Improving the services provided by hostesses to passengers

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ABSTRACT

Nowadays, the services provided by the hostess to the passengers require continuous improvement to keep up with new developments. The purpose of this thesis is to create an application which can help the hostess to make their job as easy as possible. The aim of this application is to ease the hostess work and to satisfy both parties during the flight.

In this thesis, a qualitative research methodology was used. This consist of an interview conducted via email to obtain feedback about the user-friendliness of the app for a hostess. Tiina Kumpulainen who has been working as a hostess for fifteen years was the person interviewed. She gave positive feedback, saying that this application is really good and useful. By using it, the passengers can order what they want, the order goes to the hostess's tablet. Also, analysis of the answers shows that she appreciates how this app was developed because it has many beneficial features for a hostess and for a passenger.

In conclusion, the quality of service would improve due to the app. For example, the time required for serving is reduced and the time allocated to the passenger to check products and their price is increased. Based on the interview, it is recommended that this application be used on flights with duration of about three to five hours, for flights with a shorter or longer duration it is not recommended because there are other types of service already available.

Keywords Hostess's services, application, plane, passengers, web technology

Pages 34 pages including appendices 1 page

CONTENTS

Appendices
Appendix 1   INTERVIEW BY E-MAIL

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

Abbreviation	Description
FSC	Full-service carrier
LCC	Low-cost carrier
CC	charter carrier
HTTP	HyperText Transfer Protocol
DBMS	Database management system
DML	data manipulation language
DDL	data description language
DCL	data control language
E-R	entities and relationships
PHP	Hypertext Preprocessor
CGI	Cannot Go Instantly
POP3	Post Office Protocol
IMAP	Internet Message Access Protocol
LDAP	Lightweight Directory Access Protocol
HTML	HyperText Markup Language
URL	Uniform Resource Locator
ID	identification number
IP	Internet Protocol
RDBMS	Relational Database Management System
SQL	Structured Query Language
CSV	comma-separated values
CSS	Cascading Style Sheets
WWW	World Wide Web
MS SQL Server	Microsoft SQL Server
IIS	Internet Information Services

1 INTRODUCTION

People love to travel comfortably and therefore choose more often to go by plane. The plane offers many advantages such as comfort, safety or speed. Comfort is provided by hostesses who should be friendly, easily approachable with a flawless appearance. To pass the time faster during the flight, modern airplanes offer a selection of movies, music or games to their passengers. (Becker, 2014) Some airplanes offer WI-FI access as nowadays the Internet is important. Many companies offer the service for free, however, with some airlines, the passenger has to pay a fee. (Net Stop App, 2019) The Internet is present in many planes. This gives the opportunity to create and use applications to help airline staff to provide passengers with the most comfortable flight and to ease their work. There are many applications of this type and one of them is presented in this paper.

This thesis focuses more on explaining how the application was developed. The application aims to improve the relationship between the passenger and the hostesses during the flight. By using this application, passengers can order what they need, from drinks to various perfumes, and the hostesses will receive the order with the seat number. This way the hostesses can avoid asking all the passengers separately and time can be saved. Other important topics such as technologies used, interview conducted with a hostess, and information about the airline industry are elaborated in the following chapters of this thesis.

The main objective of this thesis is to improve the services provided by hostesses to passengers and to ease their work by creating this application which brings benefits to both sides. By using this application, all orders are received in the hostesses' tablet without asking each passenger separately.

This thesis provides answers to the following research questions:
1) How can the hostesses save time by asking every passenger what he or she wants to order?
2) How can the passenger's service be improved?
3) How will the hostess receive orders from the passenger's tablet on her tablet?
4) From the point of view of the hostesses, would this application help them make their work more efficient?

2   AIRLINE INDUSTRY

Over the years, people have invented a lot of new products and services which have changed their lives for the better, one of the inventions is the airplane. The airline industry has developed a lot since the beginning and influences people's lives in a good way. This industry is divided into several categories, one of this category includes international flights. The companies in this category have annual revenue of $1 billion or more. Another category contains national flights. Their annual revenue is between $100 million and $1 billion. There are also other categories such as regional or and cargo. (Investopedia Staff, n.d.) The airline industry played an important role in the global economy because of its impacts on related industries such as aircraft manufacturing and tourism (Beloba, Odoni, & Barnhart, 2015).

Figure 1 shows the annual growth in global air traffic passenger demand that is expected to maintain a positive growth rate up to 2030 (Statista, 2019).
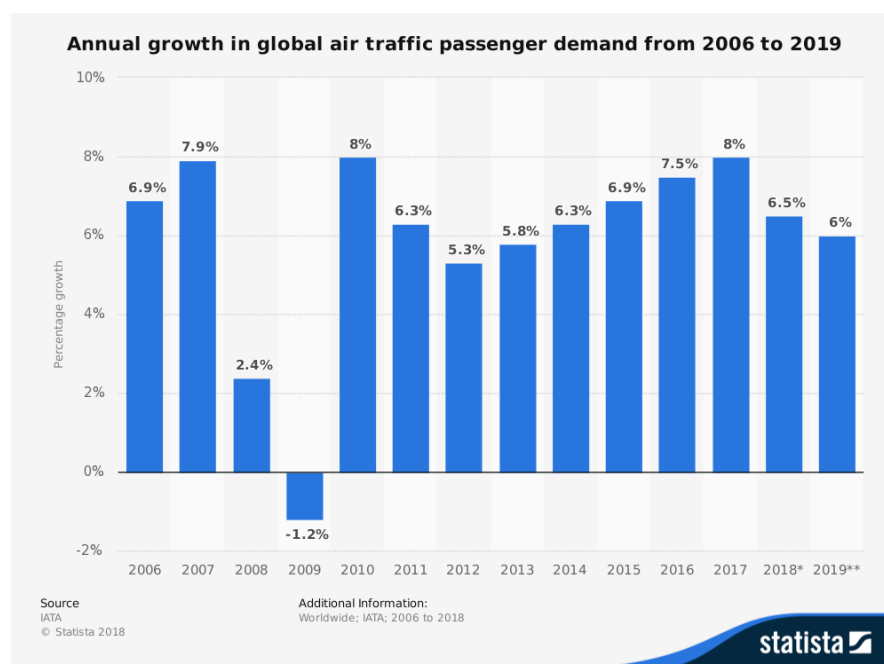
Figure 1. Annual growth in global air traffic passenger demand from 2006 to 2019. (Statista, 2019)

Three important sets of airline business are full-service carrier (FSC), low-cost carrier (LCC) and charter carrier (CC). FSC is defined as a type of airline company which is a global player: domestic, international and intercontinental flights and the core business are the passengers, cargo and maintenance. (Cento, 2009, pp. 18–19)

LCC is an airline company that has advantages over its competitors in terms of costs. The core business is passenger air-services and it has

minimized sales costs. Furthermore, all tickets are electronic and the passengers receive an e-mail with the traveling details. This sector continues to grow strongly and because of the low fare levels, the attraction of the passengers is high. (Cento, 2009, pp. 19–21)

