it easily when they go upstairs.

She leaves the door open to benefit from the light of the kitchen to find her coat. She grabs her coat, then walks past the remote stuck to the door frame of the backdoor and switches the light on, and after a last glance at the mirror in the corridor she switches off the light with the switch, closes the door and cycles to her piano lesson.

and when she comes back at half past 9 the boys are already to bed.

She opens the door, switches on the light in the corridor using the knob stuck to the door corridor downstairs using the knob stuck to the door frame, and hangs her coat on the coatrack and takes the knob with her and places it on the door frame of living room door and switches the light in the kitchen and makes tea.

As her mom saw Lisa coming in, she walks to the kitchen and makes tea.

When Claire walks to the kitchen the lights are still on there because no one bothered to turn them off. When she waits for the water to boil, the dims the light above the kitchen table to soft warm light. The rest she keeps the way they are.

Lisa finds a place on the couch and has a little chat with her dad. Then her mom joins them with the tea. Lisa tells about her lesson, about the difficult but very cool piece her teacher gave her and the little concert she will perform at school soon. After tea she goes upstairs, to bed.

Lisa asks her dad which of the remotes on the side table in the living room is from the staircase lights and the corridor light upstairs. Her dad points out the remotes and Lisa turns on the staircase light with the remote and Lisa turns on the staircase light with the remote. Jesse took downstairs earlier this evening. When lisa is upstairs, she sticks the remotes to the door frame of the bathroom and leaves the remotes to the on. The bathroom light she turns on and off with the

When lisa is off to bed, Jesse and Claire have a glass of wine and watch an episode of a series they like. Jesse brings the teapot and glasses to the kitchen and comes back with the bottle of wine and wineglasses.

When Jesse pours in the wine for them both, Claire **takes the ipad to turn off the kitchen light, and dim the living room lighting a bit.**

After the series, they walk the dog around 11. Jesse puts the wine and glasses on the kitchen counter. They both take their jacket and shoes in the corridor downstairs.

Claire turns on the light in the corridor using the wall mounted switch, when they leave the house they leave the light on, so it is not dark when they come back.

When they come back they store their shoes and jackets, give the dog a cuddle and go to bed.

They turn off the light in the corridor using the wall mounted switch, and when they go upstairs, they do the same with the staircase light and the light of the corridor upstairs. In the bathroom they turn on the light with the wall mounted switch, when they come in, and when they leave the room. **Their bedroomlight is programmed to switch on at 11.15.**

When they are in bed, Jesse takes his phone and puts it on this dressing table to charge. He quickly checks his agenda for tomorrow,

and then **takes the hue app to turn off all the lights downstairs, and upstairs, except the light of their bedroom, which is programmed to dim in a timespan of a few minutes.**

When lisa is off to bed, Jesse and Claire have a glass of wine and watch an episode of a series they like. Jesse brings the teapot and glasses to the kitchen and comes back with the bottle of wine and wineglasses.

When Jesse pours in the wine for them both, Claire **takes the remote to dim the light in livingroom and kitchen a bit.**

After the series, they walk the dog around 11. Jesse puts the wine and glasses on the kitchen counter. They both take their jacket and shoes in the corridor downstairs.

Claire turns on the light in the corridor using the wall mounted remote, when they leave the house they leave the light on, so it is not dark when they come back.

When they come back they store their shoes and jackets, give the dog a cuddle and go to bed.

They turn off the light in the corridor using the wall mounted remote. Claire turns on the staircase light and the light of the corridor upstairs while she walks by. **After that Jesse takes the remote of the living room and switches off the light in the kitchen and livingroom at ones.** In the bathroom they turn on the light with the wall mounted remote, when they come in, and when they leave. Claire leaves the door of the bedroom open to have the light from the corridor to find the remote of their bedside table lamps. She puts them on warm white.

Jesse turns off the corridor light with the wall mounted remote and joins Claire in bed. When they are in bed, Jesse takes his phone and puts it on this dressing table to charge,

and then asks Claire **to turn off the bedside table lamps** with the remote that lies on her bedside table.

and when he is done he puts his phone on the dressing table, next to the remote, with which he switches off all the lights in the room.

When lisa is off to bed, Jesse and Claire have a glass of wine and watch an episode of a series they like. Jesse brings the teapot and glasses to the kitchen and comes back with the bottle of wine and wineglasses *and Claires remote*

When Jesse pours in the wine for them both, Claire takes the remote to turn off the kitchen light, and dim the living room lighting a bit.

After the series, they walk the dog around 11. Jesse puts the wine and glasses on the kitchen counter. They both take their jacket and shoes in the corridor downstairs.

Claire turns on the light in the corridor using her own remote, when they leave the house they leave the light on. **Claire puts her remote on the window pane, Jesse has it with him in his pocket.**

When they come back they store their shoes and jackets, Jesse reminds Claire to take her remote, they give the dog a cuddle and go to bed.

