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WEB APPLICATIONS AND DEVELOPMENT

Assignments 1, 2 & 3

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Introduction

A web application is a software system based on the latest technologies and the standards of the consortium World Wide Web (W3C) which provides resources specific web such as content and services via an interface called web browser.

This report is meant to show in the first part of the report, how to assess the function of the web application, also bringing both benefits and constraints of using a web application

The second topic is to have a critical comparison between Client-side and Server-side scripts.

The last part of the assignment creates a security report which examines the current state of Web security issues and current methods used to combat them.

Assignment 1 Web application concepts

1. Task 1 Understand the concepts of web application development

Web design as a scientific discipline is influenced by web development. Current guidance in the development of Web applications is often characterized by an ad hoc approach and a lack of development methods. Due to the complexity and pace proliferation of web applications, this approach has a negative impact on quality.

It is necessary to build a web application life cycle, presenting concepts, techniques, methods and utilities for the systematic development of web applications (Pressman, 2005).

Web applications are web-based programs, executed in a web browser and implemented using technologies such as PHP, ASP, Pearl, Python, HTML, CSS, JavaScript.

1.1.1 Critically evaluate the Functions and Advantages of Web Applications

1.1.1.1 Functions of web applications

A web-based application is characterised as a group of rationally associated interactive functions that satisfy a distinct business need as described by a competent user of the internet. In the case of a web application, the business user of the web development is the web provider and it is this aspect that delimits what is user-requested functionality (Buede, 2016). The end-user of the website does not directly determine either the business functionality provided or the design requirements.

A web application contains a variety of functions, including: shopping cart, text, images, videos, contact forms, blogs, search field, logo, dynamic or static pages, logging fields, etc.

Developers must clarify the following issues during the process of adaptation:

- What types of requirements are important for web application?
- How will be described and documented requirements for web application? What are the degrees of detail and formality useful?
- Using the utilities should be considered? Which of these are suitable for the specific needs of the project?

Functional requirements - capabilities and services of a system should provide - money transfers in an online banking, use cases and formatting specifications.

Below are some of the functions of Web Applications:

Shopping Cart Function

A web meant shopping cart is equivalent to the original supermarket store shopping cart. It is a middle through which a consumer can view a catalogue of goods and head off the choices he needs. When finished buying, the customer shows that he can check out. That is where the entire order is settled and validated. Also, the buyer will enter their transportation and tax notice at the checkout. Shopping cart software is the programming that permits a website to create a catalogue of goods and its database and blend it into the website pages (Bilgihan, 2015).

The shopping cart is one of the very necessary parts of having a constant eCommerce development (Li, 2014). Factors that are critical to a shopping cart should be, website wizards, merchant tools, shopping features, payment options, delivery and taxes arrangements, statistics and protection. There are hundreds of shopping carts accessible.

They cross from simple scripts to complete e-commerce solutions. A great shopping cart is considered an eCommerce solution.



Figure 1 Shopping cart function of a web application is critical needed

Source: <https://www.milesweb.com/blog/ecommerce-stores-hosted-vs-licensed-shopping-cart-solutions/>

Content Management System Function - is a software used to automate as full content management, particularly Web sites. The goal is to reduce or eliminate interference on programmers to edit and manage their sites (Li, 2015). CMS facilitates the organisation, control, and publishing documents and other content, such as images and multimedia resources.



Figure 2 Content management function

Source: <http://chickso.com/index.php/en/en-website-functionality/169-en-content-management>

Usually, such a system brings tools that users without knowledge of the programming languages can create and manage content with relative ease of use. Most systems use a database to store content and presentation layer to display its casual visitors, based on a set

of templates. The administration is normally via a web browser, but some systems may be modified in other ways (Boukar, 2013). A CMS website differs from creative programs (such FrontPage or Dreamweaver) by enabling non-technical users to make changes to the site with little or no skills. At present, there are numerous free CMS which allow easy creation and management of web pages. Among the most popular are WordPress, Joomla, Drupal, Silver Stripe.

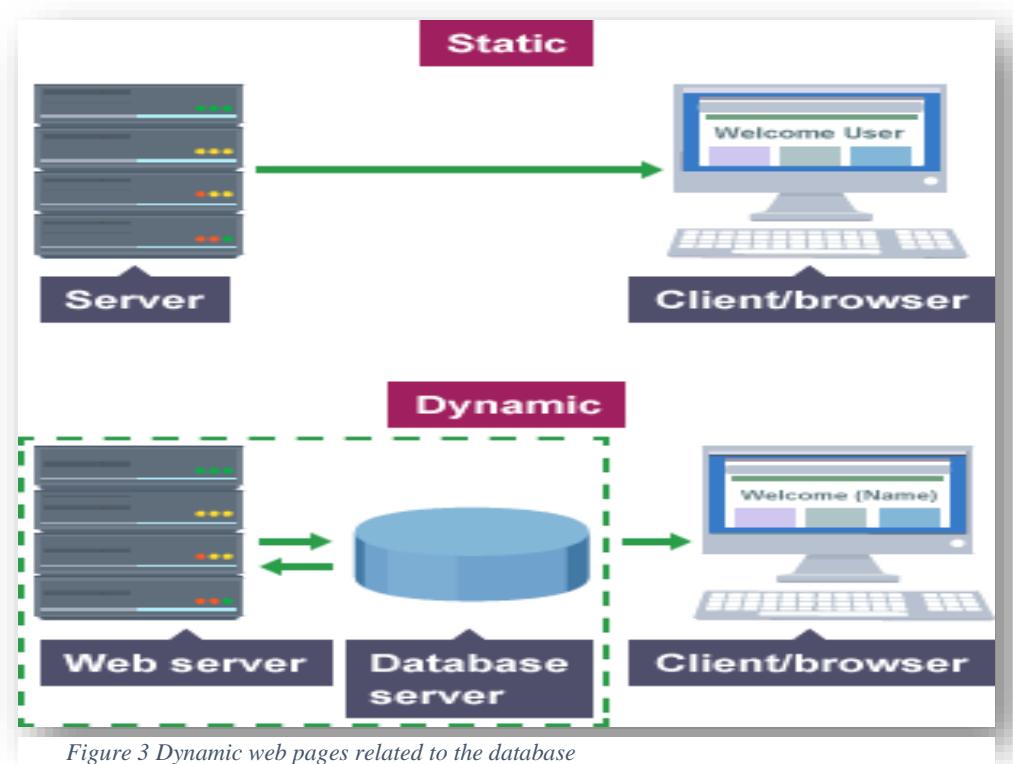
A web content management system provides the following key features:

- ✓ Automated templates - Create standard visual templates that can be automatically applied to new and existing content, creating one central point to change the interface of a website.
- ✓ Easily editable content - Once content is separated from the visual representation of the site, editing and manipulation are usually much lighter and faster. Most CMSs include WYSIWYG editing tools allowing non-technical staff to create and edit content.
- ✓ Scalable feature sets - Most CMS have plug-ins or modules that can be easily installed to extend functionality.
- ✓ Upgrades after web standards - active content management solutions usually receive regular updates that include new features and system related to web standards.
- ✓ Managing Workflow - Workflow is the process of creating sequential and parallel tasks that must be met by CMS. For example, a content creator writes an article that is published on the site until it is cleaned publisher of children and approved by the chief editor.

- ✓ Document management - CMS sites can come up with ways of managing the lifecycle of a document from creation, through revisions, publication, archiving and destruction.

Dynamic and Static Web Pages' Function

Dynamic pages - are applied when web developer wants to change the dynamic content of web pages (Mendes, 2014). Dynamic web pages receive theirs content in real time usually from a database. Adjustments demand particularly be performed in the database, usually by a back-end application.



Source: <http://www.bbc.co.uk/education/guides/znkqn39/revision>

Web dynamic pages are characterised by the following:

- Their content is created dynamically and may differ from different views; for example, to the same URL page content may vary depending on certain parameters

such as the geographical location of the user, time, pages visited, the profile of the user;

- Provides interactivity;
- Opportunities for interaction.

Depending on where it is highlighted the dynamic nature of the pages there are dynamic pages on the client-side and server-side dynamic pages.

Technologies that enable dynamic pages on the client side:

- ✓ Scripts on the client side (client side scripts)
- ✓ DHTML (Dynamic HTML)
- ✓ Java applets
- ✓ ActiveX controls
- ✓ Multimedia

General characteristics of dynamic Web pages generated on the server, regardless of the scripting language used are:

- Requires a processor for dynamic pages or an execution environment;
- A page of the script (ASP, JSP, PHP) can be combined HTML and code sequences
- Code sequences are executed on the server before sending the page to the client
- There is the possibility to customise pages dynamically
- It offers the possibility of interaction with different databases.

- Have access to all Web server resources (files, network).

Static web pages - Web page made in HTML have the disadvantage that is static; their contents cannot be modified once they have been uploaded to a server than bringing them back for editing (Mendes, 2014).

The main features of static Web pages are:

- Contain only HTML elements;
- Viewed in the browser source code is identical to the file stored on disk;
- It does not offer interactivity.

Web Server Controls Function are gathering of controls generated specifically from the System.Web.UI. WebControls base class. They are performed on the server side and yield HTML sent back to the customer program (Titov, 2013). These controls are programmable and reusable that can perform work like the conventional HTML controls. Web Server Controls can recognise the objective program's abilities and render themselves as needs be.

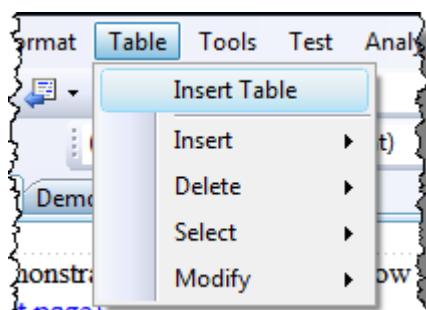


Figure 4 Web server control function

Web Server Control Advantages

- ✓ Server controls are anything but difficult to utilise and oversee yet HTML controls are most certainly not. Server control occasions are taken care of in the server side

while HTML control occasions are dealt with in the customer side program just. It can keep up information over each solicitation utilising view state while HTML controls have no such component to store information between client demands.

Wish lists - are sets of wanted goods saved by shoppers to their user account, implying interest without direct intent to buy (Usha, 2016). Attempting wish lists is a useful method to diminish shopping cart abandonment and satisfy sales from clients who showed purpose but didn't end up purchasing.

1.1.1.2 Advantages and Disadvantages of Web Applications

Advantages

The main business benefits to companies of different types of electronic business are:

- ✓ Facilitates business expansion, providing quick access to local and national markets, but more importantly and international markets;
- ✓ Lowering costs with company's activity, especially those with achievement, processing, distributing, storing and retrieving information stored on paper; when using electronic business solutions, automated for these activities;
- ✓ Creates the possibility of easy modelling of products and services according to the needs of buyers;
- ✓ Communication costs, transportation is greatly reduced.

Consumer benefits are numerous, of which are listed:

- ✓ It offers consumers the opportunity to buy or carry out transactions 24 hours/day throughout the year from almost any location;

- ✓ Gives consumers more choice;
- ✓ Buyers can choose easier lowest price for a product or service;
- ✓ Enables rapid delivery of products and services;
- ✓ Consumers can receive relevant information in a short time: in seconds, rather than in days or weeks as in much traditional business;
- ✓ Makes it possible to participate in virtual auctions;
- ✓ Facilitates competition, leading to lower prices for products and services;
- ✓ Enables consumers to interact with other buyers through electronic communities, to compare experiences.

Also, a Web Application of a company brings a number of advantages, including:

- ✓ It gives more people the opportunity to work from home and buy a home, which can lead over time to decrease car traffic and decreased pollution;
- ✓ Certain goods can be sold at lower prices, so benefiting those with lower incomes, thus contributing to social protection;
- ✓ Electronic businesses increase efficiency and improve the quality of products and services.
- ✓ They are independent of the operating system. It can be run on almost any operating system through a web browser
- ✓ No installation required, and requires only the existence of a web browser

- ✓ Updates/upgrades easily done. Practical changes are made in one place (the server), they automatically propagate to all users no longer need to install / reinstall the application on their computer.
- ✓ If classic client-server application user interface is provided through a client program installed on each user's computer. An upgrade to server code usually requires an upgrade to client code, in which case it is necessary to reinstall the client application on every computer user.
- ✓ Backup is very easy to do, the data being stored centrally
- ✓ It can be run from any computer that has a web browser. It can be accessed from virtually any point on the globe
- ✓ Usually the vast majority of the processing is done on the server, hence the resource requirements of the device / computer application that is accessed is minimal
- ✓ Programming is simplified by the existence of web applications software such as Open Source: Symphony, Code Igniter, Zend Framework, etc.
- ✓ They can be used on tablet and smartphone browsers as they were built.

Disadvantages

In addition to these advantages, the web applications have a number of limitations. The most important shortcomings of electronic business are:

- The lack of universally accepted standards for quality, security and trust in web application;
- It may be difficult or even impossible to make a connection with local client hardware (printers, scanners, etc.);

- Software development tools for conducting a web application are still evolving;
- There are some difficulties regarding integrating web development software with some existing applications and databases;
- Internet access is still expensive and inconvenient for a large part of the population.