CC is an airline company which has flights outside the normal schedules. Its main, function is to transport holidaymakers to tourist destinations. The tickets are sold by tour operator companies and not by the charter airline. In general, they are sold as a part of a holiday package. (Cento, 2009, pp. 21–22)

2.1   Airline companies with Internet access

The Internet is a public and global network that provides connectivity to anyone, and it has many benefits such as making information available or reducing procurement, marketing, and distribution costs. The Internet is used by airlines to offer a more personalized service to customers. This service includes membership detail, promotions or news. Also, it empowers the customer to be a proactive participant as the internet gives the passengers more options to enjoy their flight such as ordering items, watching movies or play games. Internet technologies were used to combine customer preferences across products and services. (McIvor, O'Reilly, & Ponsonby, 2003)

There are two ways to access the Internet on the plane. The first solution is ground-based and the second method uses satellite technology which operates on narrowband and broadband. For the first solution, the plane has an antenna which links up with the cell towers and when traveling, it connects to the nearest transmitter on a rolling basis. One disadvantage is that the system cannot work when the plane is flying over a large expanse of water. For the second solution, satellite WIFI uses a network of orbiting satellites and it is linked to the ground stations. During the flight, the plane uses the nearest satellite. (Manneh, 2019) In-flight WIFI is slow and expensive but can vary from company to company. In this world, many companies offer inflight internet access, as shown in Table 1. However, only Emirates, Qatar Airways, JetBlue Airways, Norwegian, Turkish Airlines, Air China, China Eastern, and Nok Air offer it for free. (Net Stop App, 2019)

Table 1. Airplane with WI-FI connection(Esky, 2017)

Aer Lingus	ANA	Garuda Indonesia	Mango Airlines	TAM
Aeroflot	British Airways	GOL	Nok Air	TAP Portugal
AirAsia	Cebu Pacific Air	Gulf Air	Norwegian	THAI Airways
Air Berlin	China Eastern	HongKong Airlines	Oman Air	Transaero
Air Canada	Delta Air Lines	Iberia	Philippine Airlines	Turkish Airlines
Air China	Egypt Air	Icelandair	Qatar Airways	United
Air France	Emirates	JAL	Ryanair	US Airways
Air Tran	Etihad	JetBlue	SAS	Vietnam Airlines
Alaska Airlines	EVA Air	Lufthansa	Saudia	Virgin
All Nippon Airways	Finnair	Libyan Airlines	Singapore Airlines	Vueling
American Airlines	Frontier Airlines	Malindo Air	Southwest Airlines	WestJet

2.2   Airline services and the air hostesses

To provide a high quality of service, is one of the most important aspects to gain advantages over its competitors in this industry or in other industries. In an easily explained way, the difference between service received and customer's expectations are the quality of service. It is good to know that the airline's image is a high factor in the evaluation of the services of a company and has an important role in the customer's perception of services. A strong image of the airline represents a good quality of the services that influence the behaviour of the passenger in a positive way. (Geraldine & David, 2013, p. 20) The air hostesses provide routine services in the plane and spend many nights away from home because of their flexible schedules. Airlines operate every day, and because of this they often work nights or on bank holidays, despite these facts, the competition for this job is high and attracts more applicants than there are jobs. Air hostesses' primary job is to keep passengers safe and to make that every person follow security regulations. About one-hour before take-off, the pilot conducts a pre-flight briefing about the flight where it is necessary that hostesses participate. Before take-off, it is necessary to check if there are enough beverages and food on board. (U.S. Bureau of Labor Statistics, 2019)

They need to display many capabilities, one of them is to be able to work in a team environment, and other required qualities are to be organized, highly sociable or to be in good physical condition. They must ensure passengers comfort, bring the requested items or serve food and drinks. These represent some of their many responsibilities. (Job Hero, 2019) Other responsibilities of hostesses are to check all the safety equipment, to welcome and inform the passengers about the safety measures and procedures or to give first-aid to passengers (Dewra, n.d.). This job is emotionally stressful because in the plane are many passengers with difficult behaviour and the hostesses need to stay polite and handle the challenging customers. Time spent far from family can represent other reason which increases the stress of hostesses. (Farnen, 2018)

3   WEB TECHNOLOGIES

Web technologies refer to languages and multimedia packages which are used together to make dynamic web sites. A separate technology is limited and usually requires the use of at least one other technology. (Collins, 2001) In this chapter are presented information about the technologies used in the development of the application.

3.1   PHP

PHP (Hypertext Preprocessor) is a popular and powerful scripting language which helps to develop dynamic web applications. It is used for server-side programming. If a web page is created with PHP it is often necessary to retrieve data and display it in the resulting page. This requires the use of MySQL. (Valade & Suehring, 2013, p. 12)

There are many reasons to use PHP. The first reason can be that it is free and the second is that it is easy to learn compared to other languages because it has a syntax which is easy to parse and human-friendly. (Converse, Park, & Morgan, 2004, pp. 6–8) PHP runs native on Unix and Windows and it is compatible with HTTP Server, Microsoft Internet Information Server, and Netscape Enterprise Server. (Converse et al., 2004, pp. 11–14)

PHP makes it easy to communicate with other programs and protocols and it supports a large number of protocols (Converse et al., 2004, pp. 11-14). PHP is embedded within HTML and its code starts and ends with special tags of each PHP section. There are several styles of PHP tags, but the most used is the canonical style. Everything within these tags is understood by the PHP parser to be PHP code as well as this code can be added into HTML by putting it in a separate file and calling it by using include functions. (Converse et al., 2004, pp. 53–59)

PHP has eight types: integers, doubles, booleans, null, strings, arrays, objects which are instances of programmer-defined classes and resources which are special variables. The first five are simple types, and the next two are compound which can package up other arbitrary values of arbitrary types. (Converse et al., 2004, p. 72)

PHP supports sessions. Session means maintaining the state between the pages. In the script, it is necessary to declare that a session needs to start and when the session starts, PHP register a unique session ID which is sent via cookie to the user. A cookie is a package of data which computers receive and send it back how it was, without changing. The goal of using them is to give the opportunity to a website to keep track of visitors and their activity. (Symantec employee, 2019) After this, PHP creates a file on the server. The name of it is the same as the session ID

which can keep track variables. For some reason, it is possible that some times, the cookies will not be allowed by users and for this PHP gives the opportunity that the session ID can be tracked through the query string. (Greenspan & Bulger, 2004, p. 83)

To manage sessions there are several ways, but none of these are perfect. Firstly, it is not good to store data on the client side for many reasons such as control over the data is lost. In other words, as long as the users do not return to the site, data cannot be accessed. Ninety percent of disadvantages and breakings of all web sites are because of accepting tampered data and trusting in that from the client side. (Ratschiller & Gerken, 2000, p. 124) Another reason is that it is not good to rely just on cookies because some of the users would not accept them, maybe some of them disable cookies in their browsers. The third reason is that data is hard to be maintained because all data needs to be saved on every page. Each variable needs to be saved as a cookie or to be URL encoded and this is hard to make for a single variable such as the session ID. However, if there are dozens of variables it is difficult. (Ratschiller & Gerken, 2000, p. 124)

