

# Dissolving Footprints

A research in what we leave behind



Lotte Heerkens



'Even the most perfect reproduction of a work of art is lacking in one element: its presence in time and space, its unique existence at the place where it happens to be.'

Walter Benjamin



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# Lotte at CHILL

For our last project in the second year of iArts we collaborated nine weeks with CHILL (Chemelot Innovation Learning Labs). Each student was connected to a community at CHILL. A community is a group of students of one or different educations and one or more coaches. The communities work on a research project and assignment given to them by a company or Hogeschool Zuyd. During these nine weeks we observed the group, the building they work in, their process, the products they create and so on. Our assignment was to create a work connected to our experience at CHILL.

The community I was connected to was a group of seven students from three different educations; engineering, mechanical engineering, chemical Engineering and two coaches of Hogeschool Zuyd. Their project is connected to de Wijk van Morgen & Bio-Based houses. Their task was to find solutions for the remaining 18% of a house that was not yet 100% Bio-Based. Previous communities worked on the other 82%. Think of toilet, sockets, doorhandlers, hinges, a vent etc. The main materials they use are bamboo and PLA. PLA is a plastic used for 3D-print. They make a 3D design and print the product with the help of a 3D printer. Product made of Bamboo are cut out of a plate with the help of a frasing machine.

While observing the community working I started to ask myself several questions. What is Bio-Based? What will happen to the traces we leave behind if in the future all products will become bio based and biodegradable? Will our footprints slowly dissolve? And what about the human and personal heritage we leave behind?



# Introduction

Born in 1990 I closely experienced the development of technologies like computers, laptops, mobile phones, tablets, worldwide web, computer games, digital camera's and so on.

When I was two years old I got my first analogue camera with film that had be development at one of the many development stores. My father, a filmmaker, had a 16mm editing table standing in one of the rooms in our house. A room that was also used as film development room and had to be totally dark. As a kid a played ball and hide & seek games outside with kids in the street. I painted, played with my Lego and Playmobile. I remember the day very clearly that my dad showed his old Lego train that was able to drive on batteries and a remote that was connected to the train with a wire The neighbour kid had a remote controlled racing car of which I was very jealous.

When I was a bit older I got a small racing circuit for my birthday with two small race cars. The cars got their electricity through a metal line on the road. I think this was the first real electrical toy I experienced. Later I played Wolfenstein on my dad's Macintosh a violent, simple designed but amazing game. I play it on my iPad now.

At high school things started to change quickly. In the second grade I got my first mobile phone. A Sony Ericsson T100, very small for that time with a non-

coloured screen. Two years later the phones were already way more advanced. My second mobile phone had an mp3 player, radio and a camera. If it was possible to go on the Internet it was very slow and expensive. In the last ten years my mobile phone changed from a phone for calling and texting to a phone that I can use for almost everything even to control my digital camera via Wifi. Not only mobile phones developed, everything around me changed from non digital to digital.



For me these changes were not that difficult. I could say that they grew up together with me, our learning and growing process was a parallel one. If I look at my grandparents this is a different story. My grandmother born in 1916 experienced the digital photo camera but didn't use it. I don't know if she even ever watched a DVD. She had scrapbooks filled with cut out newspaper articles. Photo books filled with photos. She wrote letters from amnesty international by hand and made a copy of it with a copier machine that could only print black and white. Nowadays I get emails from Amnesty international.

My other grandmother born in 1938 needed some time and guidance to adapt to the new systems but is now capable of using them. She still has a mobile phone from 2006 but knows how to work with a laptop. She has email, internet banking, digital television and since a few months a Facebook account. She has DVD's but also LP's.

The heritage that my grandmothers left behind for me is a totally different one then what I will leave behind for my grandchildren.

I still write a lot by hand but most of my work is digital and saved on a hard disk. Information of me can be find al over de web. I have my own website and my friends network can partly be found on social networks. They will be able to analyse what I did and who I was with the help of these social media's, my searching history, the events I attended, the web pages I visited. All this preserved on the web archive and accessible for my grandchildren. They will probably be able to find everything they want to know about me, if it will give a correct answer of who I was I don't know. But there is a big chance it will be pretty close.

If I experience and notice these developments on a personal level what does this in general mean for the heritage of human to the world? How will this change and affect the field of archaeology? The footprints we leave behind are no longer only physical but also digital.

There is a big need of new ways of producing that have less impact on the earth and are more in balance with nature. Recycling becomes more and more important but also eco-fuel, bio based materials and buildings. All these things affect our heritage and the footprint we leave behind. How? And what could this mean to our heritage?



# Desk Research

I realized that to be able to answer these questions that came to my mind while observing my community at CHILL working with the 3D printer it was needed to gain more knowledge. I needed to dig in deeper in the bio-based revolution that is taking place now. In the following chapter I focus on the desk research I did during the nine weeks.

## Bio-Based & Bio Based Economy

Bio based products are commercial or industrial products that are composed in whole, or in significant part, of biological products or renewable domestic agricultural material or forestry materials.

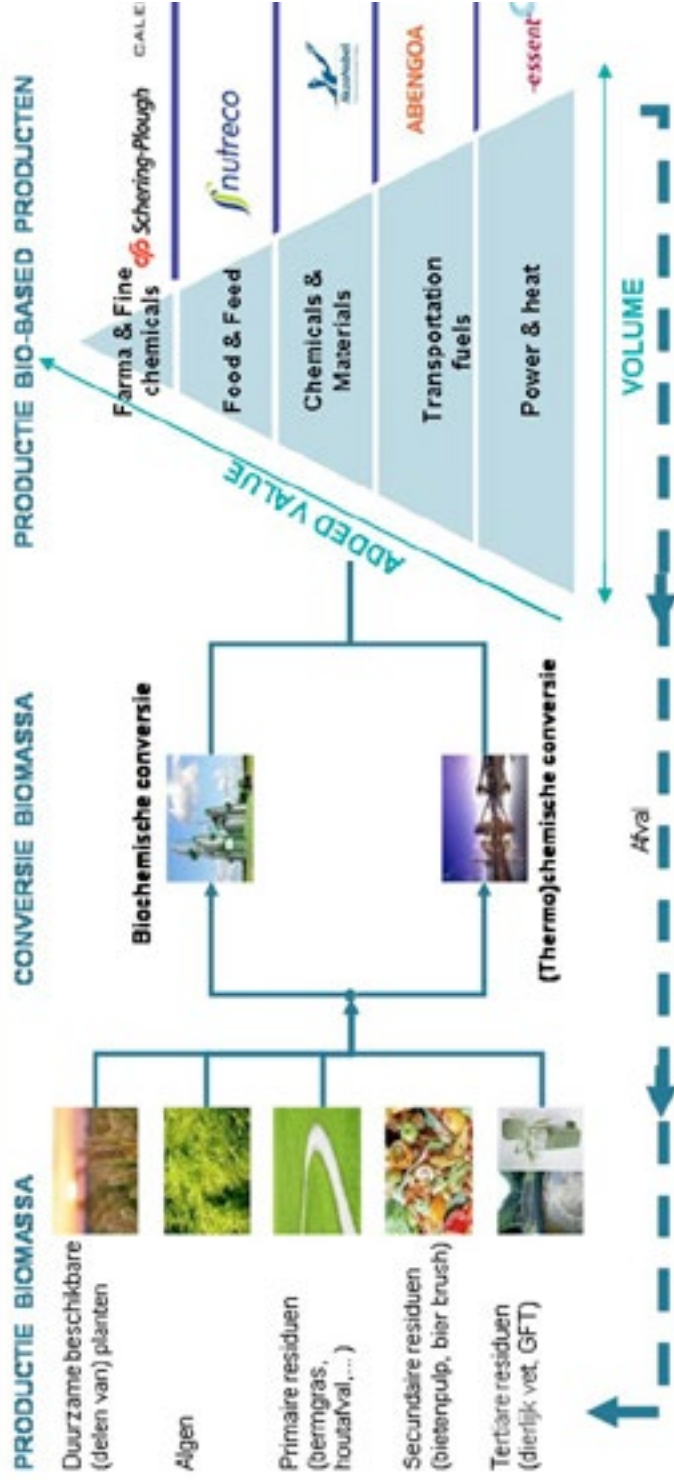
Commercial and industrial products are product other than food and feed. Agricultural materials include plants, animal and marine materials. We can say that a bio-based material is made from substances derived from living organisms.