1.1.1.3 List of the functions for KK Motors website

The website of KK Motors is a static web application and used the next functions:

- Logos of social networks
- Text within paragraphs and headings
- Multimedia files (a company's video presentation and pictures with the cars for renting and selling)
- Feedback and Contact forms
- A map with the directions for KK car shops

In the future is essential to improve the functions of the web site by implement a Search box function, by creating User Accounts and a Log file functions, also is it very import to provide a Shopping Cart function for KK Motors' customers, giving them the possibility to buy faster with high payment security. It is recommended to come with a Wish list function where the customers to save their products for future.

2. Task 2 *Compare Different Types of Server-Side and Client-Side Scripting Languages*

Task 2

Compare Different Types of Server-side and Client-side Scripting Languages

1

Overview

- A scripting language is a programming language that allows control one or more software applications. Scripts are different from code application base, typically written in different languages from code host application's source.
- Scripts are written by the end-user, often interpreted from source code or byte-code, which controls the application that is traditionally compiled in machine code.
- Scripting languages were created to shorten the editing-compiling-linking-rolling the applications.

2

Overview

- GUI scripting and macros, have become useful with the advent of visual interfaces for applications. These scripts allow simulation of human interactions with the application, which is useful in testing phases or for automating otherwise time-consuming actions.
- Web browsers are the most common forms of applications that intensively use scripting languages, being imposed rigorous standards for uniform behaviour of each scripting language.
- Text processors have scripting languages to generate log files activities (log files) or configuration files.

3

Types of Scripting Languages

- Dynamic web pages are using often scripting languages.
- Depending on where it highlighted the dynamic nature of the pages there are dynamic pages on the client side and server-side dynamic pages.
- Concrete examples are:
 - PHP and MySQL - runs on server-side
 - JavaScript (aka jQuery, MooTools, etc.) - runs on client-side
 - Java can run on client-side and server-side and can have connections.

4

Types of Scripting Languages

- What is the difference between the server and client?

The programming of the server-side involves the instructions given on the server, while programming on the client-side involves instructions provided to the browser (aka the customer) reason for which, during the viewing a site, JavaScript may be disabled and the PHP does not.

- Why?

Because there isn't control on the server except they were programmed to be accepted (which request - POST, GET, PUT, DELETE)

5

Client-side Scripts Languages

At present, a Web document can be achieved by using the following technologies on the client side:

- **Cascading Style Sheets (CSS)** and **Dynamic HTML (DHTML)** for document formatting, positioning page elements and to achieve primary effects animation;
- **JavaScript** and **VBScript** scripts for creating small applications based on events (validation data submitted via forms, making drop-down menus, small applications that run at a certain time or when purchasing a button, etc.);
- **Java Applets** that are executed by the browser, typically used for creating simulations of phenomena, games, multimedia presentations.

6

Client-side Scripts Languages

- **Flash Animation, Shockwave** etc. - usually used for creating animations, games, multimedia presentations, Web page navigation elements (menus, buttons).
- The major disadvantage of the above technologies is dependent on their default web browser and the client computer. The user can disable, for example, JavaScript execution sequences for security reasons or a mistake Web browser unable properly display documents that contain such scripts. Flash animations and Java applets can be interpreted by the client unless the user has installed some programs called special plug-ins(Flash Player). Web page content will not display correctly if necessary plugins are not installed or are installed older versions.

7

Client-side Scripts Languages

- Client-side scripts are sequences of the program included in the HTML page which shall be executed by the navigator.
- The sequences are the program included through the marker <SCRIPT> or the properties of certain components HTML in response to the various events.
- The languages used to create client-side scripts are JavaScript, VBScript and Jscript.
- The sequences of the program written using these scriptures do not provide access to system resources local (files, network).
- Last but not least, client-side applications do not have access to files and databases so that they can not develop applications that require storing and retrieving information.

8

JavaScript

- JavaScript is a programming scripting languages category, which is used mainly in applications and web pages to enrich the user interface.
- JavaScript contains a fairly extensive list of functions and commands designed to help mathematical operations, manipulation of strings, sounds, images, objects and windows of the browser, URL links and checking data entries in forms.
- JavaScript can be introduced in HTML - usually, JavaScript code is hosted in HTML documents and executed within. Most HTML tags have JavaScript objects they represent, so the program is included on the client side language. JavaScript uses HTML to enter the framework of the web application.

9

JavaScript

- Source: Internet
<https://www.slideshare.net/oxus20/web-design-and-development-life-cycle-and-technologies-39358650>

JavaScript

Definition

- » A scripting language used to design interactive Web sites.
- » JavaScript allows developers to create interactive objects such as pop-up boxes, and drop-down menus....

Example

```
<html>
  <head>
    <script type="text/javascript">
      document.write( Date() );
    </script>
  </head>
</html>
```

 <https://www.facebook.com/Oxus20>

10

JavaScript

- JavaScript is dependent on the environment - JavaScript is a scripting language; software program is running the web browser (Firefox, Opera, Netscape Navigator, Internet Explorer, Safari, etc.)
- JavaScript is an interpreted language entirely - script code will be interpreted by the browser before being executed. JavaScript does not require compilation or processing work, but remains part of the HTML document. The disadvantage of this language is that running takes a little longer because JavaScript commands will be read and processed by the web browser when the user calls to those functions (by completing forms, push buttons, etc.). The main advantage is that it can be much easier to update source code.
- JavaScript covers various contexts - programming with this language is directed mostly to the client, but we can use JavaScript and server side. JavaScript is the original language to some web development tools like Borland IntraBuilder or Macromedia Dreamweaver.

11

Visual Basic Scripting Editor (VbScript)

- It is an active scripting language, which is a technology used by operating systems Windows, support software to implement component-based scripts.
- This scripting language helps web designers to do certain operations in HTML language, namely putting scrolls or buttons of interactive pages.
- However, probably it can be used every day when surfing the internet. Drift Visual Basic, which gives an ease of implementation, is an intuitive language, operators and instructions are very similar to the programming language C, which is a great advantage for any mid-level programmer.
- The disadvantages are the lack of language popularity. Since everything could be done through VBScript can be done also in JavaScript, which is a more elegant language.

12

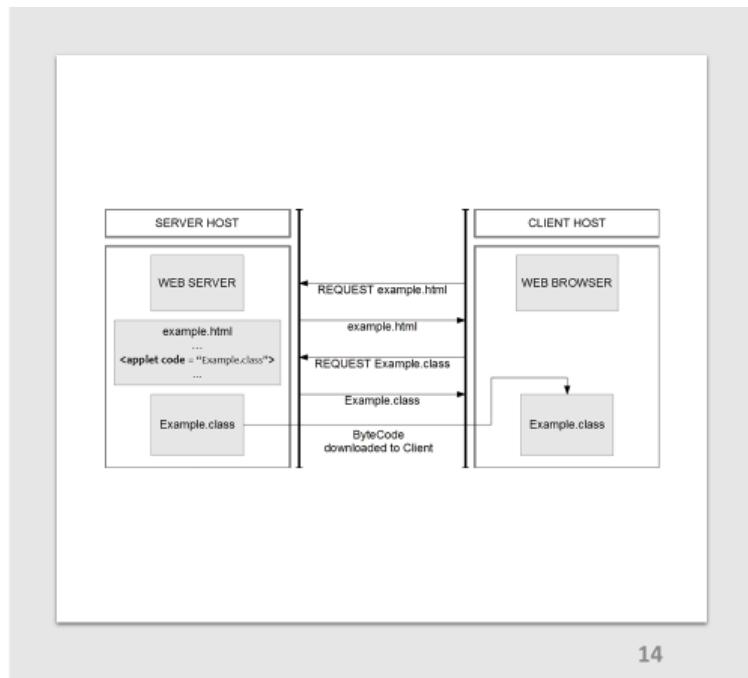
Java Applets

- Java applets are small-scale applications written in the Java language. The binary code of the application is downloaded to the client machine from the server and executed locally in the Java virtual machine (JVM).
- Almost all computers use applets, but for their operation is necessary to install a Java Virtual Machine.
- HTML within the page applets included through markers <applet> or <OBJECT>. Since Java applets are not allowed access to the local file system and the network, the risk that these applications contain malicious code is reduced.

13

Java Applets

- Source: Internet
<http://www.staff.science.uu.nl/~4015878/paper.html>



14

ActiveX

- ActiveX controls are binary components included in Web pages to provide interactivity. Applets are similar, but unlike them running on the Windows platform which is developed especially for Internet Explorer.
- ActiveX controls are included in the Web page through the marker <OBJECT>.
- No restrictions regarding access to the disk, which makes certain components of this type are likely malicious code, like viruses, worms or Trojan horses. Therefore, if a page contains ActiveX controls, browser through a confirmation dialogue asking the user to install and run them

15

Scripts of Multimedia Elements

- Multimedia elements are developed using Macromedia Flash product. These are in the form of SWF files are included in the multimedia and Web page via the marker <OBJECT>. To run these files on the client side is necessary to install a plug-in called Macromedia Shockwave Player.
- Flash multimedia files are done in the form of films that are designed frame. They offer various multimedia effects (animation, sound) and allow user interactivity.
- They are used for menus, games, animation, etc.
- Advantages: faster processing time, faster data processing

16

Benefits of Client-side Scripts

Developers force think applying client-side scripts for many purposes and they might have unusual valid reasons not to use them.

Benefits

- ✓ Client-side scripts give many advantages, containing:
- ✓ Support for more interactivity by directly answering to users' things.
- ✓ Complete fast because they do not require a way to the server.
- ✓ Can develop the usability of Web sites for users whose browsers have scripts.
- ✓ Might provide for developers more power over the look and style of their Web widgets.
- ✓ Can be replaced with choices (HTML) if users' browsers do not carry scripts
- ✓ Are reusable and available from many free sources.

17

Limitations of Client-side Scripts

Client-side scripts also perform additional problems which involve:

- ❑ Not all browsers support scripts, so, users force encounter errors if no options have been granted.
- ❑ Various browsers and browser variants support scripts oppositely.
Thus more variety assurance testing is needed.
- ❑ More development time and work might be required.
- ❑ Developers have more power over the aspect and performance of their Web widgets; though, usability obstacles can arise if a Web widget looks like a regular control but acts differently or vice-versa.

18

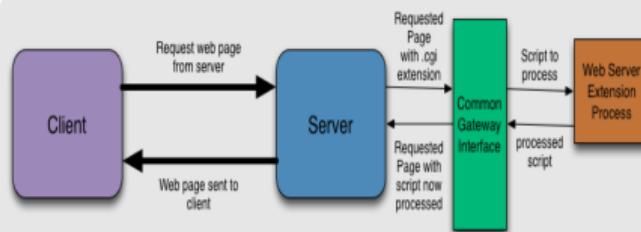
Server-side Scripts

- Level programming server appeared to overcome the limitations of client-side programming. A script executed on the server is independent of both the navigator and the software used for the Web server. Also, the server-side script can access resources located on the server, such as databases, text files, mail servers, operating system commands.
- Programming on the server assumes the existence of two entities, which are separate:
 - ❑ Scripting language itself (scripting language);
 - ❑ Language interpreter (scripting engine).

19

Server-side Scripts Languages

- Scripting language interpreter built either as a module of Web Server or is a separate application that works with it.
- Source picture: Internet
<https://pythonschool.net/server-side-scripting/introduction-to-server-side-scripting/>



20

Server-side Scripts

- Most programming languages server component interpreted scripting engine.
- Communication between the web server and other applications will be carried out by the general rules which have been standardised under the name Common Gateway Interface (CGI), in order to define a universal interface independent of the software used.
- Actual server-side technologies do not require storing scripts in a specific directory. Being part of a Web site, the scripts are stored in the same place as other files that make up the site, directory name: www, htdocs or public HTML, depending on the server used by the operating system and running on the server.
- specialized Server-side scripting languages are: PHP, Perl, Python, ASP (Active Server Page), JSP (Java Scripting Page), AppleScript etc.

21

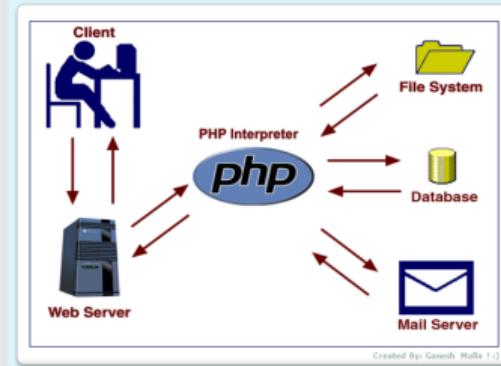
PHP

- PHP (Personal Home Pages) is a programming language that allows changing a web page before it is sent to the browser of a user. Practically, when the user accesses a web page built with PHP, first is driven PHP script, after which the HTML, after which makes the display (all these circulating in a very short period, things on which a user he may refer the matter to the).
- Originally used to produce dynamic web pages, it is widely used in developing web pages and applications. It is one of the most important web programming languages and open-source server-side, with versions available for most web servers and all operating systems.

22

PHP

- Source: Internet
<http://itjobcareers.blogspot.co.uk/2012/09/php-server-side-scripting-language.html>



23

PHP Advantages

- PHP is a simple solution to generate dynamic web pages with a number of advantages, among which:
- Simplicity and independence from the operating system. PHP is a programming language multi-platform, so writing code in Windows will be equally well performed by a Unix server with minimal changes. This can be useful because Windows environment provides a wider range of editors and capabilities best and friendliest test.
- PHP is similar in many respects with C. Therefore those who know this language will not have much trouble in learning the concepts of PHP;
- PHP comes with a rich set of standard libraries, providing over 1,000 functions;
- PHP supports object-oriented programming;
- PHP offers support (functions) for connecting to all major database servers;
- Last but not least, PHP is a product that can be used free of charge for community contribution is developed by programmers, being under the GNU Public Licence incidence license.