Claire turns off the light in the corridor, and when they go upstairs, she turns on the staircase light and the light of the corridor upstairs to a soft warm white. In the bathroom Jesse turns on the light and empties his pockets, when they leave the room, **Jesse takes his phone and remote with him. Claire does so too.**

When they are in bed, Jesse takes his phone and puts it on this dressing table to charge. He quickly checks his agenda for tomorrow,

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Claire turns on the light in the corridor using her own remote, when they leave the house they leave the light on, Claire walks to the kitchen to turn off the kitchen light, and dim the living room lighting a bit. As she wants to make the room cozy she does not bother to walk around this time. She creates a soft atmosphere, perfect for watching tv at night.

After the series, they walk the dog around 11. Jesse puts the wine and glasses on the kitchen counter. They both take their jacket and shoes in the kitchen and downstairs.

Claire turns on the light in the corridor using the knob Lisa stuck to the doorframe, when they leave the house they come back. When they come back they store their shoes and jackets, give the dog a cuddle and go to bed. They turn off the light in the corridor using the knob on the doorframe. Together they **turn off all the lights downstairs, and because Lisa left the lights of the staircase and corridor on,** they turn on and off the light with the knob on the doorframe, and the one on the sink. Claire is the first one entering their bedroom. In the bathroom they turn on and off the light with the knob on the doorframe, and the one on the sink. Claire is the first one entering their bedroom, so she turns on the light of the bedroom. Just like Lisa, **she takes the knob from the wall and takes it with her to the bedside table.** The she turns on her own bedside table and the one from Jesse. Jesse is the last one in the bathroom, so he turns off the light with the knob on the outside of the de bathroom door frame. **Because Claire left the door open, he has plenty of light from the bedroom to find his way.** When they are in bed, Claire turns off the general lighting of the bedroom with the knob she took from the wall. When they go to sleep they both turn off their lights with their own remotes.

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remotes stuck to the inside of the bathroom door frame and the one on the sink. When she enters her bedroom, she turns on her light with the remote stuck to her own door frame, closes her door, takes the remote from the door frame and goes to bed. From her bed she turns on the bedside table lamp to soft warm light. With the other control she turns off the general lighting of her room. After checking facebook on her phone and chatting with a friend, she goes to sleep and turns off the bedside table lamp with the remote.

When Lisa is off to bed, Jesse and Claire have a glass of wine and watch an episode of a series they like. Jesse brings the teapot and glasses to the kitchen and comes back with the bottle of wine and wineglasses. When Jesse pours in the wine for them both, Claire takes the remote to turn off the kitchen light, and dim the living room lighting a bit.

After the series, they walk the dog around 11. Jesse puts the wine and glasses on the kitchen counter. They both take their jacket and shoes in the corridor downstairs.

Type of interaction: Play around just for fun
What situation?   When the children are bored/have permission of their parents to play with the light
Who?   Mostly the children
Single use/shared use: can be both
Which lamps? Can be all lights or specific lights
Desirable effort: as playing around is the focus activity at that moment, you are actually exploring the settings. This can be done in many ways. Quick reaction of the system or slow, all lamps or specific lamps, everything is sufficient to play with
Duration of setting: short, as you play it is all about changing the light setting.
Overall priority in the family: very low

Type of interaction: general lighting: Switch on or off, quickly because you just need light,
What situation?   When you walk in and out a room, or when you built up lighting when it gets dark: you put more lights on the darker it is, without purposely creating a scene.
Who?   Everyone who goes somewhere the light is turned off.
Strong indicator of presence.
Single use/shared use can be both but mostly single
Which lamps?   Usually general lighting per room. Sometimes all of when you leave
Desirable effort: almost nothing. Needs to be quick and easy
Duration of setting: mostly short in spaces you are a short time, when you stay longer it is complemented with necessary setting or atmosphere lighting
Overall priority in the family: low, setting is altered (refined) easily and without much thinking

Type of interaction: task lighting: Necessary setting: you need light in a particular setting for a particular task
What situation?   When you get dressed and need light for doing makeup, when you need light for working
Who?   Everyone who does an individual task and needs specific light for that.
Single use/shared use? Single use of the particular lamp, shared use of the light, but in less extend, shared use of the atmosphere
Which lamps?   Usually task lighting, or general lighting during a particular time of day
Desirable effort: some is okay, precision is needed.
Duration of setting: only for duration of task, after it usually is turned off.
Overall priority in the family: middle, priority is desired but highly dependent of the social aspects of the situation.

Type of interaction: atmosphere lighting: atmosphere creation: tweak lights to create a certain lighting atmosphere
What situation?   When dressing the table before dinner, when you expect guests

Who?   The one who cares most about setting a scene.

Single/shared use?   Mostly shared, but can also be single to make yourself comfortable.

Which lamps: atmosphere lights and accent lighting and general lighting, sometimes task lighting

Desirable effort: effort is fine, as the activity you are doing is setting a light scene. Tweaking is important, so changing should be easy. Delicacy

Duration of setting: long: you create a setting with care to use it for the rest of the evening/social/comfortable setting

Overall priority in the family: once it is set, high. But it is not set very often.