3.2   MySQL

MySQL is a Relational Database Management System (RDBMS) which was developed to be fast and requires less memory. It can manage many databases at the same time. In the database, data is stored in tables which can be related and they are organized in rows and columns. Each row represents an entity and each column contains an item of information about the entity. (Valade & Suehring, 2013, pp. 450–451)

MySQL stores information and combined with PHP it creates a functional web application. In combination, they have several advantages such as free and easy to use, communicate well with one another and are customizable. To respond to requests for web pages, PHP and MySQL need a web server, and the most used server on the Internet is httpd from Apache which is also free and runs on a variety of operating systems. It is popular as 60 percent of websites use Apache. Furthermore, it is reliable, customizable and secure. (Valade & Suehring, 2013, pp. 12–14)

MySQL provides a security system for protecting data which includes MySQL accounts and permissions. In the first case data from a database can be accessed with an account that has a name and a password which the user must use. In the second case, an account is used to define who can do what. (Valade & Suehring, 2013, pp. 454–455)

With SQL queries it is possible to create and delete accounts, add or change passwords or add and remove permissions. MySQL account names and hostnames have many characteristics such as an account

name or hostname can be blank; the hostname can be a name or an IP address. (Valade & Suehring, 2013, pp. 460–461)

3.3 PhpMyAdmin

PhpMyAdmin is a popular application for the management of MySQL databases. It is a free tool written in PHP. Through this application it is possible to create, modify, and delete records, import and export tables, run MySQL queries, and many more tasks. (Orfali, 2017)

PhpMyAdmin offers the following features: intuitive web interface, support for most MySQL features, import data from CSV and SQL, export data to various formats, administering multiple servers, transforming stored data into any format using a set of predefined function, searching globally in a database or a subset of it and much more. (Orfali, 2017)

PhpMyAdmin home page has different sections such as general settings, database server or web server. Here a database with tables, columns, and rows can be created. (Orfali, 2017)

3.4 SQL

SQL is a declarative language which has many important roles such as creating and controlling a database, defining its structure and querying the database (Wilton & Colby, 2005, pp. 11–12). The SQL data types are divided into five categories: character string that contains attributes such as name; numeric which contains attributes like salary and age; temporal that store temporal information; binary which includes storage of multimedia like sound or movies and the last type of data is Boolean which has three values: true, false, and unknown. (Donahoo & Speegle, 2005, pp. 5–12)

A database is made of several tables. Each table has one or more relationships with each other. One-to-many, many-to-many and one-to-one are the types of relationship. The database is filled populating by adding data to the tables in the schema. Schema is a collection of tables and a description of the data. (Donahoo & Speegle, 2005, pp. 5–12)

The creation of scripts, called stored procedure is allowed by SQL and contains one or more SQL statements. With them, it is possible to use a sequence of operations repeatedly so that it has only to be written once. (Donahoo & Speegle, 2005, pp. 239–240)

3.5 Sublime Text

Sublime Text is accessible for Windows, Linux, and Mac and it uses a custom UI toolkit. To open files with just a couple of keystrokes the

project file navigator Goto Anything is used. At the same time, it is possible to make ten changes. Multiple selections allow changing many lines at once. Furthermore, variables can be renamed in an easy way and files are manipulated faster. Sublime 3 allows with only a couple of keystrokes to search what is needed avoiding the necessity to navigate through the menus. Projects in Sublime 3 take all content of the workspace, even the unsaved files. It is possible to switch between projects in a similar way as with Goto Anything. All modifications will be there when the projects will be opened next time. Sublime has a Python-based plugin API and it comes with new features such as syntaxes has improvements, a significant number of git repositories in the sidebar and the compatibility with old Linux distributions was fixed. (Techspot, 2019)

3.6 HTML5

To present and structure website content for the WWW, HTML is used. It was developed in 1997 and HTML5 in 2003. HTML5 increases user experience by making websites more responsive and interactive. The features of HTML5 are accessibility, video and audio support, smart storage, game development or mobile support and they change how websites are built. It is a powerful tool but has some disadvantages like power as the native mobile application is more powerful, and monetization regarding mobile devices. (Mark, 2019)

HTML5 is a markup language where the code is typed into a text-file like Notepad++ or Sublime Text which is saved as an HTML file, and viewed through a browser, like Chrome or Internet Explorer. It consists of a series of short codes, which are called tags and they do not appear when the page is shown in a browser, but their effects do. (Shannon, 2012) To manipulate the page styles without having to go in the text editor, developer tools are used. Web browsers have developer tools built in or have extensions available that gives similar functionality. (West, 2012, p. 11)

HTML web pages have <!DOCTYPE html> at the start to indicate which standard the respective page adheres to. It is made of a number of elements such as <html> which contain all HTML cod, such as <head>, <title>, and <body>. The <head> which is the first element is within the <html> tag. This tag contains other important elements such as <title> which sets the title of the page in the browser. Another element can be <body>, in here all content is placed that will be displayed in the browser window. (West, 2012, pp. 14–18)

3.7 CSS3

Cascading Style Sheets (CSS3) is the tool used with HTML and XHTML by developers to build websites for mobile or desktop browser. With this

tool, it is easy to set the colour of text, background images, position in the page or different other visual effects. The most important role of CSS is to style the web page. One important benefit of CSS is that the same CSS can be used by more than one page. Other benefits are applicability to more than one type of devices and language (Pouncey & York, 2011, pp. 3, 15).

CSS has many important properties like colour, font-family, background, border, z-index or padding. It is implemented to HTML inline, internal or external. Using external CSS includes many advantages such as the ability to separate HTML from CSS, to reduce the file size or to make content readable. (Menhennett & Navarro, 2019)

3.8 Framework Bootstrap

Bootstrap is a popular open source CSS framework originally developed by Twitter that includes JQuery plugins and Carousel. It comes with ready-made styles for tables, buttons, forms, and more. Bootstrap builds responsive, mobile-first websites and offers many advantages but also disadvantages. Cross-browser support, easy to customize, support useful jQuery plugins and mobile-first is some of the advantages. The first disadvantage is that jQuery plugins are hard to customize and second that many Bootstrap sites end up looking alike. (Niska, 2014, pp. 21–23)

The default Bootstrap grid system utilizes 12 columns; each column is 60 pixels wide and offsets 20 pixels to the left. It supports five different layouts based on CSS media queries. To create responsive features in Bootstrap, it is necessary to add a *<meta>* tag to the *<head>* of the web page. Responsive design is a method which helps to optimize all content of a page to fit different devices like for desktop, tablets or phones. (Spurlock, 2013, pp. 3–4)

Bootstrap is built with a customization mind, so when it is necessary to use just the grid, it is important to choose only the grid and leave ever other component out. Missing components can still be included later on. (Niska, 2014, pp. 41–42)

4 DATABASE

Database management system (DBMS) is a software which stores, manipulates and retrieves data in a database. Relational DBMS speaks a common language called SQL that manipulates, defines and queries data. It is split into three parts, the first one is data manipulation language (DML) which stores and retrieves data from the database. The second one is data description language (DDL) which is used to define the structure of the data, and the last one is data control language (DCL) used to restrict access to data for some users. (Donahoo & Speegle, 2005, pp. 1–2)

A database is an organized collection of data that makes data management easy. When the volume of data grows, the complexity to manage them also increases, but fortunate for people; computers are specialized on managing information in an efficient way. (Donahoo & Speegle, 2005, pp. 1–2) Fast, secure, and efficient data retrieval, and minimizing data redundancy represent major advantages of a database which is used everywhere. An important role in the development of computers played data processing. (Wilton & Colby, 2005, p. 1) The database also has some disadvantages such as cost of hardware and software, cost of data conversion, cost of staff training, appointing technical staff and database failures (Vidhya, Jeyaram, & Ishwarya, 2016, pp. 28–29).

