Contents

Abstract 7
How this book is organized? 9

Chapter 1 / Theory
Design Argumentation 14
Good Taste Vs Good Design 18
CO-CO Collect & Connect 28
Design for Modularity 30
Family Chart 37

Chapter 2 / Concept
Design Process 41
Surveys 42
Early Concepts / Kulma Table 44
Early Concepts / Scenario 46
Early Concepts / Corner Joint 48
Early Concepts / Modules 50
A Basic Image 52
Material Thinking 54
Splitting up the Structure 56
A Half Leg 62
Checking all the Possibilities 66

Chapter 3 / Making it
Making it 77
Making it Wood 78
Making it Wood&Metal 81
Making it Wood 93
CO-CO Structure 100
CO-CO Final Prototypes 104
Final thoughts 112
References 114
Image Credits 116
Notes 117
Acknowledgements 118
Purpose of this book is to investigate the possibilities of modular furniture especially for domestic environments and to focus on how to set up basic structures that are easy to assemble and diverse in nature in terms of the possibilities they are offering.

Furniture that is proposed as “Co-Co” is a study of joinery that allows making several tables and benches with similarly formed wooden legs. Collect & Collect (Coco), suggests a system of details, focusing only on one type of leg due to make it simply constructed tables and benches through repetition and in reversed positions. This enables easy adjustment of the length or widthsizes of the furniture based on required needs.

While investigating modularity, the thinking behind this project is to allow people freedom in the creation of structures that decision is left to people to create more than one type of structures with the suggested system.

Study also documents how material and structural investigations gave direction to design's characteristics both in aesthetical and construction levels. Based on a particular shape that the components have, product itself becomes the joint in which the essence of design lies with the very honest connection and overall impersonal attitude, so the structures becomes simple while allowing further variations.
While explaining the design idea this book is organized as a process-based and divided into two main chapters. Chapter 1 explains the theoretical part of the process, while Chapter 2 explains the practical part of stages taken during the study.

In the first chapter I try to explain the background thinking of the Coco Table Concept. The argumentation starts with design being part of the social systems and taken as an inspiration by its own nature in the structural thinking. Reasons and motivations are explained further with examples from early modernist approaches.

Following to the discussion of how personalization of designed objects is getting important while people’s preferences are shaped with own experiences. Then it continues with Good taste vs. Good design comparison giving the accounts to how personal experiences are related with industries. Design approach, as how design knowledge can be communicated over everyday products can also be inspirational. Given the priority to the structural thinking it has been suggested that modular design approach could offer people flexible yet basic solutions, leaving possibilities for further personalization of the product over use and ensures a communication of the knowledge of making things (Co-Co).

In the second chapter designing process of Co-Co Table Concept is explained. This chapter starts with short survey results that are small questionnaires taken to people to figure out the scopes of the study in practical side. Then introducing Kulma Table and following next to the concepts developed, study shows previous design is developed as a modular system detail over sketches, experimental models, 3d models and some prototypes.

In the third chapter shows the prototypes from wood to wood&metal, then at the final stage wooden prototypes with details and along with open structure drawings.
"There are better ways to design than putting a lot of effort into making something look special. Special is generally less useful than normal, and less rewarding in the long term."

J. Morrison
I see design as a part of social systems. Thinking about single items belongs to bigger systems and yet so unique by own nature inspires me. I see this in the materials and I see this in the structures, actually I try to see it everywhere. And I believe being designers it matters to think upon the primary goals of design and look for approaches that could bring on those initial goals to inspire more people to communicate the knowledge of making things through objects. In my case this would be to figure out how unique and standardized forms can create diversity in big systems and try to create alternative solutions in order make a contribution in the understanding of the medium itself.

I always found myself motivated by the primary goals of modernist design such as modularity, standardization, simplicity, whether in architecture or smaller scale. I believe those great architects and designers by manifesting their own brave ideals, they provided us thing called as “modern design”, and ground rules of beauty which had been given societies better understanding of aesthetics and functionality which we now call principles of good design. However I personally think, as technologic and industrial developments helps designers, architects and many creative people to experience enhance forms and complex aesthetics, today the approach to design problems became even more diverse and individualistic.

The personalization of products is a major upcoming trend in many industries that is changing people’s lives rapidly. Changes that are extra-ordinarily intensive by upcoming technologies brings us great comfort and finished solutions, making people’s effort to build or make things have a less value. It’s a sad fact that marketing is often the motor of unnecessary change, replacing satisfactory products with products which may be less efficient but which are easier to sell. Technologies and new materials may improve performance and design; they may bring things up to date and occasionally innovate, but the experience of living with an object seems to have cheapened (Morrison, 2002)

In my opinion, making things have more of a value. However there is a ruling motive in current technologies which makes things less and less labor intensive. Thereby rules are more or less disappearing or becoming more invisible, so people are facing to make their own ways of using things. In my opinion this leads to two things. First, people are becoming the actual designer of systems by applying their own way of using things. Second, as personalization arises and rules of the games becoming unimportant some people might feel lost making decisions related to practical aesthetics. Let it be a finishing of color or fixing a furniture. Thereby some people might need guiding structures to help them build things fast without feeling frustrated with millions of options available. Both affects the behavior of people towards designed objects and we can predict that people today needs more freedom in the creation of their own surroundings and at the same time a little guidance in constructing it with a fine taste. In that case, modular design solutions might help get things done fast & easy, providing guidelines and giving people the freedom of choice playing out with the pieces to create their own ways as well as renew it overtime.

