Problem Analysis 1

When you are going on a trip and have to stay out for one or more nights you usually need to pack some luggage. The way people pack their luggage is not always the same. Some just throw their items randomly into the suitcase, while others put it nicely into to suitcase but without a specific order. Others again have a system regarding which order the items are put into the suitcase. If the bags are not packed in the smartest way possible that means that the consumer have wasted useful space and there fore not fully. Another problem with unorganised packing is that there are no order in the bags and it might require a bigger amount of time for the consumer to find things they are looking for.

1.1 Problem

In the modern society, families or groups of friends tend to take on vacation to other countries to relax and enjoy their vacation or explore the world [Baumgarten, 2012].

When going on a vacation or a business trip packing a suitcase is normally needed. You need all you personal items and cloth with you. The length of the stay, the purpose of the trip, and the number of people travelling together effects the weight and size of the luggage. This can be a problem due to the different rules or limits to your luggage when using different means of transformation.

The time spend away affects how much clothes the traveller will need to bring and/or if the traveller will need to wash the cloth while away. A longer stay means of cause that the traveller will need more cloth. This affects the size and weight of the luggage because you will need more or fewer items with you on different trips.

The amount of items to bring also depends on what kind of trip it is and the purpose of the trip. For example if the purpose of the trip is a sport competition, you might need to bring some equipment, you would not normally bring on a holiday trip. If it is a short business trip all you might need could be a briefcase with your papers and a suit to wear.

The amount of luggage depends on the amount of people on the trip, because everyone needs their own personal items, and their own cloth. This can be a problem if the persons have a lot of shared items that has to be spread in different suitcases and need to be found afterwards and it might also effect the total weight of the luggage.

It can be frustrating, when travelling with many and/or heavy suitcases, if you need to carry the luggage far. It can also be hard to manoeuvre if where you are suppose to walk is a small space or a narrow passage or if simply filled with a lot of people constantly

blocking your way.

There can also be a problem with too large or heavy suitcases if you are travelling by plane since this can result in a fee. The size of the fee varies from airline to airline and can be found on the airlines website[SAS, 2012]. The fee has been introduced so the airline bag-handlers do not risk getting injuries by carrying too many, heavy suitcases.
To avoid this fee it can be an advantage to pack the suitcases properly and limit the choice of items to bring so the total weight does not exceed the allowed weight.

Packing

Because of the weight and size restrictions at the airports it can sometimes be difficult to get all the items you want to bring into a suitcase that is small enough and not exceed the allowed weight. It can sometimes be necessary to acquire more suitcases for the trip or leaving some of the items you wanted to bring. Bringing more luggage means you have to pay more to get the extra luggage with you on the plane. A way you might be able to avoid buying and paying for extra suitcases is to pack the suitcases more that there is meant to be. This mean that the suitcases packed more compact. This on the other hand increases the bags weight [SAS, 2012]. This should be thought through because too much weight can be unhealthy to carry around if the luggage is packed to heavily.

The increased weight means the bags might exceed the limit for weight and therefore trigger a fee for overweight luggage. It seems people often pack their luggage more compact instead of taking extra bags with them on vacation. Generally people take a lot with them on vacation and they might not have packed their luggage the most effective way [of Transportation Statistics , RITA].

An American website for statistics,[of Transportation Statistics , RITA], shows the amount of fees given in context to luggage that have been registered at the U.S. airlines. Through these statistics it is possible to see, there are people that exceed the set of limits given by the airline. A note regarding this source is that the size of the fee is a combination of the different rules and related fees. Therefore the statistics do not give an accurate image of the problem with weight limit, but a more general image of the problems with luggage exceeding the given limits.

The problem with packing luggage is mostly the same if it is by train, car, or flights. But flights is the one transport where it plays the biggest role for the traveller because it has economical consequences. With train and car it is more or less up to the traveller how heavy the luggage is allowed to be. There are restrictions to how big the bags are allowed to be in the train. For train it is 100 x 60 x 30 cm [DSB], for cars it is the size of the car and number of passages that defines how big the suitcases can be for the journey to be safe, because the less passages there is, the more space there is for the luggage.

When going on vacation, and using the car as transportation, the size of the car sets the limit in size of the luggage, since you cannot just pay to get more luggage with you than fits into your car. The weight might also have a influence on the amount of luggage there can be in the car. Because the car might not be able to drive well if the certain car is over the excess weight, since there is cars that can lift more than other.

There can be many good experiences and memories on a vacations. The memories tend to be bound to photos, items and souvenirs and thereby makes it easier to remember. Photos and souvenirs also have a certain value and can be used to fill the home with memories about the past experiences. With this in the mind, it is important to make room for possible souvenirs or other things that simply had to be bought while away.

These souvenirs can be a problem to bring home. As earlier mentioned the weight and size of the luggage is a problem before the departure, therefore it will normally also be a problem on the trip home. This means that if a family packs just to the limits and then buy things and souvenirs on their vacation they will get into trouble when packing the luggage for the trip home.