A database contains a set of tables. Each table has a unique name within the database. Each column has a name and type which defines what kind of information may be in the column. (Donahoo & Speegle, 2005, p. 4)

4.1 Degrees of relationships

For the E-R model, the world consists of a set of objects which are called entities and relationships among them. An E-R enterprise schema defines certain constraints which are of two types: mapping cardinalities and participation constraints. For a binary relationship, the mapping cardinalities are one of the following four: one-to-one, one-to-many, many-to-one, and many-to-many. (Vidhya et al., 2016, pp. 43–45)
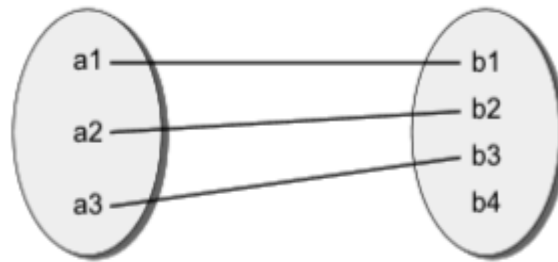
Figure 2. One-to-one. (Vidhya et al., 2016, pp. 43–45)

In the above figure, a one-to-one relationship is presented. It says that an entity from A is necessary to be associated with only one entity from B. Also, an entity in B is necessary to be associated with only one entity from A. (Vidhya et al., 2016, pp. 43–45)
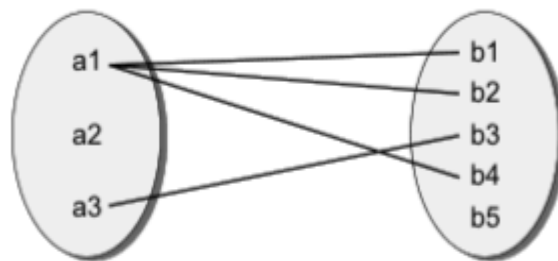

Figure 3. One-to-many. (Vidhya et al., 2016, pp. 43–45)

In the above figure, a one-to-many relationship is presented. An entity from A is associated with zero or more in B. Furthermore, an entity in B can be connected with maximally one in A. (Vidhya et al., 2016, pp. 45–46)
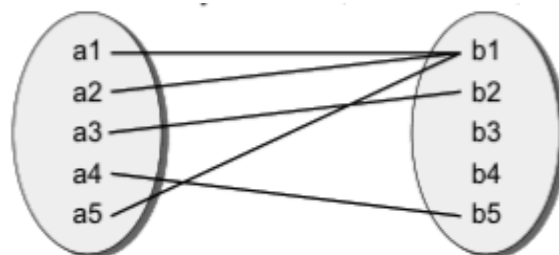

Figure 4. Many-to-one. (Vidhya et al., 2016, p. 46)

In the above picture, a many-to-one relationship is presented which says that an entity in A is mandatory associated with maximally one entity in B. An entity in B can be associated with zero or more in A. (Vidhya et al., 2016, p. 46)
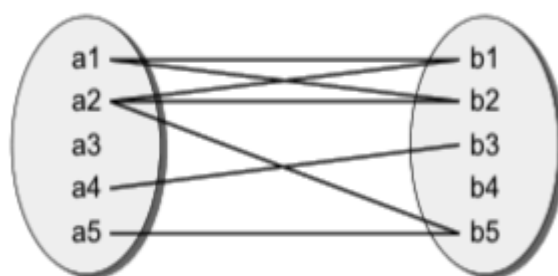
Figure 5. Many-to-many. (Vidhya et al., 2016, p. 46)

In the above picture, a many-to-many relationship is presented. For this type of relationship, an entity in A is associated with zero or more in B and the same for vice-versa. (Vidhya et al., 2016, p. 46)

4.2 Keys

Keys in the database, offer the opportunity to identify attributes, uniquely identify relationships and divide entities and relationships from one or others. Keys are of several types. The first type is a superkey. It is an attribute or mixt of them which uniquely identifies a row from a table. The second one is a candidate key or minimal superkey. The third one is the primary key which cannot have null values and it is unique for each row. The fourth is a foreign key which is an attribute in one table and refers to the primary key from another table. The last one is the secondary key which makes retrieving data in a more efficient way. (Vidhya et al., 2016, p. 47)

5 WEB SERVERS

The World Wide Web consists of a huge group of computers known as servers that provide information when it is requested by a web browser. That information is usually stored in a web page. The web from a client-server perspective works as follows: the web browser is the client and the computer which is providing or serving the information is the server. (Valade & Suehring, 2013, p. 7)

A web browser such as Google Chrome or Microsoft Internet Explorer is used when a web page is requested by a client and it contacts a web server. Apache httpd and Microsoft Internet Information Services are the most popular web server software packages that host the vast majority of all web domains. (Valade & Suehring, 2013, p. 8)

So that a web server can communicate with a web browser a protocol called HyperText Transfer Protocol, or HTTP is used. The HTTP does not remember what it is doing from one request to the next. (Valade & Suehring, 2013, pp. 8–9) In this chapter, the author offers information about some web servers, and also about XAMPP which was used for developing the application.

5.1 XAMPP

Xampp was developed by Apache Friends and gives the user the possibility to test PHP, MySQL, Apache and Perl projects. It is a cross-platform which contains in a single package many web development technologies. It is free to download and works on Mac, Linux, and Windows. Xampp allows users to create a local web server. (Editorial Staff, 2017)

The first letter X, from the name Xampp, represents the cross-platform which means that it can run with the different operating system on any computer. A stands for Apache Server. M refers to MariaDB which was developed by MySQL team and it is a popular database server. P stands for PHP and the last letter P is an abbreviation for Perl. The Xampp installation is easy. When it is installed, it acts as a local server or localhost and the user can test the applications on a local computer. (Editorial Staff, 2017)