(Morrison, 2002)
Another motivation for me during this project had been pondering on the link between good taste & good design that makes the preferences more clear or obscure. What is good taste and how it differs from good design? During the research I realized taste is more of a personal matter being more or less associated with the question of beauty and aesthetics which is a universal issue. So what is considered beautiful is or should be rather a universal perception. On the other hand taste is something learned in the early ages and it is difficult to try to change it which influences quiet deal of people’s preferences. However, if we focus on what a product does to and for its users, rather than on what a product is, we can disregard superficial statements based on taste and instead reach to a better understanding of design (Design Journal, 2012). It had been interesting to think about these rather abstract relationships between things and people and industry, thus forced me to investigate more on the modular and free structural design solutions which could be developed into bigger systems.

Overall, the idea of people understand and appreciate good design in their own way if we designers try to think more of bigger systems thus communicating via objects that give people more options to create and arrange their own surroundings. Those attempts which would make people decide their own needs and make it possible to meet in best way for and by themselves are enabling people learn and share the knowledge that would be gathered from the experience of the “good” and the “bad”. Thus for their own standards, systems those help people be their own furniture makers just with a little bit more effort.

I personally believe this could trigger better understanding of design and lead to better use of things help creating more collaborative mindsets and make people be the designers of their own and set rules for themselves. So, instead of offering concrete and unchangeable suggestions, alternatively a design approach could focus more of systems and structures to push forward the creativity of users. After all design is not only a love affair with nice forms but also a knowledge of making things that inspires people, thereafter survives longer by renewing itself which is again could be achieved through modularity.

In the end, I would like to take a naive yet honest approach towards basic methods and hold back on to the primary goals to reach for a simple standardization which can allow little more diversity in use. It is a strong belief in me that modularity doesn’t have to create a sad monotony but could also bring fresh and unique alternatives to people’s lives allowing variations with a simple design approach.

Fig.2: Jean Prouve, Compass Table, 1953
Thinking about our lives are surrounded by many objects and things, I often wondered, how things we own reflects our thinking and communicates with others within social and economic codes. Design, being a highly overrated part of our cultural environments (*) of modernity, plays crucial role how we communicate our knowledge with other people. In other words, designers as defining the world we all living in, in visual way, in functional way, in service base, however are not God like persons, but their creations influences our likes and dislikes deeply. Being influenced by objects and as well as we are, using them back to reflect our understanding of it. In a way products providing us that certain knowledge that we use to share it back even without noticing, in practice good or bad. However, communicating the knowledge with other people could be tricky since expectations for a good piece of design would differ from one person to another. Considering why we like certain things and why not other things leads to the question of where “taste” is coming from and how it works for designed objects. How do we gain a certain level of taste and decide some things are nice and some are not, thereby, some things we want to own and some others we don’t.

The tension between good design and good taste can be a tricky one since we choose either with a subjective manner or based on professional skills. Some products are considered to be bad taste and therefore of less value. Because more or less design is also associated with what is considered beautiful, although this would not be enough to evaluate whether beautiful form equals good design. What is considered beautiful is rather a universal perception whereas taste is something learned in the early ages and if difficult to try to change it. (Design Journal,2012)

..“Beholder who lacks a specific code of facts feels lost in a chaos of norms and rhythm of colors and lines.” (2)

“...All human actions take place within social fields which are arenas for the struggle of the resources. Consumption is a stage in a process of communication, that is act of decoding which presupposes practical or explicit mastery of a code. Thereby, individuals and institutions try to distinguish themselves from others through consumer goods which take place in a system of first economic then cultural and symbolic commands. (3)

On the other hand good design is believed to be more or less socially structured, meaning that there is a process or a system of people creating the criteria determining what is considered to be good design. A good taste on the other hand can be institutionalized process and rather closed system of actors that belongs to organizations and institutions. (Design Journal-2012) Kawamura refers to this not only a process that is socially constructed but more of a symbolic construction or in our context product design, two different processes. What is considered good design is not decided upon in a closed system but there are certain institutions and actors who have great impact upon what is considered good design. Being linked to social and political change, the modernist thought were especially apparent in the education of designers. Nowhere was this more visible than at the German Bauhaus, where a language of design was created through a highly systematic pedagogical model which provided an international basis for design education in the years following second world war. (Penny Sparke,2004)

Good Taste vs Good Design

1- Symposium by Plato. Original Phrase is: “Remember how in that communion only, beholding beauty with the eye of the mind, he will be enabled to bring forth, not images of beauty, but realities (for he has hold not of an image but of a reality), and bringing forth and nourishing true virtue to become the friend of God and be immortal. If mortal man may”

2, 3- La Distinction by French sociologist Pierre Bourdieu (1930–2002), based on Bourdieu’s empirical research on French culture. Taken from studies conducted by Bourdieu in 1963 and concluded in 1967-68, the book was originally published in France in 1979.


