

**We Touch Pillow: The pillow that communicates family presence  
through warmth without an obliged effort for the user**

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# We Touch Pillow

The pillow that communicates family presence through warmth without an obliged effort for the user





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## Introduction

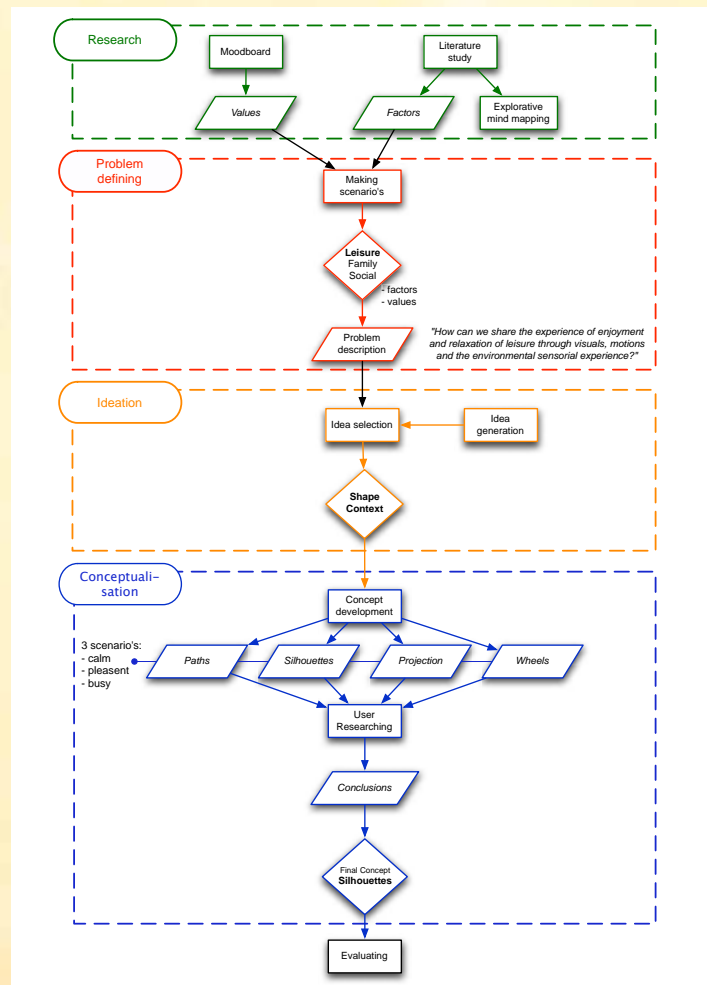
The non face-to-face communication of social and emotional experiences between people now go through phone or other media like e-mail, IM (instant messaging) or webcam (e.g. Skype). In communication the context plays an important role. However the context tends to be lost in these media - it hardly enables us to communicate the context in a way it is "experienced" by the other person. One can only imagine. I had to design a system to communicate the context of a remote user, across the information space to an other user individually.

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# Iteration I

Within this iteration we, as a group, wanted to explore what context, information exchange and contextual information exchange actually is about, since all of us had no experience with this before. With the research and explorations we did, we came to different concepts and this helped me to get a good overview upon which different directions are possible within the project.





## Literature Studies

Context is the surrounding in which you are in. This has an influence on what you are doing, because you will for instance not try to do important work which needs quietness and serenity in a room full of small children playing and crying. Thus the atmosphere or environment in which you are in mostly says something about what type of activity you do. A part of someone's context is also the way he or she feels within the surrounding and feels in general. Since how a person is set in an environment also depends on how he or she feels and acts within this environment. Light, temperature, movement, sounds, scent, touch and several other factors take care of differences between contexts as to the reports of the master students.

The value of sending a context to another person over not sending the context, but concrete information is that concrete information are just words which can for instance be misinterpreted. A context tells something about someone's situation in more than what he or she could tell by words. Since words are the mainstream of communication these days, that is what we are used to. We are not aware of that there is much more communication possible on a more subtle way than words, for instance with a context which is sent. A context tells something about how a person feels, what type of situation he or she is in and whether he or she is alright. Sometimes people just want to know someone else is fine and no specific words are needed, but just a feeling or at least a more abstract message should be sent. Words are concrete and not applicable for a more high abstract level of messaging on someone's context and thus feelings and situation. The many articles we read as a group let us conclude that a specific context can be described by different factors: sound, motion, visuals, social load, emotional atmosphere, personal status/activity awareness and environmental experience.



## Scenarios

For each type of context of the moodboard, we thought of 2 different scenarios. To these specific scenarios we connected the values and factors which fit to them to get an overview of what values and factors are more applicable to what specific type of context. This gave a better idea of what the different types of context are. In the appendices, the scenarios can be found.

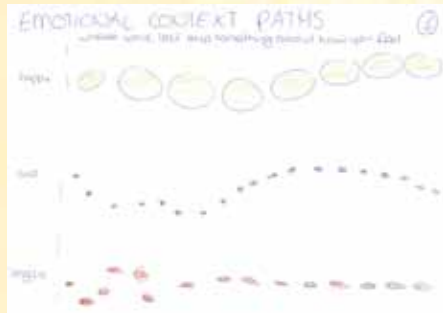
	one scenario	Factors						
	two scenarios	Sounds	Visuals	Motion	Environmental Experience (sensorial)	Emotional Atmosphere	Personal status/ Activity Awareness	Social load
Categories	Values							
Family/ Relationship	Love							
	Secure							
	Intimacy							
	Appreciation							
	Support							
Work	Skills							
	Improving							
	Self-actualizing							
	Adapting							
Leisure	Controlling							
	Energizing							
	Relaxing							
	Enjoying							
Social	Self-releasing							
	Communicating							
	Involving							
	Sharing							
Home	Bonding							
	Living							
	Reassuring							
	Recharging							
	Privacy							
	Central							
Travel	Familiar							
	Comfort zone							
	Freedom							
	Ongoing							
	Exploring							
	Transporting							
	Rejoining & Separation							

## Problem Description

Based upon the scenarios and our interests, we chose which types of context were most interesting to us to work with, which were Leisure, Social and Family. We agreed upon to choose using the Leisure context as a starting point for our problem description: "How can we share the experience of enjoyment and relaxation of leisure through visuals, motions and the environmental sensorial experience?" This is based upon the matrix of scenarios.

## Ideation

We did various brainstorms together on context exchange in general. We selected the ideas that fit to our problem description, thought of new concepts and combined different ideas that we had. In the appendices more combined final ideas can be found from which we choose. Underneath are some of them.



## Four concepts

We chosen idea of Shape context, we chose to change for the final concept. We needed to communicate a context to an other user and not to the people themselves, therefore we wanted to communicate the indoor context to the outside. The input is now the activity of the people in the club. The output is something displayed or shown outside; this way people can see what the context is inside. We thought of four different types to communicate it: through the windows, upon the building, moving elements upon the building and through a path on the pavement. more explanation on these concepts can be found in the appendices.



Path on the pavement



Displayed on windows



Projection on building



Moving objects

## User research

From the first part of the user research (results can be found in the appendices), it can be concluded that people can identify the context of the inside of the building better with the silhouettes concept, since the silhouettes resemble real people and activities. The most favorite concept was the silhouettes concept, since it represents clearly the inside context. Paths on the other hand is not favorite, since you can not see the path when it is busy on the street. The wheels and projection are also less favorite, because the context of the inside is not immediately clear to people walking by. Though the growth of the projection was clear, but not when walking by, you'd have to look at it a bit longer, or have seen it before.

From this can be concluded that the silhouettes concept is most suitable for our problem statement. (How can we share the experience of enjoyment and relaxation of leisure through visuals, motions and environmental sensorial experience?) The name Silhouettes, we though was not very appropriate for this concept, therefore we changed it to Shaping, since the people inside shape the visuals on the windows.

## Final concept Shaping

Imagine, it's evening and you are walking down the street. You walk by several bars and discos and think about how it would be inside those places. The building does not express anything of what's happening inside. You get no connection at all with the indoor context. Wouldn't it be interesting if the context of the people and the atmosphere of a discotheque are communicated to the outside through the building? Shaping gives you this contextual communication opportunity. The context of the inside is defined by the amount of people inside, their type of activity and the atmosphere of the club itself (for instance type of music and lights used). This is translated into visuals that are displayed on screens on the outside of the windows. These visuals simulate silhouettes, which represent the amount of people and their activity in a coloured surrounding. This way, when you walk by, you get an impression of the inside context. The Shaping is an answer to opportunity question. 'How can we share the experience of enjoyment and relaxation of leisure through visuals, motions and the environmental sensorial experience?'



Relax Atmosphere



Pleasant Atmosphere



Busy Atmosphere

## Evaluation of Iteration I

**Research** We researched upon what is context about. From this we could make the factors. We also read the reports of the master projects. These helped us to come up with the values, which we derived from our moodboard. We also researched upon information exchange and context awareness. We however did not use this, since the found information was too broad to apply within this process. We also found some existing designs upon contextual information exchange, but did not apply what we found. Maybe we should have looked more for information exchange, but it was hard to find any literature which was not on computers.

There are a lot of possible design research processes with researching and defining a problem statement and making scenarios. The way we did it worked good for this project iteration.

The moodboard was helpful to see the different categories within context. It was better if we would have derived them from research, since now we thought of them ourselves while we created it. The values helped us to see the different types and this helped us to select our direction.

Making the scenarios helped to give us an overview of which categories were interesting. The values and factors got meaning and we could see interesting combinations which made the choice for direction easier.