So the general problem is packing the luggage in the most effective way and spreading the weight in the available suitcases, without violating the different rules or limits to size and weight. It can also be a problem to pack the suitcases to the trip home due to the bought souvenirs or other items.

The reason to the problem could be that people find it difficult to pack the luggage for a trip and therefore pack more than they actually need on the trip.

The consequences of luggage exceeding the weight limits at the airlines are that the traveller will have to pay a fee for the extra weight. Train passenger that exceed the size limits might not be allowed to have their luggage with them if the dimensions of the suitcases are to big. There is not a program on the marked that specific help parking luggage for a trip, but there is one that help with parking a container[sol], where one can see where the different item need are places in the container. A other solution is a smart-phone application[?] that help with packing a suitcases by making a check-list over what to have with you on the trip. But the application do not help on how to pack the luggage into a suitcases.

1.2   Luggage allowance

Because of the capture and crashing of an air plane into the World Trade Center on the 9th of September 2001, the security of airports have increased dramatically. Some of the hijackers carried knives and box cutters and this led to an immediate restriction of any and all types of sharp objects. The reason the hijackers could get these weapons on board the plane, was lax security around for instance Swiss army knives and blades like a box cutter. Along with stricter rules for items allowed on the plane, a thorough check up of the security personnel hired by the airport have been issued. After the change, airports are no longer allowed to hire their own security personnel due to a lack of discipline and training and in some cases hiring of personnel with a criminal background.[Zielbauer, 2001]

On the 5th of October 2006 more regulations were introduced to prevent passengers from bringing liquids of too large a quantity on board.(**See luggage rules for a complete list of restricted items**) To construct a bomb a certain amount of "liquid" is required for it to have enough power to be a threat, and studies have showed that 100 millilitre containers stored in a 1 litre bag equals around 500 millilitres of liquids which in turn is not enough to make a bomb that can take down a plane. This restriction covers all types of liquids because the screening points at the security can not distinguish one liquid from another without the security personnel manually checking the various liquids, which would severely slowdown the whole process.[EU-Kommisionen]

Due to these restrictions packing a bag is not as simple as it used to be. A lot of items are no longer allowed and thus it can be difficult to know what is allowed and what is not. As the restriction covers all sorts of liquids packing a simple toilet bag is time consuming.

1.3 Luggage rules

This section will focus on the general rules regarding luggage when going abroad, whether by plane, train or cruise ship.

1.3.1 Luggage table

This section will include a table which displays the various limits for luggage in different public transportations. First column is the type of luggage, second column is the limit to the luggages dimensions and thirdly is the limit to the weight of the luggage. This means, when packing luggage for a trip, the suitcase should not exceed these limitations. Further explanation will be given in the related subsections.

Type of luggage	Dimension limit	Weight limit
Check-in luggage(Airplane)	158 cm *	20-23 kg
Extra luggage(Airplane)	158/277 cm *	20/45 kg
Carry on(Airplane)	50-55 x 40 x 18-25 cm	5-8 kg
Luggage(Train)	100 x 60 x 30 cm	Within reason **
Check-in luggage (Cruise)	75 x 50 x 29 cm	30 kg
Hand Luggage (Cruise)	55 x 35 x 25 cm	Within reason **

Table 1.1: This table displays a summary of the different rules given below.
* The sum of the dimensions; height, weight and depth must not exceed the given value. Depending on how much is paid on extra luggage different dimension and weight limits are given.
** There are no set limits, it just have to be carry able and not be a bother for other passengers

1.3.2 Charter trips on air planes

Given below is the rules for varies items you could bring on a plane.

Checked-in luggage

Check-in luggage is the luggage that will go in the planes cargo hold.
Items not allowed:

- Explosives, including detonators, fuses, grenades, mines and explosive compounds

- Gasses, propane, butane

- Flammable liquids, including petrol, methanol

- Flammable solid matter and reactive, including magnesium, matches, fireworks, flares

- Oxidising and oxidised compounds and organic peroxides, including bleach, auto repair-kits.

- Toxic or contagious compounds, including rat poison, infected blood.

- Radioactive materials, including medical isotopes and isotopes for industrial use

- Corrosive compounds, including quicksilver, car batteries.

- Compounds from combustible systems, which have contained fuel.

Due to the volatile or dangerous nature of the items listed above they have been deemed unsafe and thus not allowed on the plane without explicit permission from the airport.

Carry on

Carry on luggage is what the passenger is allowed to bring aboard in the cabin.
Approved items:

- Liquids, perfume, gel and spray – max. 100 ml – equal to one decilitre pr. container

- You are only allow to bring these containers (bottles, cans, tubes and, so on), if they are contained in a transparent plastic bag, which have to be closed (1 litre bag per passenger).

- The bag have to be resealable.

- Past security, wares can be purchased (including spirits, perfume and other liquids). Wares are handed out in sealed bags, these bags may only be opened after the final destination have been reached.

- It is now a requirement that you take off your overcoat, take laptops and other larger electronic devices out of the bag before the security check-in.
  [Airlines]

1.3.3   Rules on trains

There are different rules depending on which train company you are using.
The Danish train company, DSB, have very few rules regarding the luggage you are allowed to bring with you.