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Active Server Pages (ASP)

- ASP (Active Server Pages) is a language developed by Microsoft and is used with IIS (Internet Information Server) which runs only on Microsoft Servers.

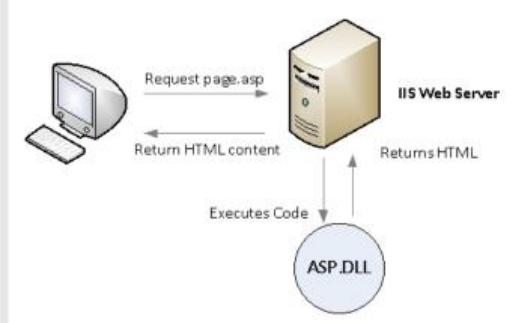
Advantages of ASP:

- ✓ Combine HTML and scripts in the same file to build applications whose code to be easy to understand and maintain;
- ✓ Because much of the scripts are run on the server, there are no issues related to the ability to run these scripts browsers;
- ✓ Supports both VBScript and JavaScript;
- ✓ Working with well-defined object-oriented models;
- ✓ Offers the possibility of keeping information between applications or even between the pages of various accesses a Web application;
- ✓ Enable programmers who know Visual Basic to add a Web application and those features that demanding schedule before using CGI and ISAPI.

25

ASP script

- Source: Internet
<http://www.itgeared.com/articles/1407-asp-server-side-scripting-tutorial/>



26

ASP.NET script

- ASP .NET is the next step of the platform ASP.
- Is the most advanced Web development platform available today, being rewritten from scratch in .Net Framework consistent platform on which it runs.
- ASP.NET supports object-oriented programming in the true sense of the word, including inheritance, encapsulation and polymorphism.

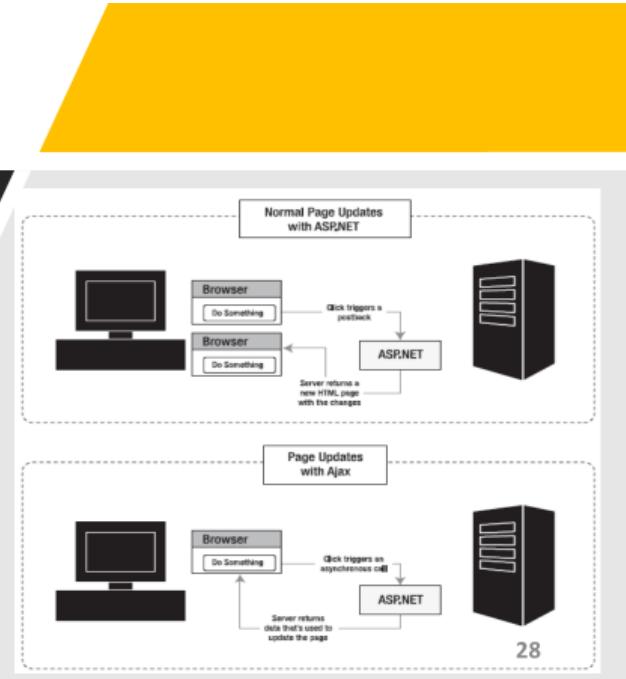
Among the features introduced by the new platform include the following:

- ✓ Better support for different programming languages
- ✓ The web form (Web Forms) facility combines powerful PSA easily GUI development and productivity of the Visual Basic community.
- ✓ Controls the server (server controls) are components that can be used in web forms and that internal mapped tags and HTML elements

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ASP.NET script

- Source: Internet
http://www.c-sharpcorner.com/uploadfile/prvn_131971/chapter-1-introducing-Asp-Net/



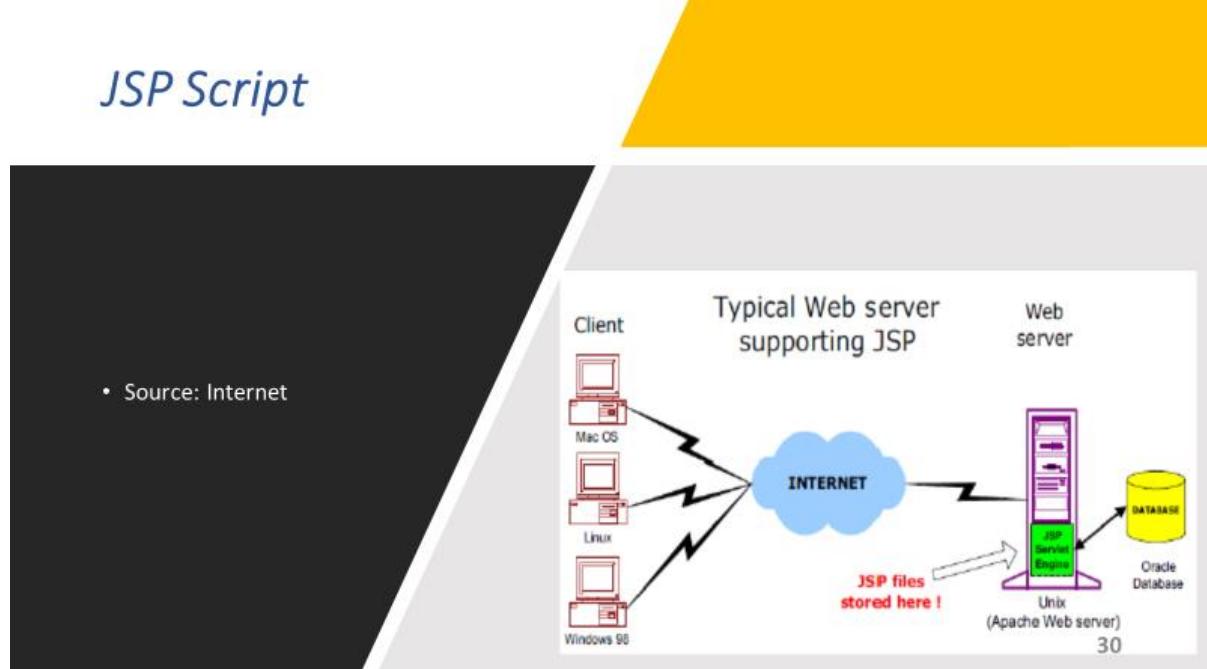
28

Java Server Pages (JSP)

- Java Server Pages (JSP) is a technology based on Java and allow the implementation of dynamic websites. JSP was created by Sun Microsystems to develop applications and web services on the server.
- JSP files are HTML files with special tags that contain Java source code that generates dynamic content.
- The main reason to use JSP:
 - ✓ Multiple platform
 - ✓ Reuse component using JavaBeans and EJB
 - ✓ Advantages of Java

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JSP Script



Cold Fusion Script

- It is a meta-language developed by the folks at Macromedia and acquired by Adobe Systems later. It installs the application server than Apache, IIS or other web server. Also, comes with its web server, JRun, for those who want an installation out of the box.
- Java code running back, as does the JSP (Java Server Page) and just as ASP.NET (Active Server Page) runs behind C #.
- It is a language based on tags whose names help most often fairly easy to intuit what does each. Tags range from the trivial <cfset> with which to initialize a variable, running back up some complex code that exempts the developer much work.
- Creates an exe, similar to ActiveX

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PERL

- Perl is an acronym for Practical Extraction and Report Language.
 - Has many uses, especially for administrative tasks to UNIX system.
 - Provides all the features of sed and awk script languages, plus features that are not present in any of these languages. Perl supports a translator sed-> Perl and awk-> Perl.
 - Perl is as powerful as C but as friendly as, awk, sed and scripting system (shell scripts).
- Is good at many things:
- ✓ Perl has the power and flexibility of a higher level language like C.
 - ✓ As scripting languages (in MSDOS such language is used in extension .bat files; these language instructions are nothing more than DOS commands), Perl is ideal for producing quick solutions to small programming problems or creating prototypes to test the solution of complex problems.

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Benefits of Server-side Scripts

- User can consider one template for the whole website
- The website can utilise a content management system which performs a simplistic editing.
- Usually faster to upload than client-side scripting
- The user is capable of incorporate outer files to save time for coding.
- Scripts are concealed from view, so it is also secure. Users only notice the HTML output.
- Is not needed to download plugins like Java or Flash.

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Limitations of Server-side Scripts

- Plenty scripts and content management systems tools need databases to collect dynamic data.
- It requires the scripting software to be established on the server.
- The sort of dynamic scripts creates extra safety matters, in some circumstances producing it easier for hackers to obtain entrance to servers abusing code flaws.

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3. Task 3 Examine Web Security Concerns and Make Recommendations for Security Improvements

Breath-taking development of the web has created specific vulnerabilities premise occurrence of any technological product. Their number is growing although most popular attacks rely on vulnerabilities identified for the first time several years ago.

The range of specific vulnerabilities of web applications is very large and those presented within the framework of this guide is yet most often encountered. As well as the techniques presented are simplistic, but the purpose of this guide is to provide for the general security concepts about the problems of the web applications.

3.1 Log suspect errors

Issues with the Log Events normally are defined by the fact that web applications are hit by hackers, also, outwardly error logging, the company may not understand that their website is under attack by hackers (Beckley, 2017).

Proof of attack:

- Calls from many IP addresses recommend a denial of service attack
- Input including “..” advises an attacker is attempting to access files with a relevant path
- Forms submitted without required fields (hacker may be using a false copy of the form)
- Identify if a form is displayed with GET rather than of POST
- Forms submitted without needed areas (hacker may be doing a fraudulent copy of the form)

- Attempts to obtain a non-existent file or one the browser does not have rights to read.

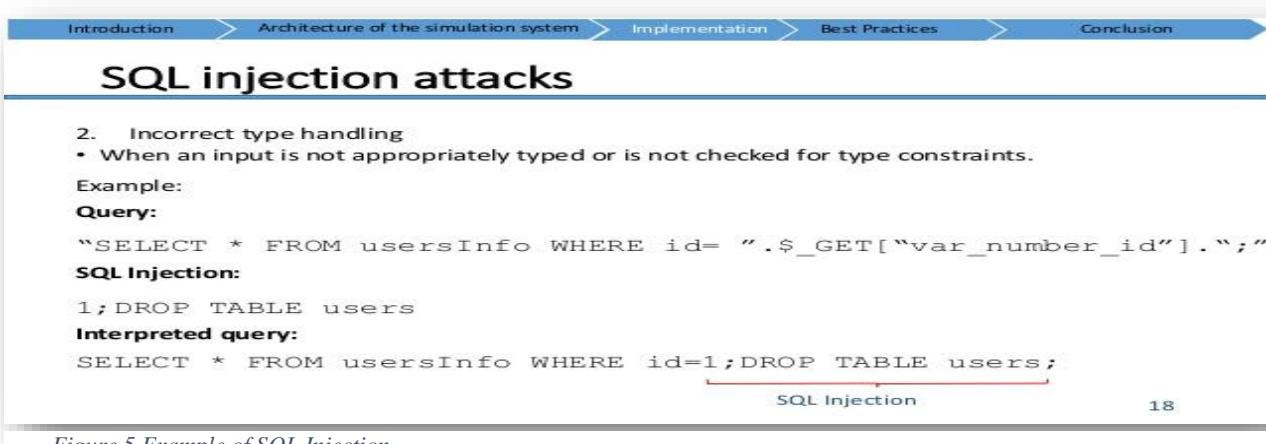
3.2 Method of solving the issue

The method of solving the issue is to catch and improve from errors, but also log events that may show an attack.

3.3 SQL Injection

Most web projects use databases to store data. SQL is an international standard that establishes rules and command syntax that can be transmitted to a database management system (DBMS) for manipulating data stored (Shar, 2013). Currently the most popular DBMS's are MySQL, PostgreSQL, Microsoft SQL Server and Oracle.

A SQL injection vulnerability (source code SQL injection) occurs when an attacker can input the data into a SQL query sent to a database or when the data by injecting syntax, logic declaration is amended such a way as to perform a different action. SQL injection can be crucial to a system but despite the danger they present, it is the most common vulnerability.



The screenshot shows a navigation bar at the top with links: Introduction > Architecture of the simulation system > Implementation > Best Practices > Conclusion. Below this is a section titled "SQL injection attacks". The content includes:

- 2. Incorrect type handling
 - When an input is not appropriately typed or is not checked for type constraints.
- Example:
- Query:**

```
"SELECT * FROM usersInfo WHERE id= ".$_GET["var_number_id"].";"
```

- SQL Injection:**

```
1; DROP TABLE users
```

- Interpreted query:**

```
SELECT * FROM usersInfo WHERE id=1; DROP TABLE users;
```

SQL Injection

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Figure 5 Example of SQL Injection

Source: Internet <https://www.slideshare.net/sayvortana/powerpoint-presentation-1-47302656>

The best strategy to defend against SQL injections based on the implementation of powerful data validation routines input, the attacker cannot enter data other than those required by the application.

Among the specific measures that can be implemented within databases and applications can be found the following:

- ✓ Using well-defined variables and definitions of database columns
- ✓ Assigning a variable defined query results
- ✓ Limiting the length of data
- ✓ Avoid creating queries by concatenating the strings
- ✓ Separation of data and application access based on role within the database

3.4 Cross-site Scripting (XSS)

Cross-site Scripting (XSS) is an attack technique used to force a webpage to display a malicious code (usually written in HTML, JavaScript, ActiveX or Flash), which it subsequently executes in a user's browser (Gupta, 2015). This type of attack does not target web site server, which is just a host, malicious code being executed directly in the browser, because the real target of the attack is the user.