At this moment a whole economy is created around the idea of bio-based products, BioBased economy.

The BioBased Economy (BBE) focuses on the transition from an economy that runs on fossil fuel to an economy that runs on biomass feedstock. The main focus for the use of biomass goes to non-food applications. A few examples of these applications are: chemicals, materials, transport fuels, electricity and heat.

This new way of thinking and producing is especially important for processes that have no other solution in production. Electricity and heat can be produced with the help of wind- and watermills but also with the power of the sun. Producing plastic from wind and sun is impossible. This is were biomass and bio-based material are an important element.

# Concept van de Bio-Based Economy



Source: Governmentalision on Bio-Based Economy, Roland Berger

# Biodegradable & Circular Economy

Biodegradable waste is waste that can be broken down into its base compounds by microorganisms and other living things. Human waste, manure, sewage and slaughterhouse waste are examples of biodegradable wastes. Also the waste of paper, food and biodegradable plastics. When biodegradable products decay it is important that enough oxygen is present otherwise methane will be produced.

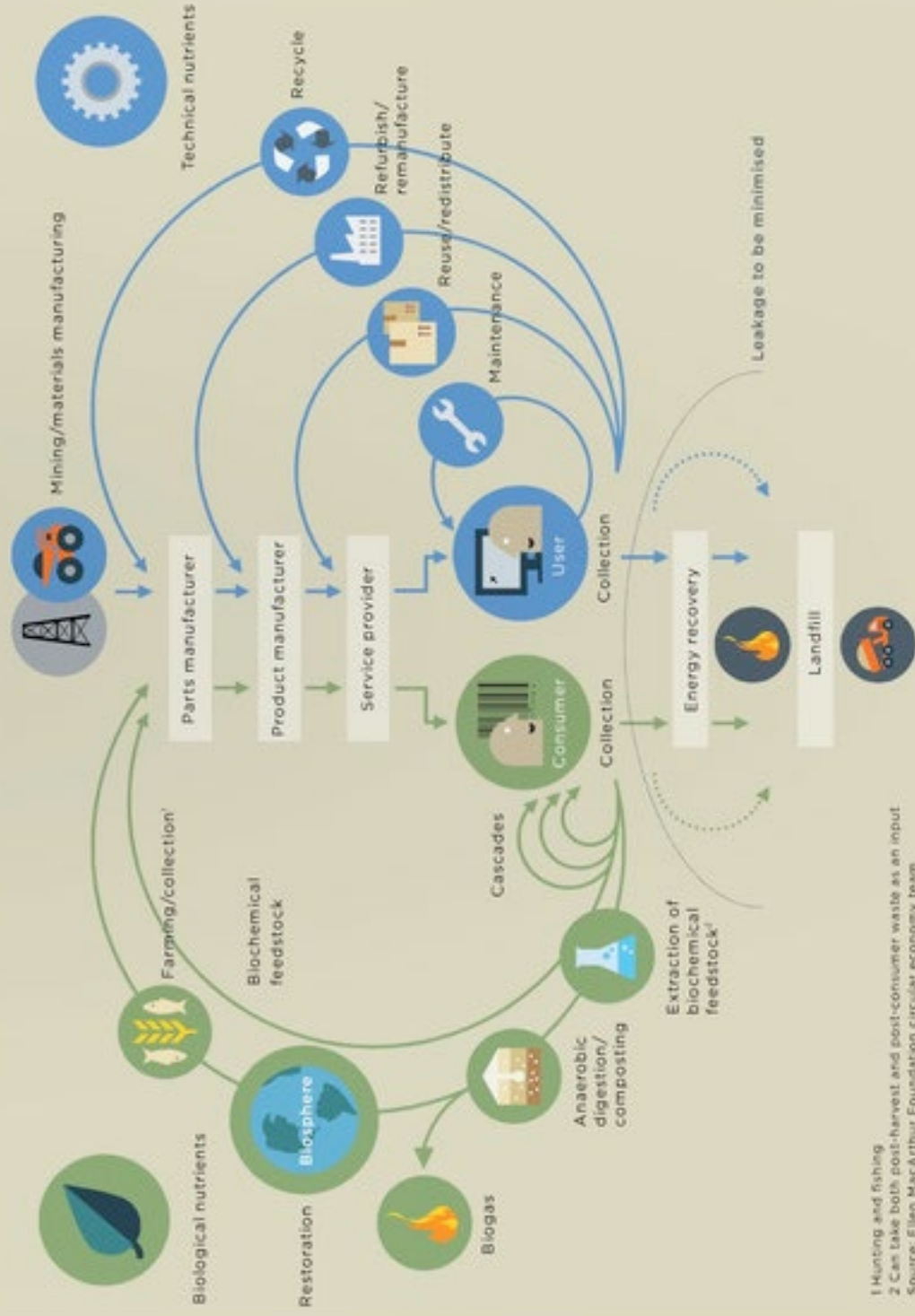
Most of the bio-based products are also biodegradable. This results in an interesting circle in which everything goes back to where it comes from and the production of waste disappears.

The circular economy connects to the idea of no waste. They refer to an industrial economy without the take-make-waste principles but an economy in which the loop is closed and waste becomes a new material again. Waste should be food and not leftover that will stay on the earth forever and become useless.

An economy in which is possible will lead to an economy with a smaller footprint and less traces.

See the image on the next page for a visualization of the circular economy.

## The circular economy – an industrial system that is restorative by design



<sup>1</sup> Hunting and fishing

<sup>2</sup> Can take both pre-harvest and post-consumer waste as an input

Source: Ellen MacArthur Foundation circular economy team

# Human Footprint

The Human Footprint reveals the lifetime consumption of a person on the earth. Every human activity demands natural resources and produces waste. Even a latte in the morning costs 50 liters of water. If we all live and keep living the way we do know we probably need 2 more earths to cover all the resources we need.

According to the WWF a human footprint is measured by the following six criteria:

1. Carbon: carbon emissions, amount of forest land that would be needed to sequester carbon dioxide emissions.
2. Cropland: amount of cropland used to grow plants for food, fiber, animal feed, dairy products and commodities including oil, soy & rubber.
3. Grazing land: the amount of grazing land used to raise livestock for meat, dairy products, hide and wool.
4. Fishing grounds: the estimated primary production required to support the fish and seafood caught in fresh water and marine environments.
5. Built-up land: the amount of land covered by human structures, including transportation, housing, industrial structures and reservoirs created by dams.
6. Forests: the extend of forests required to supply timber, pulp and fuel wood.

A lot of country's have as mission to reduce the human footprint of their inhabitants. This is of course not easy. An important element is to raise knowledge among the people about their own human footprint. But also new and different resources have to be found. The same counts for current production processes. Both bio based and the 3D printer could be an interesting development for the reduction of the human footprint. Curious why 50 liters of water is needed when a simple latte coffee is produced? OR what your own human footprint is? Scan the QR codes at the end of the book.



# The Ecological Footprint

## MEASURES

how fast we consume resources and generate waste



Energy



Settlement



Timber & paper



Food & fibre



Seafood

COMPARED TO

how fast nature can absorb our waste and generate new resources.



Carbon Footprint

Built-up land

Forest

Cropland & pasture

Fisheries

# Heritage (digital & non-digital)

Heritage is what we inherit from the past. There are different kinds of heritage, cultural and natural heritage are the main two I will talk about.

When we speak of cultural heritage we speak of man-made heritage, the legacy of physical artefacts and intangible attributes of a group or society. Cultural heritage is unique and irreplaceable and should be preserved for future generations. UNESCO has created a list of the most valuable cultural heritage in the world and is successful in preserving the list. Smaller objects are mainly preserved in museums and art galleries. Natural heritage is the inheritance of fauna and flora, geology, landscape and landforms, and other natural resources.