Xampp allows users to test and make updates easily in the localhost. For example, to test PHP applications, it is necessary to start the Apache and MySQL module like presented in the figure below. (Editorial Staff, 2017)
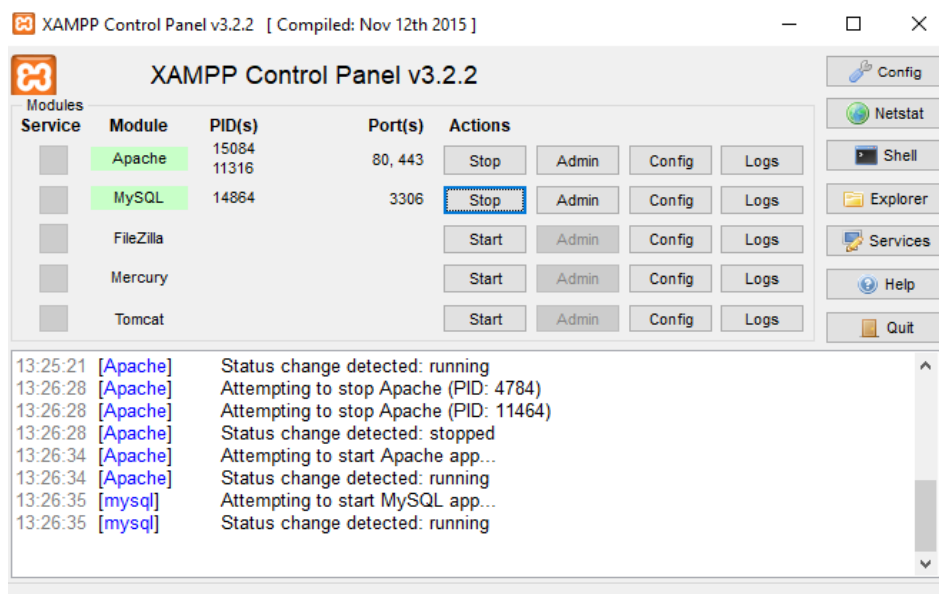
Figure 6. XAMPP Control Panel

To verify if the local server is well installed, it is necessary to go in the browser to http://localhost. If there are some issues, most are because of the port conflict which means that another program uses ports 80 or 443 that Apache and MySQL need to run. (Morey, 2019)

5.2   Apache HTTP Server

Xampp contains important tools and one of them is Apache HTTP Server which is an open source free software. Apache Software Foundation maintains it. It was developed originally for Unix, but it is available for Windows and other operating systems. HTTP Server is a remote computer which gives files to requesting clients. The content is delivered using the HTTP. (Mitchell, 2019)

A good reason to use Apache HTTP Server is that it is free for personal or commercial use. It is actively maintained, so it is an updated product. Apache supports proxy services, password authentication, multiple request processing models and so on. (Mitchell, 2019)

5.3   Wamp

Wamp is used on Windows servers. The first letter comes from Windows, the second letter comes from Apache, the third from MySQL and the last from PHP. On Windows servers, WordPress is usually not installed which made Wamp successful as on this solution WordPress is already installed. It is good for developing on personal computer websites as it does not have to transfer all the fields to a live website. If WordPress is installed locally on the computer with Wamp, then this site can be seen just by

that person who works from that computer. To have it available for everyone, it is necessary to have a domain and web hosting. (wpbeginner, 2019)

5.4   INTERNET INFORMATION SERVICES (IIS)

IIS, short of Internet Information Services is an extensible web server which was created by Microsoft. There are many versions of them. In the world, Apache HTTP Server is the most popular web server and IIS has the second place. IIS gives the possibility to create sites or applications and also, to share information over the Internet or intranet with users. (Marc Wilson, 2016) IIS comes with Windows, but it is not accessible, to have access on it is necessary to be installed. Enterprise users want to secure their data, which is possible through SSL. It allows encrypting data which is transmitted. SSL can be used to secure the server, however, it is necessary to have a server certification installed. (Keary, 2018)

6 COMPARISON OF TOOLS AND TECHNOLOGIES

In this chapter, the author makes a comparison between tools and servers. Some of them are used to develop web application.

6.1 Sublime Text versus Visual Studio Code

Sublime Text works for Windows, Linux, and OX X. It is necessary to have one license which can be used on every computer the user owns. Visual Studio Code is free and it is available on Windows, Linux and Mac OSX. Some alternative to it is Notepad++, Vim, Atom, and Emacs. There are a lot of companies which use these tools. Visual Studio Code is used by Microsoft, Asana, Jitbit, Avocode and so on. Sublime Text is used by Lyft, Starbucks, HubSpot, OpenTable, Webedia and so on. (stackshare, 2019)
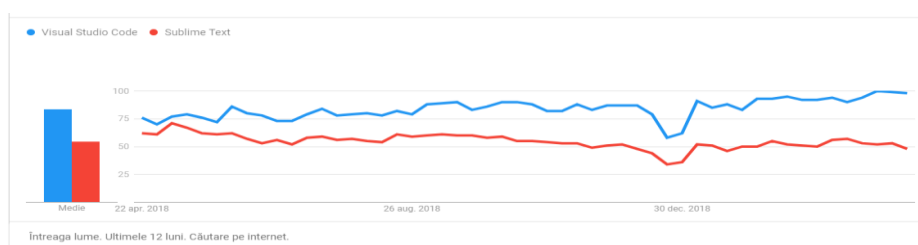

Figure 7. The level of interest over a period. (stackshare, 2019)

In the above picture, the level of interest for one year is present. The timeline starts on 22 April 2018 and ended on 22 April 2019. It is shown that the Visual Studio Code has a higher-interest level than Sublime Text. (stackshare, 2019)

6.2 MySQL versus Microsoft SQL Server

MySQL and Microsoft SQL Server are the most common relational database platforms used on the web. Both have some advantages and disadvantages. (Ravago, n.d.)

MySQL represents one of the most common database systems which is used in this world and has many advantages such as open-source solution, easy to use and offers compatibility to many operating systems. Stability issues or poor scaling performance represents some disadvantages of using MySQL. (Ravago, n.d.)

Another database platform used very frequently in this world is Microsoft SQL which also has advantages and disadvantages. MS SQL works in a set-based style, it has scalable performance, and it is in continuous development which is some of its advantages. MS SQL is made for enterprise companies which store many data and it costs double than

their concurrence. This means that the price is one of its disadvantages followed by the core language which is distinct from its adversary and programmers must learn a new set of guidelines and setups. (Ravago, n.d.)

Table 2. COMPARISON TABLE- MySQL versus MS SQL (Ravago, n.d.)

Database Management System		
Particulars	MySQL	MS SQL
Description	Widely used open-source RDBMS	Microsoft Relational RDBMS
Developer	Oracle	Microsoft
Initial Release	1989	1995
Current Release	MySQL 5.7.18	SQL Server 2016
License	Open Source	Commercial
Cloud-based	No	No
Operating systems	FreeBSD Linux OSX Solaris Windows	Windows
Data Scheme	Yes	Yes
SQL	Yes	Yes
Supported APIs (Application Programming Interfaces)	ADO.NET JDBC ODBC	OLEDB Tabular Data Stream ADO.NET JDBC ODBC
Development Platforms	Ada C C# C++ D Delphi Eiffel Erlang Haskell Java JavaScript Objective-C OCamp Perl PHP Python Ruby Scheme TCL	C++ Delphi Go Java JavaScript PHP Python R Ruby Visual Basic

In the above table, a comparison between MySQL and MS SQL is shown. It is clearly shown that both of them have some advantages and some disadvantages. For example, MySQL runs on multiple operating systems and MS SQL runs just on Windows. Another example from this table is that the SQL Server has ample coverage of APIs compared to MySQL. Both of them have good security support for developing government applications. (Ravago, n.d.)