1. Referring to design being highly “overrated” was meant that designer becoming the superior actor in creating surroundings for daily life is slightly questionable.
Bauhaus translated the aesthetic of functionalism into the production of objects. It manifested a philosophy to provide people with a certain level of well designed products on a materialistic thinking in the first step with a new and modern sense of beauty. It is also pointed out that a product must have a proper function first not just appearance. And there is the idea of originality, merely imitating something already exists gives the product less value. The idea of beauty is a kind of beauty which has a purpose such as architecture as Bauhaus manifests. It was a theory which had been in existence within architectural circles for some time, but it had not yet been fed back into mass. The impulse behind the Bauhaus was to give modernity a precise physical form. Its emphasis was urban and technological, and it embraced 20th-century machine culture. Mass production was the god, and the machine aesthetic demanded reduction to essentials, an excision of the sentimental choices and visual distractions that cluttered human lives. Produced goods themselves even through modern architects had been developing the idea of “machine aesthetic”. However, the limitations of modernism in design resided, ultimately, in its failure to achieve the level of universality to which it aspired in spite of the limited audience for modernist designs the impact of modernist ideology upon design and practice was and remains without equal. As a value system underpinning the role and purpose of modern material culture it penetrated the design education system and the cultural institutions dedicated to design to the extent that it became the overriding philosophy of twentieth-century design. Thus, modern aesthetics failure to grasp universality still present. (Sparde,2004)

**The idea of today’s world is already recognizable, its shape still unclear and hazy** (5)

Another yet individual approach during 20th century came from Italian designer Enzo Mari proposed Autoprogetazione in 70’s – his hope and argument was that if people gets the knowledge of making things, they would understand it better and appreciate more. Mari investigated an unprecedented level of personal education and involvement in fabrication in an industry that had become complacent about the standards of the assembly line. Mari’s project for self-made furniture contained a set of instructions for 19 pieces of furniture in the form of cutting plans and axonometric drawings. Autoprogetazione, conceived in 1971, was essentially a reaction against the increasing pressure to produce consumer goods for a public that did not understand the kind of quality that Mari was able to achieve. Mari believed strongly in the pedagogical role of design and is always searching for the ideal interaction between himself, the industrial process and the consumer of his works. He reasoned that if people could some-how participate in the process of making a designed object, they would understand and engaged in a sympathetic project of discovery. Some might argue that this is forcing people for working more to have a piece of furniture is not the best way to serve people. Designer’s role should be to make people’s life better easier. However if we consider that furniture might demand a little bit more effort and might not be perfect solution for everybody but they are creating opportunities for people to meet their own needs, these attempts could help trigger changing people’s mindsets for good in terms of how to decide the “good” for themselves.

“Design is only design if it communicates knowledge” (Enzo Mari)

A collaborative mindset of a designer, meaning that designer being willing to share the knowledge of making things, like Mari did is an interesting one. By modular components to be put together by the user to set the actual needs whether it be regarding to use or just aesthetics. This would save the designer from making decisions those associate to personal preferences which could be subjective both in use and aesthetical levels. Design output could offer a system of self-supporting pre-fabricated components to be gathered and brought together by the user itself. Even slight adjustments that create slight differences in appearance would give more freedom to the user and enable them communicate the aesthetics via objects.

5- Gropius (1923 // As Gropius saw it in 1923, “The idea of today’s world is already recognizable, its shape still unclear and hazy”. The impulse behind the Bauhaus, which was more a philosophy of life than a teaching institution, was to give modernity a precise physical form. // Fiona MacCarthy, 2007)
To sum up shortly overall, I believe that the main characteristics of design could be seen in the details of making things. Concentrating on the structures and components that are brought together and units that enable several adjustments are associated with form and functions could bring fresh insights to the user. Since beauty to people is somehow comes with own experiences what ever designers do could only reach to those who enjoys the similar norms of beauty. And most of the time people are lost in the immerse options that are available for them. So, simple and modular solutions seems like one alternative way to go. Moreover, If we focus on the functionality of systems with honest aesthetics, components those come together in a particular way, already ensures a character. And design value would be recognized and appreciated by the user in time. User taking the responsibility of making a piece of furniture stretches the given aesthetics and not only communicates through the possession but also communicates a certain knowledge of making things. This way experience of “design” becomes collaborative in the long term, yet maintains a certain character that is given to the product by the designer.

“There are better ways to design than putting a lot of effort into making something look special. Special is generally less useful than normal, and less rewarding in the long term. Special things demand attention for the wrong reasons, interrupting potentially good atmosphere with their awkward presence.” (J. Morrison, 2006)
In my opinion, there are three main aspects that help remembering to achieve such goal “communicating the knowledge”. Those aspects are structure, longevity and modularity.

First of all structure is one thing that defines a knowledge yet leave room for individual discoveries. Structures basically offer us an account of what a system is made of. In terms of products they define a unique configuration of items, a collection of inter-related components. A structure is the core of a design. It makes things stand while putting all the components into order and determining a particular character where and how it connects ensures certain forms come real. Structures also sets certain rules determining how components will hold on. Since they allow us to stretch the given rules and create things with, it is specifically where identity arises above all. Besides, what one’s appeal to a product is based on personal perceptions whether experience or feelings attached, therefore user’s final touch can be ensured while designer’s primary touch still maintained in the structure.

Second aspect in order to communicate knowledge of design would be via longevity of a product. The word “longevity” is also used as a synonym for life expectancy. The subject of longevity in design is a tricky issue yet everybody seems to take different sides of what sustainability can really mean. There can be several ways and approaches that could ensure longer life span. Societies have different record of economy and the history of building things, in other words history of communicating the knowledge, also differs from one to another.

So we could assume that perception of longevity cannot be thought as one and the only one. Longevity coming with certain quality of a design is one important matter however different industries set rules for designers so that they find better working solutions for the societies.

On one side term itself suggests using good quality of materials and unique methods to make a piece of furniture that would last generations of generations. For instance, in Finland designs are tend to be long lasting which makes it easy for repairs and people use furniture in good shape for long, reuse them live happily ever after. Thanks for the record of own history of making things design communicated in everyday life, it became a valuable tool which is is understood in daily practice. And of course people can buy or find good quality furniture. But this is not the case for the rest of the world, yet the question of how do we preserve the “design” still exists.