At this moment we can say that there are two revolutions that could affect the way heritage is preserved. The first revolution is connected to the digital era; the world around us is more and more linked to the digital world. The second revolution is a growing production of bio-based materials and products. What could these revolutions mean for our future heritage?

The arrival of bio-based and the digital could mean a shift in both natural and cultural heritage. If we talk about the natural heritage and bio-based the biggest change will be that we will start using our natural resources differently and by that also how we structure fauna and flora, geology, landscapes and landforms.

The biggest shift will probably take place in the cultural heritage. More and more products depend on digital machines and tools to be produced. Not only products used in daily life but also art is becoming more digitally. Photographs, video's, graphic design all are mainly created with digital tools. Part of the digital era is the world that we are creating online. The World Wide Web is becoming more important and a bigger part of the heritage we leave behind.

When I die my grandchildren will be able to find a lot of information about me online. Not only through my own personal website, blog or articles that are published but also through my social networks. They will be able to see my social activities, events I attended, posts I posted, events that happened in my life, where I travelled, who my friends were. My online life will be an open book for them, but not only for them for everybody that has access to the Internet.

I believe we are at a point that we can ask our self the question if this is the kind of heritage we want to leave behind? Your life will be exposed to everyone, of course we have the choice to be on social media or not but will we still have this choice in the future? At one point it will be joining the mass or being isolated.

It will be part of our evolution and for other generations something that is totally normal. We are in a transition and the generations that live now are between to different eras. We still remember the time with no Internet or mobile phones, the sound of dialling into the Internet, the phone with the turning wheel, the first mobile phones with snake. We did everything by hand at school, now they work mainly with tablets. The world around us is changing quickly and only the ones who remember the old will notice the new.

The traces we leave behind are changing from non-digital to more and more digital. But so are the future generations and the way we live.

# 3D Printing & scanning

If we talk about the world around us becoming more and more digital I see an important or new tool: 3D scanning and printing.

3D printing is changing the way we relate to the products we produce.

Below I describe these changes in five different topics.

## Heritage

In the previous chapter I talked about our digital heritage. How the preserving and creation of objects is becoming more and more digital. With 3D scanning we will be capable to make a very detailed and accurate scan of an object. In this way the information of the object will always be preserved. Connecting these 3D scans to a printer will mean a never-ending resource and production of a certain object. Once a perfect scan and digital duplicate is made of an object it will be possible to print it whenever we want. The more advanced the 3D printers will become the more detailed and realistic the printed object will be. At one point there is a big chance that we will be able to print things that were lost centuries ago and in that way physically visualize them again. A development that could mean interesting things for all kinds of professional fields like history, archaeology, school system but also the theatre and film industry.

## **Plagiarism/Piracy**

The seam side of the scanning and printing is that it will be very easy to scan a certain object and make a illegal copy of it or a fake. Once a scan of an object is made it can go viral on the Internet and everybody has, maybe even for a price, access to it. With the scanning and printing it will be easy to make perfect duplicates that can be used for workshops or other occasions without needing the original object. But once a legal scan is made this can be digitally stolen and used with wrong intentions. Stealing a digital file will be a lot easier then stealing an artwork from a gallery.

In the design field we will probably have the same problems and discussion as the music and film industry are having right now about piracy. With the scanning and printing it will be very easy to duplicate a certain design and make a fake one at home.

## **Bio-based & Biodegradable materials**

When the production of products would become more and more something the consumers do themselves the perfect scenario would be to use bio-based and biodegradable products to print. At this moment already a lot of the printing is done with PLA (Polylactic acid), which is a biodegradable thermoplastic. This will mean that the products created with the 3D printer can be decayed back to nature without leaving traces that harms the environment. If this will happen on a big scale the human footprint could decrease even more.

## **Production process**

If we look at the production process of products we see that a dominant part of producing is happening in China. But what will happen to the need for products from China once everybody has their own, shared or public 3D printer? People will be capable to design and print their own products and add personal elements to it. Or they share designs online and print their own product. The production of the products could go back to the person itself instead of the industrial mass production. Will we go back to the production industry from before the industrial revolution? If so will we still need big containers full of products from China? If not what will this mean for the human footprint? A possible outcome is that the use of fossil fuels for the transport will decrease.

Thinking like this could be seen as visualizing a Utopia but if we would be able to bring back the products delivered from China with 50% it would be amazing. Unfortunately when taking in consideration that people are lazy and sooner go for the easy way and not for the more personal and more time consuming way a small percentage is more realistic and could already mean a lot for the traces we leave behind.

Another development that presumably will happen is companies selling both the product itself and a 3D design of the same product. People will be able to print the product at home instead of going to a store. In this way online shopping will get a whole other dimension.

## Creativity

Connected to the production process and plagiarism is creativity. If I want to buy a product today I go to several stores and decide which suits me the best. Depending on the popularity of the product I have more or less choice in variation. Making the product myself will cost me too much time and I do not have the tools or skills to do so. The arrival of the 3D printer could create a shift in this buying pattern. I could go to the stores or look online and find several versions of the product I'm looking for but none of them are exactly what I'm looking for. By using 3D designing and printing I can design my own product that fulfils all my needs and I can even add a personal touch or engrave my name. It is not anymore about making decisions and deciding which products suits but about something totally differently. My own creativity is challenged when I decide to design the product myself, the skills of working with a computer tool is learned easier then of different machines. The production process is brought back to the consumer and the same consumer decides the end result of the product.

People are stimulated to start thinking again about the product they use, why they use it and how. Small irritations when your hands are to small or to big can be solved with creative solutions. We are asked again to not only consume but instead use-reflect-react-produce.

The next level is not to design on your own behind the computer but share designs with others and support each other to improve. Start a dialogue about the products. This is where innovation could take place.

# Artistic Research

## Gephi

Gephi is a program to visualize social networks and the relations between different connections. An example of such a visualization can be seen on the website [inmaps.linkedinlabs.com](http://inmaps.linkedinlabs.com). You log in with your LinkedIn account, the information of your connections is gained and a visualization of your network is created.