The hacker will use the site only to carry out the attack and once the attacker have control over the user's browser, he can use to stealing various data: bank accounts, user accounts, passwords, stealing records from user browser history.

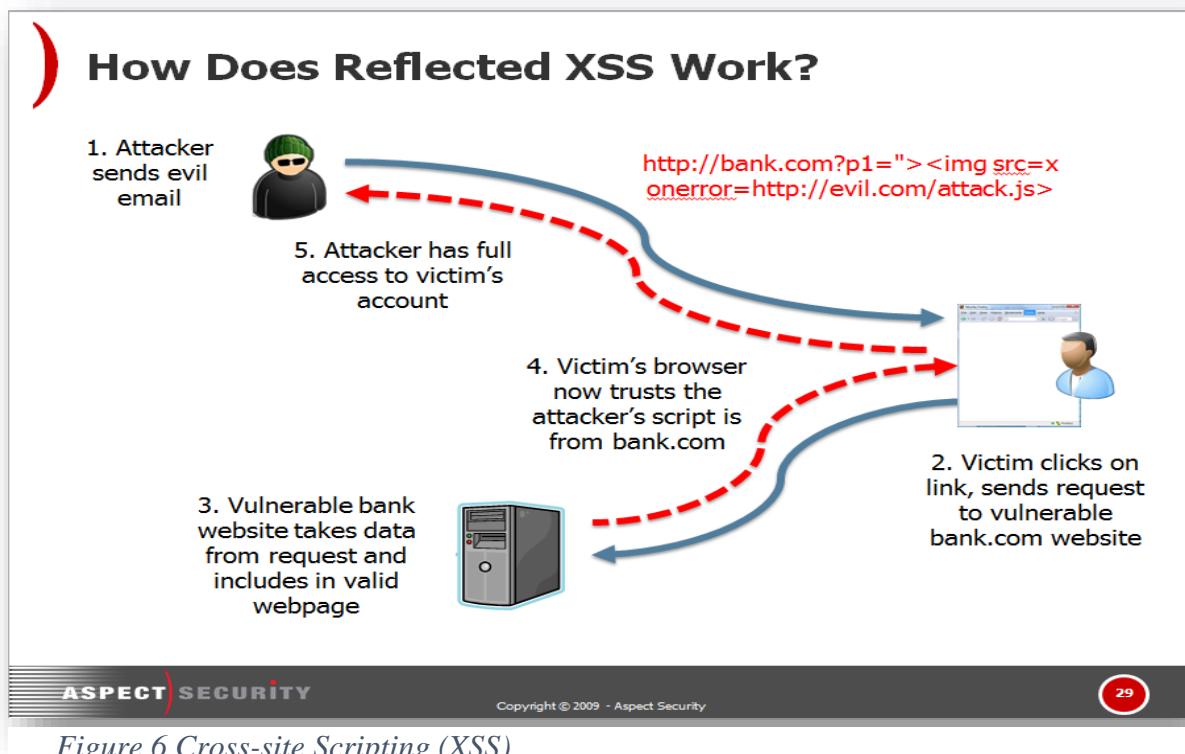


Figure 6 Cross-site Scripting (XSS)

Source: Internet <http://buzzupp.com/how-to-secure-your-wordpress-website-from-cross-site-scripting/>

There are a number of methods to protect the customers and also the company:

- ✓ Choosing a secure browser;
- ✓ Use a virtual machine;
- ✓ Only accessing known links;
- ✓ Watch what disclose information about user accounts, etc.

3.5 Verbose error messages

A list of usernames listed may be used for various attack methods including password guessing attacks on users' data sessions or social engineering. The authentication processes more complex, where the application requires the user to enter more information or to pass through several stages, Verbose error messages or other discriminators can help an attacker to go

through each step of authentication, increasing his chances of getting unauthorised access (Zhang, 2014).

Methods to prevent attacks based on Verbose Errors:

- ✓ Use validation on the client side only for performance, not for security - mechanisms for checking the data entered on the client prevent input errors and typographical innocent reach the server, this step anticipation of validation can reduce application server, preventing input wrong unintentionally reach it.
- ✓ Apply server-side validation - validation data entered should be done by the server, where avoidance is not possible validation functions.
- ✓ Refine types of data that can be entered - The application should not contain data types that do not meet the basic type, format and length required.
- ✓ Use white lists and black lists - use regular expressions to search if the data are content authorised or unauthorised - whitelists containing accepted data patterns, and blacklists contain unsupported data or malicious patterns.

3.6 Authorization Bypass - Do not put all files in the root folder

Vulnerabilities related to authorization and access can occur anywhere in the web application and refers to what happens when an attacker has access to a resource from which normally only authenticated users have access or have certain privileges in those applications (Jing, 2015).

The techniques used to circumvent the restrictions on authorization:

- Directory traversal;

- Avoidance of licensing mechanisms;
- Escalating privileges.

Servers restrict users browsing a web document root thereof, whose location depends on the operating system installed on the server, and additionally depending on the permissions of read / write / execution that we have this user on the file server.

Undermining a script execution server to traverse directories and read the protected files such as /etc./ passwd is known as the crossing attack directories.

Since almost all web applications using roles (e.g., unauthenticated user/authenticated user/administrator) that can have different levels of access, an attacker may be able to access a privilege restricted level of access and avoid the mechanism of authorization, this is done usually by changing role within the upper one.

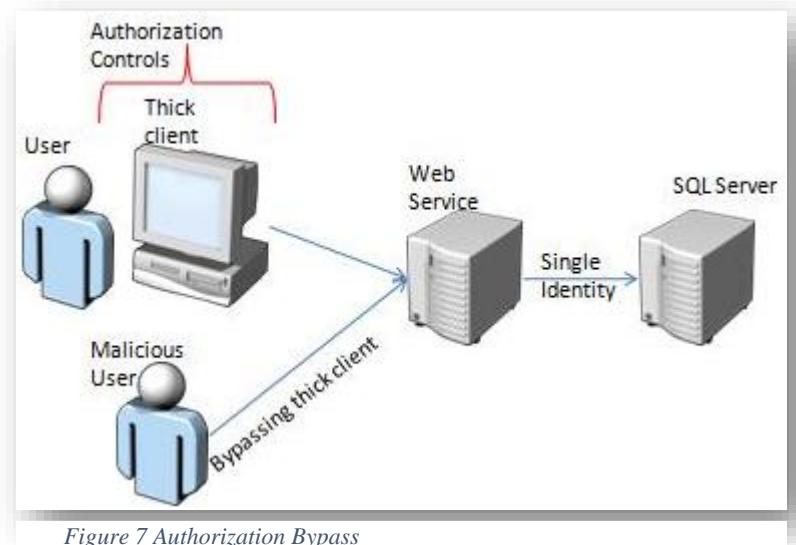


Figure 7 Authorization Bypass

Methods to prevent type attacks Authorization Bypass

The simplest method of protection against this type of attack are validating user input and follow safe design methods. It is important to identify early any part of the web application that can be used in a possible cyber-attack.

These data should be properly validated before you can move on. Use also the principle of giving the fewer user privileges, the more chances fall to lead the way an attack on web application.

3.7 Vulnerabilities in the management of the sessions

Authentication and session management includes all aspects of data handling user authentication and session management of its assets. Authentication is a critical process of this, but even the strongest authentication process can be undermined by errors functions for checking credentials, including: changing passwords function recovery of forgotten passwords function reminder of passwords to the web application, updates accounts and other related functions (Lukanta, 2014). To avoid such problems, for any functions related to the management accounts should require re-authenticating the user, even if it has a valid session id.

If all credentials and authentication identifiers session adequately protected (SSL) protected against disclosure and other errors, such as vulnerability to cross-site scripting, an attacker can steal a user's session and assume his identity.

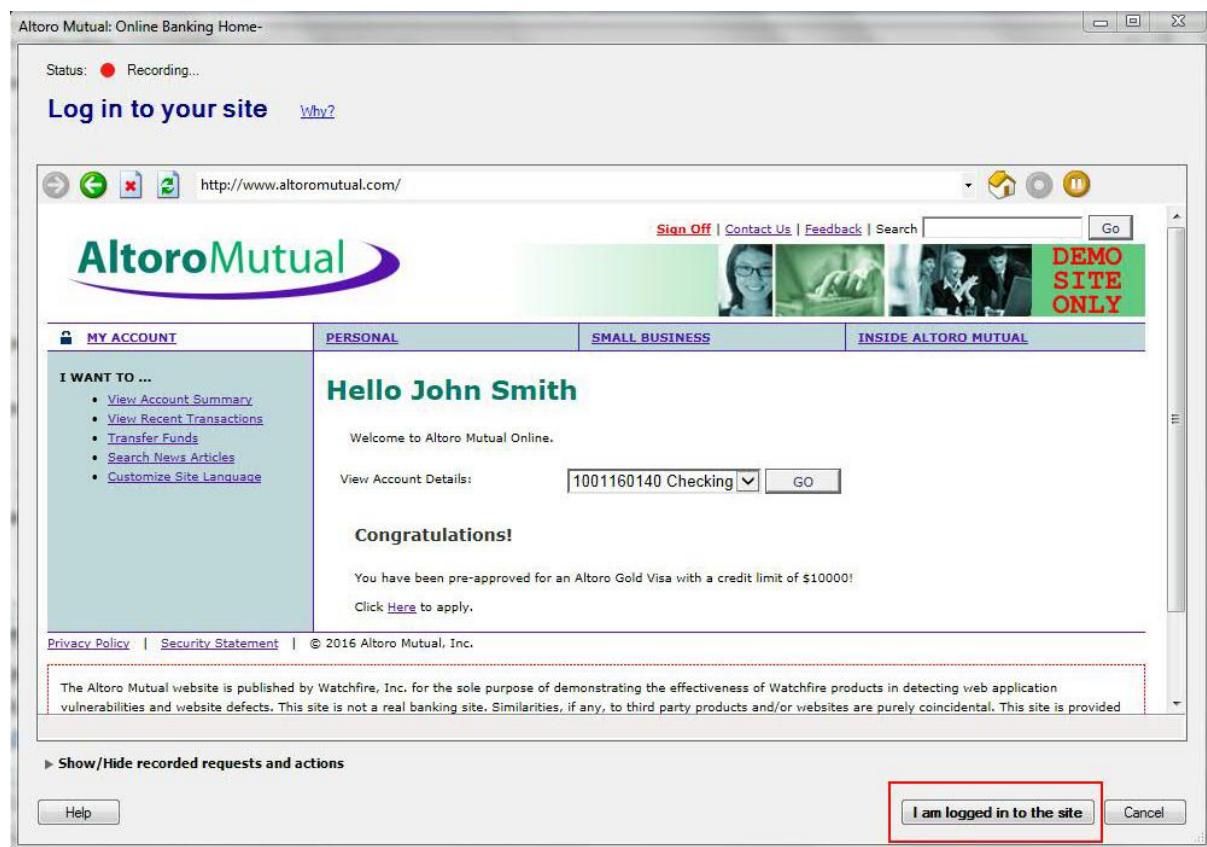


Figure 8 Vulnerabilities in the management of the sessions

Methods to prevent vulnerabilities of session management

- ✓ The complexity of passwords - passwords should have restrictions that require a minimum number of characters and complexity; also, they should be advised users to change their password regularly and to be prohibited from reusing an old password.
- ✓ Use passwords - users should be limited to a limited number of logins that they can try in a certain unit of time and failed attempts authentication should be logged, but passwords entered should not be recorded, as this can expose the user's password anyone manages to gain access to the logs.
- ✓ Commands to change passwords - It should use a single mechanism for changing passwords regardless of the circumstances in which this happens. The user should

always write the old password and new password every time. If forgotten passwords are sent to the user via e-mail, the system would have to ask the user to log in again when changing e-mail. Otherwise, an attacker who has access token session temporary user can easily simply change the address to which the forgotten password to be sent.

- ✓ Storing passwords - All passwords must be encrypted or as hashes wherever they are stored.

Assignment 2 Design and Implement a Webb Application

1. Task 1 Design Documentation

Introduction

This report is meant to show in the first part of the report, how to prepare a design portfolio (flowchart and website requirements), show flowcharts for a secure login facilities and relevant ER diagrams of login database for registered users and a list of car pictures stored in the database.

The second part of the report will come with alternative designs to the eCommerce website solutions and an implementation of the new design for chosen website.

All these methods will be applied to the existing KK Motors e-commerce solution, developed in Unit 14: Website Design along the HNC year. This update

This improvement of the website will be done by implementing dynamic solutions, which will replace the static solutions developed for this eCommerce project (Chen, 2003). These dynamic solutions will be visible by creating registration and login forms for registration of a new user in the site database and respectively log in and log out form to an existing user in the website's database. Another implementation of a dynamic website solution will be the creation of a database containing the details of the second-hand cars and their price details.

1.1 Design a Web Application to Meet a Given Requirement

1.1.1 Website Specifications

Functionality: The entire functionalities offered on the website are specified below:

Header: includes the navigation bar with all the pages of the website, including also, the Sign-Up and login pages. The header is accessible on all the pages of the website

Footer side: has the copyright of the website. This is visible on all the web pages of the website.