In the end, if the programmer wants less configuration and simple setup, then MySQL is a good choice. If the programmer wants to make an application for an enterprise which is complex, then MS SQL is a good choice. The author of this thesis chooses MySQL because it is free and easy to setup. (Ravago, n.d.)

6.3   Apache versus Microsoft IIS web server

Apache and Internet Information Services are most used web server platforms in the entire world. Apache is number one in the web server market and represents 42% of the total market but it is in drop and most loss has been to IIS which is number one rival. IIS has second place in the web server market which only runs on Windows operating systems. (UpGuard, 2017)

To implement some features, Apache and IIS use external web extensions. When it comes to performance, Apache is a bit better than IIS. However, when it comes to security, IIS is better than Apache. This leads to a fairly big advantage for IIS. Both of them have their advantages and disadvantages such as Apache does not have big-name corporate support but IIS has. In the below table a good comparison between these two web servers can be seen. (UpGuard, 2017)

Table 3. Comparison between IIS and Apache server (UpGuard, 2017)

Feature	IIS	Apache
Supported OS	Windows	Linux, Unix, Windows, Mac OS
User support & fixes	Corporate support	Community support
Cost	Free, but bundled with Windows	Completely free
Development	Closed, proprietary	Open source
Security	Excellent	Good
Performance	Good	Good
Market Share	32%	42%

6.4   **XAMPP versus Wamp**

XAMPP and Wamp Server are free open source web servers which run a web server on a personal computer. Both of them have Apache server and PHP and other necessary software for running websites or web applications. They have the same basic software's which are necessary for running a web server, but also have a few differences. For example, both of them can be used for PHP based applications, but XAMPP can be used for applications which are also written in Perl. (Qoncious, n.d.)

Whether the user wishes to use XAMPP or Wamp, he or she will have a great benefit, namely that they do not have to install Apache, PHP, MySQL, and MariaDB individually. It is enough to download XAMPP or Wamp installers which can be found on their websites and then install them on the desktop PC or user's laptop. XAMPP has more software and tools than Wamp such as Mercury Mail, Tomcat or Strawberry Perl. Hence, the size of the XAMPP installer is bigger than the size of the Wamp installer. (Qoncious, n.d.)

XAMPP is available for three operating systems: Windows, Mac OS X, and Linux. Wamp is available for Windows only. Both of them consist of basic software for running a web server mentioned above. (Qoncious, n.d.)

6.5   **Used tools and technologies**

The author chose to work with Xampp, MySql, Apache, and Sublime 3.
The author chose Xampp because she worked with it and it seemed a good opportunity to gain more knowledge. It also comes with Apache and Mysql which is another benefit and reason why it was chosen. Sublime 3 has been chosen because it has many features and it is easy to work with.

7 IMPLEMENTATION OF THE APPLICATION

The goal of the practical part is to create an application for passengers and hostesses flying by plane to help them to order and receive the desired product as soon as possible the. Using this application, the passengers are able to see what food, drinks, creams or perfumes can be ordered and in this way, they have enough time to choose what they want.

In this chapter, the author presents the theory related to the practical part of this thesis. It contains details of how the practical part was made, the steps are taken to accomplish this application, and the theoretical details of the methods, tools, and techniques used.

7.1 Database structure

The practical part started by installing Sublime 3, which is a code editor. In it, the entire code needed to develop the application was written. After that, XAMPP was installed which allows the user to work on a local server and test the websites locally. When starting to using XAMPP and test the website, it was necessary to start in XAMPP the Control Panel, Apache and MySQL module. Here, the Admin button is placed and when it is pressed, it opens the phpMyAdmin. In another way, it is possible to have access to the MySQL database via *localhost/phpmyadmin/*. The following database which can be seen in the below image was required to make this web application.
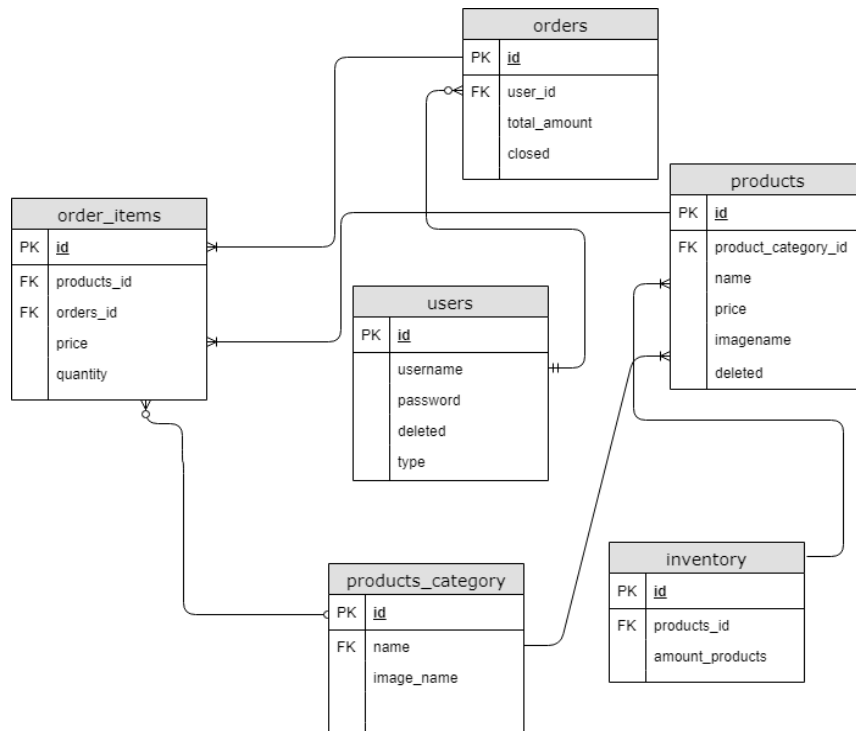
Figure 8. Database structure and table relation

Six tables were needed for this web application. The first table is called order_items and has five columns. The first column, called id. It is the primary key that must contain a unique value and it is auto-incremental. In other words, it generates a unique number when a new row is inserted in the table. The following two columns, products_id and orders_id are the foreign keys which make the link between the data in the two tables. In this case, a link between order_items and products table and between order_items and orders table is made. The relationship between them is many-to-one. An example can be that orders can have many items.

The second table, called orders, is made up of four columns. The first column, called id, is the primary key, the second column, called user_id, is the foreign key, the third column, called total_amount, and the last is called closed. The closed column was created for the hostess. When she brings the order to the passenger, she needs to close the order because maybe others can come after some time. When the close button is pressed, the page will be refreshed and the hostess can see the next orders.

The third table, called users, is made up of four columns. The first column is called id and it is the primary key, the second column is called username, the third password and the fourth is called deleted. This table was created for users of this application which are of two types, passengers and hostesses. The username is the name of the hostess or the name of the passenger seat, such as 1A or 17B. The username will be

stored in the database. The password column stores the hostess password and passenger password. The hostess has a special username and a special password. With these credentials, she is able to log into the web application and see the passenger's orders. The username of the passenger is the name of the seat and the password is also the name of the seat. The relationship between users and orders is one-to-many because one user can have many orders, but the order must have a user. For example, a passenger can order multiple times during the flight as at beginning he or she wants to drink something and later on eat something. However, the order must have a user so that the hostess knows where to bring the order.