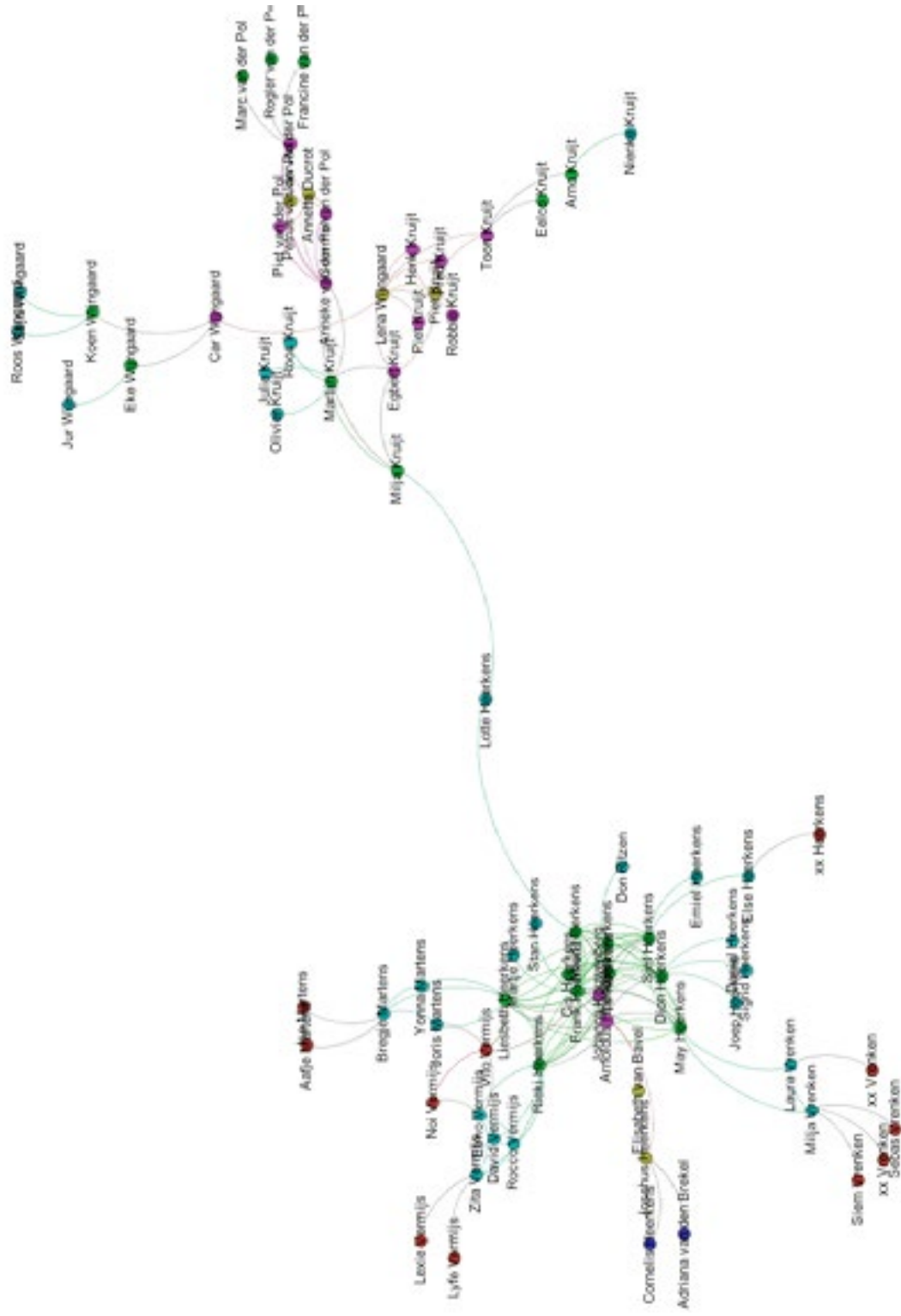
With an app in Facebook it is possible to download your own connection information and import it into the Gephi program. The program translates the information into nodes (a spot/a person) and edges (a connection). Persons that have more connections to each other are grouped together.

The more information you have about your nodes the more different groups you can create. Connected to age, generations, birthplace and so on.

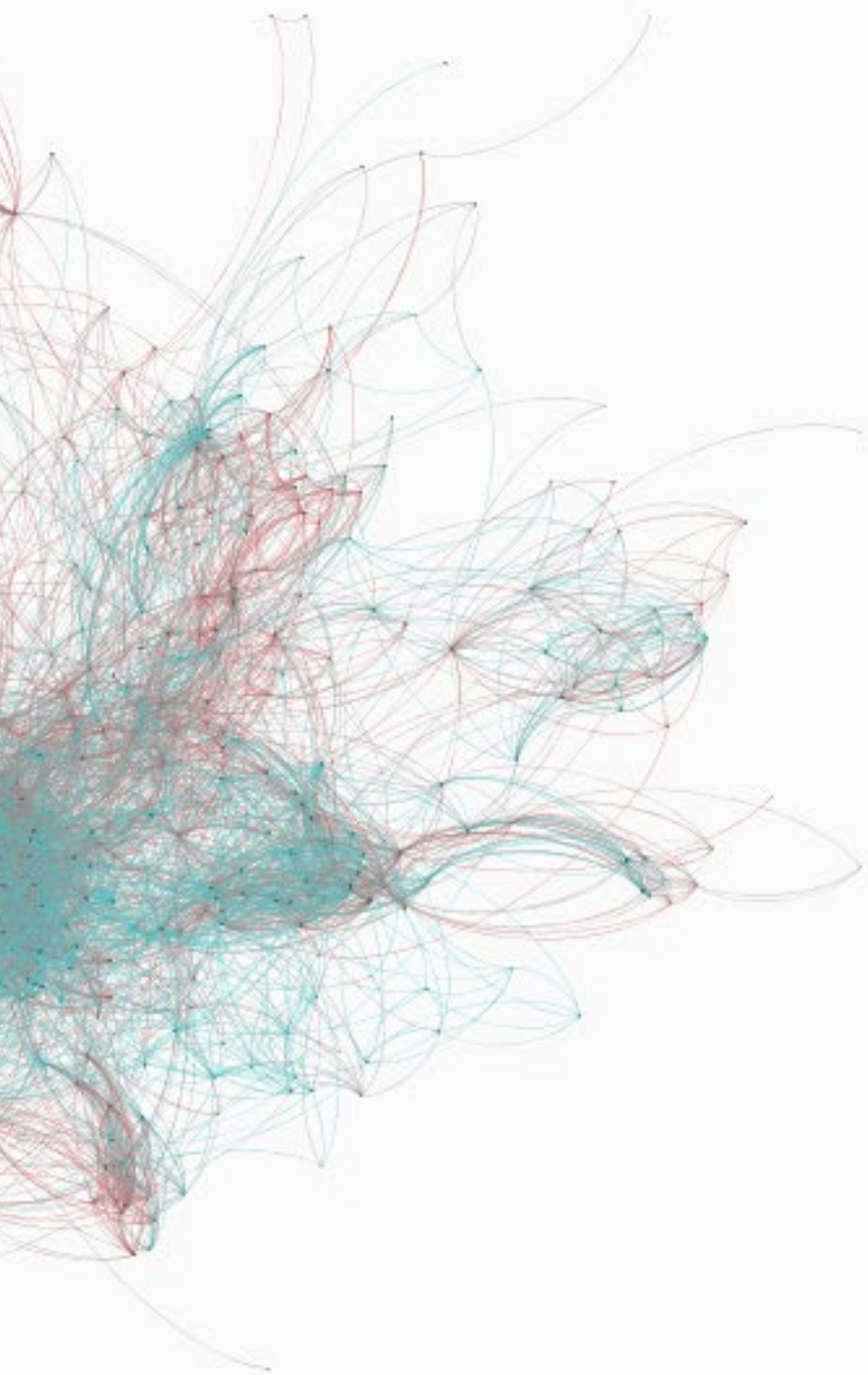
On the next pages you can see some Gephi graphs of my social network. A small visualization of my family is also shown. As you can see, the more nodes and edges you have, the more interesting the graph becomes. I used this part of the artistic research to discover what my social network and such graphs say about me. Specifically, what it will add to the trace that I leave behind.

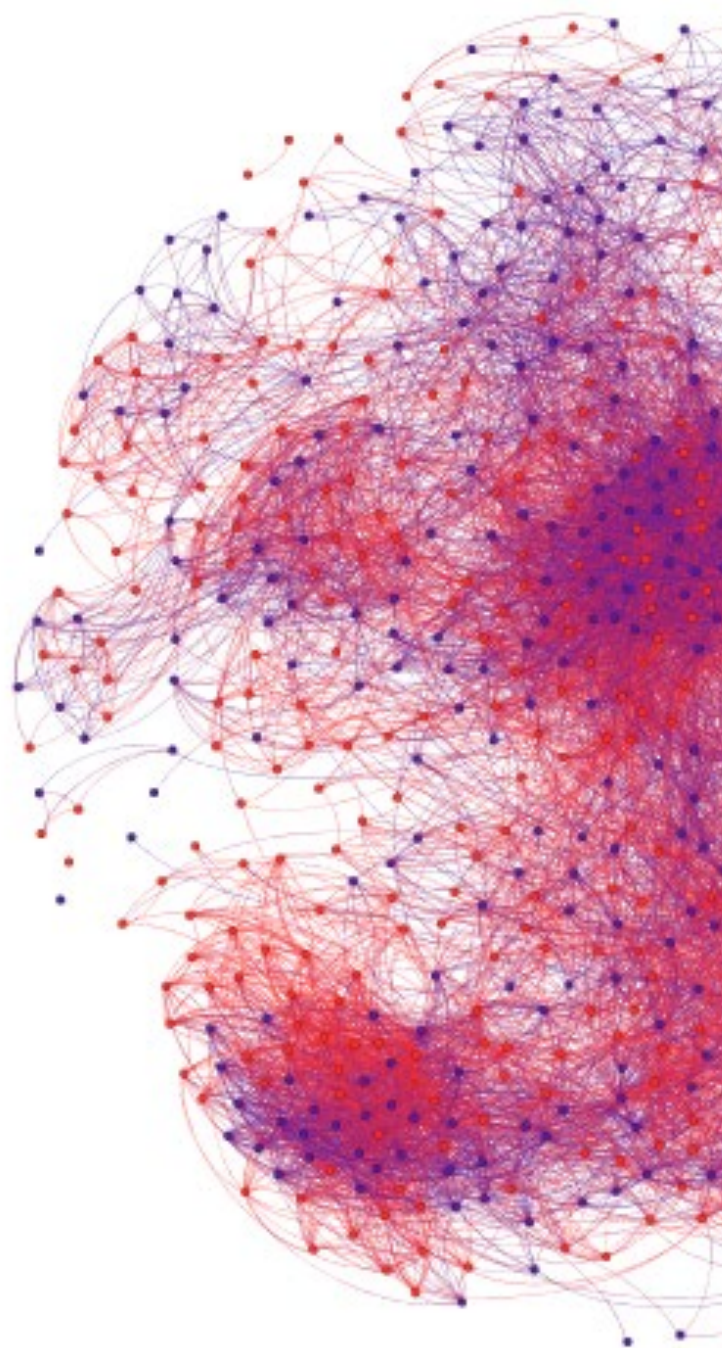
Curious how your LinkedIn graph looks like? Scan the QR code at the end of the book.