The only rule is that your luggage need to be able to lie on the luggage rack or under the seat and not be bothering or putting any other person on the train in danger [DSB].

Another example could be Indian Railways where the luggage is allowed to have different weight depending on which class you are on. They have no other rules regarding luggage [railways].

1.3.4   Rules on cruise ships

On board a cruise ship the "rules" are not really rules more like guidelines as they encourage the passengers to not exceed the limits. Furthermore the passengers luggage should be kept in their cabin during the trip[MSCcruise].

1.4   Solutions on the market

This chapter are used to research the marked and thereby get a image of what solutions there already exits on the marked. Through the research it is also possible to determine, how the exiting solution helps the user with the stated problem. By looking at existing solutions it can used to determine what features that would needed in an more problem oriented solution. The amount of lists and guides on the market is huge. These lists

and guides offers help and provide tips for packing for travelling. Some of these lists and guides have been developed into applications that are available for the customer to use. An application or in short app, is a program that fulfil different kind of services for the user. Apps are used in the web browser, computer, smart phone, and tablets. The term app is general mentioned in context to smart phones and tablets.

There also exists programs, that have integrated algorithms to handle optimization of the packing, on the marked that can be used. First a look into these lists and guides and the more advance solution thereafter.

1.4.1   App - Packing Pro

Packing pro is an app developed for the Iphone and Ipad that offers templates for check lists to the customer. Iphone is a smart phone and the brand is owned by Apple. Packing Pro uses a touch interface which means that the user by using the finger can navigate around. This is possible because Iphone and Ipad support touch navigation.

Figure 1.1: Picture of 2 of Packing Pros menus from [**?**]

Packing pro is designed with a panel in the bottom of the screen that allows the user navigate through the menus. Packing Pro provides the user with a help menu that contain information on how to use the app. There is also a menu in where the user can charge color theme of the app. On figure: 1.1 can an example of how a check list could look like.

These templates are designed to different purposes regarding the customer, gender, type of trip, and purpose of the trip. The customer can then load the wanted template for the purpose. The user also have the possibility to create their own lists by adding things that should be remembered for the trip by them self. The user also have possibility to select an existing list and delete the objects that were found irrelevant by the user. The user can then check object on the lists off as it get packed. Packing Pro is a management tool that helps the customer get an overview of all the things to remember. As the name implies(pro) the app have to be bought before it can be used [top iphone application, 2011].

Packing Pro works as check list and help the user remember what to pack, but it does not preform any organization of luggages content itself. So Packing Pro itself does not solve the described problem but helps the user remembering what to pack. So a feature to use from this program is the check list function that gives the user an overview of things to pack. A function that would not be needed is the compatible with Iphone/Ipad operating system. It would be nice if the program made work cross platforms but it is still not required to solve the problem.

1.4.2   App - Checkmark Packlist

Checkmark Packlist is an free app for the smart phones running the Android system. Checkmark Packlist offers different templates for check lists that the customer can use. One of these templates is the list for packing for a trip. That way the customer can select and use this template for remembering what they will need to pack for the trip. Checkmark Packlist uses touch to navigated in the program. This means that the customer with their fingers can navigated through the check list and check off things that have been packed.
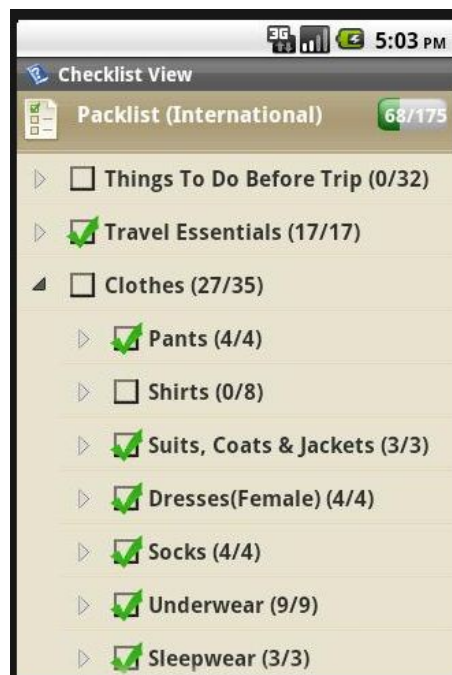

Figure 1.2: Picture of the Checkmark Packlist in action from [?]

On figure: 1.2 there can be seen an example of the product and how Pheckmark Packlist looks like for the user. Checkmark Packlist does not provide customization tool that let the customer add more categories to the check list. This is only a featured provided in the paid version of Checkmark Packlist [GreenbeanSoft, 2010].

This app does not provide a solid solution to the found problem but helps the user remembering what there should be packed for trip. This check list feature give a guiding effect and this is a useful feature and can be used in the product design to solve the state problem. A feature to consider is the mobility by designing the program for hand held devices.

1.4.3 Online check/tip list

The online check list works as a reminder when packing luggage. It also give tips and tricks that could be considered when packing for the trip. There exists a lot of different websites offering this service for free. Some are posted by an organization and others by a person on a forum. This means that all electronic devices as computers, tablets, and smart phones that have access to the Internet can open the website address.