APPENDIX H: FINAL CODE

```
// This #include statement was automatically added by the Particle IDE.
// include alle nodige libraries
#include <neopixel.h>
#include "application.h"
#include "neopixel/neopixel.h"

#define CLOUD_ENABLED false
#define CLOUD_ENABLED true

//------------------LED-benodigdheden--------
// IMPORTANT: Set pixel COUNT, PIN and TYPE
#define PIXEL_COUNT 1
#define PIXEL_PIN D0
#define PIXEL_TYPE WS2811
Adafruit_NeoPixel strip = Adafruit_NeoPixel(PIXEL_COUNT, PIXEL_PIN, PIXEL_TYPE);

// ----------------- pin setup ---------------

const int GRBLedPin = D0;
//const int highVolt = D0;
const int brightUpPin = A0;
const int brightDownPin = A1;
const int tempUpPin = A2;
const int tempDownPin = A3;
const int previewPin = A4;
const int ledPin = D7;
const int pres1Pin = D2;
const int pres2Pin = D3;
const int pres3Pin = D4;

//----------------- PHILIPS HUE benodigdheden ----------------------

const byte ip[] = { 192, 168, 1, 101 };                    // ip adress van de bridge
const String id = "lOG10jMOPRVtgGQuIqBZ4Hsb3sjw0n4FlC7zUl8X";      // which is "id" obtained from
the brige, or maybe the "username": "lOG10jMOPRVtgGQuIqBZ4Hsb3sjw0n4FlC7zUl8X"

// The rooms or individual lights to be controlled. Trial and error is simplest for finding these values.
// Set room numbers to control all lights in that room.
const int rooms[] = { };    // deze zal niet nodig zijn wanneer je maar een lamp gebruikt.
// Additional individual lights that are not already controlled as part
// of a room. There is no need to double up on sending requests.
```

```
const int lights[] = { 5 }; //vul hier het aantal lampen in

// These variables are derived from the Hue parameters specified above
const int lightCount = sizeof(lights) > 0 ? sizeof(lights) / sizeof(lights[0]) : 0;
const int roomCount  = sizeof(rooms)  > 0 ? sizeof(rooms)  / sizeof(rooms[0])  : 0;
// Add a delay of a number of milliseconds into the main loop to avoid
// sending too many requests to the Hue Bridge and to save power
//const int loopInterval = 500;

// ---------------- maak alle variabelen aan die je nodig hebt en geef ze een initiele waarde ------------------
-------

int brightButtonUp = 0;
int brightButtonUpOld = 0;
int brightButtonDown = 0;
int brightButtonDownOld = 0;
int tempButtonUp = 0;
int tempButtonUpOld = 0;
int tempButtonDown = 0;
int tempButtonDownOld = 0;
int previewButton = 0;
int previewButtonOld = 0;
int pres1Button = 0;
int pres1ButtonOld = 0;
int pres2Button = 0;
int pres2ButtonOld = 0;
int pres3Button = 0;
int pres3ButtonOld = 0;
bool on = false;

int temp = 0;
int bright = 0;
int GRBvalues[4][5][3] = {{{44,49,24},{89,99,48},{133,148,73},{178,198,97},{222,247,121}} , {{49,50,42},{97
,101,84},{146,152,127},{194,202,169},{243,252,211}} , {{51,51,51},{102,102,102},{153,153,153},{204,204,204
},{255,255,255}} , {{50,43,51},{99,85,102},{149,128,153},{198,170,204},{248,213,255}}};
int HSBvalues[4][5][3] = {{{13548,200,51},{13548,200,102},{13548,200,153},{13548,200,204},{13548,200,2
55}} , {{14910,144,51},{14910,144,102},{14910,144,153},{14910,144,204},{14910,144,255}} , {{16468,35,51},
{16468,35,102},{16468,35,153},{16468,35, 204},{16468,35,255}} , {{34069,251,51},{34069,251,102},{34069,2
51,153},{34069,251,204},{34069,251,255}}};
//hoi ik ben een matrix van4x5 (multidimantional array) ik bevat integers en ik heet RGB/HSBvalues. En
die lange lijst zijn mijn waarden
//4 kolommen (temp waardes)  met 5 rijen (brightness waardes), twee arrays want een met grb waardes en
een met hsbwaardes voor de hue.
// int GRBvalueFromArray = GRBvalues [3][4][0];
int GRBwaardeG = GRBvalues[temp][bright][0];
int GRBwaardeR = GRBvalues[temp][bright][1];
int GRBwaardeB = GRBvalues[temp][bright][2];

// int HSBvalueFromArray = HSBvalues [3][4][0];
```

```
int HSBwaardeH = HSBvalues[temp][bright][0];
int HSBwaardeS = HSBvalues[temp][bright][1];
int HSBwaardeB = HSBvalues[temp][bright][2];

int preset1H = 0;            ///variabelen om presets op te slaan, preset button 1
int preset1S = 0;
int preset1B = 0;

int preset2H = 0;            ///variabelen om presets op te slaan, preset button 2
int preset2S = 0;
int preset2B = 0;

int preset3H = 0;            ///variabelen om presets op te slaan, preset button 3
int preset3S = 0;
int preset3B = 0;

int sendValueH = 0;           ///variabelen waar de laatst verzonden waardes in op worden geslagen
int sendValueS = 0;
int sendValueB = 0;