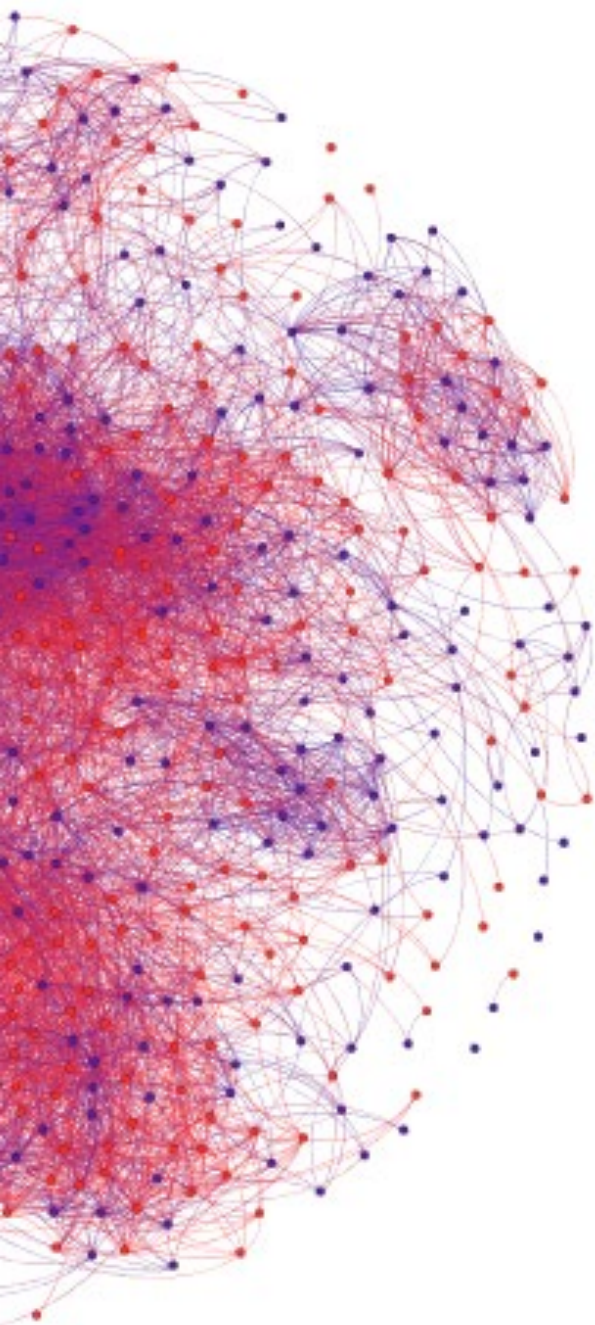












## **3 Generations of toys**

Children have always had toys. The production of a toy changed in the past 100 years from handcraft production to mass production but could be returned back to the user with the growing popularity of the 3D printer.

About 100 years ago children made their own toys out of wood with as tool mainly a knife. They used their skills and imagination to make a little boat or pistol out of a piece of wood.



A boat made from wood found in the forest and some tools like a knife and saw.

With the start of the industrial revolution toys became part of the mass production. At this moment 75% of the toys are made in factory's in china. Mostly under bad circumstances.

Children pick a toy out of shelf and that's it. They can sometimes choose their favorite color but that's it all the imagination is left in the playing with the toy. If I look back to the home-made wooding toys children were able to personalize their toy. Carve their name on it, paint it in a certain color or adapt it after playing with it. This is difficult with toys from China.





A simple boat that can be bought at a toy store, made in China.

The arrival and growing popularity of the 3D printer could change this. Children can design and print their own toys again. They are asked to think creatively about the toy they want, how it should look like. Add their own personal twists to it. Skills are needed to design a 3D toy with software, something that will need practice and training but makes it more interesting and challenging for the children. Once they made a design they are proud of they can decide to share it with others online and start a dialogue in designing and adapting. Others might change things to their design that stimulates the original designer to adapt it again and so on.

The 3D scanner can also become an interesting part in the design process. Children can scan themselves and their friends and use their personal surrounding for the personality's of their toys. Another option is to scan a broken toy and fix it with an additional object or reproduce it with a personal twist.

With the arrival of the 3D printer and scanner a whole new way of producing and playing is created for children of all different ages.



# Mind mapping

The term 'mind map' was introduced by author and TV personality Tony Buzan in 1974 during a TV series he hosted, called Use Your Head.

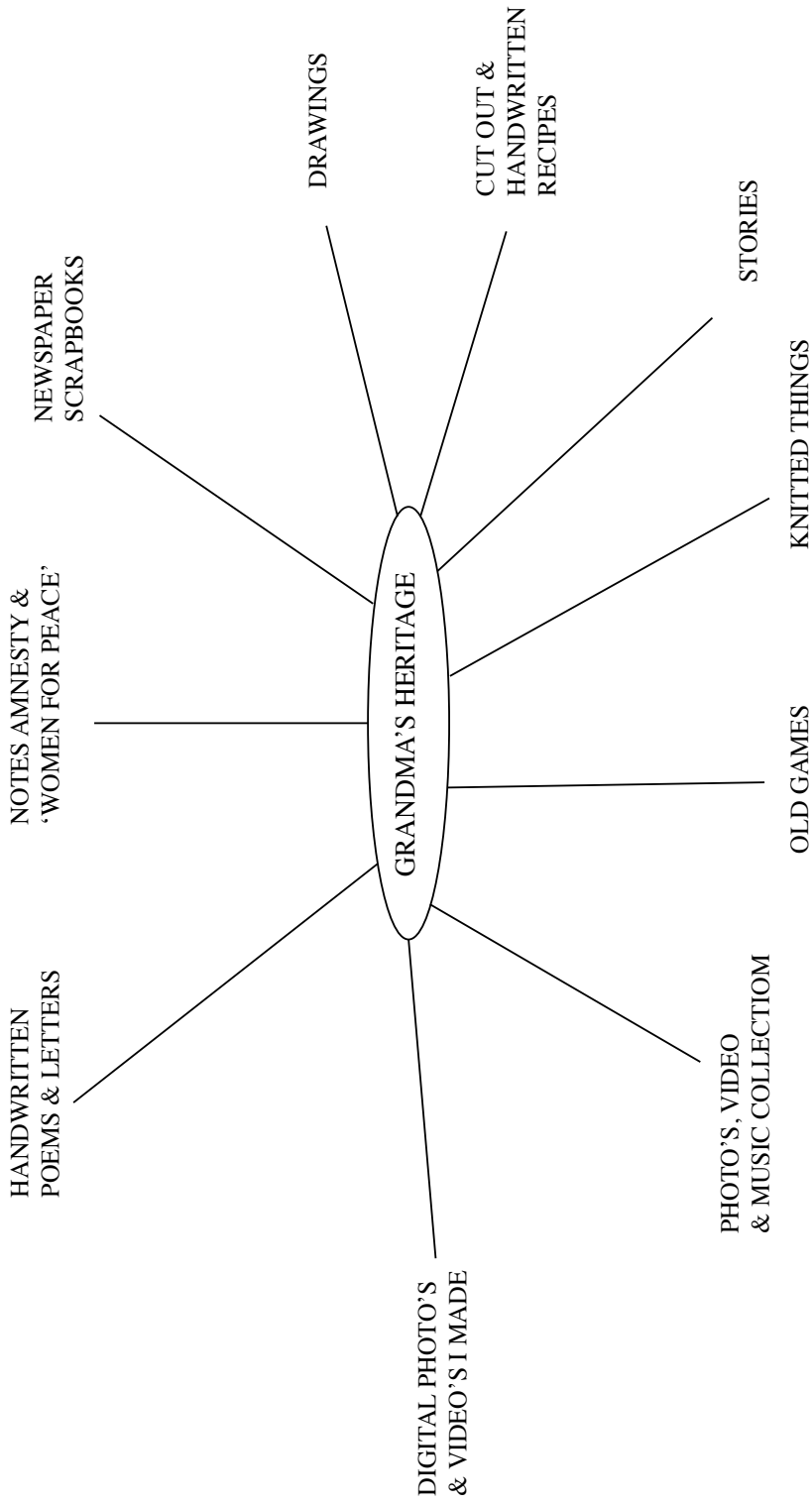
A mind map is used to visually organize information.