An example of this kind of website is the following source [foster]. This website offers a list of 10 tips that can be helpful for the customer when they are packing for a trip. The website is purely text based and helps the user packing through the tips on the website. The site does not help with the actual packing, instead it helps with the planing of materials that the user might want to have on the trip. The website is designed with a menu left that let the user navigate through the different content of the website.

The online check/tip list in itself does not give the customer a solution to the packing problem. The websites instead help the customer planing the trip and thereby no the actual problem. The type of check/tip list used on [foster] does not apply as a useful feature that could be used in the final program. Instead it would more be focus on helping the user with the packing.

1.4.4 The e-Commerce shipping calculator

The e-Commerce shipping calculator is an advanced program that helps the customer packing large containers and calculates the price of the shipment. By typing the size, weight, location, and destination of the items that should be shipped, the program can calculate what the prize is going to be and generates a 3D(3 dimensional) model of the container where the given items are placed in the best possible way so there are a minimum of wasted space. On their website [sol] they offer a demo(demonstration) of their program. Their demo runs through the web browser and thereby should be accessible from computers connected to the internet. The demo is design to have the containers dimension variables and weight limit as input fields. Under the container is there are list of item where each item can have different dimensions and weights. To right of these field is the 3d model placed that will be generated.
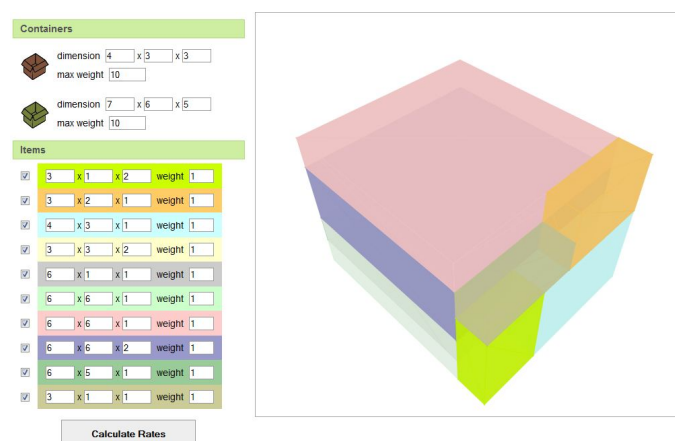

Figure 1.3: Screen shot of the program running taken from [sol]

The customer have to type all known data in and press "Calculate Rates" and the program will then form a 3d model, this can be seen on figure: 1.3. This product have a number of useful features that can be used in the final product. This solution can take

items dimensions and weight and calculate the most optimal placement in the container. This can be related to packing your luggage for a trip. So a feature to have in the final product is to calculate somewhat most effective way to pack the users luggage. Another useful feature is that this solution also shows it to the user. So the final product most inform the user in similar or another way how the luggage should be pack.

1.4.5   Recapitulation

This sections main object is to look at the wanted features and recap them. Packing Pro and Checkmark Packlist is similar in the way that they help the user. They both provide the user with a sort of check list that can be check off and thereby help the customer remember what have not been packed yet. One of the differences is that Packing Pro have a price while Checkmark Packlist is free. But this difference means that Packing Pro allows the user to edit the check list while that are not possible in Checkmark Packlist. These two apps do not help the user arrange the luggage content or take in consideration of size and weight of it. Thereby is two apps do not help people with the packing itself but more what should be remembered for the trip. The online check/tip list provide the user with advices for the trip and what to pack. Advices are great to get a general idea of what to take pack but it still does not give a more effective way to pack. The e-Commerce shipping calculator is the one solution with the most wanted features. One of the strong feature that can be used is the ability to calculate the most effective that a container should be packed. A important side note is that the intentions is not to pack bags but the feature can be related to packing content of a bag.

Included in product	Solutions	App - Packing / Packing Pro	App - Checkmark Packlist	Online check/tip list	The e-Commerce shipping calculator
Guide the user		x	x	x	x
Distribute weight					x
Distribute space					x
On the road		x	x		x
Baggage rules					
Where in the suitcase					x
Packing list		x	x		x

Table 1.2:   Table for the different products on the market compared to features

Table 1.2 consists of features down the y-akse and exiting solution on the market out the x-akse. The crosses indicates when the particular product have the particular feature. The purpose of the table is to give a overview of the products compared to features that

was found essential to the problem. Table 1.2 shows that none of the exiting solution does not take rules regarding baggage. It also shows that there are a lot of help regarding what to bring but when it comes to packing it is only one of the selected solution that had this feature.

1.5   Thesis Statement

In this section a thesis statement will be formulated which will be used to develop a method to the problem of this project and to get a more precise problem to work with. The method is used to try and solve the problem stated in the thesis statement.
The problem analyses shows that there are two general types of programs on the market. One type is a form of a packing list that tells the user what they might want to pack, the other type of program is a packing program which packs containers for the user and calculates the shipping cost to a designated location. These two types of programs only fulfil parts of the criteria this project have put forward. With this in mind a thesis statement have been formulated to help shape the solution for this projects problem.