On the other side, modularity refers to being designed with standardized units or dimensions, as for easy assembly and repair or flexible arrangement and use. It can offer a great deal of variation of a system. When we think of life expectancy of design, not only the life expectancy of materials but the characteristics of a product also become important. As long as design knowledge is communicated over generations, structures ensure a longevity of a design too. There comes the practicality of modularity in order to keep the personal means of quality and design value too. If we make this particular detail for the components fixed with standard items and choosing materials in terms of their life span, could bring longer life both in terms of materials and of design idea.
In a furniture module at Aalto Arts with Simo Heikkilä’s Sustainable Furniture course, I started thinking about modularity and I noticed its varied advantages in the long term for my designs. I looked at industrial ready made metal pieces that are for constructing houses and thought about how to simplify the structure that such as L and U profiles needs certain supports and bearings and make it unique but modest at the same time. This idea of somehow trapping a constructive idea into unique shapes gave me inspiration to think more about modular structures. Moreover I discovered that making the core elements of construction standardized with unique forms that works well in a modular system. In summary, modularity gives us three main advantages: design gets to be concrete yet flexible in us, possibility of variations in design increases, freedom of personalization is enabled. Co-Co as the name of the furniture concept explained, is a an abbreviation of the two words “collect” and “connect”, reflecting the overall idea of making furniture with pieces.

It is a simple table & bench structural leg detail that allows modularity. A structure based on similar components in several sizes in order to create several tables and benches. Coco is a free table structure which enables finishing it with glass or wooden table tops. It offers a certain way of construction but leaving the further decisions to users regarding to the sizes. Suggesting several options of how to connect for the legs, cross bars and with extension pieces. Instead of an additional connector the table leg itself becomes a joint by attached together tightened with cross bars. Although, there are many alternative ways to construct it in terms of dimensions, structural characteristics remains simple and modest. This not only enables an easy assembled structure but also ensures a certain aesthetics.  

Co-Co is a modular system offering building table and benches with identical legs that attached to each other in the reversed position, making it possible to adjust the width of the support that is needed for the table top. Thereby, It allows making narrow or wide structures. There are no additional connectors, legs has a unique shape eventually fits into one another.
There is one type of leg and two sizes for each. Both legs can be adjusted in at least two positions, also the width of the table or bench can be extended with an extension pieces. It is also possible to use these legs in both directions. For example, they can be on the sides or on the front which enables creating different looks and different sizes (Sizes decided for this system can vary). I considered offering table and bench with most standard sizes. Although it could be possible to make higher or lower tables, benches as well as other structures. There are two sizes of identical wooden leg namely coco-L1 with the size of 30x70(h)cm for making tables and coco-L2 lower wooden leg with the size of 27x45(h)cm for making benches. Both legs can be doubled, reversed horizontally flipped and fixed together with screws directly to the cross beams.

Both structures can be extended both in width and length. In width extensions starting with 60 cm ensures a 90 cm width table. For the cross bars starts from 110 cm making 125 cm tables at minimum, till it can extend up to 200 cm with middle support having the same detail for connections and using the same leg adjusted to middle if length of the table of bench requires vertical support.

Design solution and the main characteristics are provided by the simple and unique detailing. It aims to achieve a basic level of aesthetics with a straightforward attitude in the use of materials as well. However, at material level, primary role is given to the wooden leg which is the actual joint in the structure itself, since it has a special form allowing adjustment of the legs. It is also because it has the bigger surface and more unique character in texture compared to metal. Decisions regarding to the finish of the wood is assumed to be set by user thus can be varied and diversified based on personal preferences.
CONCEPT
Design process took a start with short surveys with people on the use of domestic furniture, prefabricated furniture and building things by yourself. Following these small surveys, before conceptualization and idea developing, several scenarios are drawn to get a glimpse of a bigger picture regarding to the use of tables.

Following to this process, first concepts derived from previous design practice Kulma Table, continued with further mock ups and scaled models, ended up with a detailed consideration of a particular detail. After several trials with 1-1 scale prototype tests to check how materials do with this particular detail, I came to realize that a good structure lies in the very simple connecting solutions with less materials. Thereafter, idea of using an additional metal joinery as a connector was eliminated and the components are decided to be of the same material (wood) with no additional joinery.

During this process I also realized that a simple and ordinary look can be achieved with less pieces. I decided that it is better to concentrate on one material that leads to simpler connections in terms of modularity, which will require less effort and time needed to construct the components for the user.
In the beginning of the research, to be able to frame the scopes of my design, I made small surveys with people. They helped me check my initial thoughts regarding to modularity, building things at home and furniture consumption. Surveys were conducted among 25 people including design professionals as well as people with different backgrounds and education. There were 3 main resolutions arising from the surveys.

First of all, it was interesting to learn that people do not buy furniture just because it is beautiful, interesting or just to the need, each have personal combination of the ready answers. So, responses are more personal than expected. Each person has their own perception and a response to the “beauty”, function and is regarding to their individual needs. People were asked what they think makes a design unique. 13 of the responses were, nice form & shape, 12 said clever detail & function. Another interesting highlight from the survey results was that 15 people of 25 said clever detail and nice form with function makes the most special of a piece of furniture. Most of the results showed that people like it when furniture is “beautiful” and covering their “needs” which are both associated with individual perceptions. Another interesting result came from another set of questions “how do you use your table” or “what is your most used & liked furniture”. 20 of the 25 people said that they have their own setting but nothing special is needed around the table. They spent variously 2-7 hours around tables. People also mentioned that they like the idea of making things themselves but building up takes a lot of time to, although they enjoyed the time spent. They also indicated that making things by themselves adds a certain value to their surroundings. So feeling around the table is that is can be bigger or smaller compared to the room which can cause problems. Otherwise, habits around the table, on the table are similar and people do not required special additional features much rather than good lighting and well arranged space.