String json;            //Declare a JSON formatted string to be sent to the Hue Bridge
TCPClient client;            //Create a TCPClient that will send on the JSON data

void setup() {
  pinMode(GRBLedPin, OUTPUT);                    // sets pin as output
  //pinMode(highVolt, OUTPUT);                // sets pin as output
  pinMode(brightUpPin, INPUT_PULLDOWN);           // sets pin as input
  pinMode(brightDownPin, INPUT_PULLDOWN);          // sets pin as input
  pinMode(tempUpPin, INPUT_PULLDOWN);            // sets pin as input
  pinMode(tempDownPin, INPUT_PULLDOWN);           // sets pin as input
  pinMode(previewPin, INPUT_PULLDOWN);           // sets pin as input
  pinMode(ledPin, OUTPUT);                 // sets pin as output
  pinMode(pres1Pin, INPUT_PULLDOWN);
  pinMode(pres2Pin, INPUT_PULLDOWN);
  pinMode(pres3Pin, INPUT_PULLDOWN);

  // digitalWrite(highVolt, HIGH);                 // sets pin high for + for button loop in the circuit

  strip.begin();
  strip.setPixelColor(0,0,0,0);    //LED uit in begin
  strip.show();

   #if CLOUD_ENABLED
  // Make hue, sat, bri, whether the hue lights are on and sending of the json into Particle variables so they
are accessible in the cloud
  Particle.variable("HSBwaardeH", &HSBwaardeH, INT);
  Particle.variable("HSBwaardeS", &HSBwaardeS, INT);
  Particle.variable("HSBwaardeB", &HSBwaardeB, INT);
  Particle.variable("on", &on, BOOLEAN);
  Particle.variable("json", &json, STRING);
```

```
        if (brightButtonUp > brightButtonUpOld) {

  bright = bright+1;        }              if(b
right>4) {

   // als
 bright bij het 5e stapje is, dan de volgende weer terug naar 0                                // s
tatement(s) w
ill execute if the b
oolean exp
ressi
on is true */         bright=0;        }              if (brightButtonDown
 > bright-
ButtonDownOld) {          bright = bright-1;        }              if(bright<0)
 {
            // als brig
ht bij het 5e
 stapje is
, dan de
volgende weer terug naar 0


                  bri
ght=4;
 }
     if
&(jsemp.StRrIiNnGg)p;> temButtonUpOld) {            temp
= tf(tecmp+1;
lient.conife(ttenimp(>80)) {                  //
Setup the server, and wait unti
l it's rea
dy  //a
ls temp b                       // Flash the onboard LED to show connected        ledFlash(200);
ij hetlFeldasht(200);, dan deviensltorpde)weer}tevruigchlaonp()) {        previewButton = digitalRead(previewPin);
     if (!on) {
            temp=0;                              }        if (tempButtonDown > tempButton-

        //sketch begint met alles uit, in d
eze staat kun je alleen aanzett
en: druk 2
 sec op
previewbutton           if(previewButton>previewButtonOld){   //als op de previewbutton wordt gedrukt dan
     turnMeOnIfPressedLongEnough();
   //ga kijken of je
aan mag (n
a 2se
c) anders doe niks, als je al aan bent is de v
olle functionaliteit te geb
ruiken
   }              } else {                       //hier gebeurt het uitlezen van alle k
noppen           readSettingsButtons();
```

```
                    }                         if (previewButton > previewButtonOld){     //als previewbutton
 wordt ingedruk
t                turnMeOffIfPressedLongEnough();         //
ga eerst maar
eens kijken o
f je uit moet,
 laat je
los voor die tijd dan ga lekker door met hierbeneden                    if(on) {
    HSBwaardeH = HSBvalues[temp][bright][0]; /
/lees de HSB waarden uit de array
        HSBwaardeS = HSBvalues[temp][brigh
t][1];          HSBwaardeB = HSBvalues[temp][bright][2
];                    se
ndValueH = HSBwaardeH; //make sure tha
t all thr
oughou
t the
 code the same last send values are kn
own


 sendValueS = HSBwaardeS;
        sendValueB = HSBwaardeB;                          json = "{\"on\":true,\"hue\":" + String(s
endValue
H) +          // Build a JSON string with the va
lues to be sent off
        ",\"sat\":" + String(sendValueS) +
```

```
                    }                         if (previewButton > previewButtonOld){     //als previewbutton
 wordt ingedruk
t                turnMeOffIfPressedLongEnough();         //
ga eerst maar
eens kijken o
f je uit moet,
 laat je
los voor die tijd dan ga lekker door met hierbeneden                    if(on) {
    HSBwaardeH = HSBvalues[temp][bright][0]; /
/lees de HSB waarden uit de array
        HSBwaardeS = HSBvalues[temp][brigh
t][1];          HSBwaardeB = HSBvalues[temp][bright][2
];                    se
ndValueH = HSBwaardeH; //make sure tha
t all thr