Home Page: Under the top of the page there is a slider with images of KK Motors company, followed by a link - button for the Gallery Page where it can be found all the images from KK Motors' car park.

Services Page: present all the financial benefits and services related to their business.

Gallery Page has all the car images and their details of them where each image can be enlarged to a better view of them.

Parts/Accessories page is describing in detail all the accessories which the company offers to the clients.

Contact Us Page: has a feedback form, company's address, a timetable and Google map location.

Sign Up Page: registration form with four fields for name, email password and confirm the password field.

Login Page: include a login form with two fields for email and password.

Register Manufacturer, register Car and Register Car Model pages are registration forms to register the car and all of them will be linked to the testdb database.

1.1.2 Flowchart for the updated KK Motors' website

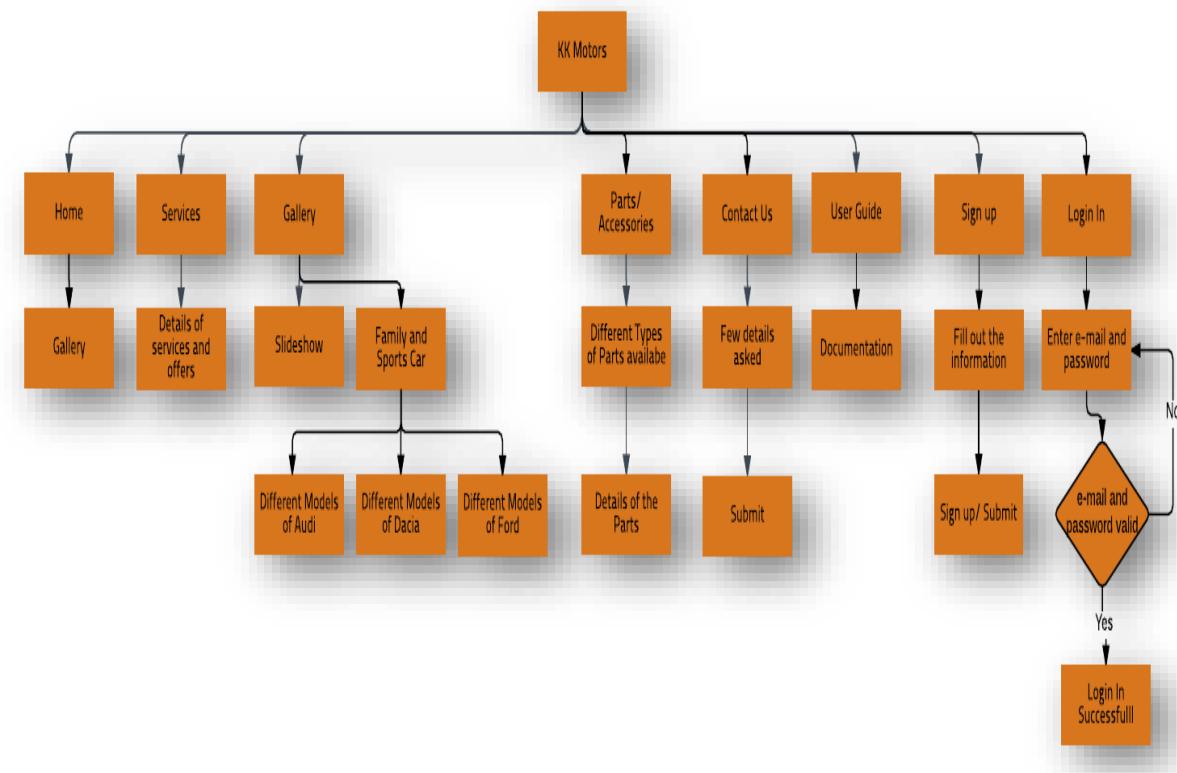


Figure 9 Flowchart of the updated KK Motors

The updated design of KK Motors will bring new the dynamic pages of the website related to the layout of the pages, a dynamic login, log out and registration forms for the users of website.

1.1.3 Font Style used

The similar font style it will be used on each web page. The font

the style of the font used in all the pages of the website is Robot.

1.1.4 Colour scheme

The top of all pages:

- **Background:** Blue dark-1



Text: White



Footer of all pages:

- **Background:** Red Light



Text: White



Content of all pages:

- **Background:** White



Plain Text: Black



- **Headings:** Red Light



and Black



1.1.5 The Sitemap of the Website

It will be applied a presentation website model to promote their selling for second-hand cars to the people who wish to do not spend too much money on a new one but have in the same time a good car. The plan for which it will be using this kind of website is a mixed one by combining dynamic functions with static ones and will be shown following:

- Delivery of second-car details - The website is relating to details about products and services provided by the organisation. Also, details of contact the company or send feedbacks about the services
- Technical Guide - Sections of the website will be built in such a way as to provide details to the possible or current clients in a professional way

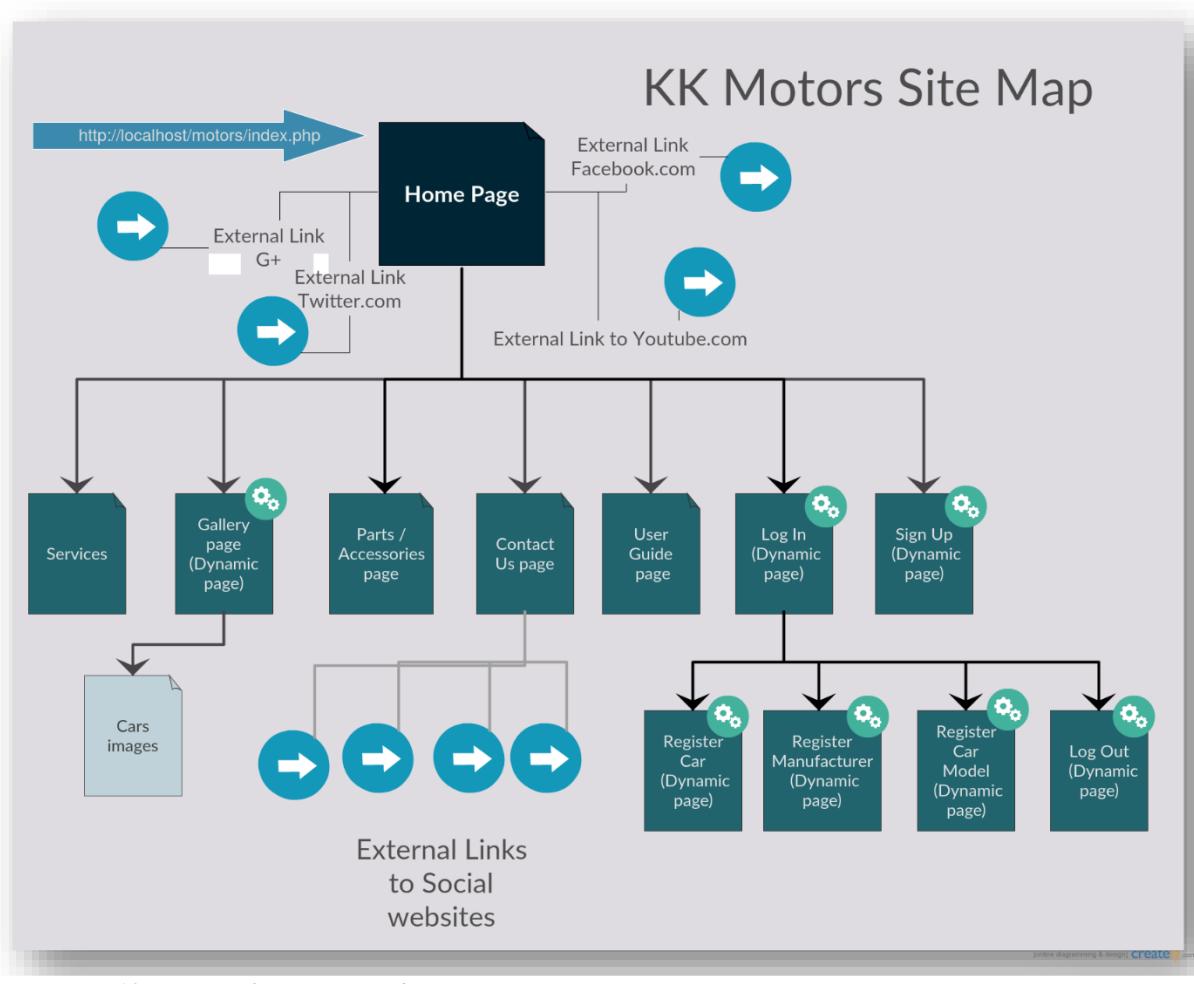


Figure 10 Site map of KK Motors website

1.2 Websites Requirements

1.2.1 Functionality Requirements

This improvement of the website will be done by implementing dynamic solutions, which will replace the static solutions developed for some of the webpages of KK Motors website. These dynamic solutions will be visible by creating registration and login forms for registration of a new user in the site database and respectively log in and log out form to an existing user in the website's database. Also, the new Gallery page will be a dynamic one by add the images and details of the cars in the database of KK Motors.

1.2.2 Target Audience

The KK Motors Corporation purposes are to increase the number of service centres in sale, leasing, servicing second-hand vehicles in more areas of United Kingdom. Also, another goal is to enhance the capability of the organisation market at a high level and to react promptly and in an adapted approach to the problems of their clients, to be attractive for the customers, to be user-friendly and produces a powerful online appearance (Aaker, 2012). The target audience is for the customers which don't want to invest the money in a new car but want to buy a repaired car which provides good quality by drive it.

The aim of marketing is to know and understand the customers so well, the product or service fits him and sells itself. (Drucker, 2001)

Everyone is fascinated about cars, so KK Motors plans to provide a consumer specific services. Every consumer choice is different and with a single plan it's not possible to serve every consumer.

Young consumers are one of main audience KK Motors intend to target. If young audience start accepting the second-hand car, it will help in building a confidence in the second-hand cars.

It's easy to target young consumers, as they frequently use internet and it's easy and cost effective to reach them.

Auto market provide wrong information to the consumer about second hand car and if young consumer is provided with the right information about various service, they will help the market in spreading the right information about various automobiles services.

Website traffic analysis will also help KK Motors in deciding their target audience, as it will help them to know their audience.

1.2.3 Purpose of the Updated Website

It was decided to update the layout and the design of KK Motors website, which will have five web pages plus a login/registration page for the users of the site. Each web page will have their particulars information wanted to bring more clients. Also, the new view of car's images will come with a new design together with the details of the cars and price of it.

Selling a second-hand car is really a troublesome task, as it's not easy to find a customer, especially when customer these days have lot of options of financing a brand-new car. However, if a website is designed where customer can interact with various services like second hand buying and repairing. It will help the firm in its marketing and branding.

“Websites say something, and potentially allow visitors and owners to do something. In other words, they communicate and facilitate. Businesses on the Web

are communicating better and facilitating more interaction than ever before" (Elure, 2007-2016).

KK Motors website promote a series of functions of the auto second cars market:

- To provide information to both the buyer and the seller.
- To provide correct information like warranty, prices etc. to the customer.
- To stimulate demand is one of the main purpose of the website.
- To counter competitors of second hand cars dealers.
- To Form an image or brand in the automobile market.

The main objectives of KK Motors promotion are:

- To increase annual sales.
- To provide a platform for selling and repairing of the cars.
- To create an acceptance of second cars among consumer.
- To create a favourable climate for the future sales.
- To educate consumers about the second car market.

1.2.4 What KK Motors Wants the Website to Accomplish?

"Our objectives are clear: to identify the most important aspects surrounding your market and to deliver solutions that provide a great user experience - an experience which builds your brand and supports efficient growth. We look at all available standards and technologies to build websites and a better customer experience" (Elure, 2014).

Second hand car market is very complex, and because of wrong information it has become more complex for the consumers, to cope up with this situation KK Motors has started its

own website to provide correct information regarding the second-hand car market. Sometime consumer pay more for a service as they are not aware of the right prices, website will also provide right information regarding prices so that consumer can be made aware about the charges he/she is paying.

Consumer always prefer a brand, and as soon as a car is used, it starts losing its brand value, KK Motor want to create a brand for second car and this website will help KK Motors in their branding and marketing of the services. And this website will also create a competition in the second car market which will help in creating a vibrant auto market.

1.2.5 What opportunity, problem or issue is website addressing?

- Consumers are provided with wrong information about the second-hand car market, this website will provide right information about various services they use (Sarel, 2006).
- Second hand car market is not very competitive and because of that services are not satisfactory in nature, this website will help in creating a competitive second hand car market.
- Consumers are not confident about second hand car due to less knowledge, this website will provide them the required information so that they trust a second-hand car.
- Young consumer is searching for cars and second hand car will be cost effective to them, if proper information is provided to them, they will be very interested in buying a second-hand car.
- Creating a favorable market is the main problem as consumer prefer a brand over a second-hand car, this website will help in creating a brand for second hand market.
- Creating a country wide second hand car market is the biggest opportunity, if a nationwide market is created, consumer will have lot of options to buy.

2. Task 2 *Extension of Design documentation*

2.1 Extend the Website Design

2.1.1 Synthesise Client-Side and Server-Side Functionality in a Web Application

With the development of PCs, user interfaces have become more evolved, more consistent, more user-friendly. A new approach was born, where data and processing remain on a mainframe, but the user interface is downloaded to the user's computer: the client/server approach. It has been and still represents a very useful way of developing commercial applications. The use of the client/server model is motivated by the fact that many operators have access to a relatively powerful desktop computer that can take over the tasks of a user interface (Hamilton, 2014).