- Is it possible to develop a program that helps the customer through the progress of packing one or more suitcases the most effective way?

   The meaning of this thesis statement is to research and develop a program that in some way could handle the problem and all the calculation that lies in the problem. But the consumer also plays a role in the problem. Therefore the consumer must also be taken into account when it is being developed. The reason for this is to make the program as user friendly as possible.

Sub Statements

The sub statements have been made to help find a solution to the thesis statement. These sub statements describe some of the steps that need to be made in order to find the solution for the thesis statement.

- **How can it be checked that the weight in the suitcases are evenly distributed and it does not exceed the allowed weight or the volume in the bag?**

   The program will need to handle and solve calculations with weight and volume. Through these algorithms the program should find the must most effective solution for the given data. It will also have to check that the solutions weight does not exceed the given limits or the volume of the luggage.

- **Which functions are needed to get the program to compute the most effective way to fit the items into the suitcases?**

   Some functions are needed for the program to find the most effective solution. The functions will use an algorithm for optimising and thereby the program will fulfil its purpose.

- **How should the program communicate with the user and inform where the items are placed, and tell how much space is left?**

The program will have to be developed and tested so the customer can use the program to its full extent. Therefore it is important not to use advanced technical language or unexplained abbreviations.

- **How can the program be developed so it takes the length of the journey into account, and enable the user to update the program on the go?**

  The program should also be developed so it is possible for the user to update the programs database while on vacation thereby get a packing order for the new content of the bags.

From this thesis statement there will be developed a list of requirements for the program, which it will need, to solve the given problem and be user friendly. The system requirements can be seen on page 3.1

1.6   Method

This project structure will be based on Aalborg PBL (problem based learning). The Aalborg PBL is a method whereby the learning process lies in the work with a problem and try to develop a solution for the given problem. The Aalborg PBL method also trains the students ability to work together in a project group and give them tools to handle the processes that goes with working in a group.

The first stage of the project is the problem analysis, which purpose is to find and document that there is a problem to begin with. From the problem analysis a thesis statement is formed and is used to produce a list of product requirements. The requirements are then use to design and develop a product that should solve the problem stated in the thesis statement. The program are then tested on the target group of the problem. The testing leads to a conclusion of the project. This is the main focus of the project, when using the Aalborg PBL. This project form is used because it finds and document a problem and then through the work with the problem gives an estimated solution to the problem.

To document the problem, a lot of information is needed. The information is found through different sources such as; books, article, websites, etc. When using information found through the internet or other sources it is important to evaluate the used sources. This is done to filter out unreliable sources and thereby achieve a better and more trustworthy project. This process of evaluation is also known as source criticism and are general used when using others materials as documentation. Therefore it is also a relevant method to use when using sources in the project work.

Theory 2

In this chapter a there will be taken a closer look on the theoretical aspect of writing a sorting program. First off is a quick description the NP-problem followed by a look on different ways to pack different objects. With a good grasp on the different algorithms and the most effective way to pack items, the process of developing a program should be easier.

2.1   Bin Packing Complexity

The Bin Packing Problem is NP-hard **??**. This means that the problem is at least as hard as an existing NP-complete problem. NP-complete means, in simple terms, that every combination must be examined, and then the best combination must be chosen. An example is the Traveling Salesman Problem (TSP), where a list of cities and distances between the cities is given. The problem is then to find the shortest route to visit all cities, and to end at the starting point.

2.2   Bin packing problem

Bin packing problems is a combinatorial NP-hard problem. The problem consists of fitting objects of different sizes into bins of identical sizes **??**. This could for example be fitting various packages into shipping containers. There are various approaches to solve the bin packing problem. Bin packing problem is focusing on bins instead of suitcases but they are basically the same only major different is probably size. Some of the popular methods will be described in the following section.

First fit (FF)

The first fit algorithm creates a list of the objects needed to be fitted into bins. It then runs through the list, checking if an item can fit in each bin: If it cannot fit in the first bin, it will check if it can fit in the second bin and so on. If it does not fit in any bins, it opens a new bin, and fits the object there.

Best fit (BF)

The best fit algorithm is the same as the first fit algorithm, except that before an object is packed, the algorithm checks each open bin, where the object fit. It will then place the object in the bin which will have the least space left when the object is packed.

Last fit (LF)

This algorithm packs the object in the last open bin which has room for it.

Worst fit (WF)

The algorithm checks all the bins, and packs the object in the bin which has most empty space.

Almost worst fit (AWF)

Similar to the worst fit algorithm, but the almost worst fit algorithm packs the object in the second-emptiest bin.

First fit decreasing(FFD)

The above algorithms are very ineffective because the biggest objects might be placed at the end of the list, and thus be packed in the end, where it is more effective to first pack these large objects. The first fit decreasing algorithms takes this into account and sorts the list before attempting to pack the items. This way the biggest items will be packed first.

Best fit decreasing(BFD)

Again this is the same as the best fit algorithm, but with the list being sorted before attempting to pack the objects.