oughou
t the
 code the same last send values are kn
own


 sendValueS = HSBwaardeS;
        sendValueB = HSBwaardeB;                          json = "{\"on\":true,\"hue\":" + String(s
endValue
H) +          // Build a JSON string with the va
lues to be sent off
        ",\"sat\":" + String(sendValueS) +




            temp=0;                              }       if (tempButtonDown > tempButton-
DownOld) {        temp = temp-1;
 }
      if (temp<
0) {                    //als temp bij het 4e stapje is, dan de volgende weer ter-
ug naar 0                 temp=3;        }
    setLed(temp, bright);              //pr
eview de setting
in de LED              if(pres1Button > pres1ButtonOld) {        //loop ook de presetbuttons langs

      presetButton1 ();
      }              if(pres2Butt
on > pres2Bu
ttonOld) {                    presetButton2 ();              }              if(pres3Button-
 > pres3ButtonOld)
{                    presetButton3 ();
```

```
                pres2Button = digitalRead(pres2Pin);    pres3Button = digitalRead(p
r
es3Pin); } void setLed(int temperature, int brightness) {          //preview LED aanstu
r
en    GRBwaardeG = GRBvalues[temperature][brightness][0];   //lees de GRB waarden uit de arra
y    GRBwaardeR = GRBvalues[temperatu
re][brightness][1];    GRBwaardeB = GR-
Bvalues[temperature][brightnes
s][2];         strip.setPixelColo
r(0,GRBwaardeG,GRBwaardeR,GRBwaardeB
);   //stuur de GRBwaarden naar de Led    stri
p.show();
      //zeg datie mag shinen }  void fl
ashLed() {
            //feedback
LED voor p
reset
z
etten        strip.setPixelColor(0,0,0,0);                //ga uit    strip.show();
    delay(1000);
              //ff wachtuu
h       setLed(temp, bright
);                    /
/ga aan op je vorige setting }  void



                  “\”bri\”:” + String(s
endValueB) + “,\”transitiontime\”:10}”;
              sendJSON();


// Send the data to the Hue Bridge        }              }
    brightButtonUpOld = brightButtonUp;         //update states van alle knoppen
    brightButtonDownOld = brightButtonDown;
tempButtonUpOld = tempButtonUp;        tempButtonDownOl
d = tempB
uttonDown;       pres1ButtonOld = pres1Button;                    pres2ButtonOld = p
res2Button;       pres3ButtonOld = pres3Button;          }       previewButton-
Ol
d
 = previewButton;    delay(50); } void readSettingsButtons() {    brightButtonUp = digitalR
ead(b
rightUpPin);         //reads van alle knoppen: set buttons en pr
eset knoppen    b
right-
ButtonDown = digitalRead(brightDownPin);    tempButtonUp = digitalRead(te
mpUpP
in);    tempButtonDown = digitalRead(tempDownPin);    pres1Button = digitalRead(pres1Pin
);
```

```
i]);
client.println("/state HTTP/1.0");
   client.print("Content-Length: ")
;       client.println(json.leng
th());
    client
.print
ln();
        client.println(-
json);     }   }   dig-
italWrite(ledPin, LOW);
            // Sendin
g JSON le
d flash end }  //---
---------
-------------
------------------functionalit
eit presetbuttons ------------------------------------------------------------------------ void presetButton1 () {

      //functionality presetb
utton 1     int almostSaved = 0;

              bool keepChecking = true;        while (keepChecking) {                    //wac
ht tot de kn
/ga 2 seconje drukt is dan uj rvoid on        pres1ButtonOld = pre
selBdSON() { delay(50);      pres1Button = digitalRead(pres1Pin);            if
 (pres/fButtion snp JSON te sturen     digit
alWutte(lOlfn, HIGH)keepChecking = false;        } el
    // Sending JSON led fl
ash start     for (int i = 0; i <
 roomCount
; i++)

{              // Send a PUT request to each room        if (client.connect(ip, 80))
 {

      client.print("PUT /api/");         client.print(id);          client.print("/groups/");
 client.print(rooms[i]);

    client.println("/action HTTP/1.0");        client.print("Content-Length: ");
      client.println(json.length());         clien
t.println();       clien
t.pri
ntln(json);     }   }   for (int i = 0; i < lightCount; i++) {            ///// Send a PUT request to
 each light      if (client.connect
(ip, 80)) {
   client.print("PUT /api/");          c
lient.pri
nt(id);        client.print("/lights/")
;        client.print(lights[
```

```
tring
 with the values to be sent off                                    “\”sat\”:” + String(sendValue
S) +
    “\”bri\”:” + String(sendV
alueB) + “\”transitiontime\”:1
0}”;