Based on these small surveys, I came down to realizing, tables are important pieces of furniture at home which more or less some surface is always needed with dimensions that would fit the surroundings. Therefore I began sketching many scenarios around table and the modularity, in the end they provided insights for what it should be like for a single table.
My study practically started with Kulma table. A course taken in 2011 by Simo Heikkilä and Martin Relander was called “Sustainable Furniture”. The term “sustainability” was discussed in a Finnish manner, how do we make things that last longer which motivated me to think more about how furniture components combines together.

The word sustainability is derived from the Latin sustinerere (tenere, to hold; sus, up). Dictionaries provide more than ten meanings for sustain, the main ones being to “maintain”, “support”, or “endure”. For humans, sustainability is the potential for long-term maintenance of well being, which has environmental, economic, and social dimensions. Moving towards sustainability is also a social challenge that entails international and national law, urban planning and transport, local and individual lifestyles and ethical consumerism. Ways of living more sustainably can take many forms from reorganizing living conditions.

During the course we held on the approach that was to think of durability and stability of structural features of a furniture as the primary goals rather than how it looks like. In the end the outputs of each person changed but overall the furniture were neat and durable in the structural features each showed particular character, a certain way of thinking. This was inspiring to me for long and influenced my goals for the final product and made me realize my primary goals in a design would be first a structure leading to certain functions that are playful or adjustable and second formal expression.

The process was challenging regarding how to design one element that would have a unique shape that highlights the structural elements of the table but at the same time this joinery would be hidden behind wooden legs so to keep it “normal”. It also gave a certain level of aesthetical impulse while just doing its job by supporting the elements and forces as well as highlighting the modesty.

Kulma, was about with a prefabricated design approach would make a table joint that would survive longer with less constructive pieces. Structurally no beam or any other supportive element or third party was needed, trying to save the design value with concrete parts that have a unique shape. The connector material used for was 7mm thick carbon metal flat bar. It had a shape exactly for balancing all of the certain pressures, ensuring a stable table. Further on, Kulma was special in its own way but it was not a system detail. It was an idea for only one table. Since I already got into the thinking of modularity, I wondered how far I could go with a metal joinery to connect pieces in adjustable ways to fit the needs. As well it motivated me to think more about modular furniture systems. I was interested to try making the joint smaller and more practical as well in offering alternatives with same unique shape which in the end disappeared surprisingly along the way.
After a while sketching, a basic scenario came out highlighting the possibilities that would be looked upon. To decide how to start with the tables I thought of sizes of the tables from the child desk to young adult. This was crucial to understand the size and height variations to be used in different situations. After several discussions and meetings, I decided to focus on three main sizes and start with the bigger heights that would also be suited for smaller sizes and different situations too.

During this process, I also thought of some key words defining the features I am aiming for. This helpful to draw a mental picture and to get back at each time when things got complicated to remind myself of the main principles. And those key features were; modular, playful and modest with a primitive look and easy assembly.

To be able to decide what sort of furniture concept that would be, I went through several stages and pictured the situations for kids, teenagers or adults. To start with a system design, I sketched down several scenarios of the uses and functions of tables or benches. There are many functions that could be considered when we think of the uses of basic desk & table structures. The overall heights of tables vary depending on the age. For example, the size of a side table starting with 40-45cm height, this is also a close measure for child desks which start with 45-48cm height or on other words junior size tables for 4-5 age group. If we continue with the storages compared with elbow heights combination, sizes could be generalize as starting with 50-55cm up to 60cm. Then work and dining tables can be fixed around 70cm. For example desk & standard tables would start 68cm for easy dinings, 70cm for dining tables and 72-75cm for a work desk. This chart leaded to a generalization of the heights for a set of table structures. There are three main sizes that I decided to work on; 45-55, 55-60, 65-70. According to the drawing, I cited mainly 5 group of height. Numbers starting with age 4-5 with the heights of 44-48cm as junior size and turns to stay stable around the age 17 (being young adults) with the height of 67-72cm for the elbow heights. Thinking about the height as humans evolves using several pieces of furniture were crucial to understand where to start designing.
After this height and variation scenario I start creating concepts. First concept derived from an existing furniture study Kulma Table. Corner Joint Concept was an investigation of a corner piece of that is similar kulma table joint. Corner joint concept was developed to imagine what kind of structures could be created out of it as an initial step.

At this stage, half of a metal of Kulma joint used as a corner joint to connect the tables with small storage items. The result of sketch was a good exercise to think of the tables and variations in a broader sense. What is learned at this stage was that the main structuring of the connections plays more important role in a system than one “joint” which is an just one of the elements of a piece of furniture. On the other hand, Corner joint was also used to see the challenges in a bigger picture while trying to sort them out rather than start making one table.

Corner joint concept had been a good exercise to focus more on how different sizes and storages could come together to construct bigger settings and how would they look like as well as in their combinations.
Since Corner joint concept was a start up stretching exercise to better see things in a bigger scale, I sketched down another table structure concept which focuses more on the pieces. This was a stage where I took everything down in pieces, laid down the main elements and mark them later to be combined and organized into more concrete elements.