Round up

It seems that it is more effective to sort the lists before attempting to pack objects into bins. This way bigger objects are packed first, and the smaller objects can then be fitted around the bigger objects. However in some situations it is necessary to use unsorted lists. For example in a factory with continuous production, it is never possible to have the complete list of objects, and thus never possible to sort the list.

Design 3

In the design chapter a look will be taken on the specification requirements and why those features are needed or wanted in the program. There are also a section detailing some features that will be nice to have if there is enough time to implement them in the program.

3.1 Specification Requirements

Through the problem analysis it has been documented that there are some strict rules regarding some forms of public transportation when going on vacation. Based on this research a list of features have been composed, that the program must for fill to meet the base requirement to help the user. Furthermore another list have also been made composed of some additional features that would make the program better and more user friendly. They are not needed for the base requirement, but rather as an improvements to further make the program ideal for the user.

3.1.1 Targeted Features

These are the essential features that the program will have.

Guide the user: The program will have a little "readme" file, or other form of guide, that will tell the customer how to use the program.

Distribute weight: The program must be able to distribute weight of items evenly in each individual suitcase and if needed spread out in multiple suitcases.

Distribute space: The program also needs to distribute the items by space. The whole idea of the program, is that it should be able to tell the user how to pack the suitcase, and be able to tell if there is enough space for eventual souvenirs. Lastly it should inform the user how much space, if any, is left.

On the road: The program will be able to tell you, while you are on the trip, if there is enough space for a souvenirs, if you input the dimensions and weight of that item.

Baggage rules: The program will need to know basic baggage rules. For example the luggage must not weigh too much, and it must be below certain dimensions.

Where in the suitcase: When the user asks the program if an item will fit in the suitcase, the program will show exactly where in the suitcase the item will fit.

Packing list: To make it easier for the user to know what will be packed an editable lists will be included depending on the type of trip.

3.1.2   Optional Features

These features as mentioned above, are additional features that might be able to be implemented later if possible.

Solid/liquid/bendable shapes: The program will also take in account that items might be bendable, and therefore fit in other ways than solid items. For instance a T-shirt can be folded in many ways and thus can be considered a liquid form as it can fit almost everywhere.

Type of trip Depending on the nature of the trip different packing lists will be necessary because each trip might require different items.

Number of people Usually a trip is done with more then one person, so more suitcases might be available to distribute items between.

Account for the trips length: If a long trip is planned, the program must be able to account for more souvenirs.

3.2   Target Group Analysis

The target group analysis for this project will be based on the Minerva Model, because it is an internationally recognized model, and it suits the international market better than e.g. the Gallup Compass.

The Minerva model consist of 4 main segments, and 1 sub segment; The blue, the green, the pink, the violet, and the grey.

- The modern/materialistic segment(blue)

  These people are individualists who mostly believe in themselves and are rarely solidary with certain groups, but they gladly join other people who are going the same way as they are. The crucial key for the modern materialist's group is that they consider society as a relatively fair and justified system which rewards the one who does an effort that can be felt in society.

  The blue segment mostly consists of men with a long education and a high wage. The Danish Liberal Party stay true to their original values from when the party was established, this makes them the favourite party among the blue segment. It is estimated that 25% of the Danish population belongs in the blue segment.

- The modern/idealistic segment(green)

  The green segment consists of modern, but idealistic, and strongly solidary people who have the same kind of education as themselves. They often consider society as

something that is "higher" than the group they belong to, and they consider everything outside their own group with some scepticism. Depending on the conjunctures they seem to have some tendency to feel either better than society or besieged.

This segment consists of mostly women, academics, and similar. They often read "Information" or "Politiken", two left oriented newspapers. They Vote for The Danish Socialistic Folk Party (Socialistisk Folkeparti), The Danish Red-Green Party (Enhedslisten), The Danish Radical Left Party (Det Radikale Venstre), and they are courted by The Danish Social Democrats (Socialdemokraterne). It is estimated that 25% of the Danish population belongs in the green segment.

- The traditional/idealistic segment(pink)

This culture is traditional-idealistic, and is in many ways, the most "original". In this segment they are for-anchored in local areas and feel a strong solidarity with everyone in the neighbourhood. Within this culture, one's view upon charity for close friends and family should be taken literal, and the world around them become more and more frightening the further you move away from it.

The people in this group tend to be uneducated, or at least have a short education. Some of them have an allotment garden, and other Danish valuable stuff which they took great care of. They have earlier voted for The Danish Social Democrats, but now it is The Danish Folk Party (Dansk Folkeparti) that is the most favourable party.

It is estimated that 20% of the population belongs in the pink segment.

- The traditional/materialistic segment(violet)

People in this segment have a lot of the same norms as the pink segment, but have lost their roots, which is why it often seems to miss some orienting points in life, both in the relation to the group and in relation to society. As a compensation the violet person seeks exile in consumption, and modern offers about group affiliation such as associations, hobbies, sports clubs, fan clubs etc.