                sendJSON();   // Send the data to the Hue Bridge
      }    }    } void presetButton2 () {                      //functionality preset button 2     int almos
tSaved = 0;
          bool keepChecking = true;        while (keepChecking) {                    //wacht
tot de knop 2 sec
 ingedrukt is, dan save de setting
      pres2ButtonOld = pres2Butto
n;       de-
lay(50);       pres2Button = digitalRead(pres2Pin);              if (pres2Button < pres2ButtonOld) {
 keepChecking
= false;       } else {        almostSaved = almostSaved +
1;        if (almostSaved > 40) {            keepChecking = false;           }
    }    }
```

```
s1ButtonOld) {        keepChecking = false;        } el
se {
    al-
mo
s
tSaved = almostSaved + 1;          if (almostSaved > 40) {              keepChecki
ng = false;          }        }      }          if(almos
tSaved >= 40) {        preset
1H =
sendValueH;        preset1S = sendValueS;        preset1B = sendValueB;            flashLed();
} else {       if (preset1H != 0) {
        sendVa
lueH = preset1H;                  //m
ake sure
that all throughout the code the same last s
end values are known            s
endValueS = prese
t1S;         sendValueB = preset1B;
            json = “{\”on\
”:true,\”hue\”:” + String(sendValueH)
+
// Build a
JSON s
```

```
tSaved = 0;
            bool keepChecking = true;        while (keepChecking) {                    //wacht
tot de knop 2 sec
 ingedrukt is, dan save de setting
    pres3ButtonOld = pres3Butto
n;        de-
lay(50);      pres3Button = digitalRead(pres3Pin);            if (pres3Button < pres3ButtonOld) {
 keepChecking
= false;      } else {          almostSaved = almostSaved +
1;        if (almostSaved > 40) {            keepChecking = false;          }
    }    }
   if(almostSaved >= 40) {                //sl
a de laats
t gestuur
de

waarden op      preset3H = sendValueH;      preset3S = sendValueS;
  preset3B = sendValueB;          flashLed();
    }    }
   if(almostSaved LED 40){feedback    } else//sl
a de laats                  //wanneer k
otgestudan 2 sec op de knop ged-
dekt,
 stuur dan memory uit        if (preset3H != 0) {          sendValueH = preset3H;              //m
waarden op      preset2H = sendValueH;      preset2S = sendValueS;      preset2
B = sendValueB;          flashLed();
          //LED for
 feed-
back    } else {                    //wanneer korter dan 2 sec op de knop gedrukt, stuur da
n memory uit       if (preset2H != 0
) {        se
ndValueH = preset2H;            //m
ake sure
that all throughout the code the same last s
end values are known          s
endValueS = prese
t2S;        sendValueB = preset2B;
          json = "{\"on\
":true,\"hue\":" + String(sendValueH)
+
// Build a
JSON s
tring
 with the values to be sent off                  ",\"sat\":" + String(sendValue
S) +
   ",\"bri\":" + String(sendV
alueB) + ",\"transitiontime\":1
0}";
          sendJSON();  // Send the data to the Hue Bridge
    }    }    } void presetButton3 () {                //functionality preset button 3    int almos
```

```
    int almostOn = 0;

    bool keepChecking = true;        wh
ile (keepChecking) {
        /
/wacht tot de knop 2 sec ingedrukt is,
dan turn me on        previewButt
onOld = previewButton;        delay(5
0);        pr
eviewButton
 = dig-
italR
ead(previewPin);
    if (previewBu
tton <
 p
r
eviewButtonOld) {        keepChecking = false;        } else {        almostOn =
almostOn + 1;

    if (almostOn > 40) {        keepChecking = false;        }        }
   }        if(almostOn >= 40) {        tu
rnMeOn();    } }  void turnMeOffIfPressedLon
gEnou dan memory uit        if (preset3H != 0) {        sendValueH = preset3H;        //m
ghe) ure that all thrngahmothOfodo;the
samolaol sendChlu
eskirek nrue;        sendValueS = preset3S;
    while (keepChecking) {                //wacht tot de knop 2 sec ingedr
usktrid,ValueBrn mesofBB;    previewButton-
OldE= pfeviowVBurtuon,\"hue\delay(50);
 String(sendValue
H) +        // Build a JSON stri
ng with the values to be sent off
                ",\"sa
t\":" + String
(sendValueS
) +

            "
,\"bri\":" + String(
sendVa
lu
e
B) + ",\"transitiontime\":10}";
    sendJSON();  // Send the data to the Hue Bridge
   }    }    } //----------
-----
--------------------------------functionaliteit previewbutton------------------------------------------------
---------- void turnMeOnIfPressedLongEnou
gh() {
```