We decided which direction we wanted based on the values and our identities, thus what was interesting for us to choose as a group. We made the problem description based on the values and factors and structured them to the essence of the problem.

**Ideation** We did the brainstorm too early in the process and therefore it was too broad, because of the broad general problem description. We should have done a more specific creative session, for which we needed a more specific problem description first. We selected the ideas upon personal preference and which fitted to the problem description. It would have been better if we would have set requirements and have selected the ideas based upon those. This could have made it easier and the choice would have been better grounded.

**Concept development** We should have had a complete new brainstorm for sub-ideas of the chosen concept. Then chose again, work it out and get feedback, instead of immediately working out the four first ideas we came up with.

It was good to get feedback from possible users. But we should have asked for more specific and objective feedback for the choice of concept. The pictures did not give a good and full idea of what the concepts were about. A small wizard of Oz would have been more realistic for the users. The user research was not structured and focused. We should have thought of specific criteria. Since we had not done that, the choice for our final concept was not well grounded. User research could have been implemented more and sooner within the process.

**Final Concept** We only thought of one way contextual communication, but it is more interesting if we would have thought of a two way contextual information exchange and had included distance. This could have been a requirement.

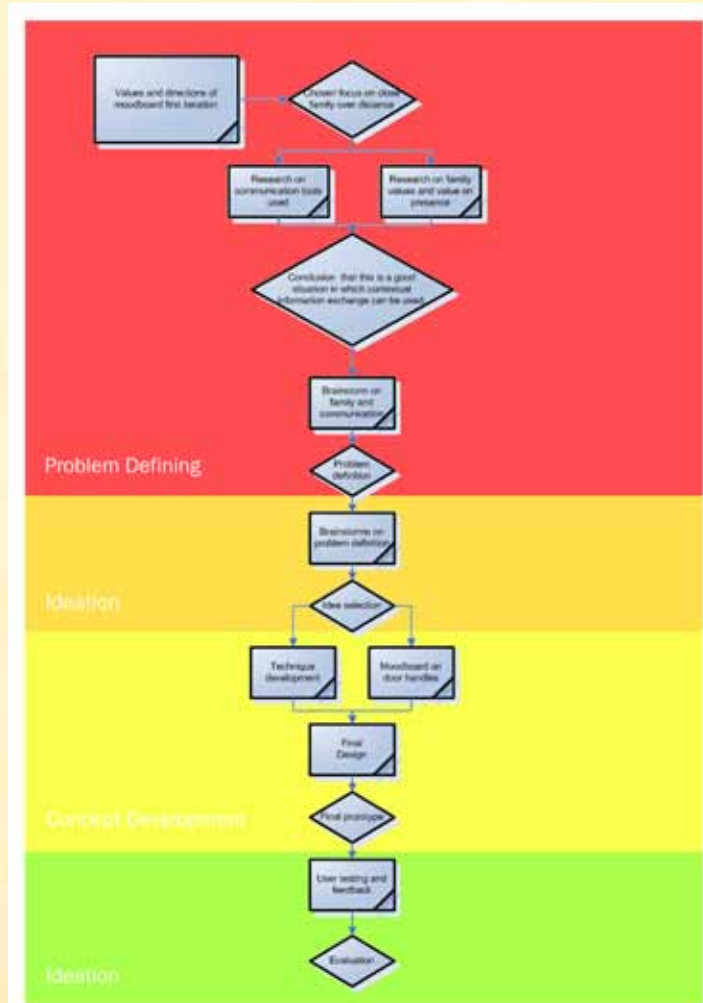
Strong points: a clear communication, recognizable, easily feasible, easily adaptable to another context, the visuals can be anything.

Weak points: too concrete, we did no research upon the colours, we just tested the pictures and not for real, just one way communication.

It is a nice concept, but there was not enough time to work it out fully, which would have led to better results. We should have been more clear about what exactly is the input and the output. The output is a too direct visualisation of the inside. It is not contextual enough.

## Iteration II

Within this second iteration of the project, I wanted to choose a direction from the start to focus upon, because of my competency development. Otherwise this iteration would still be not focussed and I would have been researching upon all different areas, which would have lead to a less clear direction for myself.





## Direction

Coming from the first design iteration, I already had an idea of what context and existing communication is about. I started to think of the things I want to develop within this semester and I got to the fact that I need to design a marketable product. Therefore I decided that I want to design a product which would be used by a lot of people. Together with the moodboard of the six different types of contexts, we made within the first iteration, I could conclude that having family and friends around is very important to people. Almost everybody has family and close friends. But what if you are separated from them by any reason? Then can an exchange of contextual information be a real enrichment to the communication. I want to design a product which shows the context of a close one far away. I also want to create a product which has an added value over direct non contextual communication.



## Research

### Research on tools

There are several options for communicating with your relatives. For instance by phone. To hear your relative is a good way of feeling connected with each other. But it is very expensive when calling someone in another country, so this is not a good option. Family members often have phone calls with no specific reason, but just to feel connected. Another option is to use the internet by e-mails and blogs on your own website. This is a very cheap way to transfer information to someone else, but as from research, (Interactive Human Communication; Alphonse Chapanis; Johns Hopkins University; Baltimore MD) writing does not allow to communicate all the thoughts of a person, since you only write sentences and you take a long time to write it. Written communication is not a good way to communicate feelings, thoughts and the well-being of a close one. There is also another possibility with the internet. By using Skype, you can see and talk to the person live. This is a good way to communicate, though it is just one set time you talk to someone and you do not get a good idea of what exactly the person is going through in that other context for the entire time. Of course you can tell each other those things, but you do not get a good idea of the whole context and atmosphere the other is at. Of course there are also internet applications like facebook, twitter and hyves, on which people can leave messages and add their own status (context). Tough this is just by using words and text and is just there when you start the internet browser and not around you constantly giving you this secure feeling. These types of communication give a secure feeling, but only when you start it and it is not constant the feeling of having your relative around.

## **Research on family**

There are different types of family in which it differs about what is communicated and how this is communicated and it also differs how important the family is compared to friend and others close to them. Overall the family does play an important role in ones life, even if others are seen as more important. Family can not be chosen, except your (marital) partner. Family is present if you want it or not, you have a connection which takes care of secure surrounding and that you share money, space and thus your lives with. The state of family members affect each others well being. If family and close friends are not around, you miss them and want to have contact with them. If you have enough contact and confirmation of their well-being, you are much more relaxed and you will perform better at your job, study, internship, or a trip not close to your relatives.

## **Conclusion**

The research led me to my design question for this iteration:  
"How can I communicate family presence?"

## Ideation

My first brainstorm was upon the design question, so on how to communicate family presence. This resulted in different ideas, such as communication through an object by warmth, communicating what kind of groceries the other has or showing each others coffee tables upon your own coffee table. While going through the different ideas which I had, which can be found in the appendices, I soon realised that I find communication through warmth very interesting. Some ideas can be found in the appendices.

My second brainstorm was upon the application of this idea of communication through warmth. I thought of existing products in a house which you hold or touch. Since I do not want to create a whole new product, but a product which people already use. This because I do not want to let people buy whole new products for yet another type of communication, but if people already buy an existing product for their homes, they might as well buy the product with a new application to it. Underneath are some of the drawings of products in house which are held. More of them can be found in the appendices.

Finally I chose the door handle as a final concept for this iteration. Door handles are used a lot within houses by everybody. It says something about which room you enter, so in which type of context of the house you are at.



## Warmth

With the chosen idea of the door handle, I need to find out about warmth before I go any further. What is it, how can I show it and what is the feeling of warmth.

### **Essence of warmth:**

As taken from the dictionary, warmth means:

- 1 : the quality or state of being warm in temperature
- 2 : the quality or state of being warm in feeling <a child needing human warmth and family life>
- 3 : a glowing effect produced by the use of warm colors

The second meaning of warmth is the type of warmth which I want to focus upon. It is the essence of why I want to make my product: the warmth of family and their presence, which is missing in the current scenario. By using the first and the third meaning of warmth as replacement for the second, the state of being in a warm feeling by family presence can be simulated by a warm temperature or indication with colours.

### **Show warmth**

Warmth can be shown on any scale, but outputs of warmth which people identify with warmth are by: actual warmth (temperature rise), a colour (more red, more blue; think of infrared) and light intensity (the brighter the warmer). Of those, an infrared image is most clear to people or just the use of red and blue for showing warmth from a distance. But of course the most logical way of showing is by temperature rise.

### **Feeling of warmth**

A warm feeling, we get when something good happens to us, so when we are happy with the situation we are in. A feeling of warmth can be short, when you shortly positively think of something or someone, but it also can be long, for instance when you are doing an activity which brings you joy.



## Final concept

This is the WeTouch Door Handle. You and your close relative both have it in your house on all doors. The door handles which are on the same doors in each house are connected to each other. When one opens a door with his WeTouch, the WeTouch of the other becomes warmer and stays warm for 5 minutes. When the other relative also uses his WeTouch within these 5 minutes, he feels your presence within his home. For the Final Design of the WeTouch DoorHandle, I chose this simple shape. It lays good in the hand by its organic shape, which I have tried out by making clay models. I also made a small warmth prototype for the exhibition in which one part needs to be held to make the other become more warmer. This way I got an idea of how it feels when an object becomes warmer. I received feedback that people did see the combination of warmth and presence of other people, which was valuable user feedback for me.