The violet have, as the pink, lost group affiliation to the working party and are now those who can not decide whether to vote The Conservative or The Danish Folk Party, but they definitely have their favourite football club. They frequently seek physical challenges rather than intellectual, and work spare time jobs.

It is estimated that 20% of the population belongs to the violet segment.

- The undecided segment(grey)

The grey does not appear in A.C. Nielsen's official model and are the most discussed individuals. It is the people who have not decided which segment they belong to yet. It is typically the youth, but some adults have not found themselves in a specific segment. The grey segment is 10-11% of the population above the age of 18.

The grey can be found in the middle of coordinate system and contains features from all the "pure" segments.
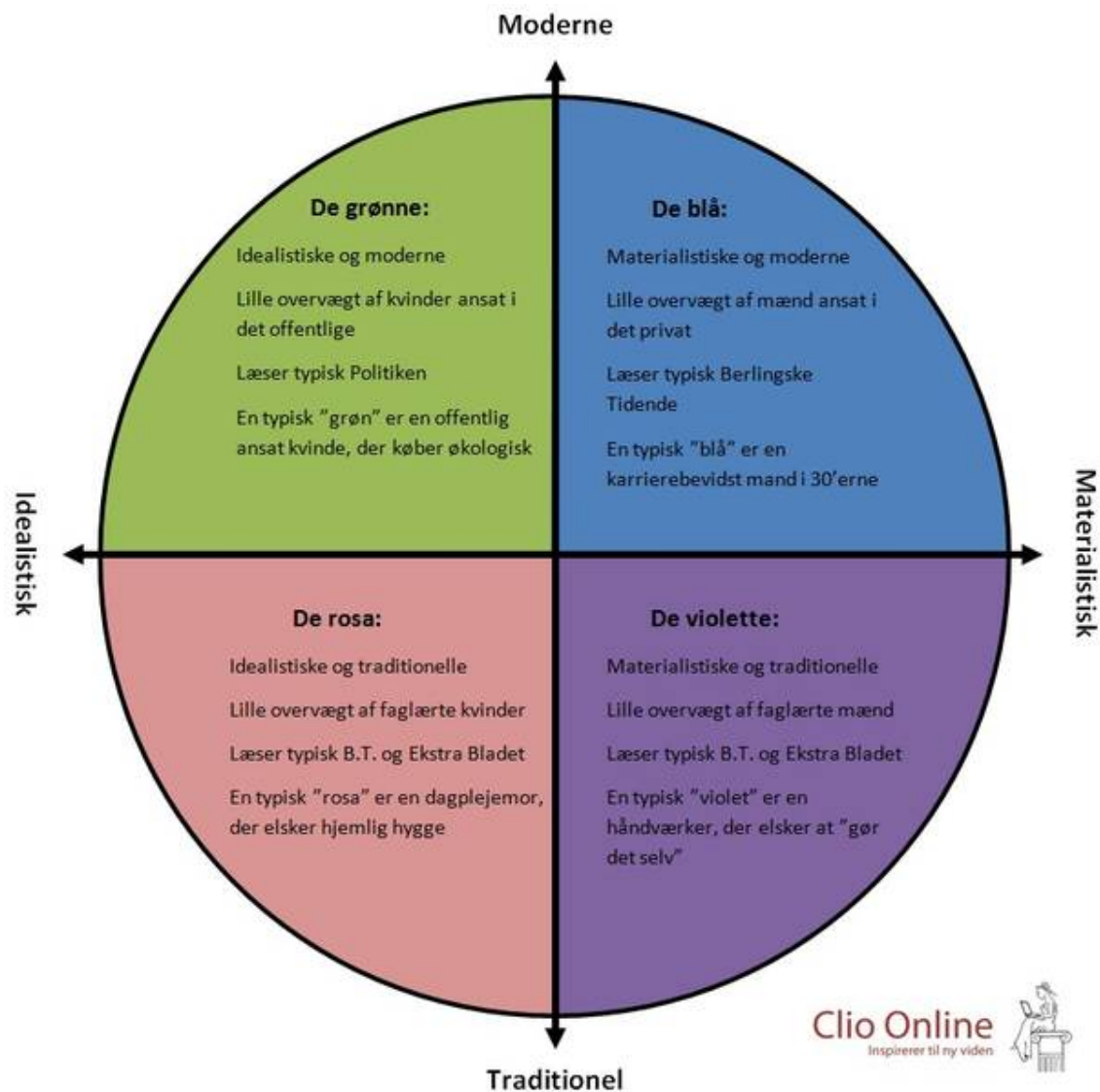
[?]

Figure 3.1: The Minerva Model

As the Minerva model is based on political views and therefore not the most effective method to define the target group for this project. The reason to this conclusion is that packing a suitcase is not a political matter. Still the Minerva can be used to create a general base for the target group using the general social characteristics of the different segments. The targeted group cannot be put into just one segment because there are people from both the blue, the green, and the grey segments. It is a quite wide group, but it might be necessary for the product to cover more than one segment. The target group for this project is in the modern segments because it has been estimated that the users are somewhat interested in new technologies, and so there is a chance of finding somebody in this segment who do not know how to properly pack a suitcase. A requirement for target group is that they must travel in some form, that requires a packed suitcase or luggage in some form, before the solution becomes relevant for the target group.