APPENDIX I: HARDWARE

HARDWARE LIST

Processor: Particle Photon
Derived from: https://store.particle.io/
Datasheet available: https://docs.particle.io/datasheets/wi-fi/photon-datasheet/

Battery shield: Sparkfun photon battery shield
Derived from: https://www.antratek.nl/photon-battery-shield?gclid=Cj0KCQiA1NbhBRCBARIsAKOTmU
v86omxLIw0IElU5y3rGh8VxzKUnViKw_P3ZH3glWlCOdJIPsy1PKoaAv2iEALw_wcB
Datasheet available: https://www.sparkfun.com/products/13626

Battery: Li-Po Accu 3.7V 800mAh
Derived from: https://www.tinytronics.nl/shop/en/batteries/li-po/li-po-accu-3.7v-800mah
Datasheet available from the same link

        LED: Neopixel
Derived from a previous project, I have no idea of the exact serial number or where to find a datasheet.
        Switches: Micro switch hefboom
Derived from: https://www.tinytronics.nl/shop/nl/componenten/schakelaars/micro-switch-met-hefboom
                    Breadboard Tactile Pushbutton Switch Momentary 2 pin 6x6x5mm
Derived from: https://www.tinytronics.nl/shop/nl/componenten/schakelaars/breadboard-
tactile-pushbutton-switch-momentary-2pin-6*6*5mm?search=push%20button

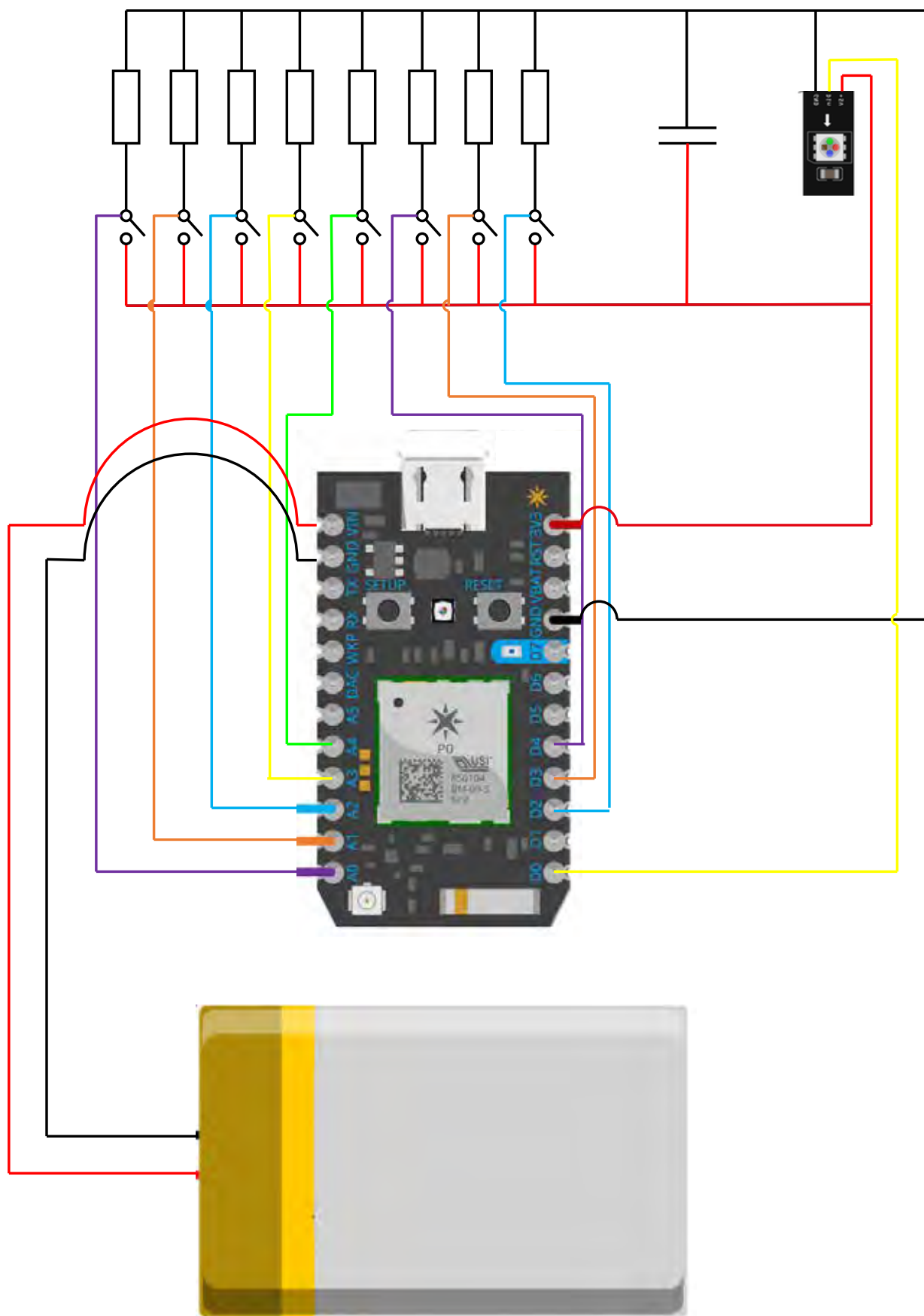   Resistors: for switches: 1.7K ohm
Derived from my dads electronics provision
                    For LED: 470 ohm

        Capacitor: 220 mu, 10 V
Derived from my dads electronics provision

APPENDIX J: USER EVALUATION PLAN

DECIDE framework user evaluation

1.   Determine the goals of the evaluation addresses
2.   Explore the specific questions that need to be answered to reach your goal
3.   Choose the evaluation approach and combine techniques to answer the questions
4.   Identify and solve practical issues (participants, location, prototype, protocol etc
5.   Decide how to deal with ethical issues, privacy, consent
6.   Evaluate, interpret and present data

GOAL
1.   evaluate if the proposed design increases the 'home feeling' when using it at home?