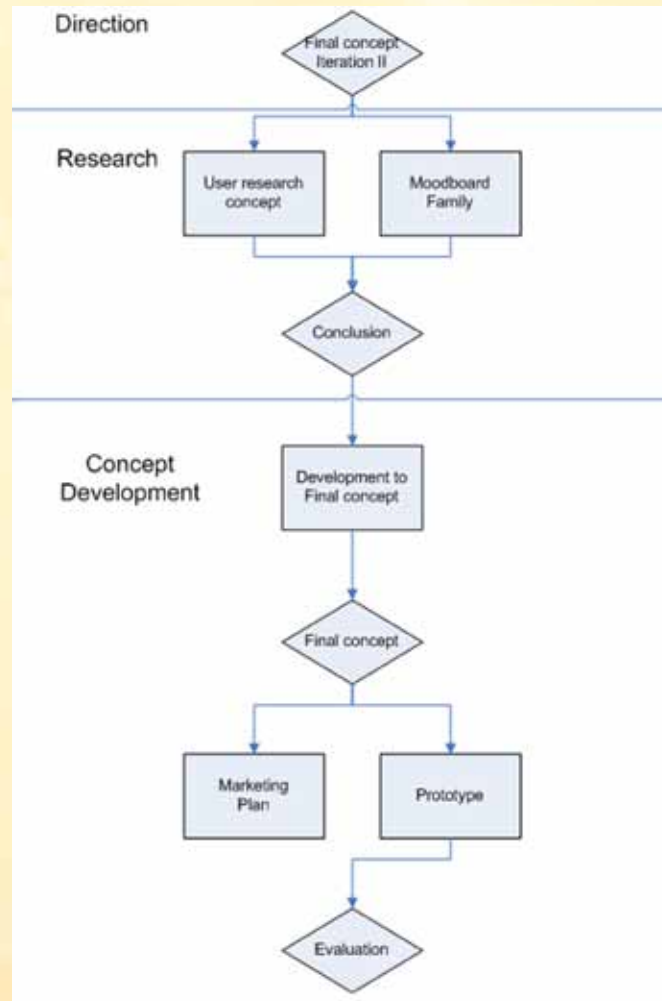
## Evaluation

Within this second iteration, it was good that I first chose a direction which is interesting for me as a designer. This way I can show my own identity better through my project. Though it was really focussed, so I did not conjure a lot of information about other aspects within the project area, which could have been interesting to me as well. While brainstorming upon my problem description, I easily came to what type of product I wanted to design. I should have thought more out of the box and have use more different brainstorm techniques to think of other ideas. And would have not let me stick with my first good idea which fitted to what I wanted to accomplish within this project. While developing the concept, I chose too fast and without enough argument the application of the door handle. I should have thought more of specific reasons for this and not just move along, though within my schedule it was time to decide which concept to develop. While making a small prototype for the midterm exhibition, I decided to separate shape and use. So I had a small warmth device and a shape. This is not bad, considering the time I had for this, but I made the shape out of clay. Though clay is an easy way to come up with a shape; I learned that it is not a presentable material to use. I should have better made it out of wood or plastic. The concept itself of communicating family presence through warmth of an object is a good concept, but it needs more background user research, which I will continue with in the next iteration.



## Iteration III

For the third iteration I wanted to proceed with communicating family presence by warmth. I find it very important to research upon experiences of people with their families and let the results be the basis of the final concept. Because of my competency development, I chose to focus myself mostly on marketing and a working prototype and less upon appearance of the product.



## User research

I held interviews students between 19 and 21 years old. Some of them still live with their parents, others live by themselves. This way I got insight on different families and different perceptions on family. Those who live with their parents only see them during evening dinner and sometimes spend time with their family during the evening. Users who live by themselves visit their parents between every weekend and one weekend per four weeks.

For everybody, family members are people to fall back upon. It is a cozy and safe place and you can be yourself in a family environment. Tough most feel like it is an obligation to visit and contact them. Since your family is interested in what you do and there are other positive things that family brings, people do visit their family because they feel obligated.

Activities with close family are mostly having dinner, going on day trips, talk a lot and watching television together. With less close family, birthdays are visited, they go on trips and they meet each other during (Christmas) holidays.

Most people relate the living room (especially the couch) and the kitchen to their family. The holidays and being all together gives people a family feeling. And this feeling is described as coziness, a trusted environment and a safe place to be.

People want to know how their family is doing, but do not take the effort most of the time. They especially find it important to know the others state when he is not doing well. Most people do not need a special thing to remember their relatives by when they are away for a while, but they do call or send post cards for instance during a holiday.

From these concluding results, I can conclude that there is a need for a product which connects them to their close family, since family is important. Tough it should not be an obligation to take any effort while doing this. Family is not something you want to be confronted with constantly, tough it is something to fall back upon and a safe place.

## Moodboard

To explore the family feeling, I made this moodboard upon activities of families and what places give a family feeling. This moodboard is for a part based upon my user research conclusions and gives inspiration for further concept development together with my new design question: How can I communicate family presence in a subtle way, without an obliged effort for the users?



## Concept Development

Within the user research I had gathered information upon amongst others family values and different family activities. Together with the objects around the house which I drew in the second iteration, I started brainstorming upon the best way to communicate family presence by warmth in ones house without an obligation for both users. The activity that was described by 92% as most done with family is watching tv on the couch or chairs in the living room. The living room is also the place where other family members are received.

So around a livingroom coach or chair is the best place in a house to have a family presence communication tool. Should it be part of a couch, or used around it, like a table? Since I want it to be marketable, it should not be a couch, because people do not purchase new large furniture often. So the product should be used a lot within this area but purchased more often and easily. A pillow gives extra softness and make you sit and feel better and stable when sitting on a couch or a chair. It makes you feel secure and safe about your situation, just like family does as to the family values derived from my user research. Pillows are a good option and are even actually warm when your relative sat on and with it before you did. Context in this product will be communicated directly, what would normally be over time. When you go and sit on a chair and the chair is still warm of the person who sat on it before you, his contextual presence is communicated to you over time, which is within the pillow directly but over distance.

Having a pillow as a final product for the warmth concept is a good way to communicate family presence in a realistic way without an obliged effort for the users.

## Marketing plan

### **WeTouch Pillow**

I will offer the 'WeTouch Pillow'; the pillow that communicates your families' presence in a subtle way without an obliged effort. If one uses his pillow, the pillow of the other becomes warmer and vice versa. I will focus upon the communication tools market. The market will have a need for my product, since it communicates family presence without an obligation and current communication tools require an obligation and effort, which people do not like when communicating with their family like having to call, as to my user research. I want to express to the market the importance of family presence and contact, but that there is no obliged effort needed. The internet will be a good medium to use to contact the target group of relatives living apart, since the younger generations uses it a lot. And I try to reach people who live apart from each other, so an internet service which sends one pillow to each of the relatives is a good way to sell the WeTouch Pillow. Also because an internet connection is needed for the pillows to connect.

### **Mission Statement**

With the WeTouch Pillow, I want to give parents and their young adult children the opportunity to be closer to each other. This product gives that real family feeling which is really connected to your own family. It communicates the presence of the other family members. To have your families' presence in your home is very important, since family is the basis of our well-being. Knowing that your family is doing fine is something we all want to know, but we do not want to be confronted with it constantly nor take an effort. The WeTouch Pillow gives you the family presence feeling when both you and your family member are using the pillow on your family sofa, so it is not put in your attention constantly. Only when you have a moment for yourself which you normally also have with your family. It replaces the obliged phone calls.

## **Target Market**

The user group for the WeTouch Pillow are people that are related to each other. The WeTouch Pillow always has to be bought with a minimum of two because of its function. The relatives should be close family, since that is the family you are used to live with, that currently live apart from each other. Almost everybody is part of this market segment, since almost everybody has close family, whether you are talking about your parents, your children or your siblings. A smaller segment of the market to start with for the WeTouch Pillow, I have chosen to focus upon young adolescents that leave their parental home for study or work and live separate from each other.

## **Services**

Since the target users are living apart from each other, they require a service in which the WeTouch Pillow is sent to each of them. Everybody has a different interior and colours in his living room. To make sure that people can buy a pillow which fits to their specific interior, there will be a choice in colour of black, white, red, blue, green and brown for the pillow. As to the selection and sending service for the user, it will not cost a lot and won't be much trouble. People have the chance to select and buy the WeTouch Pillow pair on the internet site. There are sending services like FedEx around the world and they have their own prizes for sending a package. To send both pillows will cost between €5,- and €30,-; depending on the distance. As to paying the WeTouch Pillow over the internet, it is easy by PayPal (creditcard) and IDEAL (internet banking), so there are no extra costs to that.

## **Marketing Strategy**

At first I will let groups of multiple parent-adolescent relatives test the WeTouch Pillow, in order to get a user evaluation on how the product would do upon the market. I will next organize lectures on family importance and interaction to show the vision of the WeTouch Pillow to companies which could be interested to buy the product. I will also show the companies a folder upon the WeTouch Pillow. I will go to furniture and design fairs upon which I hope to stand, in order to contact new companies and to show my product. Internet sites such as Ads by Google; Big Internet Warehouse sites (Wehkamp, Bol) to reach a bigger market than the local chosen area. And I will advertise by using normal flyers in people's mailboxes within an area of 100 households to see if there is a need.