Several pieces coming together mainly are table tops, legs and additional elements that are no longer considered separate items but every single item as one elements contributing to a structure.

For example, main beam, legs, end connectors, connectors and table tops support are the components of the structure. Each one representing one constructive element, given different colors so to overview a broad image of the pieces in a modular and basic schema. Then, primitively thinking focusing more on how many components makes the structure.

One by one, elements are classified in two main groups. The connectors and the elements that are connected. All the elements both connected or connectors are no longer separate within the structure but all are sub elements of a whole. This approach showed that considering each structural joint that are connected to each other same way having different shapes but those shapes are identical and could be combined and arranged in order to change or re-set pieces of furniture.

Therefore those components that are taken down can be united again in particular ways based on their function or structural need.
A Basic Image

To make this selection of gathering of each component easier, a basic image that stands out suggesting a basic structural preference was needed. As a kind of step back from small pieces to the big picture, thinking of an identical and whether a primitive look; a look that has certain constructive elements and should be used when re-organising the pieces to figure out the organisation of reuniting.

Then combining this image with the data that was gathered from the research, a selection of the several heights were picked using the first scenario prepared. Primary sizes decided were pictured with a strong visual image so that the size and overall aesthetics could be decide. Heights at this stage were, 45-50 as junior table size, 56-66 as low table/side table size and 68-72 as standard table height for work table or dining table.

This followed a thinking of variations of the legs whether it would be one piece or divided into two parts. The basic shape divided into two parts first. A wing support would carry the table surface while legs can be attached to that with varying heights.

Fig. 14: Scaled mock-ups for basic image

Thereby we would have a table with several heights. Table top supported by and the leg connected with a cross beam which are at this stage thought would be all of the same material. However, a particular material was not considered at this stage focusing only the relationship between the pieces. Simple look to be maintained whatever it takes when combining the components of the table.
Next step was to think about materials to make things more clear. I thought of spicing up the visual aesthetics with combination of two materials while maintaining the simplicity of structure which later on lessening the elements that the structure needs. Thinking of two materials helped highlighting some of the elements where later on I tested with prototypes and decide where the structure focuses.

For instance, I wanted to combine wood with metal crossbars in the beginning. This would allow me to have a simple & straightforward look with highlighted detailing. In modular sense of the product it be also highlighted with variation of the selected materials that would stand out more distinctively and give the product a colorful aesthetical character.

Then, using several materials together also could help organising the functions around the tables. For example, with the second round of materialised concepts of table with small drawers inspired me to try several other structural possibilities with wooden table legs.

At this stage if one needs to make a rather subjective decision regarding to the primary elements of the structure, as a driving force this would be the wooden part. Because it gives a certain character to furniture and the connection underlines the difference between the sizes.

Personally I think of wood as the primary element because of its own characteristics as a material. That would be connected and shaped to adjust heights and length and metal as secondary element that is to connect and unite these modules with a simple logic. Then thinking of tables with similar elements, at each step I added and leave out some additional elements to check and consider the variations that wooden legs would provide.

There were three tables to consider with 3 different looks and function in the previous examples. Coffee tables or benches were thought as low tables, narrow tables for working purposes and large tables were thought as dining tables or meeting tables. So, the design question in short was; how to make a table with a simple look which would allow me construct all these table variations.

In the end I decided to split up the structure so that it would create variations in terms of combining narrow or wide surfaces.
I continued with wooden leg & metal beam idea but in a half structure. Half wooden leg attached to metal beam in several shapes. 3 different form for wooden legs with different heights so to have a variation in terms of making different tables such as low tables, narrow tables and wide tables.

If we think of everything sort of in a mirrored way, symmetrically legs would come together in same symmetric rhythm. With this in mind, if we have a cross bar or beam that splits the legs into same two kinds, we would get three different table with same beam. In a way playing out with the wooden legs we would have different tables if we enlarge the surface needed we would need extensions with different sizes. Thereby idea can evolve into a bigger system of legs.

1 / Small tables such as side tables, coffee tables or low desks
2 / Narrow tables such as, work tables, side tables
3 / Big tables such as meeting tables or dining tables
Splitting up the structure

However, there is another way to apply the same thinking for the wooden legs which gives more exciting and simple as well unique joinery.
Splitting up the structure

If we think of a form that splits the structure into half with a non-symmetrical self standing form given to the leg, we could have the possibility of adjusting the width of tables in to more narrow or wider. Besides, this leg system would look as simple as the first sketch when it’s fixed.
If we think of a form that splits the structure into half with a non-symmetrical self standing form given to the leg, we could have the possibility of adjusting the width of tables in to more narrow or wider. Besides, this leg system would look as simple as the first sketch when it's fixed.

Dividing the structure into half legs that are same kind would make it easy to understand for people who wants to build up table, thus which would save from time spent for building it. If you just figure one detail and put them together where you will have half of the structure already and it would be quick to connect the rest of the pieces.

So I thought of one type of leg repeatedly coming together in a modular way. Several structural trials made to reach a better form. With further examples I got closer to the look of table in the initial sketches that underlines a very simplified and straightforward look. These legs would fit together easily with screws and with their own shape and in the next step one could connect those half legs with cross beams and make a table.