2.   What is home feeling according to the participants?
        How to let them imagine and describe their home feeling?
        How to let them imagine the scenarios of use of the design?
Does the design influence the home feeling? What aspects of this home feeling are influenced? And in what way?
3.   sort of co-constructing story telling (Buskermolen & Terken, 2012)

part one: associate
Make cards with words of feelings, both positive and negative. Ask the person to pick a number (4?) of cards which correspond to their experience of their home feeling. And ask why these words are most important to their desired home experience. Maybe also have some empty cards for them to write down some words when their ultimate home-feeling words are not on the cards.

Part two: sensitize
Ask them, with this feeling in mind, to imagine a situation where they change the light, using their current lighting system with their current interface, while having company from other people living in the same house. Let them tell the situation, draw the outline of the room and the people's place in it, and the lamps, or let them act out the situation when the test is done in their own living room.

Part three: evaluate
Give them back the cards they have chosen, and ask them to remember the home feeling they described. Ask them to evaluate the envisioned situation using their current lighting system according to their described home feeling. Are there aspects that line up, are their aspects of use that are in contrast with their home feeling. Does the situation complement the home feeling or not, and why?

Part four: imagine
Explain them the design: show the mock-ups and explain the functionalities, explain that the functionalities can be assigned to the remotes and give them the prototypes to feel the product.
Then let them imagine the same situation as described in part two, but now ask them to imagine the use of the product in that particular situation. Let them draw/act out the situation so that it is fresh in their head.

Part five: evaluate

Give them back the cards they have chosen, and ask them to remember the home feeling they described. Ask them to evaluate the envisioned situation using the product according to their described home feeling. Are there aspects that line up, are their aspects of use that are in contrast with their home feeling.

The words on the cards come from the definition of the home feeling based on basic human needs. By comparing the words picked and in which group (fulfilling of which need) they belong, I can get some understanding of how the users perceive the design.

4.   Participants:

I will chose to test in different households: as I want the product to be flexible and usable for a lot of households, it should be appealing to many different people. I imagine that the product could be sold in places like IKEA or HEMA, shops where people from every age and household can find what they need in their homes.

a.   Pilot test: mama
b.   Participant 1: Niels (single person household, using smart lighting system (Philips hue))
c.   Participant 2: Meis and Nik?: 3 person household
d.   Participant 3: preferably someone with children, or some older brother/sister with siblings living at home.

5.
a.   Consent: make a consent form somewhere
b.   Privacy: the test will be video-taped (when test is at location) otherwise sound recordings will be made and the drawings will be analyzed. No material will be published without approval of the participant. Handling of privacy-sensitive information will be done according to the privacy law.

6.   Analysis: home feeling descriptions – which needs are most important?
Link them to the basic human needs.

Influence of the product – does it change the perception of home feeling in that particular situation, does it influence the fulfilling of this home feeling, what aspects are amplified, or in conflict. Does the product 'work'?: does it increase the home feeling, does it generate a feeling, in what situation does it or not?

TOESTEMMINGSVERKLARING TESTDEELNAME

Introductie
Als afsluiting van haar bachelor opleiding Industrial Design aan de Technische Universiteit Eindhoven heeft Randi Nuij een ontwerpproject doorlopen met als eindresultaat het productconcept 'thuisjes'. Het laatste onderdeel van dit ontwerpproject betreft een gebruikersevaluatie om inzicht te krijgen in de kwaliteit van het ontworpen product.

Doel van de test
Het exploreren van de ervaring die toekomstige gebruikers van 'thuisjes' zullen kunnen hebben.
Uitleg van de test
Ik zal u vragen deel te nemen aan de test van met prototypes van 'thuisjes'. De test bestaat uit 4 verschillende delen die achtereenvolgens worden uitgelegd en doorlopen. De gehele test duurt ongeveer 30 minuten. U mag de test verlaten wanneer u wilt.

Toestemming
Om de ervaring met het product zo goed mogelijk te kunnen analyseren, zal de hele test gefilmd worden en zullen er eventueel geluidsopnamen worden gemaakt. Ook kunnen er foto's worden genomen. Hiervoor vraag ik uw toestemming. De videobeelden en geluidsfragmenten zullen gebruikt worden voor analyse van de test. De foto's kunnen worden gepubliceerd in het eindrapport van dit project. Voor publicatie van dit beeldmateriaal wordt apart toestemming gevraagd.

TOESTEMMINGSVERKLARING

Hierbij verklaar ik het volgende:
Ik geef toestemming om gefilmd en gefotografeerd te worden tijdens de hele duur van de test. Tevens geef ik toestemming voor het maken van audio-opnamen tijdens de hele duur van de test.

Naam: ………………………………………………………………………………….

Datum: ………………………………………………………………………………......

Handtekening: ………………………………………………………………………………….