## **Marketing Goals**

The goal is to introduce the WeTouch Pillow to the people and to companies. Since it is a new type of product, people need to get acquainted with it and see the value of the WeTouch over another type of family contact over distance and a normal pillow. I want to reach first a small group of 50 people with the testing with relatives. With the lectures, I want to reach about 50 companies. With the advertisement to companies by folders, I want to reach about 500 companies. The pillow itself will cost about €50,- ex BTW for two pillows. I want to have sold about 1000 WeTouch Pillows within this first timeslot of this plan of a year and have found a company which wants to produce and buy the WeTouch.

The price of the WeTouch Pillow should be not too much more expensive than an average pillow; otherwise people are less likely to buy a pillow with an added function. To make profit, it should be an exclusive product which is made in small volumes and has a bit higher price than normal pillows, but for a haptic communication tool is rather cheap. Since there is not yet a similar product on the market, I will not compete for price. The price of the WeTouch without sending costs and BTW(16,9%) will be €50,- for two and for each pillow extra the WeTouch Pillow costs €30,-.

## **Competition**

The WeTouch Pillow is a new communication tool for close family members who live apart from each other. Currently relatives call to see whether the other is fine and to have their presence with them, which costs them a lot of money every time they use this tool. The WeTouch Pillow communicates in a simple way the presence of your family in your house. You and your relative buy the combination pillows at the (internet) store and both put them for instance in a chair or couch. When your relative uses the pillow by sitting on it, your own pillow becomes warmer. This works both ways. You are not confronted with your family constantly, but when you use it at the same time or a bit later, you feel the presence of your relative in your house and you feel connected. As I found out by my user research, relatives do not like the effort they have to put in family contact and the obligation of calling and seeing each other regularly. The WeTouch Pillow takes care of family contact, but without any special obligation and effort.

Other competitors within this family communication market are regular products for communication with family (such as e-mail, Skype, telephone). These products do not give a tactile experience of family feeling like the WeTouch Pillow gives and gives the obligation to answer and the effort of thinking of contacting the other yourself.

## **Production**

Of course, the WeTouch Pillow needs to be produced. For the first timeslot, I will make 16 of them, to present it to companies and use them for further user evaluation. The pillow consists out of two parts which can be produced by different companies; the electronic part with sensors, actuators and network and also the pillow part. These two parts can be put together in a specific factory. Right now, I have not decided yet where it will be produced and by which companies, but when a company has interests in the WeTouch Pillow, we can decide what the best is for the product.



## Final Product

### WeTouch

Since the name WeTouch of the last iteration is also good applicable to this concept, I chose to name the last concept of the door handle the WeTouch DoorHandle and this final concept of the last iteration the WeTouch Pillow. WeTouch stands for the connection of two people through touch over distance.

### Wireless

In real, the WeTouch will be connected wireless to the other pillow. An Ethernet connection is common in a nowadays household. To connect both pillows of the WeTouch Pillow, a long distance connection is needed. The pillow needs power from the electric circuit to function, so it already needs a long cable. Attached to this cable can be a cable going to the internet modem in the household. Through the internet cable are the signals sent through the computer.

### Prototype

The prototype I made demonstrates how the WeTouch Pillow works. When one pillow is touched, the other heathens up and the other way around. The code and electronics schedule can be found in the appendices.



Arduino connection



Sensor and actuators



Testing input with LED's



Final prototype in chairs

## Evaluation

During this iteration, I mainly focussed on the parts which I still needed to develop within the competency areas of User Focus and Perspective, Integrating Technology and Business Processes.

The user research I did, I found very interesting. Of course I had assumptions on what people would answer, but talking to people really opened my eyes upon other peoples perspective on family. The family values I could conclude from this together with the other information I had gathered from this research was the basis for my project within this iteration. To have the user central in my project is very important for me, since that is what I am designing for. To even have the user more central and to prove my concept more, I could have better tested my final concept with my prototype.

As to the marketing plan, I could have had approached it better. I should have gone to an expert earlier. Tough it was good of me to try it on my own, next time it is better to set it up together with an expert and ask for advice earlier upon literature to refer to. Now I asked Ilse Luijk for feedback after my first own written version. She could not give me full feedback, only upon what she saw, since I had not involved her within my process. Next time, I will ask an expert to help me earlier within the process.

While creating the prototype, I have learned a lot about the best way to approach creating a prototype. With all the flaws I made and everything I have tried and programmed and built extra, I learned that it is best to just build it step by step, instead of making everything and then filter out all the mistakes. It is also very important to keep it structured and not have wires all around the prototype. It is also better to use multiple wired wires, since they are more flexible, make better contact and are less likely to break. compared to one-wired wires. I went to Peter Peters and Geert van den Boomen to help me how to approach to filter faults out of the prototype I had made. Creating this prototype has really helped me to get skills in making a working prototype with electronics and Arduino.

## Appendices

### **Appendix A: Values**

#### FAMILY/RELATIONSHIP

Appreciation, support, intimacy, secure, love

#### WORK

Skills, controlling, adapting, self-actualising, improving

#### LEISURE

Energizing, relaxing, enjoying, self-releasing

#### SOCIAL

Envolving, bonding, sharing, communicating

#### HOME

Living, recharging, privacy, familiar, central, comfort zone

#### TRAVEL

Ongoing, freedom, exploring, transporting, rejoyning & separation

## Appendix B: Scenarios

The scenarios are based upon the moodboard values and different factors as derived from the literature studies within context.

The sender is indicated with (s) and the receiver is indicated with (r)

### FAMILY/RELATIONSHIP

Scenario 1: A wife (r) is at home and her husband (s) is on a business trip.

Value: She wants to know if he is secure, they want to have a feeling of being together.

Factors: emotional atmosphere, environmental experience

Scenario 2: Parents (s) are having dinner at a restaurant and their child (r) is at home.

Value: feeling of being secure and being together.

Factors: emotional atmosphere, environmental experience.

### WORK

Scenario 1: two managers which have to cooperate and are of different companies. (Can be both sender and receiver)

Value: improving and controlling

Factors: personal status/activity

Scenario 2: A secretary (r) is waiting for his boss (s) who is in a meeting.

Value: controlling and adapting

Factors: personal status/activity and social load (active)

## SOCIAL

Scenario 1: A person (r) wants to know how a friend (s) is doing who is on a date.

Value: sharing and involving

Factors: emotional atmosphere

Scenario 2: A person (r) wants to know how her friend (s) abroad is doing.

Value: communicating, sharing and bonding

Factors: visuals, personal status/activity and emotional atmosphere

## HOME

Scenario 1: There are two roommates. One is at home (s) and one is at school (r).

Value: comforting, familiar and reassuring

Factors: sound, social load and visuals

Scenario 2: A wife is at home (s) and the husband (r) is on a business trip.

Value: reassuring, comforting and familiar

Factors: environmental experience, emotional atmosphere, sounds and visuals.

## LEISURE

Scenario 1: A friend (s) is drinking and hanging in a pub and his friend is at home.

Value: enjoying

Factors: social load, emotional, sound and visuals

Scenario 2: someone (s) is lying in the sun in her backyard while reading a book and her friend (r) is at work.

Value: relaxing and enjoying

Factors: environmental experience sounds and visuals.

## TRAVEL

Scenario 1: one person (s) is travelling somewhere and someone else (r) is anywhere else.

Value: transporting

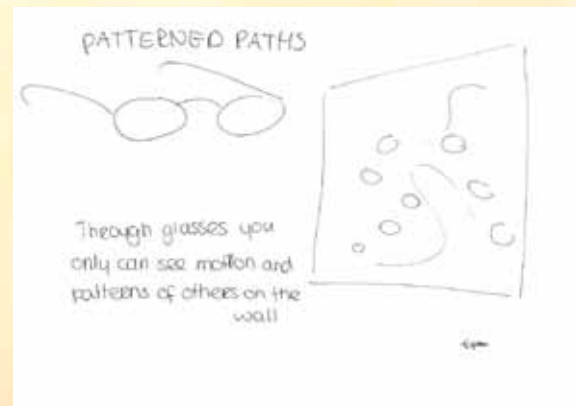
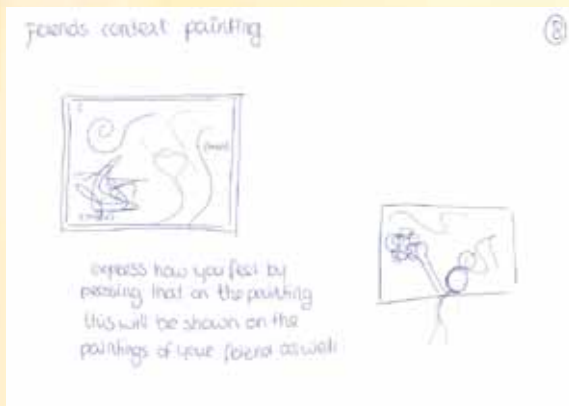
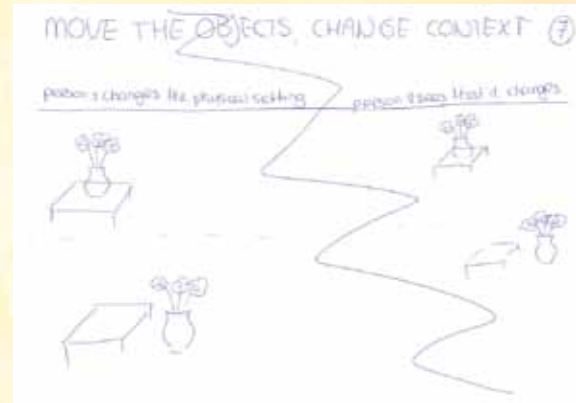
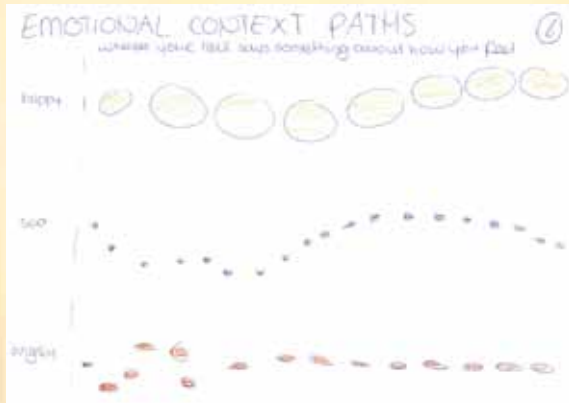
Factors: motion, visuals and sound