The fourth table is called products_category and is made up of three columns. The first column is called id, which is a primary key, the second is called name which is the foreign key, and the third is called image_name. Here the images are stored for the four product categories which are displayed on the main page.

The fifth table, inventory, has three columns. The first column is called id and is the primary key. The second column is called products_id which is the foreign key. The last column is called amount_products. Here the amount of all products which can be found in the database are stored. When someone will place an order, the amount will decrease. For example, if in the inventory are five products and someone orders all of them, then these products will not be displayed on the page anymore.

The last table is called products and consists of six columns. The first is called id, which is the primary key. The second table is called product_category_id which is the foreign key, and the following four are called name, price, imagename and deleted. This table is used for storing details about the products. The imagename column stores the path to the image of a product which is written in the name column. This image is displayed on the web page.

There is also other product information in this table such as its name or the price it has. The deleted column is used when the user wants to remove items from the shopping cart. When the product is in the shopping cart, the column is marked with 0, and when it is deleted, the product is marked with 1.

The relationship between products_category table and products table is one-to-many. One category of products can have more products, however, one product can just be in one category. For example, in the food category can only be food and no drinks or other types of products.

Once the database has been created in the correct way, the login page implementation has begun. To access the data, a PHP code must be written to connect to the database. In this line of code the name of the

server (usually called localhost), the username (usually called root), the password (usually a free space), and the database name are given.
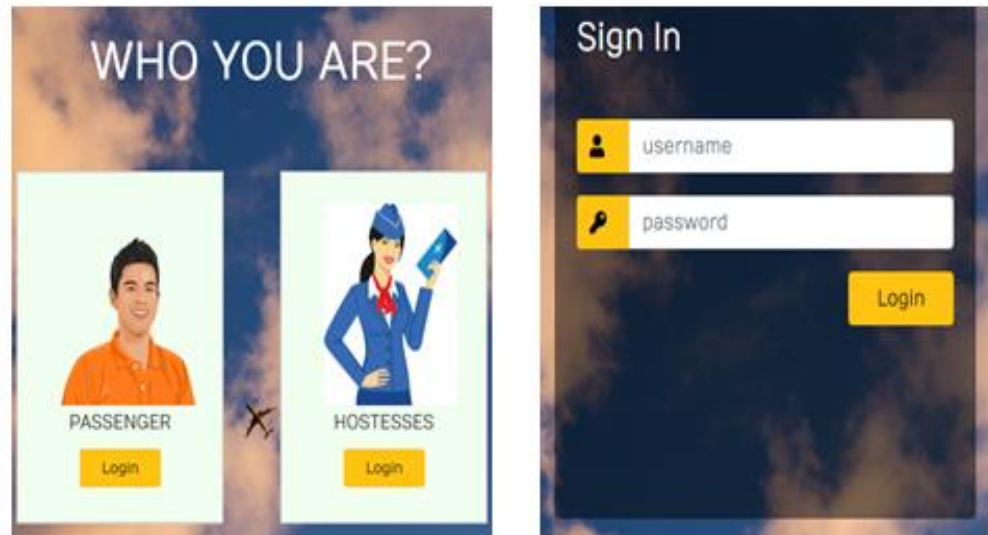
7.2   Passengers page

Figure 9. Login Page

In this page, the user can log in as a passenger or as a hostess, depending on his status. Once the login button is pressed, a new page opens where the username and password must be inserted. If the user is a passenger, he/she needs to type in the username and password which is his/her seat name. If the user is a hostess, she needs to write her personal username and password which is unknown to the passengers and it is stored in the database. When a passenger logs in, then the image below is displayed.
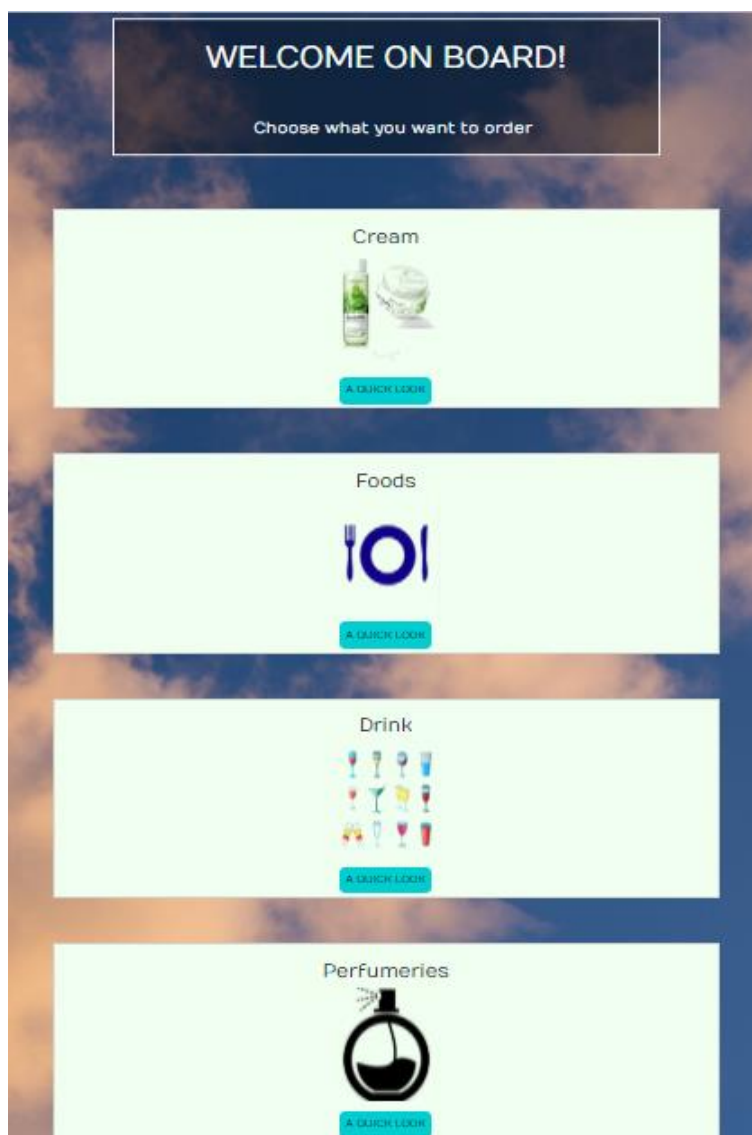
Figure 10. Main page