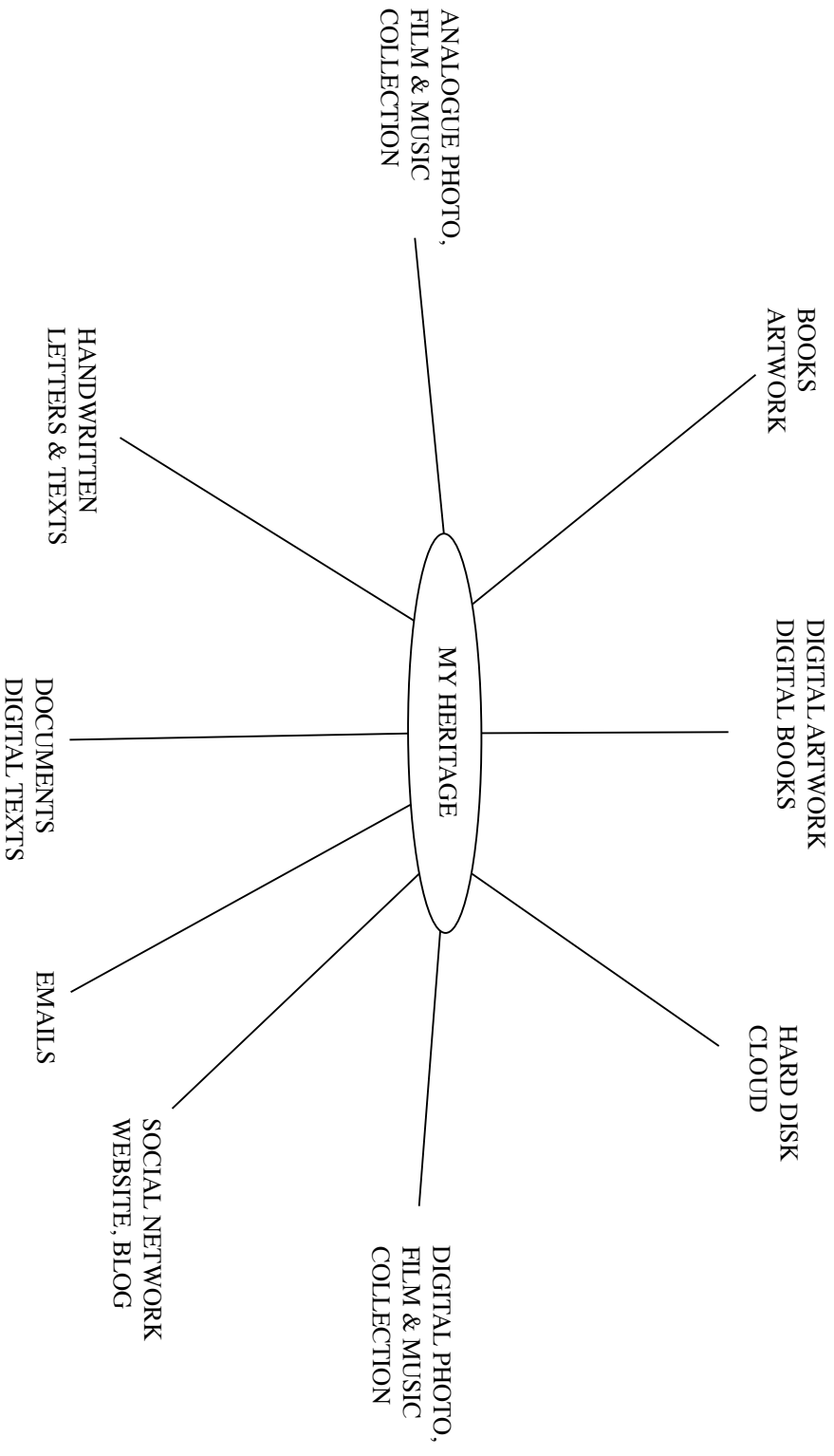
Buzan even set up a guideline for creating a mind map. In a mind map ideas and information connecting to a certain main topic are written down and connected to each other. In this way a web of relationships between the topics is created. With the help of colors different groups can be divided and the map becomes even more clear and structured.

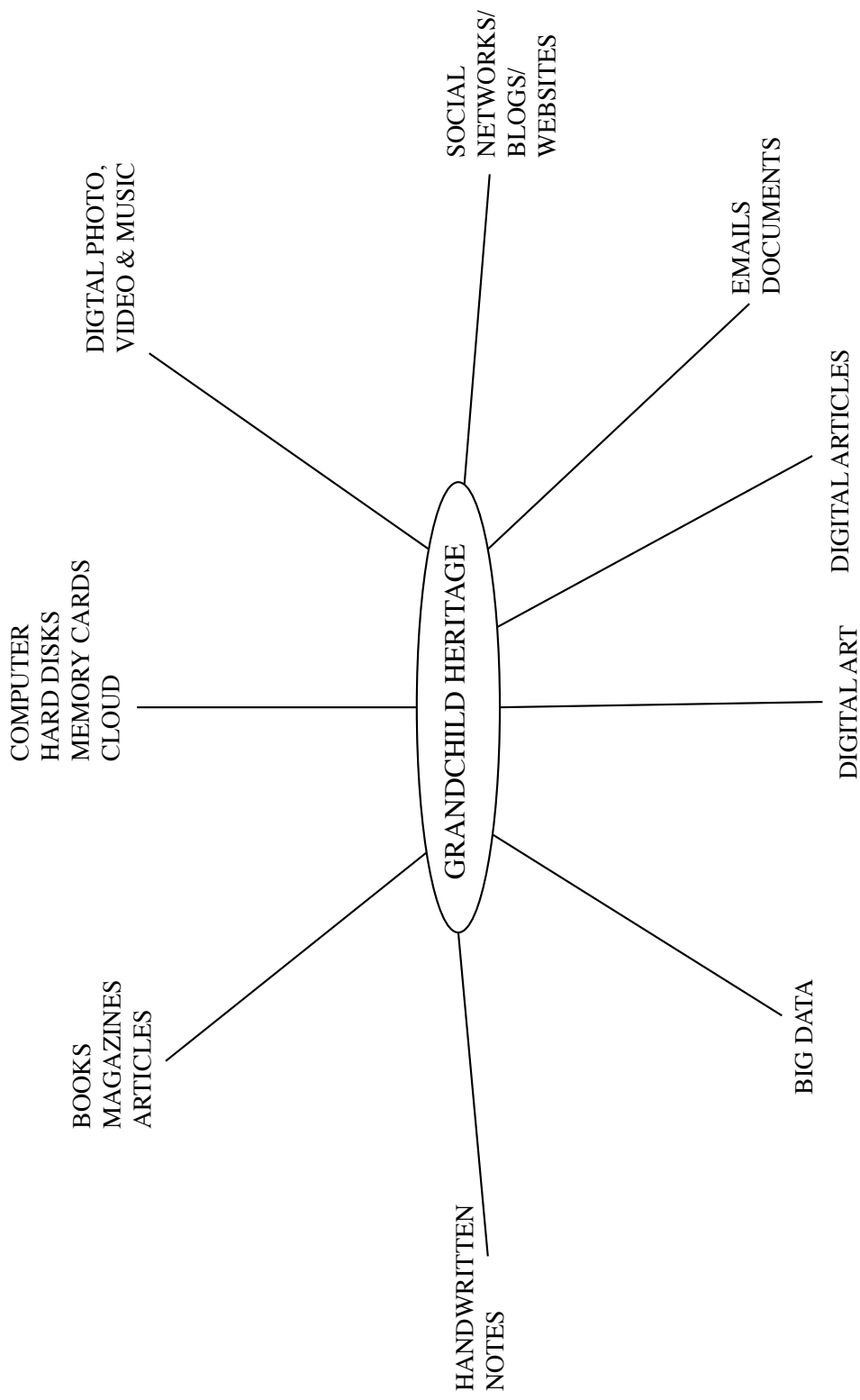
The goal of a mind map is to structure ideas and concepts. This can be useful with brainstorming.. problem solving, learning and so on. Mind maps are these days applied in both professional as personal branches.