## CONCLUSIONS

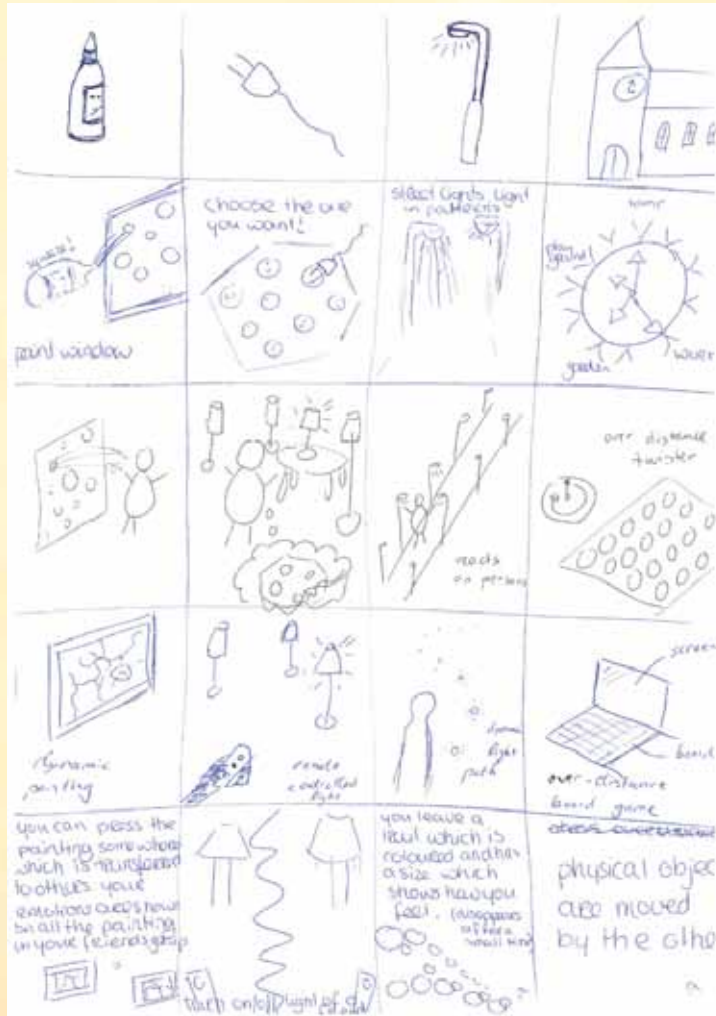
When a person is on a leisure context, sounds and visuals are important to communicate this person's context to show relaxing and enjoying. In a home context, are sounds and visuals mainly important to communicate the comfort, familiarity and reassurance to an other person. In a social environment, the emotional aspect is very important to share with each other. When you want to communicate your work context, it is important to show you are controlling by your personal status or activity. When you are in a family or relationship context you want to communicate you are secure and want a feeling of being together by your emotional atmosphere and the environmental experience. When you are in a travel context and you are transporting, this is communicated by motions, sounds and visuals.

## Appendix C: Brainstorms iteration I

These are just a few of the ideas I had during the first iterations' brainstorm



This is one of the brainstorms we did with the three of us.






## Appendix D: further explanation of concepts

# Paths

Imagine, it's evening and you are walking down the street. You walk by several bars and discos and think about how it would be inside those places. The building does not express anything of what's happening inside. You get no connection at all with the indoor context. Wouldn't it be interesting if the context of the people and the atmosphere of a discotheque are communicated to the outside through the building? The paths gives you this contextual communication opportunity. The context of the inside is defined by the amount of people inside, their type of activity and the atmosphere of the club itself (for instance type of music and lights used). This is translated into visuals which form a path in front of the building. When walking by the building, this path will move with you a bit as a hologram. The visuals represent the context of the inside. Its colour pattern stand for the mood and type of activity people do, and the amount of differences in colour and amount of circles represent the busyness and the atmosphere of the club. This way, when you walk by, you get an impression of the inside context.



Relax Atmosphere

Pleasant Atmosphere

Busy Atmosphere

SPK13 Contextual Information Exchange | Daach | H | Graf Carlswater 102020 | Meethe Heuvelings 1020605 | Sophie van der Weerd 1021440 | Yi Xue 1021420

# Projection

Imagine, it's evening and you are walking down the street. You walk by several bars and discos and think about how it would be inside those places. The building does not express anything of what's happening inside. You get no connection at all with the indoor context. Wouldn't it be interesting if the context of the people and the atmosphere of a discotheque are communicated to the outside through the building? Shaping gives you this contextual communication opportunity.

The context of the inside is defined by the amount of people inside, their type of activity and the atmosphere of the club itself (for instance type of music and lights used). This is translated into blocks that are projected on the building. The blocks itself represent the amount of people that are in the building. The colour of the blocks stand for the activity that those people are doing (sitting, dancing, drinking etc.). This way, when you walk by, you get an impression of the inside context.



Relax Atmosphere



Pleasant Atmosphere



Busy Atmosphere

DPC13 Contextual Information Exchange | Cuijck 1, 96 | Graf Coudewinter 3072052 | Meetthe Houwvelling 3070603 | Soethe van der Woude 3071440 | Y. Kue 3068800

# Silhouettes

Imagine, it's evening and you are walking down the street. You walk by several bars and discos and think about how it would be inside those places. The building does not express anything of what's happening inside. You get no connection at all with the indoor context. Wouldn't it be interesting if the context of the people and the atmosphere of a discotheque are communicated to the outside through the building? Shaping gives you this contextual communication opportunity. The context of the inside is defined by the amount of people inside, their type of activity and the atmosphere of the club itself (for instance type of music and lights used). This is translated into visuals that are displayed on screens on the outside of the windows. These visuals simulate silhouettes, which represent the amount of people and their activity in a coloured surrounding. This way, when you walk by, you get an impression of the inside context.



Relax Atmosphere



Pleasant Atmosphere



Busy Atmosphere

DPC's Contextual Information Exchange | Coach: HJ | Olaf Cardwener 5070297 | Meerthe Heuvelings 5070605 | Sophie van der Weerd 5071440 | YI Xue 5062629

# Wheels

Imagine, it's evening and you are walking down the street. You walk by several bars and discos and think about how it would be inside those places. The building does not express anything of what's happening inside. You get no connection at all with the indoor context. Wouldn't it be interesting if the context of the people and the atmosphere of a discotheque are communicated to the outside through the building? These wheels gives you this contextual communication opportunity. The context of the inside is defined by the **amount of people inside**, their **type of activity** and the **atmosphere of the club itself**. The wheel is a physical object which communicates the context inside the pub to the outside. The speed of the rotation represents the music inside more or less like an equalizer. The color of the wheels will also change according to atmosphere inside the pub. The direction of the wheel will change according to the adaption of the pub like more people are joining or leaving. In this way you can easily feel the context inside the pub and probably you would like to join them to influence the context yourself.



Example Atmosphere

DPC13 Contextual Information Exchange | Daech, H | Olaf Gooljaewer 309287 | Meenthe Heuvlings 3070605 | Sophie van der Weerd 3073448 | Y. Kai 3083820

## Appendix E: user research

User                      Concept                      Number                      Correct

User 1	Paths	1	
	Silhouettes	3	
	Projection	2	
	Wheels		
<b>Preference</b>	<b>Projection</b>		

User 2	Paths	2	
	Silhouettes	1	
	Projection	3	V
	Wheels		
<b>Preference</b>	<b>Silhouettes</b>		

User 3	Paths	1	V
	Silhouettes	2	
	Projection	1	V
	Wheels		
<b>Preference</b>	<b>Silhouettes</b>		

User 4	Paths	3	
	Silhouettes	3	V
	Projection	2	V
	Wheels		
<b>Preference</b>	<b>Silhouettes</b>		

User 5	Paths	2	
	Silhouettes	1	V
	Projection	3	
	Wheels		
<b>Preference</b>	<b>Silhouettes</b>		

What happens inside:

Busy and dancing people. Discolights.

Hoerenkast' because of the colours and in combination with silhouettes.

Relaxed ambience because of the yellowish colours of the building and visuals.

**Blocks give an association of the busy-ness in the building. Doesn't like closed windows with visuals.**

Dancing, disco feeling.

Hoerenkast' association because of the colours and the silhouettes of the people in the building..

When the blocks are coloured, people are dancing, the rest (uncoloured boxes) are people that are not dancing. More busy when everything is

**Windows, because you can see very clearly what is happening inside.**

Loungespace, early in the evening, calm music.

Loud music, party

Chic building, yellowish, contrast of building with abstract forms. Early in the evening

**Cooler to see people, gives clearer representations and is more fun to look at.**

Happens not much, happy colours that could represent different kinds of people. Purple is missing.