First, a basic shape obtained with a wooden mock up, following trials both in scaled mockups and in 1-1 scale mockups to divide that form into two identical parts.
A decision was made to continue with one type of leg in principle among all other trials. Identical form with a simple look, self-standing half structure with easy assembling detail were achieved in principle. This type of leg would be checked with conceptual scenarios again to figure out its own possibilities in the big picture, later to eliminate and simplify.

Simply, these legs have same shape enabling them to slide into each other easily with a strong and flexible connection which reminds the basic form that was sketched previously. They repeat same form which goes into each other in reversed position, plus they enable several positioning. Thus we have here a half structure of a table. Three initial positions marked and tried out to check with possible table sizes that are planned to make.
To further make decision for what kind of variations would be achieved with half leg system I developed two concepts for it.

In the first Co-Co module concept there were two types of legs to unite in several ways to make tables and benches. Both of them have the same form but in two different sizes (45cm, 70cm). And they were also attached to each other with same kind detail. The reason behind making two different sizes in two different shapes came from the idea that legs could allow supporting wider surfaces. Therefore, second type of leg came additional to check the various possibilities. Half legs make narrow tables and bigger tables. Smaller versions of these legs make low tables or benches.

In the second Co-Co concept two types of legs was eliminated to one and sizes were added up to three (45cm, 60cm, 70cm). Again, same one type of leg in several sizes can offer making several structures. It was exciting to think of low tables or benches, storages (with same leg as benches but with different connection points), seating with arms and tables to be built up with similar approach.

However, connection points in several sizes would require certain compromises regarding to the simplicity of each leg itself. Moreover, thinking of these connection parts second concept leaded to more detailed version of a system detail including metal joinery and focusing more on the table structures in various sizes.
CO-CO > Checking all the possibilities > Step 1

Fig. 20: Co-Co Table Concept Step 1, Low setting & high setting

Fig. 21: Co-Co Table Concept Step 1, Storage, bench, table, wide table
CO-CO > Checking all the possibilities > Step 2

Fig. 22: Co-Co Table Concept Step 2, Swatting with arms, storage, bench, table

Fig. 23: Co-Co Table Concept > Three levels sizes are 45cm, 60cm, 75cm
In the end, I took a basic step and picked one table and bench structure to start with the prototypes to make sure of simple and unique detail for an open system of tables. During prototyping I realised that even with same size of one particular form several more sacrifices were along the way based on materials, which gave Co-Co Table Concept a certain direction and a final form table structures.

Fig.24 : Co-Co Table Concept Step 3 > Reduces sizes are 45cm, 70cm with extension pieces for wider structures

Fig.25 : Co-Co Step 3 > Metal connectors with extension pieces

Fig.26 : Co-Co Step 3 > Metal connectors with extension pieces
MAKING IT
After the decision was made to continue with one type of leg and two sizes in concept and with experimental mock-ups, prototyping process began. There were three main stages during prototyping. Starting with wooden mock-ups, then wooden mock-ups with metal connectors and finally detail developing ended with simplified wooden legs as final prototypes.

During this process the most important discovery in both structural and aesthetical way was, one item one material one simple detail would be enough to create variations.

This item is the wooden leg, which gives the overall character and offers particular assembly.
1-1 scale mock-ups helped checking overall dimensions and proportions for the tables. These models also helped sorting out the structure with same kind of detailing only with wood. Structure was tested and lengths of each leg for the surface support were adjusted.

These mock-ups had different detail for better hold & easier fix and fast building time. However, to make the table size whether narrow or wide metal fixtures were to be tested than making one table.
Second step was defining a metal joint to tighten these wooden legs and attaching them to cross bar and thinking of the metal pieces that would connect the wooden pieces with cross bar. Several metal joints were tried out starting with simple L profiles with several thicknesses. Then, to make the connection as tight as possible and to maintain a good hold for wooden legs, further trials were made with metal flat bars. Varying sizes were 4mm metal flat bars first. Eventually these metal parts got thicker and thicker to make sure of a strong connection between metal and wooden parts.
Making it > Wood & Metal

Step 1: Basic L profiles were used to connect wooden legs.

Step 2: More specified form for metal to connect wooden legs was applied.
Step 3: Metal & Wood structure with one beam.

Step 4: Metal & Wood structure with two crossbars, which would allow making wider tables (Ref. P.70&71: Checking the Possibilities > Step 3).
Step 6: Metal pieces getting bigger and thicker (from 4mm to 6mm flat bars bent). Several sizes and shapes tried out.
Step 6: Metal piece at final stage, two more variations which in the end were both eliminated.
Following the metal pieces, another step taken was the detail for the wooden leg connection. In the first examples, I tried several details to get strong connection between the wooden legs. I thought this would make the adjustment of the wooden legs more tight enabling a better holding of the pieces. After several types of sliding details, I also decided to eliminate these details because in the end, flat finishes were better to make it easier to assemble.

At this stage, I also decided to reduce three-level positioning into two main positions which will eventually lead to third position with the use of extension pieces (Ref. P60-61: Splitting up the structure > Half Leg).
In the final stage I decided whether I should use an additional metal piece or just wooden beams to connect the legs. My decision came from the obvious practical tests of the prototypes. Both metal and wooden parts had distinct character in form, which could be visually disturbing. After looking back and check with the primary goals of my design I realized that those components both aesthetically and structurally were fighting with each other, so it was better to eliminate one that seemed unnecessary.