3.3   Program planing

This section is to plan how the program should work and the flow of the program. The flow of the program will be described and shown in a flowchart to give an overview of the whole program. A flowchart is a useful tool when programming because it explains the structure of the program that can be used when programming.

To give a more precise explanation of a program the flowchart can be formed into a pseudocode which is a level above real code. Pseudocode is used as a schematic for the program and thereby giving some foresight into any problems that can be encountered when writing the actual code. Thus planing ahead and designing the program so it gives the minimum amount of code errors and unexpected problems. The program planing will be used to make it easier to develop the program and help to a better process of making the program.

When the program starts, it should check the database and see if there is any items stored. If there is no items stored it should ask the user to input the items that should be packed. If there are recorded item in the database, the program should ask the user if it is the right items and if there is new items to be added. The new added items will then be saved in the database.

The program shall then preform the algorithms to place the items in the most efficient way regarding volume and weight. If the program can not fit the items in one bag it should try the second bag if there is any. If the program reach the point where all items have been packed it should inform the user that the process was a success and how the user have to pack the bags. If the program does not complete the process and there are no bags left, the program should inform the user that process was incomplete. Then the program should be at the end where the user can choose to add more items, see the exiting item, see the order of packing and close the program.
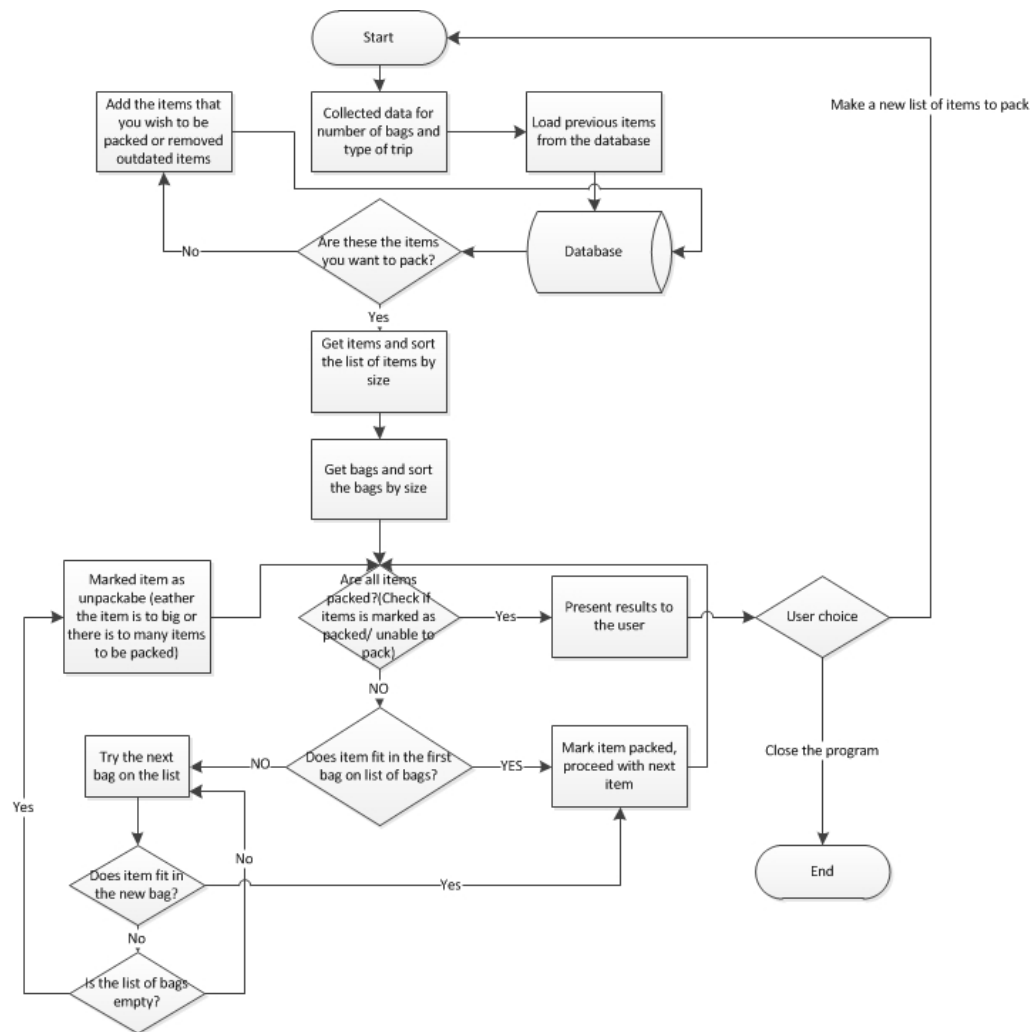
Figure 3.2: This is the flowchart of the program (not quiet finished yet)

Thereby the general structure of the program have been formed and can be describe by a flowchart, see on figure: 3.2. This flowchart can then be used as a schematic for the developing of the program and thereby a better structure of the program can be archived.

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