Dancing, busy party, because all windows are full.

Partial busy, people stand still in the building, happy colours represent the dancing people, green is a more passive colour, big and small gro

**People behind the windows clearly represent activity and how busy it is in the disco.**

Party, not a normal evening but a special party, colours look like confetti

Normal evening, seems kind of calm because of the empty windows.

Museum, a special evening, themaparty.

More direct what it has to represent, percentage of people that are displayed on the windows can represent how many people there are in the building.

Paths are not that good because you can't see it if there are many people outside.

User                      Concept                      Number    Correct

User 6	Paths	2	
	Silhouettes	1	
	Projection	3	
	Wheels		
<b>Preference</b>	<b>Silhouettes</b>		

User 7	Paths	3	
	Silhouettes	1	
	Projection	2	V
	Wheels		
<b>Preference</b>	<b>Projection</b>		

User 8	Paths	2	
	Silhouettes	3	
	Projection	2	
	Wheels		
<b>Preference</b>	<b>Silhouettes</b>		

User 9	Paths	1	
	Silhouettes	3	
	Projection	2	V
	Wheels		
<b>Preference</b>	<b>Silhouettes</b>		

User 10	Paths	3	
	Silhouettes	3	
	Projection	1	V
	Wheels		
<b>Preference</b>	<b>Projection</b>		

What happens inside:

Christmas, someone important inside, red carpet association
Red light district, privacy, private area, chilling
Family visiting, decoration

Carnaval
Gay party, intimate, romantic
Techno party, grows with amount of people that is in the building.

Mode show, chic
Laser show, normal party
Carnaval

Dance party, displays amount of people that are in the building.
Sensatoin, busy, certain music
Private party, certain group of people, art background, half-busy, blocks will fill the building

90's music, machine music feeldings
Trance music
Formal dinner, calm



## Appendix F: brainstorm on family presence

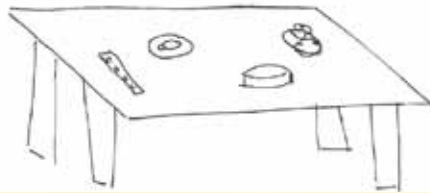
FIRE PLACE  
buens when the  
other is at home



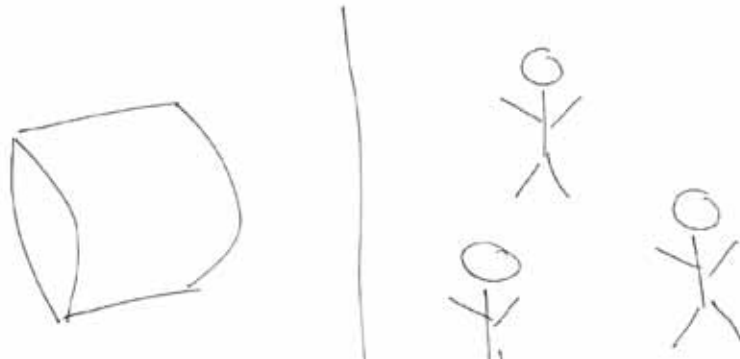
Shopping Bag  
indicates the  
items the other  
bought last  
time he went  
shopping



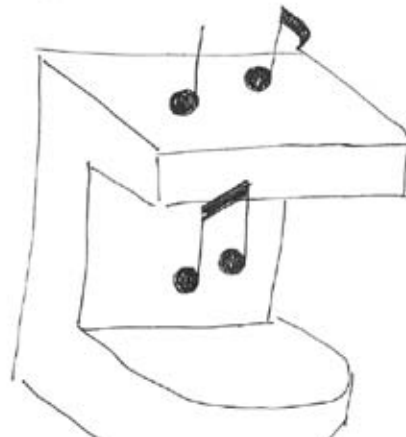
COFFEE TABLE  
displays what the  
other has got upon  
his coffee table