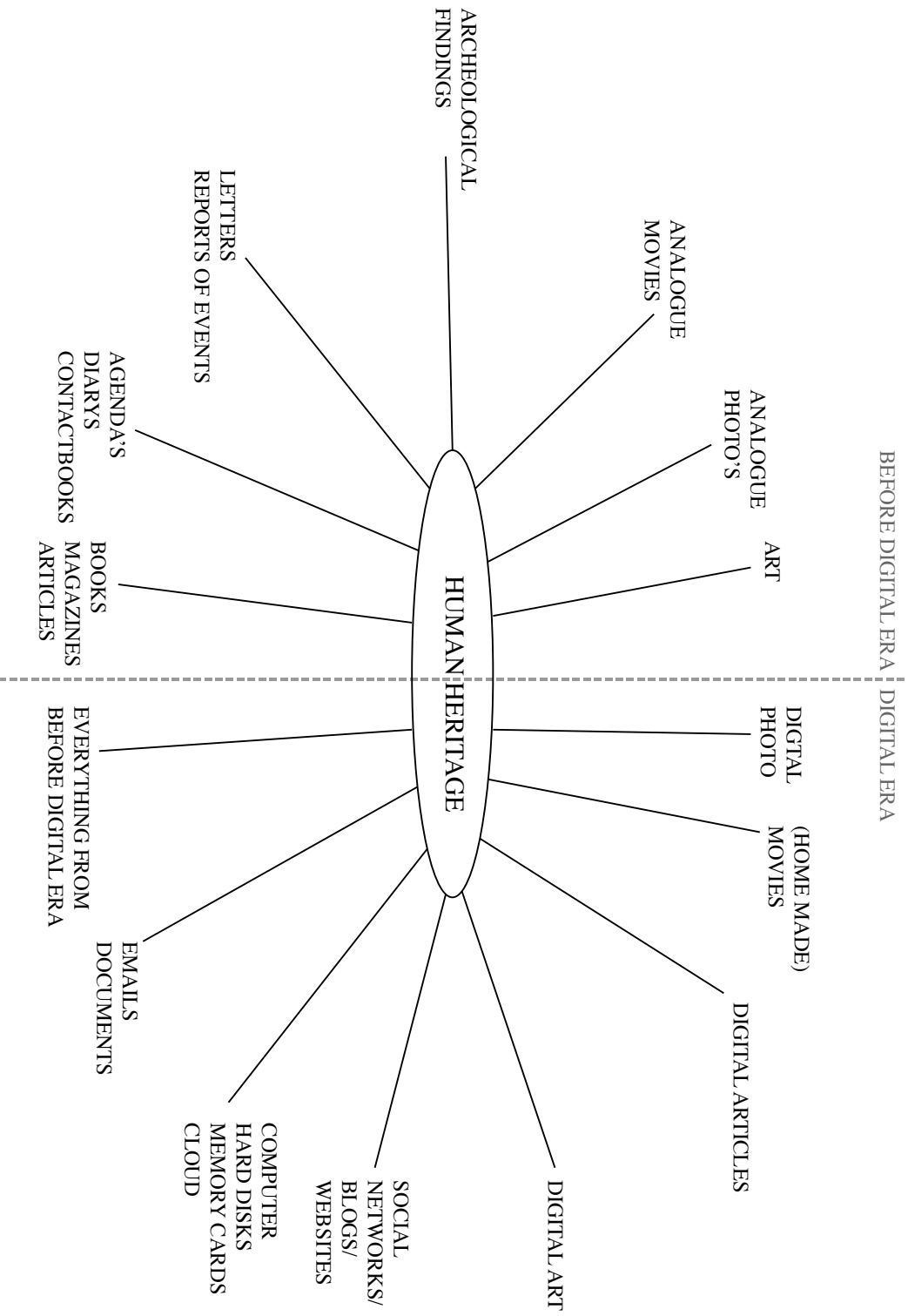
For me mind mapping is an easy way to get an oversight of the information I have and how different elements connect or could connect. It is becoming a habit to make a mind map about almost everything that has a main topic and smaller topics connected to it. Also making a few different mind maps connected to the same topic.

On the following three pages you see four examples of mind maps I made connected to the theme personal heritage and the time we live in.











If you look at the first three mind maps we pass a certain timeline. The kind of heritage changes according to the time a generation lives in. An important element in the mind maps is that the world that surrounds the generations is becoming more and more digital. My grandchild will probably live in a world where everything happens digitally. Maybe writing by hand will disappear and will become something only the elite are capable of.

In the last mind map the results of the first three mind maps come together. A division is made between before and during the digital era in which we are now. There is a big chance that the future will become fully digital but at this moment we are still in a transition period.

# Inspiring artists

In my research process I came across a number of interesting artist that inspired me. I would like to share these artists, their work and why they inspired me.

## **Burak Arikan**

Burak Arikan (1976) is a New York and Istanbul based artist working with complex networks. He takes the obvious social, economical, and political issues as input and runs through a abstract machinery, which generates network maps and algorithmic interfaces, results in performances, and procreates predictions to render inherent power relationships visible, thus discussable. Arikan's software, prints, installations, and performances have been featured in numerous exhibitions internationally. Arikan is the founder of Graph Commons platform, dedicated to provide "network intelligence" for everyone.

What inspired me about the work of Arikan is how he visualizes complex and sometimes sensitive issues and makes them transparent and understandable. Underlying connections, first not visible become visible in his graph's.

The image on the next page is part of the work Truth is concrete and is for me an example of a visualization that shows how everything is in a way connected to each other and originates from only a few big sources.

See the QR code in the back for a link to the Graph Commons platform



## **Mark Lombardi**

Mark Lombardi (1951 – 2000) is an American neo-conceptual artist who specialized in drawings that document alleged financial and political frauds by power brokers, and in general "the uses and abuses of power".

Lombardi and Arikian both work with network maps but have a different focus. Lombardi's focus was mainly on financial and political issues connected to abuses of power. While Arikian has a broader focus. Probably Lombardi has been an inspiration for Arikian, who lives and works a generation later than Lombardi. A big difference between these two artists is Lombardi working with pencil and paper while Arikian works with digital software. This can be explained by the age difference. Both artists have for me a strong connection to the concept of heritage, what we leave behind while we are on this earth. Their graphs are visualizations of our society and have an archeological value. Arikian is part of the new digital era and so is his work that will become part of the digital heritage. Lombardi's work still belongs to the non-digital era.