Therefore, I decided to continue only with wooden cross bars with bolts tightened with inside bits allowing the wooden structure to be more easily assembled with less pieces with more simplified look.
Making it > CO-CO Structure

CO-CO L1: TABLE
1/ Co-Co L1: 700x300mm
2/ Furniture bolts (M6x90mm)
3/ Cross beams (1200x97mm)
4/ Barrel nuts (M6x20mm)
5/ 1400x610mm Birch Wood table top
6/ Middle Support

CO-CO L2: BENCH
1/ Co-Co L2: 450x25mm
2/ Furniture bolts (M6x90mm)
3/ Cross beams (1100x97mm)
4/ Barrel nuts (M6x20mm)
5/ 1200x380mm Birch Wood seating
6/ Middle support
CO-CO L1: TABLE WIDE (WITH EXTENSIONS)

CO-CO L1/700x300mm with cross bars from 1400 to 1600mm, and middle support. Table surfaces can make 1600 or 1800.

CO-CO L2: BENCH WIDE (WITH EXTENSIONS)

CO-CO L2 (450x25mm) with cross bars from 800x800mm, 1000x1000mm or 1400-1600mm to make 1600mm or 1800mm lengths.
CO-CO > Final Prototypes
CO-CO > Final Prototypes
Final Thoughts

I believe that design’s character lies in the structural thinking and my suggestion was to investigate how to accomplish this goal through modularity. How design could generate more possibilities for the future with a simple touch of materiality was the essential question that I asked during the design process. In the end, I wanted to suggest a design that involves other people's effort to make it, which I think could be a way to communicate design knowledge. Since modular designs could push people’s creativity in terms of fitting things into their own surroundings people have chance to discover of what is good and useful for them.

Study had thought me many things. First of all, to overcome the limitations and challenges of modular systems I kept the importance of simplicity of details in mind and let material thinking be the most important element.

Second, design process required simplifying in several stages over and over until one and only element stands out. Therefore balancing the two extremes which were both aesthetic decisions and pure functions with consideration of materials and their combination, I came to realizing that less noticeable things such as details could add more character to a furniture.

I also think it had been interesting to experience how a previous interest such as “instant constructive metal joinery” evolved into a furniture set like Co-Co.

Third, I was able to keep the first basic image that I pictured and felt confident about the structural features of the design as well as the simplicity both in assembly and visual aesthetics.

It’s all been a fascinating discovery for me and I find it fascinating to experience that, being a designer there should be no fear of losing special forms or when designing for modularity. Because in the end people should give it a real meaning and character when they actually use as their own furniture. And as I tried to contribute to it, I believe that beauty of designing furniture not only lies in the present solutions but as well in the future possibilities of the provided systems.

Deniz Uner
April 2013.
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Bouroullec / Steel-Wood Chair / 2007 http://www.bouroullec.com/
Image Credits

Fig.1: Alvar Aalto, Artek edition from 70's.
Fig.2: Jean Prouve, Compass Table, 1953
Fig.3: Marcel Breuer, 1928
Fig.4: Marcel Breuer, Nest of Tables, 1930
Fig.5: Enzo Mari, 1974
Fig.6: Enzo Mari, Autoprogettazione, 1974
Fig.7: Enzo Mari, Sedia Chair, Autoprogettazione, 1974
Fig.8: Jasper Morrison, Big Wood Table, 1993
Fig.9: Ineke Hans, Tête à Tete Ordinary Furniture Sets, 1997-2005
Fig.10: Bouroullecs, Steel-Wood Chair, 2007

Notes

1-Symposium by Plato: Original Phrase is "Remember how in that communion only, beholding beauty with the eye of the mind, he will be enabled to bring forth, not images of beauty, but realities (for he has hold not of an image but of a reality), and bringing forth and nourishing true virtue to become the friend of God and be immortal, if mortal man may." Plato does not teach the aesthetic view that "Beauty is in the eye of the beholder." That view not only makes the point—which all philosophers recognize—that people differ in what they find beautiful. That view also claims that there is no standard beyond individual opinion (anyone’s view is as good as anyone else’s). Plato holds that there is an eternal form of beauty, "the beautiful itself," which is not a subjective affair of what any person happens to prefer. According to Plato, some are more advanced than others in their realization of beauty. What I did say was that Plato recognizes the grain of truth in that theory when he implicitly acknowledges that people’s views differ regarding the beauty of bodies, customs, and so on.

(*) Referring to design being highly “overrated” was meant that designer becoming the superior actor in creating surroundings for daily life is slightly questionable. As Morrison mentions in Super Normal: "Design, which is supposed to be responsible for the man-made environment we all inhabit, seems to be polluting it instead. Its historic and idealistic goal to serve industry and the happy consuming masses at the same time, of conceiving things easier to make and better to live with, has been side-tracked. Meanwhile design, which used to be almost unknown as a profession, has become a major source of pollution.

2, 3- La Distinction by French sociologist Pierre Bourdieu (1930–2002), based on Bourdieu’s empirical research on French culture. Taken from studies conducted by Bourdieu in 1963 and concluded in 1967-68, the book was originally published in France in 1979. Richard Nice translated the work into English, and it appeared in the United States in 1984 under the title Distinction: A Social Critique of the Judgement of Taste. In 1998 the International Sociological Association voted it one of the ten most important sociological books of the 20th century.


5- As Gropius saw it in 1923, "the idea of today's world is already recognizable, its shape still unclear and hazy". The impulse behind the Bauhaus, which was more a philosophy of life than a teaching institution, was to give modernity a precise physical form. // Fiona MacCarthy (2007)
To those who inspired me, guided me and supported me during my studies as well as during my life,

With my deepest thanks to you all!

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