Pillow becomes  
warmer when the  
other has visitors

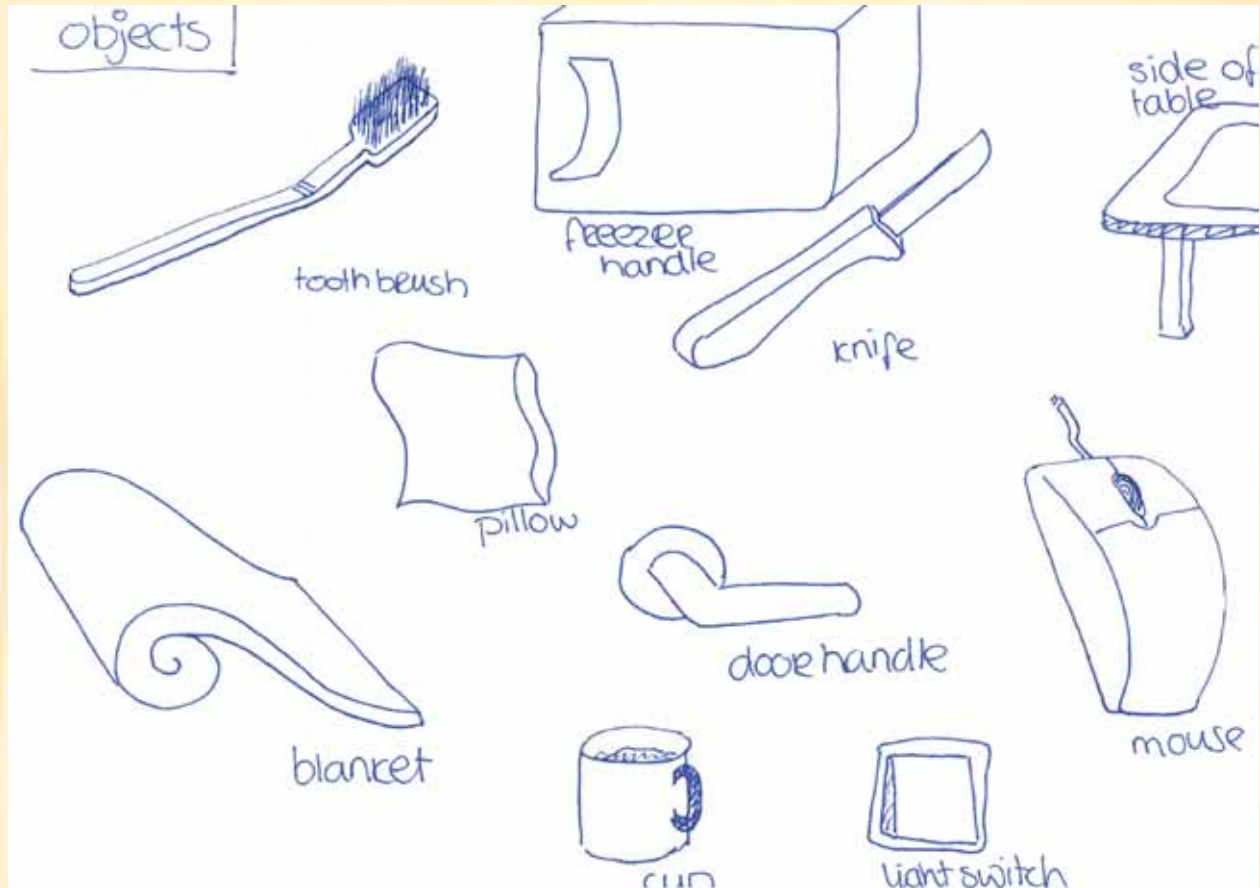


COFFEE MACHINE  
makes a sound when the  
other has fresh coffee





## Appendix G: brainstorm on tools



objects



sofa/chair  
armrest



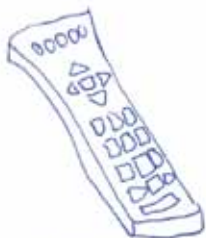
flush the  
toilet button



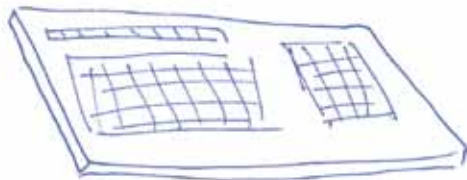
pencil



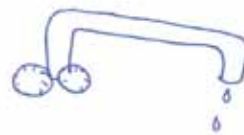
keys



Remote  
control

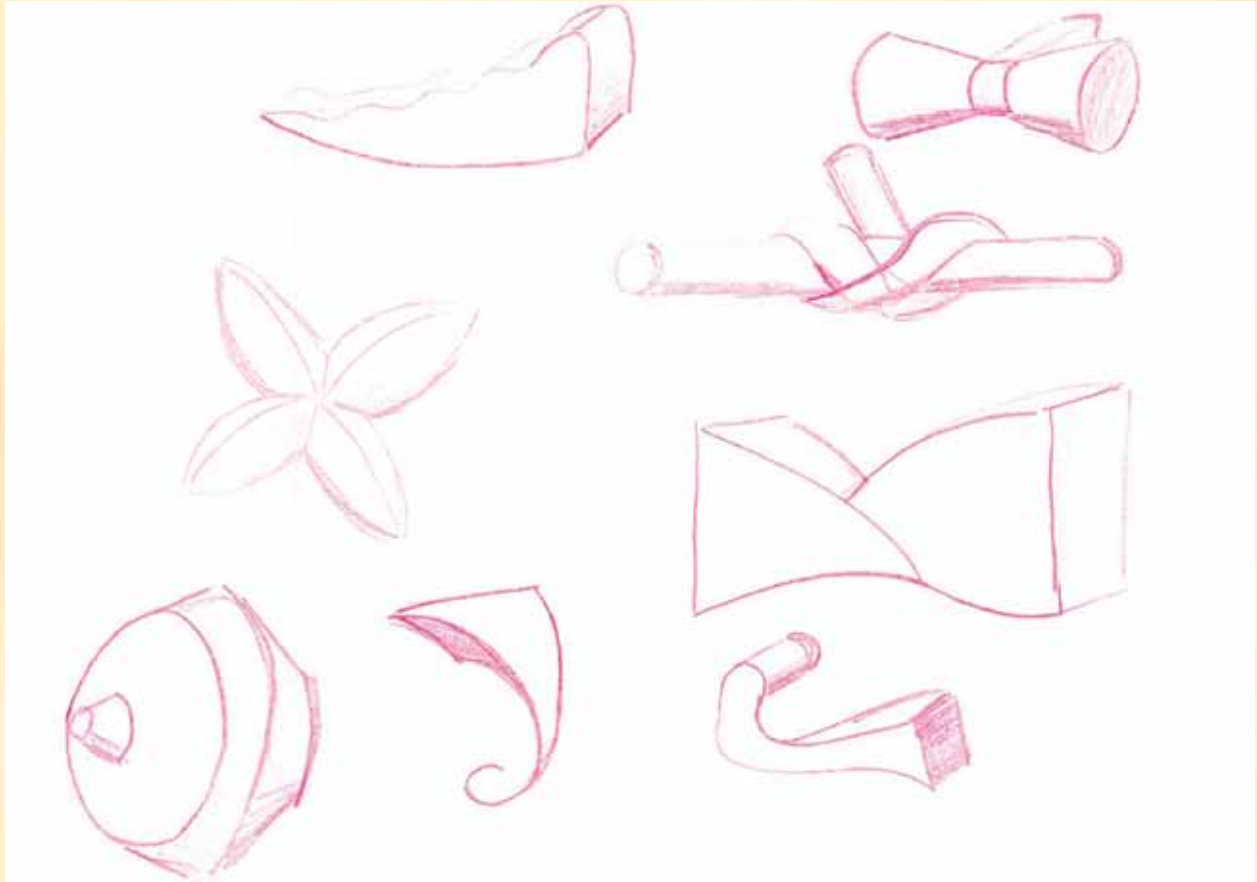


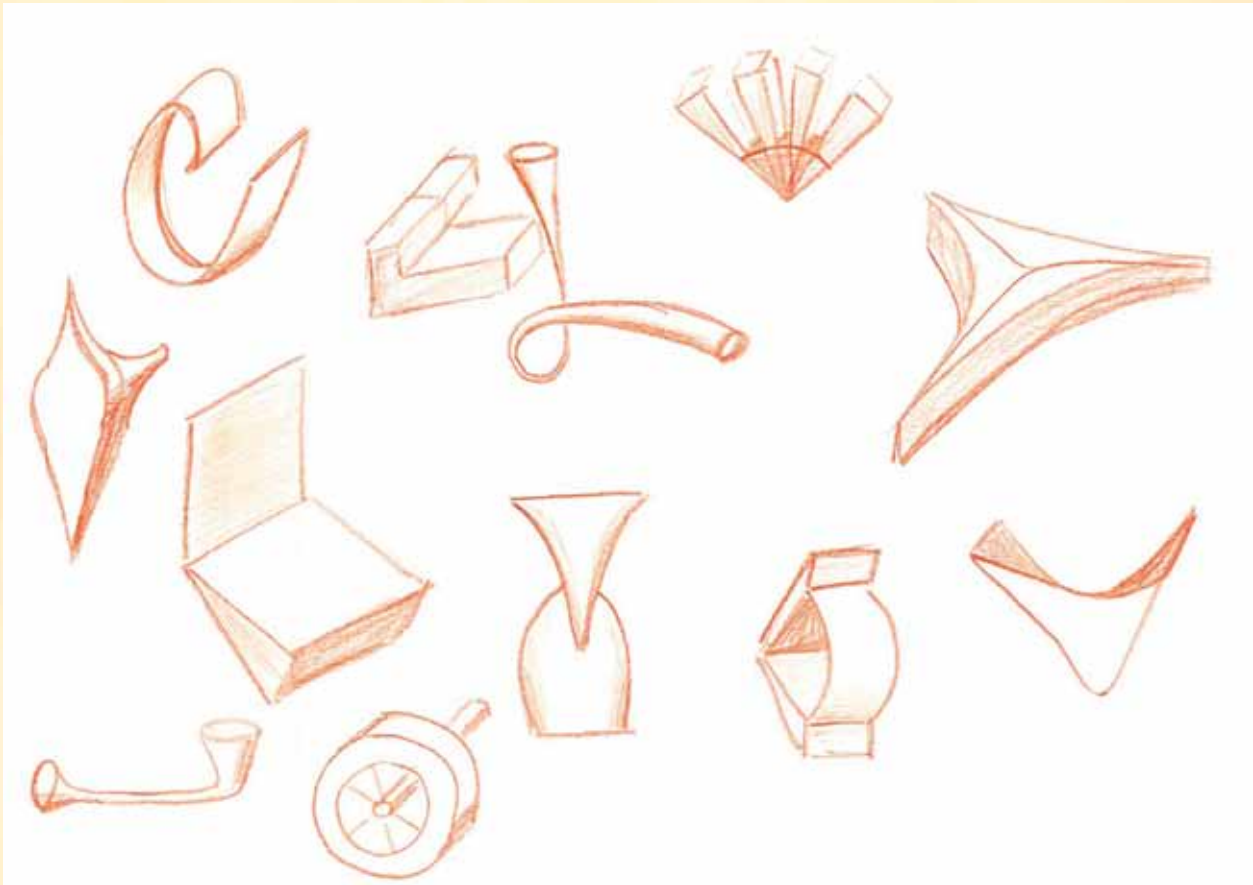
key board



water supply

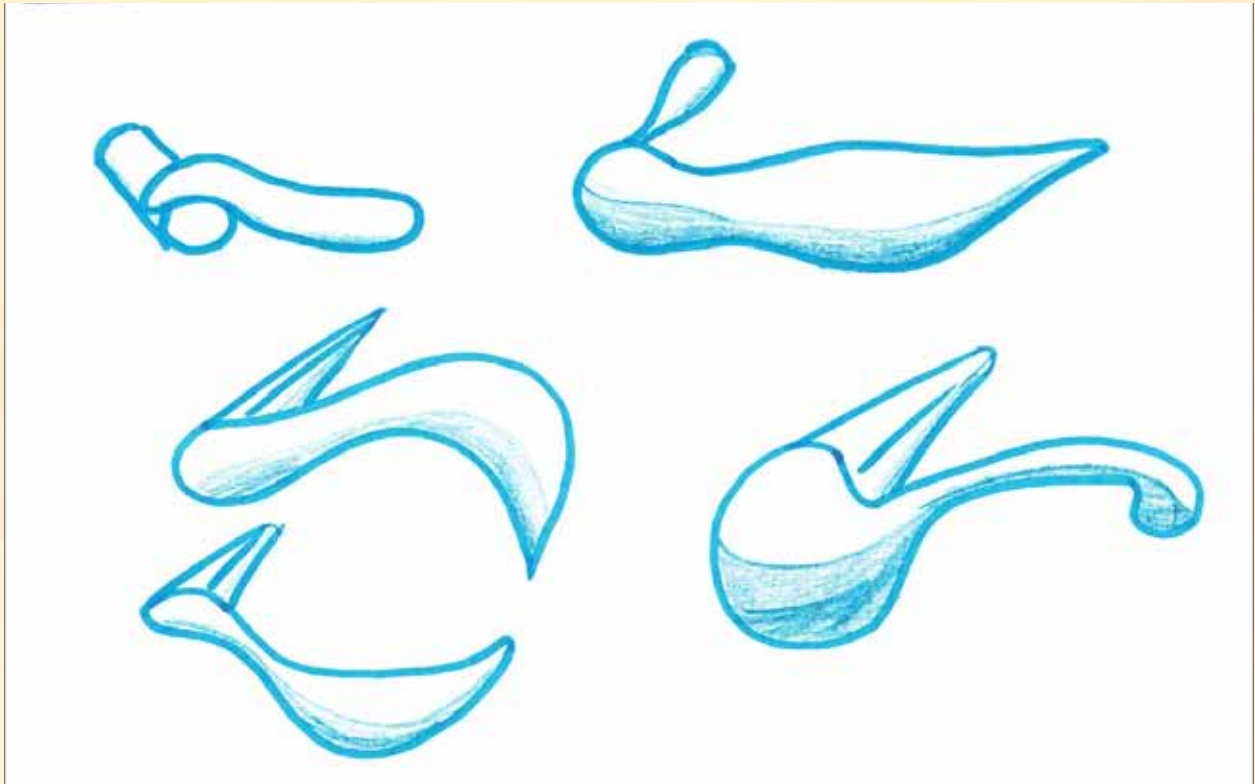
## Appendix H: form explorations

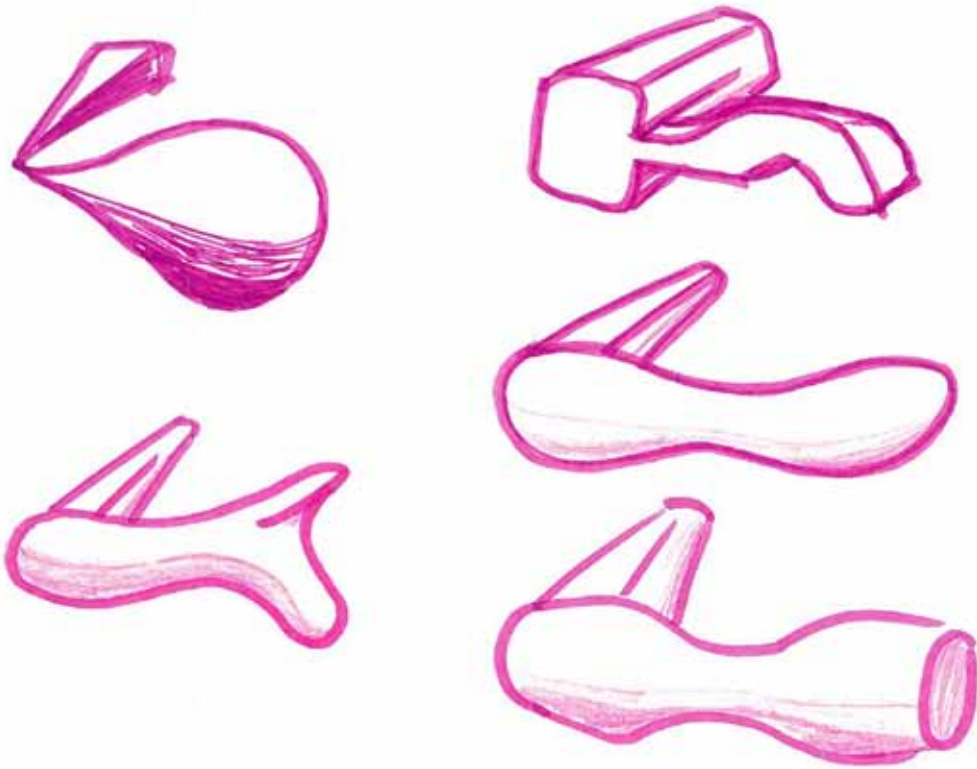












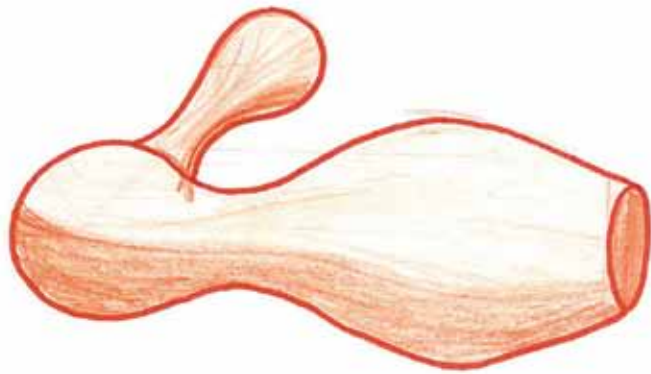
top view



front view



side view



Welouch

## Appendix I: user research

Name (age)	Meerthe (19)	Rick (19)
1. Do you live with your parents?	yes	no
2. How many time do you spend with you family?	in the evening for a short time grandparents not often, at holidays/birthdays	1 day per 2/3 weeks
3. what does family mean for you?	it are people to fall back upon	cosiness, special connection, When I do argue, it turns out fine anyway; some sort of protection
4. what types of activity do you do with your family?	having dinner, watching tv sometimes	day trips, board games, watching movies, going out with sisters, going on vacation, sitting in the garden, talking, coffee/tea drinking
5. which object or spaces are related to family for you?	the couch, dinner table, bathroom	garden, living room, houses of sisters, table
6. what gives you a family feeling?	easter, christmas	going on holiday with each other, talk about everything, do things together.
7. can you describe what that family feeling is for you?	calm, you do not need to do anything, just sit and eat and do nothing because you have to	it as something 'regular', sometimes you are annoyed, having jokes with family
8. What can you say about knowing that your family is doing fine?	I think it is more important to me when I am not living with my parents any more, I think that my family has more need to know how I am doing	when we are all together, we talk about everything, we are an open family, we also call a lot
9. Can you recall a moment at which you are separated from your family and you needed to remember them?	sometimes when I was somewhere else, we called just to know we are doing fine, while I normally only call for practical reasons	I do not need something to remember them by.

Frits (20)	Hanneke (20)	Roeland (19)
no	yes	yes, parents are divorced
one weekend per 3 weeks	home: 3 evenings in the week grandparents: once a month	not much, not days
coziness	it is something I can fall back upon	you can count on family, and talk about my problems
having dinner, talking	evening dinner, talking, visiting family	having dinner at grandparents, going somewhere, going on holiday
kitchen, living room	the house, livingroom, kitchen	livingroom/kitchen
when the family is complete, with everybody together, doing something together	that the family is there when you do something wrong	going on holiday together, eating during the holidays
it feels like very close friends, it is safe and you belong together	being me, be in a trusted environment, and being at ease.	it is the same as old friends you have not seen for a while.
they call me more often than I call them and then they tell me about what is going on with them.	it is good to know what is going on, but it differs per person	I do not need to know it constantly. by catching up I get to know about it.
no, but when I call I do not get a special feeling with it.	call them once, send receive postcards, bringing my own stuff from home reminds me of home.	I never needed anything like that

Fienee (21)	Patrick (20)	Nick (21)
no	also	no
not much, one weekend a month	not that often, father 4 x a year. The rest during birthdays	1 or 2 times a month-family grandpa: once a two months
getting pampered, I can be myself, I do not have to think about what I eat or have to do	cosiness, love from/for family	important, have the same view on life partially, but that differs per generation