On the next page one of Lombardi's graphs.



## **Marnix de Nijs**

Marnix de Nijs (1970) is a Dutch installation artist. Graduated as a sculptor in 1992, he focused his early career on sculpture, public space and architecture. Since the mid 90's, he has been a pioneer in researching the experimental use of media and technologies in Art. Impelled by the idea that technology acts as a driving force behind cultural change and therefore capable of generating new experiences where societal habits and communication are rethought, his work thrives on the creative possibilities offered by new media, while critically examining their impact on contemporary society and human perception.

The work that inspired me the most is exploding views 2.0(2012). Exploded Views 2.0 is an interactive installation where the visitor physically navigates through an audio-visual city landscape built up from 'point clouds'. These 'point clouds' are generated from online web 2.0 photo collections like those found in Flickr.

What I found interesting in this work is that something physical has become digital with the help of digital information found online. The digital visualization of a certain surrounding has created a joining of non-and digital heritage. Everywhere the installation is placed it is possible for everyone to walk through this surrounding. An interesting development for future visualization of places that are demolished.

See the QR code in the back for a short video of exploded views.





## **Chiharu Shiota**

Chiharu Shiota (1972) is a Japanese performance and installation artist best known for creating room-filling, monumental yet delicate, poetic environments. Central to the artist's work are the themes of remembrance and oblivion, dreaming and sleeping, traces of the past and childhood, and dealing with anxieties. Shiota finds diverse visual expressions for these subject matters, the most celebrated being impenetrable installations made of black thread which often enclose various household and everyday, personal objects: a burnt-out piano, a wedding dress, a lady's mackintosh, sometimes even the sleeping artist herself.

What inspires me about Shiota is how she explores the relationship between present and past. How are things connected and do the memories stay visible in a certain place? If we see a certain room we perceive the room differently than people who have a memory connected to that same room. Shiota visualizes those memories and brings them back from the past to the present.

Heritage on the level of memories and past events is mostly of the time not visible. Making this visible creates a certain kind of consciousness of the traces we leave behind as human kind. This process and the work of Shiota was for me an interesting inspiration in my research into human heritage.





## Larry Sass

Larry is an architectural designer and researcher exploring digital design and fabrication across scales. Larry's research builds on his belief that hand crafted, hand operated construction will soon be a thing of the past, and that in the future, buildings will be printed with machines run by computers.

The first time I saw work of Sass was in 2008 at the MoMA in New York. They had an exhibition about prefabricating houses. The house of Sass called A Digitally Fabricated Housing for New Orleans was part of his research of creating an "Instant House". The goal of the Instant House was to find a way to harness the speed and precision of laser cutters to fabricate simple shelters quickly and inexpensively.

The house was a 196-square-foot one-room intended as one proposal for the rapid reconstruction of New Orleans, a major topic sine Hurricane Katrina in 2005.

For designing the house two different methods were used: 3D-printing and digital fabrication. Eventually the house had to build up from planar sheet of plywood cut out by a laser printer in such a way that they would fit together like a puzzle. With the help of notches and special grooves only a rubber mallet was needed to put the house together.

When meeting my community at CHILL and seeing the Bio-Based House they were working on this was one of the works that popped up in my head. It was not only inspiration for me but for them as well.









# Conclusion

In the introduction I ask myself several questions connected to our (cultural) heritage, traces and footprints we leave behind as humans. And how these elements will be influenced by the growing importance of the digital world, the 3D printer and bio-based/biodegradable products.

I think I could say that the development of the 3D printer and 3D scanning are significant developments concerning the reproduction of products and in that way to the (de)materialization of our future cultural heritage.

Walter Benjamin states in his essay *The Work of Art in the Age of Mechanical Reproduction* the following: 'that which withers in the age of mechanical reproduction is the aura of the work of art'

And with this quote we come to an important part of my conclusion. In the research the topics are approached mainly through an abstract perspective and not through the personal. This personal aspect contains the 'aura' Benjamin is talking about. The 'aura' or as I prefer to call it the 'identity' of a product is connected to its ritual function, time and place of production and use. When reproducing the object all these elements of its origin are taken away and won't be part of the reproduced product.

In this conclusion I want to make division between the abstract and personal questions asked in relation to heritage, traces and footprints.

The first part is the more abstract conclusion. With the arrival of working in 3D we could say that there is a swift in perception and production. The same thing happened with the arrival of film and photography and is described in the essay of Benjamin. Film en photography made it possible to reproduce in a totally different way than was possible before. The world around us could be copied by documentation it which had a totally different and more realistic result than painting or sculpturing. 3D takes it a step further and creates the possibility to make an exact three-dimensional copy or the reality.

Film and photography already meant a lot for the heritage and traces we leave behind. It was possible to have a visualisation of how a certain place or person once looked like. Not everybody could afford a good and realistic portrait but having a camera was more realistic. This meant that in the future archaeology would not only depend on ruins and sites but also on the photographic documentation available. The arrival of working in 3D creates possibilities on a whole new level of preserving heritage and traces. All over the world professionals are scanning historical objects or trying to recreate an object with the help of working in 3D. For example at the Harvard University Semitic Museum they are recreating a ceramic lion that was smashed 3000 years ago.

Working in 3D does not only mean a lot for the history but also for the future heritage and traces. Everything will be documented and preserved digitally. Most of the digital will come online and will be accessible for everyone all over the world.

The developments of working in 3D and everything becoming digital is something I see as a step forward in passing on our knowledge and culture to future generations.

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Parallel to the digitalisation is the need for less use of fossil resources and more bio-based resources. This development leads to less traces and a smaller human footprint. Products used decent back to nature and will not be preserved. But when most of these products are created through 3D printing or from a digital file this means the information is preserved in a digital database or archive and could even be printed again.

Overall the heritage, traces and human footprint are not negatively influenced by the current revolutions. We could even say that they are an improvement on an abstract level. The heritage is preserved better, more is discovered and restored from the past and in the future our human footprint could decrease.

The second conclusion is connected to these developments but what it will mean on a personal level. What happens to the identity of the products but also to the identity of the designer? With the arrival of the compact digital photo camera everybody was capable of making photos and filming. The same thing happened in the time of Benjamin when the daily press created a section in the paper for "letters to the editor". From that moment on everybody wanting to write a letter to the editor could become a writer instead of only a reader. This shift is also taking place with the arrival of the 3D printer everyone who wants can become designer and creator. And to quote Benjamin in this: 'masses have a right to change property relations'.



Benjamin states that reproduction leads to a loss of identity of a certain product. I agree with him that the industrial mass production of products has led to the depersonalization of humans to a product. But I believe that the 3D printer could be a new possibility to bring this back and give new identity to previous products. People will personally design and create a product according to their own standards and preferences. The same product could be printed by different persons with a different twist and each product will have their own identity or as Benjamin calls it 'aura'.

Looking at both abstract and personal level of the developments happening I could say that they connect to a new way of living and perceiving life. A way that is more connected to the earth and our future generations. Still small steps that have to be continued and development in a bigger and global mindset. However a promising prospect.

# QR Code's

On the following pages you will find teh QR codes refered to earlier in the book.

**Calculate your own footprint**



## LinkeIn maps



**Video 50 liters of water in a latte cofee**



**Link to Graph Commons platform**



## Video exploded views Marnix de Nijs



# Source list

## Books

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## Online documents

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- <http://www.biobasedeconomy.nl/wp-content/uploads/2014/05/Normen-en-certificaten-in-de-biobased-economy.pdf>
- <http://www.nationalgeographic.com/xpeditions/lessons/14/g68/HumanFootprint.pdf>

## Video's

- [http://www.youtube.com/watch?v=nDTmjR\\_GG1w](http://www.youtube.com/watch?v=nDTmjR_GG1w)

## Websites

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