In the above figure, the main page for the passengers is presented. This contains a welcome message and four product categories. The first category is called Cream. When the quick look button is pressed a new page is opened where more creams are available. Every product category has a unique id and when the button for e.g. the drink category is pressed, only beverages are displayed. In the database, each product has a products category id so that it can be properly displayed. Each category has a specific id number.
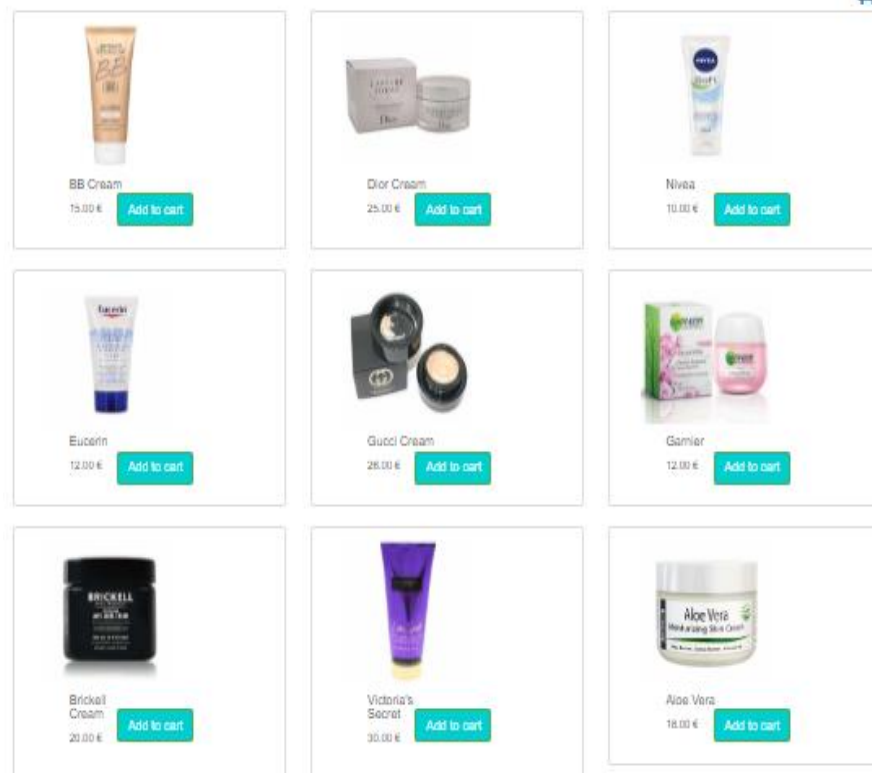
Figure 11. Cream category

In the above picture, the page of creams is presented. The images are displayed from the database and other details such as price and name. All the information comes from the database. To make this possible the code was written in PHP and the query was used to display what is needed. When the button add to cart is pressed, the product is added to the shopping cart which can be seen in the image below.

Figure 12. Shopping Cart

In figure 12 the shopping cart is presented. There are all the available products. The user has the possibility to delete the desired product or to add more. In the shopping cart are details about all products such as price, quantity, name or image with the desired product presented. Furthermore, the total sum is also presented.

If the user wants to order something else, then he presses the continue shopping button and the main page appears with four products category and he can continue shopping. To continue the shopping and to keep the products in the shopping cart it is necessary to use sessions which represent a way of storing information in variables which can be used across multiple pages. These variables are set with the PHP global variable: $_SESSION. If the user does not want to order other items, he or she has to apply the checkout button. Afterward, she or he has to check if all the wanted items are in the shopping cart before placing the order.

After the order has been placed, the user sees a message on the screen telling him or her that the order has been sent successfully. To check the received orders, the hostess has to log in with the username and password. Once she is logged in, the page presented in the figure below is shown.

7.3 Hostess page

All the orders

1A	1B	1C	1D	1E	1F
2A	2B	2C	2D	2E	2F
3A	3B	3C	3D	3E	3F
4A	4B	4C	4D	4E	4F
5A	5B	5C	5D	5E	5F
6A	6B	6C	6D	6E	6F
7A	7B	7C	7D	7E	7F
8A	8B	8C	8D	8E	8F

Figure 13. All the orders from all users

In figure 13 all the name of seats which represent the user is shown. If the seat number is blue, the hostess knows that an order was placed and she needs to click on that box to see the order. When the hostess clicks on the box, all products which a passenger has ordered with the overall sum appear.

Figure 14. Orders from a passenger

After the passenger has received all the orders, the hostess can close it. When the order is closed, the page is refreshed and directed back to the main page. Now the hostess can check if any new orders came in the meantime.

7.4 Interview

The purpose of this interview was to receive feedback about this web application from a hostess. An email was sent to Tiina Kumpulainen which has been working as an air hostess for 15 years.

The first question was about the first impression of the application and if it is easy to use. According to hostess Kumpulainen, this application makes life easier, faster and it is easy to use.

The second question was "Do you think that passengers have enough time to think and look at what they want to order when you are near them with the products?" Tiina Kumpulainen (e-mail interview 2019) said that at that time they do not have enough time. Such an application would be helpful and also would make better sales.

The third question was "What is the main benefit of this app for you?" Kumpulainen answered "Many people get the same information at the same time with the app. They get the same service without the hostess telling it personally to every passenger."

The fourth question asked was "In your opinion, if passengers and hostess would use this application would it be helpful for them?"

According to the experience of Kumpulainen, this application would be helpful for passengers and hostesses. They will use it.

The fifth question asked was about what is not so good in this application, what she does not like or what is missing. Kumpulainen said: "This kind of app does not work with regular dinner/lunch/coffee service where the trolley goes from one passenger to another."

The last question was "What feature would you like to see in this app?" Kumpulainen affirms that a built-in alarm triggered by an order would be helpful. Furthermore, the orders should be seen in a timed list, first comes on the top.

8 CONCLUSION AND RECOMMENDATIONS

This thesis had the aim to develop an application to help the hostesses to accomplish their tasks as good as possible and as fast as possible. This application allows the passenger to order what they want and the hostess receives the order on her tablet, avoiding the need to ask each passenger.

During the entire thesis, the research questions stated in the introduction were well answered. To give a good response to them, it was necessary to develop an application with all features which the research questions gave. By using the application the hostess can save time because the passengers can make an order through the application. This feature represents a good improvement in the service quality of hostess. To be possible to make an order and to send to hostess tablet were used many technologies such as PHP, HTML5 or MySql. Based on feedback from a hostess, this app is quite good and can make her work to be more efficiently.

In order to improve the services offered by the hostess to the passengers, this thesis provided information about the hostesses conducted through an interview. The interview helped to check if this application is good and useful for her.

In general, the author is grateful about the development and final result of this thesis. During this process, the author improved her skills in programming and researching. For example, she learned how to make a database, how to write code in PHP, and how to work with Xampp.

For the future, some improvements can be added such as an alarm popping up when an order was placed. Another feature which can be added is that the orders can be seen in a timed list, first come on the top. These examples of improvements are based on the interview with the hostess.

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INTERVIEW

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Appendix 1

INTERVIEW BY E-MAIL

PUT THE QUESTIONS

1. Can you give me some details about you?
2. How long do you work as a hostess?
3. From your perspective, is it comfortable and easy to ask every passenger what he or she wants to order?
4. Do you think that passengers have enough time to think and look at what they want to order when you are near them with the products?
5. What was your first impression of the app?
6. Do you think this app could give more time for passengers to see all the products you have?
7. Do you think this application is easy to use?
 8. What is the main benefit of this app for you?
9. In your opinion, would passengers and hostess use this application? Would it be helpful for them?
10. When do you think would the application be more helpful: on shorter flights like 1 hour, longer flights like 5 hours or for both options?
11. What do you like most and what do you dislike most about this app?
12. What feature would you like to see in this app?