holidays, theatre, playing games, holiday, eating pie	going on large trips, bowling, something with entire family	going to birthdays, doing nice things, having dinner, talk
sofa in front of tv with blanket, the house, car of grandmother	living room at home, where you receive family	house of parents, scent of family in a hoouse, music
cosiness, being with a large group	being all together even after a long time, cosiness	not
a lot of people talking busy, laughs, cosiness, together	it is what I grew up with, it might be an obligation, but it is comfortable and I feel at ease and trusted	not a special feeling
I do not keep contact with them myself, but I do would like to know about the others state	yes, I have contact by e-mail, calling, so available media	call sometimes, send postcards, e-mail, visit I do find it important
e-mail, pictures from that person on the internet	music, it makes me think of my parents automatically.	you do think about home.

Maartje (20)	Jordy (21)	Laurens (20)	Niels (20)
yes	no	no	yes
not much family during dinner rest once a six months	once in 2 weeks a weekend family: irregular	parents: 2,5 day in 2/3 weeks grandparents 1 day of that 2.5 day	parents not much the rest once a 2 months
safe homebase	trust, interest in me, nice to see them, trustfull place	it has two sides to it: I MUST go to them, but they are always open for you, and support you	grandparents are important not much value to others
familyday, birthdays, going out for dinner, having dinner at home	sometimes going ou for dinner, daytrips, visiting family with family, breakfast, dinner, coffee break	having a drink, having dinner, playing computer games with brother, having a talk, daytrips	going on vaacation, daytrips, birthdays
livingroom	parental house, living room, fire place	livingroom, dinner table	pictures of family, elephant of dead grandmother
being all together cosy, talking to each other	christmas, birthdays, being home or coming hoome	when everybody is busy and having fun	christmas, with family
cosyness, loving, safe environment, laughing	trust, it is where you come from, your home	support, having fun, feeling connected as a group	cosy doing nothing with each other
I find it important, but my mother tells me about the rest of the family	yes I find it important, and I SMS to my parents, but the initiative is by my parents.	not much, but I do want to know about them when they are ill or something bad has happened to	yes, my grandparents are ill, so I want to know how they are doing, but I do not take the initiative myself for contact.
we used to give my father something when he was on a businesstrip, to remember us	summer holiday, sending a postcard	when my mother went with me on a schoolcamp, it was strange because the rest of my family was not there.	no, I just think about them



## Appendix J: Arduino Code

```
int mat1Pin = 2;    // pillow 1 pressure mat
int mat2Pin = 4;    // pillow 2 pressure mat
int we1Pin = 10;   // pillow 1 warmth elements
int we2Pin = 11;   // pillow 2 warmth elements

int val = 0;

int value = 0;
boolean we1on = false;
boolean we2on = false;

void setup() {
  pinMode(mat1Pin, INPUT);    //mat1 is input
  pinMode(mat2Pin, INPUT);    //mat2 is input
  pinMode(we1Pin, OUTPUT);    //we1 is output
  pinMode(we2Pin, OUTPUT);    //we2 is output
}
```

```

void loop()
{
//input mat1 and output we2
  val = digitalRead(mat1Pin);      // read input value
  if (val == HIGH) {                //check if the input is HIGH (mat1 released)
    digitalWrite(we2Pin, HIGH);     //turn we2 OFF
    //we2on = false;
  } else {
    digitalWrite(we2Pin, LOW); // turn we2 ON
    //we2on = true;
  }
//input mat2 and output we1
  val = digitalRead(mat2Pin);      // read input value
  if (val == HIGH) {                //check if the input is HIGH (mat2 released)
    digitalWrite(we1Pin, HIGH);     //turn we1 OFF
    //we1on = false;
  } else {
    digitalWrite(we1Pin, LOW); // turn we1 ON
    //we1on = true;
  }
}
}

```