2.1.1.1 Client Side

Standard Web Architecture has been designed so that a client computer can interact with a server computer through a TCP / IP network connection.

Browser and server communicate using the Hypertext Transport Protocol (HTTP) protocol. TCP / IP manages transport details, making sure packages arrive at the correct destination. HTTP structures the communication about the files they receive and how they are interpreted (Hamilton, 2014). This allows Web software to focus on what it does best: accessing and displaying content. Like most client/server projects, the Web uses a demand-response method, which means the server waits and listens to client requests before responding to them.

The Web browser requires a specific web page (Uniform Resource Locator URL) from the server. It does not matter if that URL has been entered by the user, or has been associated

with a hyperlink, a bookmark, or a browser button called Home. It is important that the web server responds to requests, usually sent by a web browser under the control of the user.

The Web server software is installed on a suitable host computer. Depending on the volume of requests that the server must handle, the operating system and server hardware platform are selected. Once installed and configured, most web servers just wait and listen if there are requests from web browsers.

Once the request is received, the server enters into action. The server locates the requested URL and copies it to the network connection where TCP / IP transmits it to the browser. Once the browser receives the required file (webpage) from the server, the browser interprets the HTML (and other codes included) and displays the correct web page (with its capabilities) on the client computer.

The client side of the Web application framework consists of four fundamental elements: browsers, HTML, client-side extensions (Java widgets, ActiveX controls and Netscape plug-ins), scripting languages (JavaScript, VBScript).

Advantages of client-side technologies

Client-side technologies play the important role of using existing investments for desktop computers. They release the server by shifting client-side processing. They improve the reliability of the software package. Reduce traffic to the network. They also improve the user interface, the response to user actions is immediately obtained.

Disadvantages client-side

Client-side technologies also have some drawbacks. When designing for the Internet, the designer loses control over the platform on which the application will run. This does not raise problems for simple applications that run as well on modest computers or sophisticated computers. Complex problems may occur. Another problem is the use of browser variants that do not support current versions of client-side languages.

2.1.1.2 Server-side of a web application

A web server is a program that runs on a computer, waits for a port a TCP connection coming from a client and serves its web pages using the HTTP protocol in general. The web server is a stand-alone program, an executable with a well-established function: to serve on-demand Internet pages (Hamilton, 2014). This software can be Apache HTTP Server, Microsoft Internet Information Server (IIS), iPlanet Web Server, Roxen WebSever, Zeus Webserver.

Advantages of server-side technologies

In this case, server-side processing offers several advantages. It focuses important processing on a particular computer under the control of the developer. The server computer can be properly dimensioned and manoeuvred to deliver a high level of service. The server operating system can also be chosen to meet certain application requirements. Application software can be kept up to date by periodical updates. These are easy to achieve because they require execution on a central computer (or possibly a small number of computers).

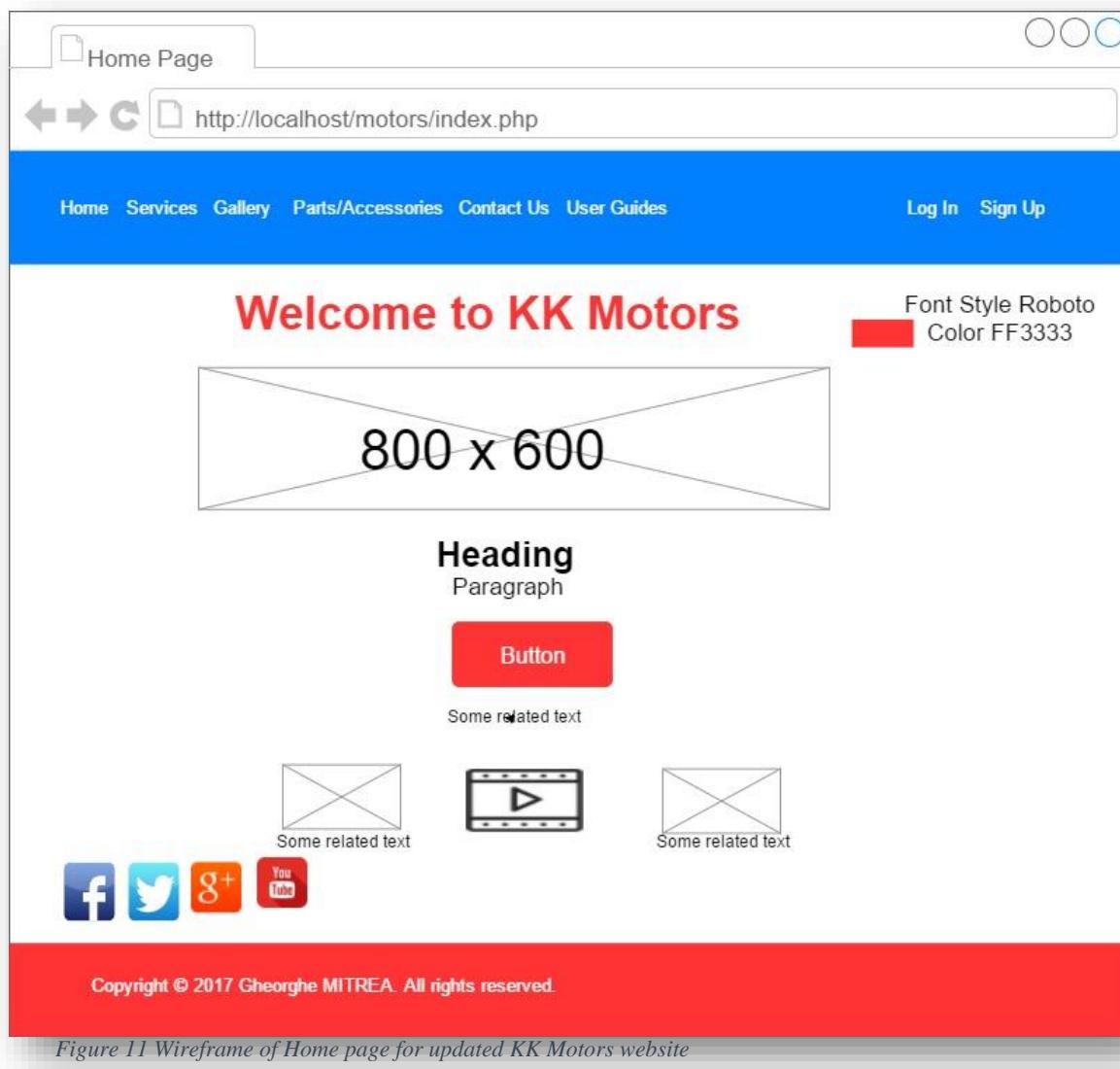
Disadvantages of server-side technologies

Server-level processing also has some drawbacks. It focuses on a single car. This may cause problems if the right operating system choices are not made, or the hardware platform is

inappropriate. Also, if the server falls no service is no longer available. By designing the running of all aspects of an application on a server leads to increased traffic between the client and the server. Every task that needs to be done involves making a dialogue through a request and a response. This has implications on the user interface response rate.

2.1.2 Wireframe of KK Motors website's pages

The wireframe for the Home page will have in the Content Area: Paragraphs, more Headings (1,2,4,5), two images, an internal Hyperlink button for my Gallery page, an URL encoded movie from YouTube, four boutons of social networks 'icons. The new functions



for the navigation menu will be the dynamic registration and login buttons. Also, the page was converted to a dynamic layout.

Services page will include more Headings (1,4 and 5), Paragraphs and three images. The next image will show the wireframe for this page:

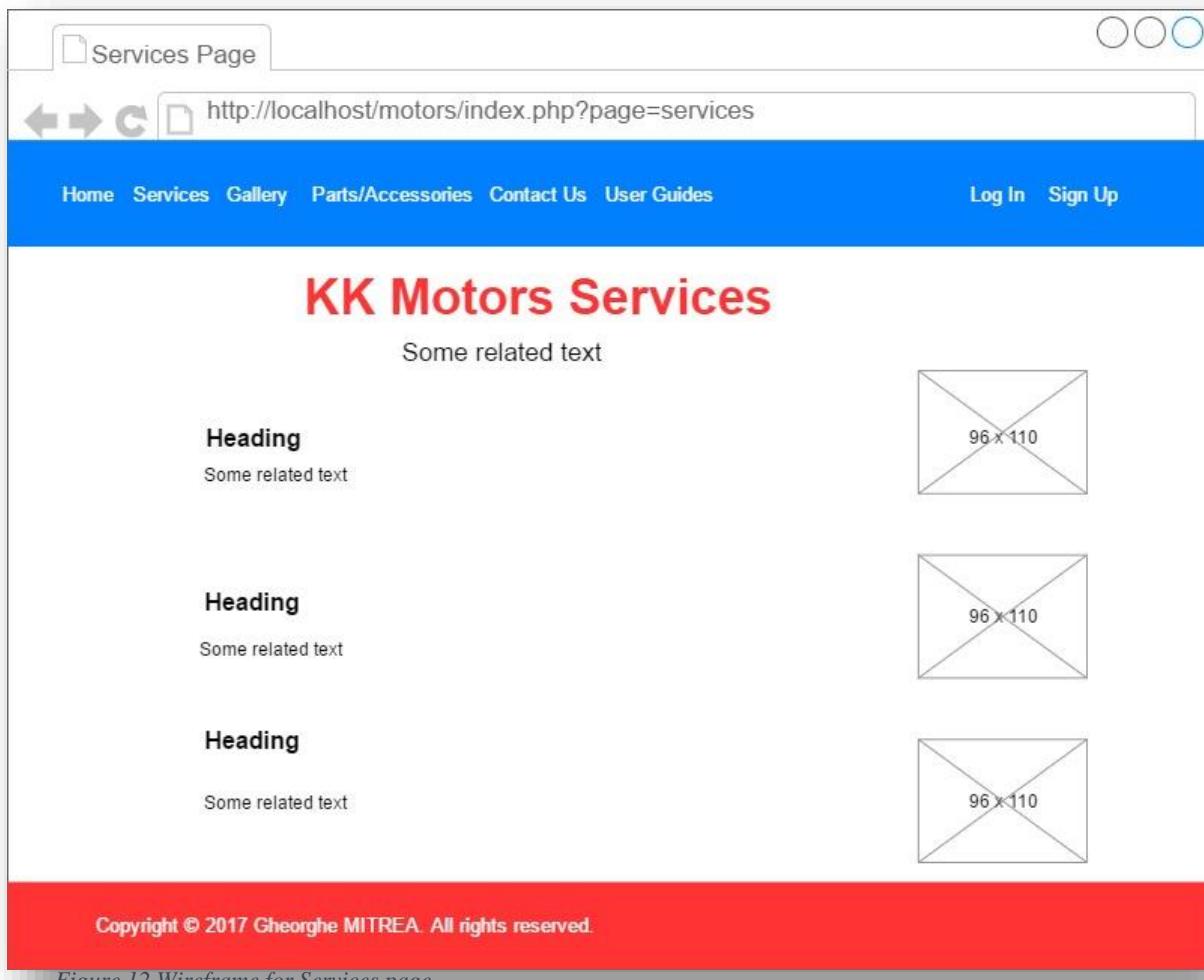


Figure 12 Wireframe for Services page

Gallery page will include Headings (1,4,5,6), Paragraphs and details of the cars with the images related to each car. For the updated KK Motors website, this page will have integrated a dynamic database in MySQL with all the details of each car. The previous

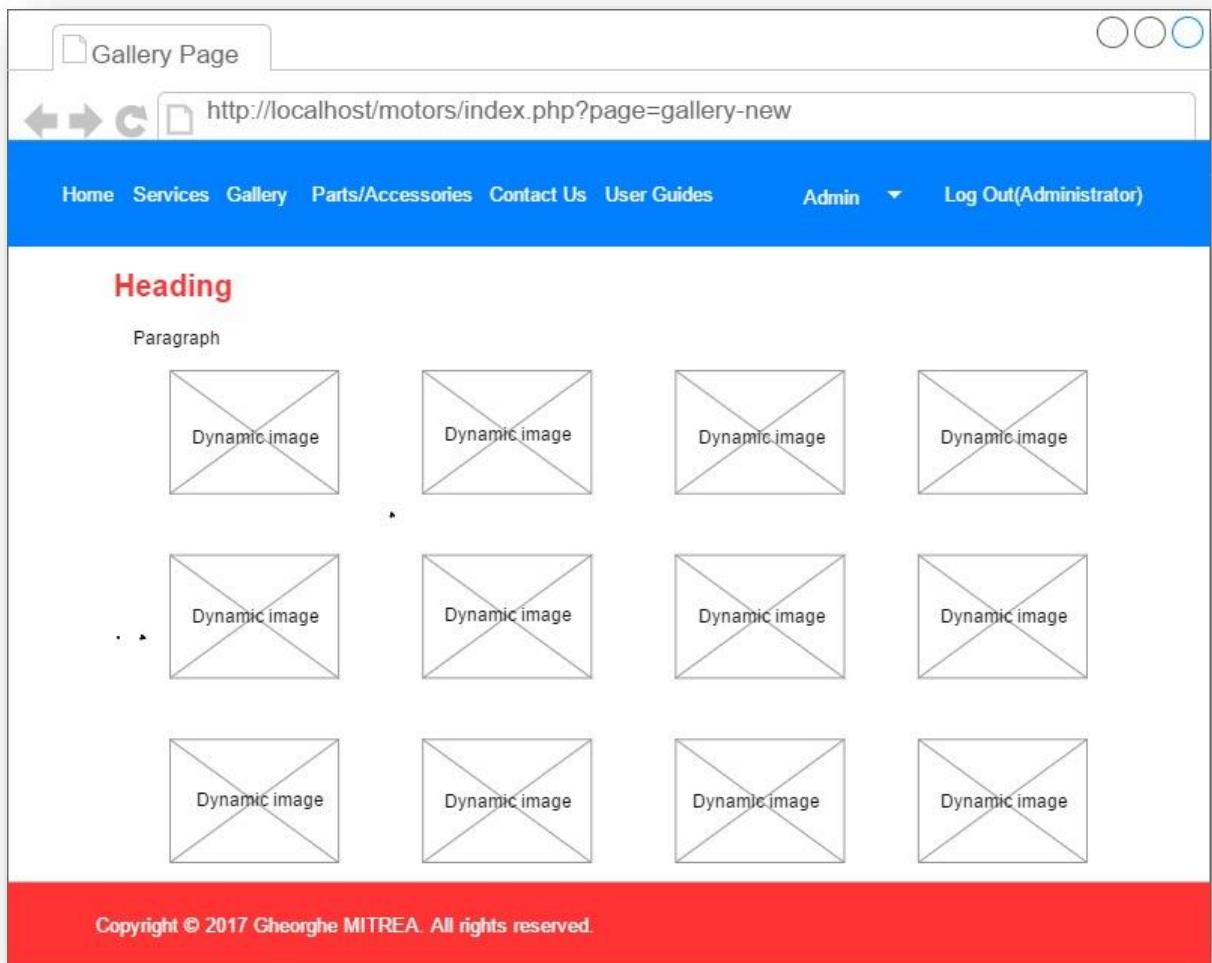


Figure 13 The updated wireframe of Gallery page

design of this page used static functions, all the images were placed in the source code of the page. The wireframe for this page will be shown below:

Next page as **Parts/Accessories page**, this page will hold Paragraphs, Heading 1 and more icons:

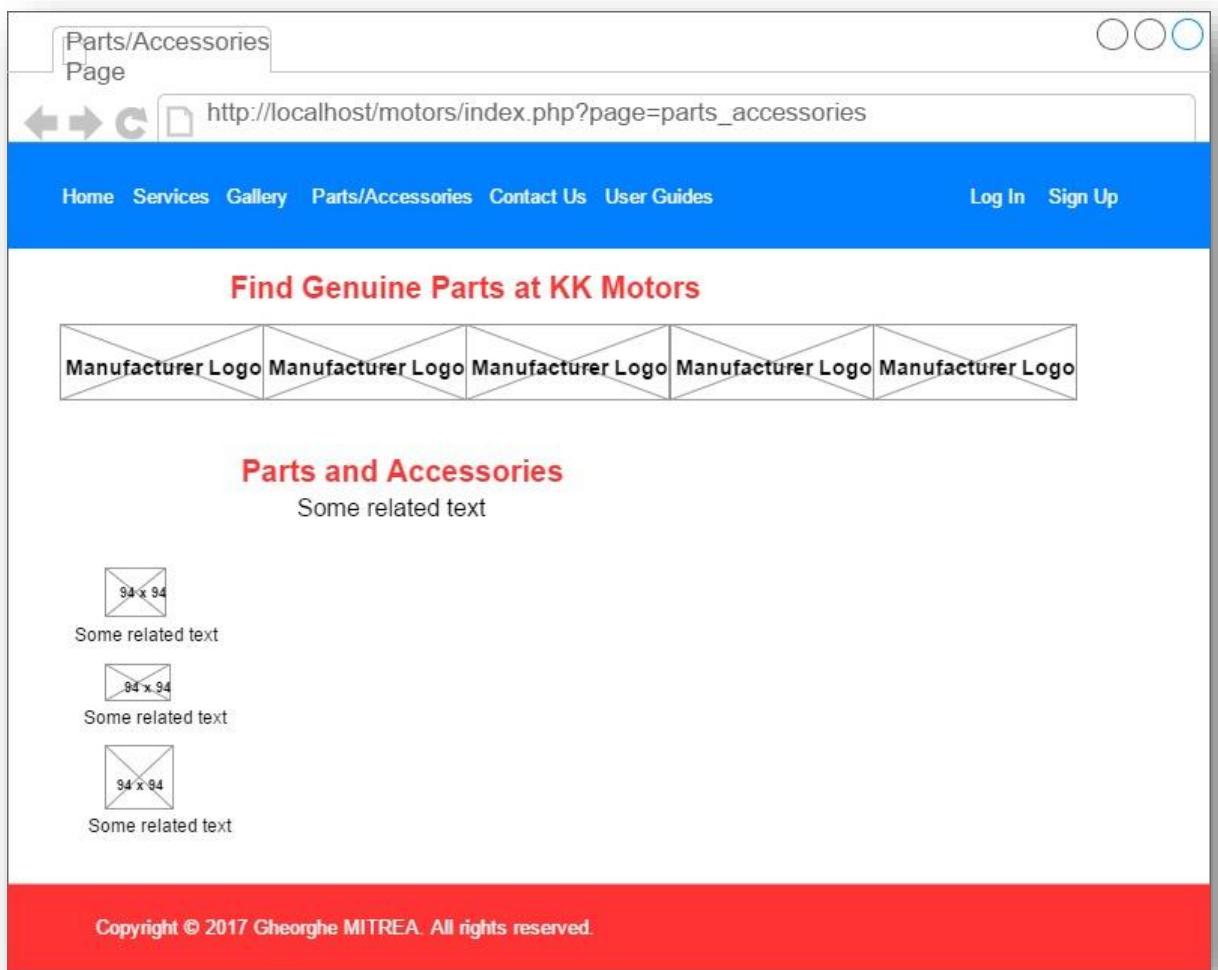


Figure 14 Wireframe for Parts/Accessories page

The design for wireframe of **Contact Us** page, this one will include Headings (3,5,6), Paragraphs, icons for social network's websites, a feedback form and a Google Map to locate servicing points of KK Motors:

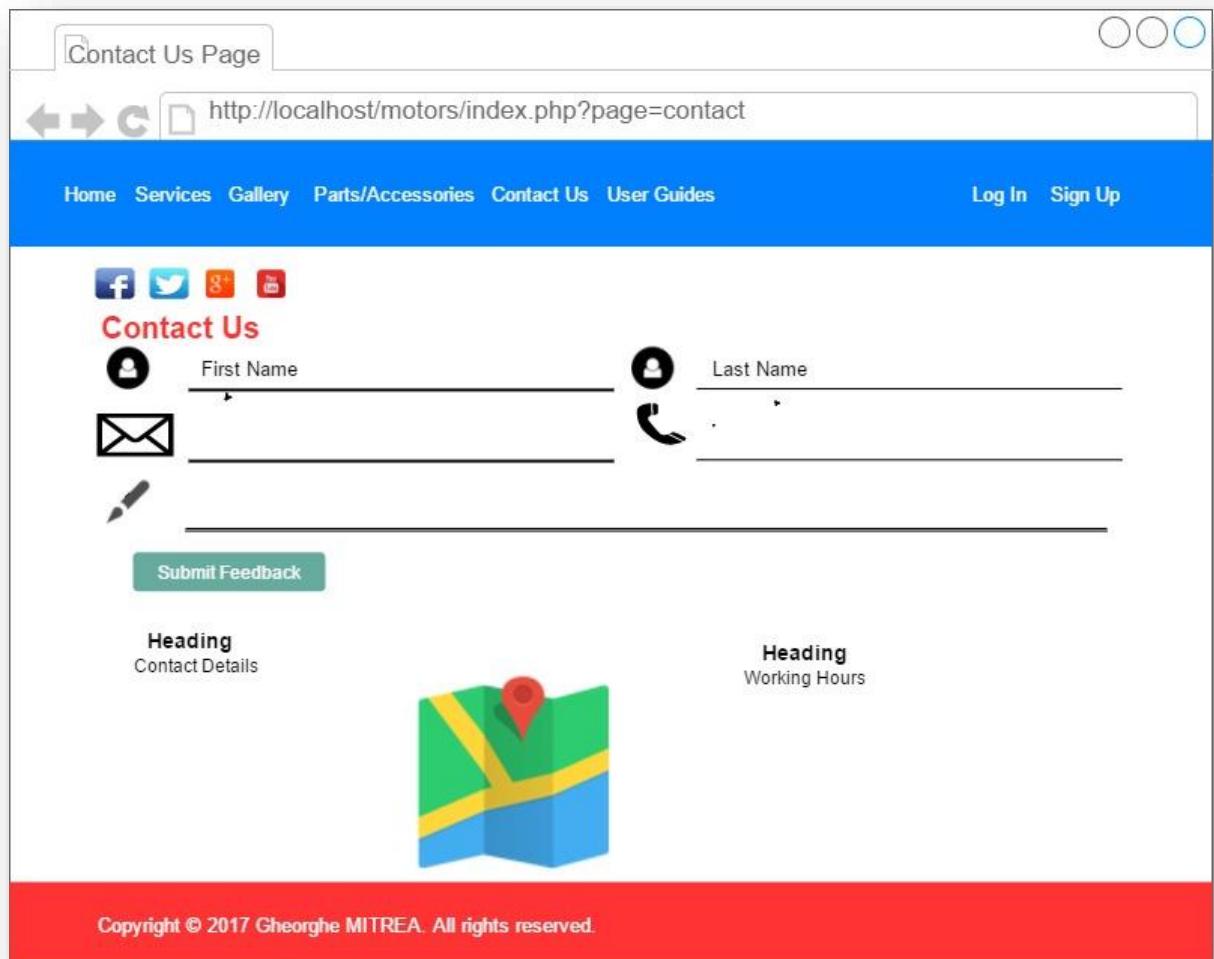


Figure 15 Wireframe for Contact Us page

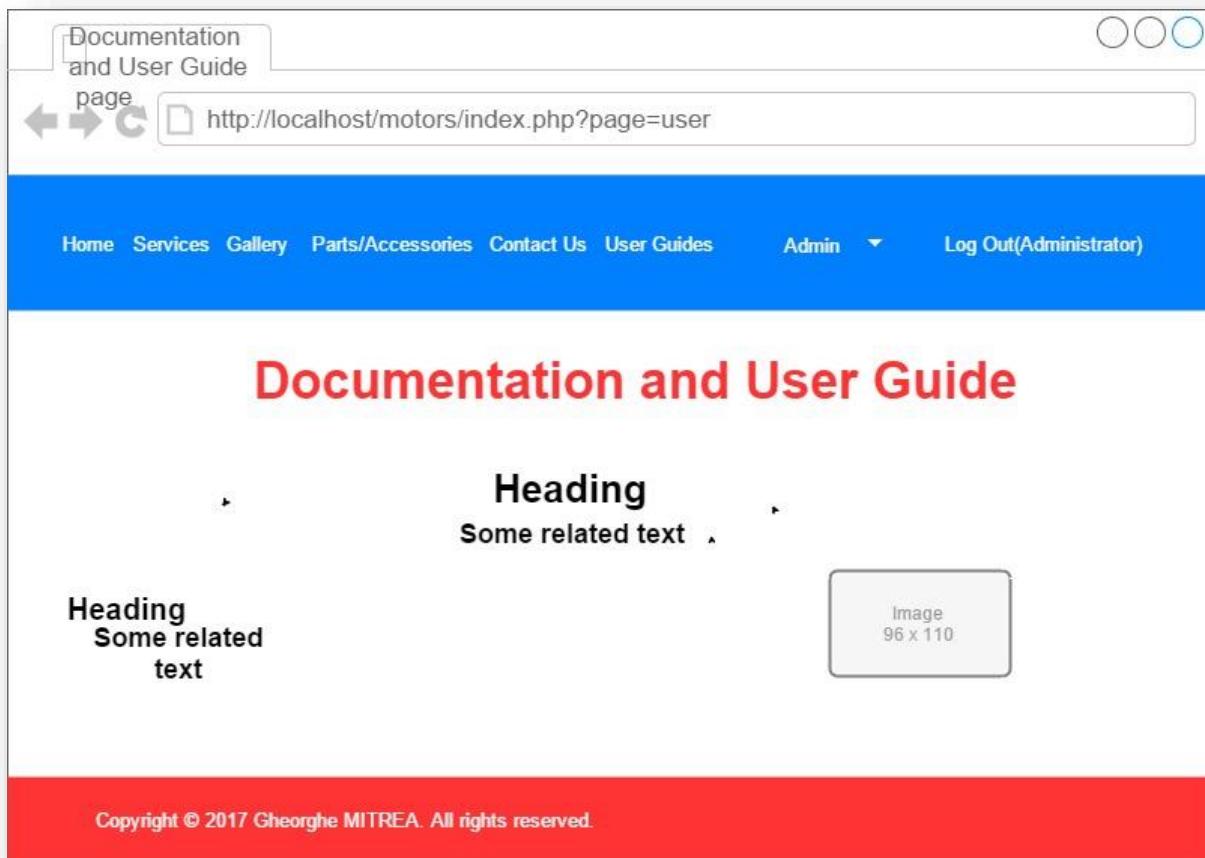


Figure 17 User Guide page

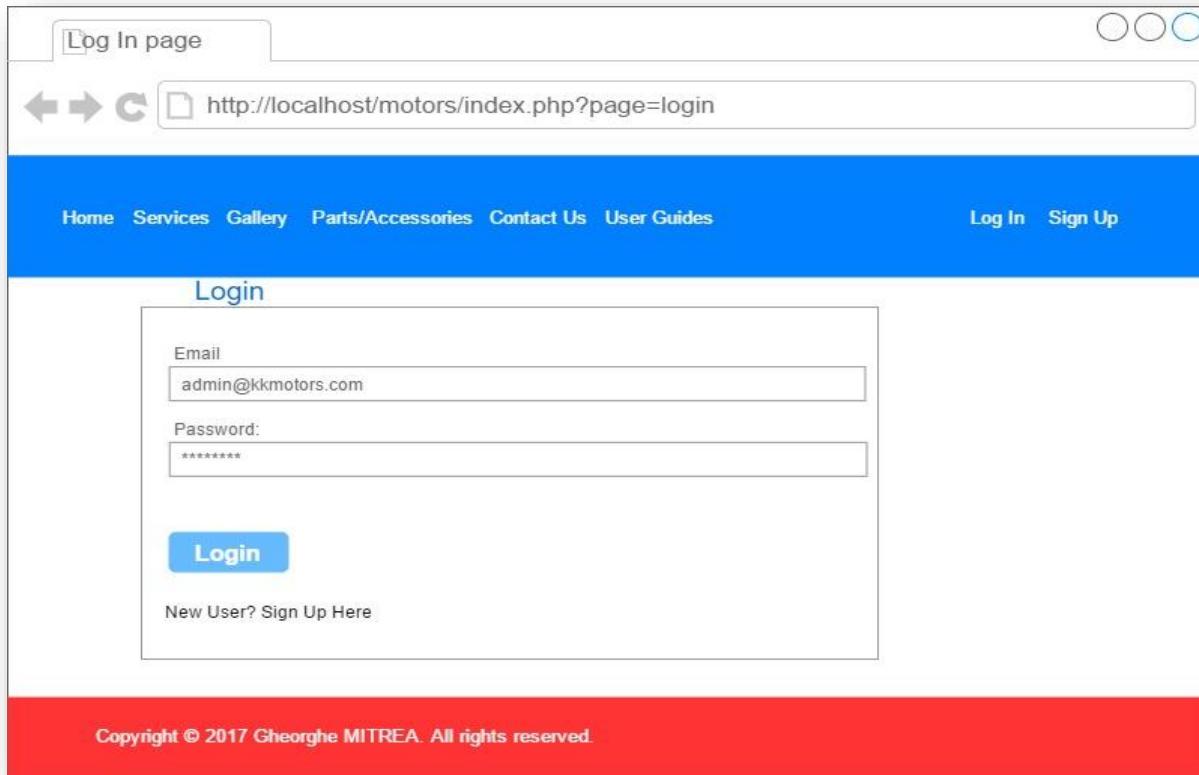


Figure 16 Login page

Sign Up page

http://localhost/motors/index.php?page=register

Home Services Gallery Parts/Accessories Contact Us User Guides Log In Sign Up

Sign Up

Name:

Email:

Password: *****

Confirm Password: *****

SIGN UP

Already Registered? Login Here

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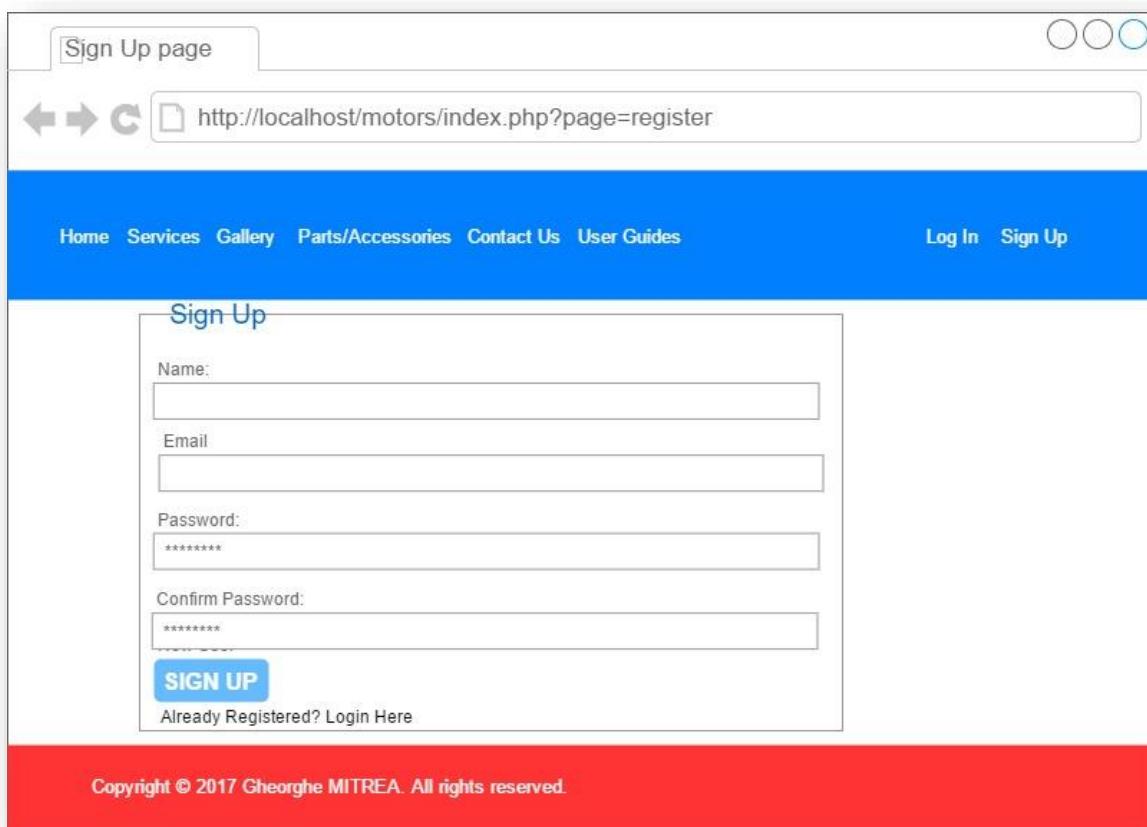


Figure 8 Sign Up page

Register Car page

http://localhost/motors/index.php?page=register-car

Home Services Gallery Parts/Accessories Contact Us User Guides Admin ▾ Log Out(Admin)

Register Car

Choose Manufacturer Choose Car Model

Chassis No.

Year Price

Register

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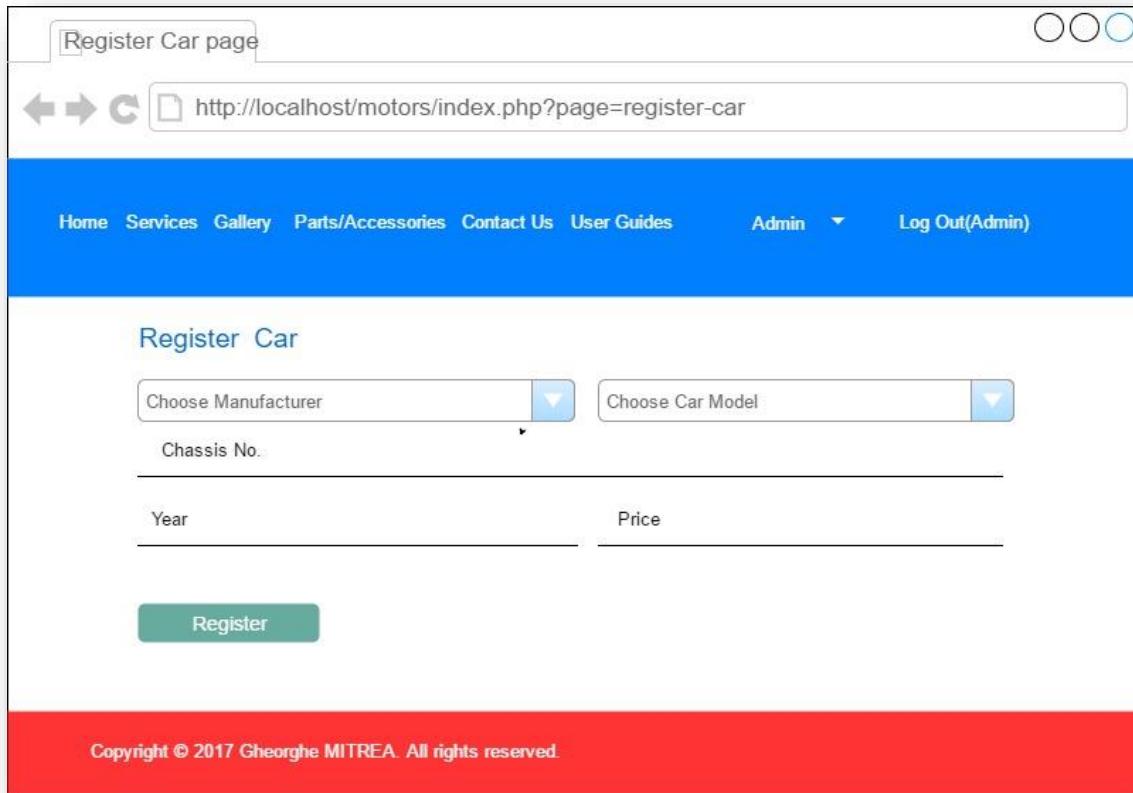


Figure 18 Register Car page

Register
Manufacturer page

← → C http://localhost/motors/index.php?page=register-manufacturer

Home Services Gallery Parts/Accessories Contact Us User Guides Admin ▾ Log Out(Administrator)

Register Manufacturer

Name

Register

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Figure 20 Register Manufacturer page

Register Car Model page

← → C http://localhost/motors/index.php?page=register-carmodel

Home Services Gallery Parts/Accessories Contact Us User Guides Admin ▾ Log Out(Administrator)

Register Car Model

Choose Manufacturer Car Model Name

Register

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Figure 20 Register Car Model page

2.2 Entity Relationship Diagram (ERD) of testdb database for KK Motors website

2.2.1 Entity Relationship Diagram of entire testdb database

In the below image is shown the entire **ER Diagram** of testdb database of KK Motors website:

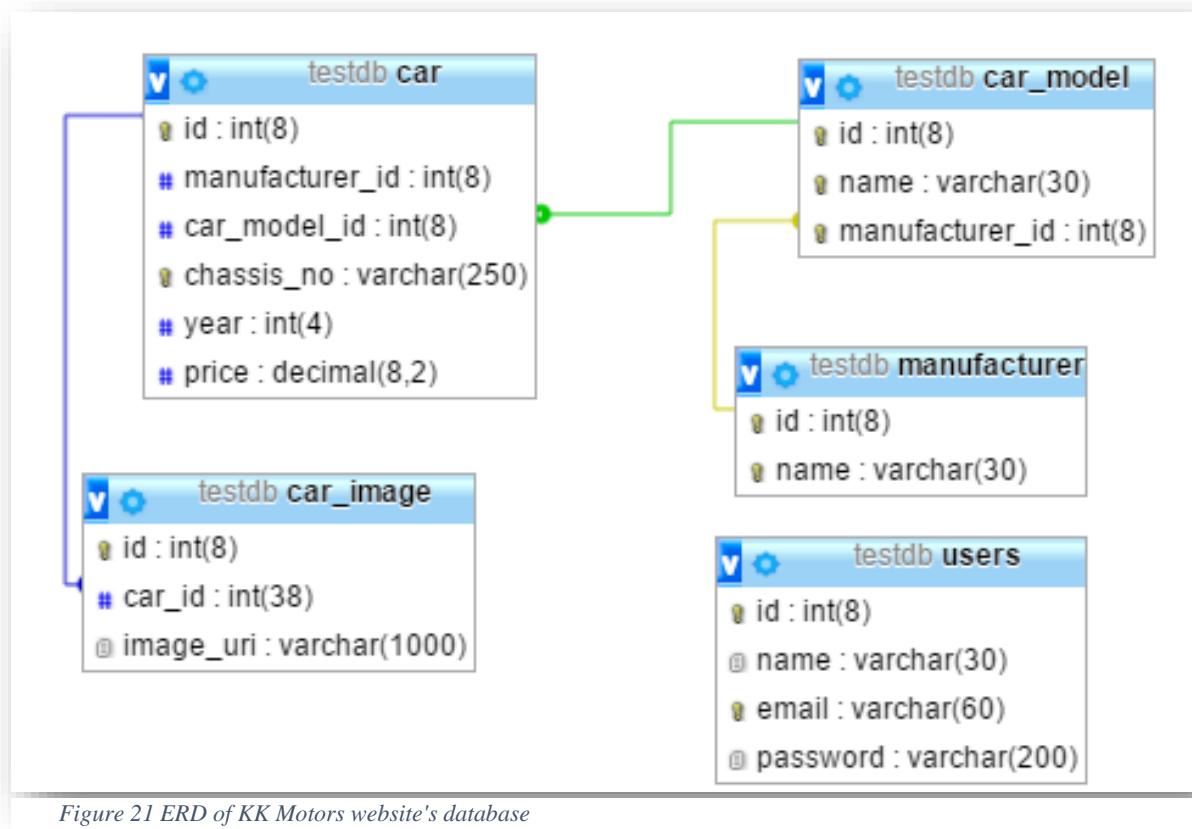


Figure 21 ERD of KK Motors website's database

3. Task 3 Evaluate Alternative Designs and Solutions to Meet a Given Requirement

Selected Designs and solutions:

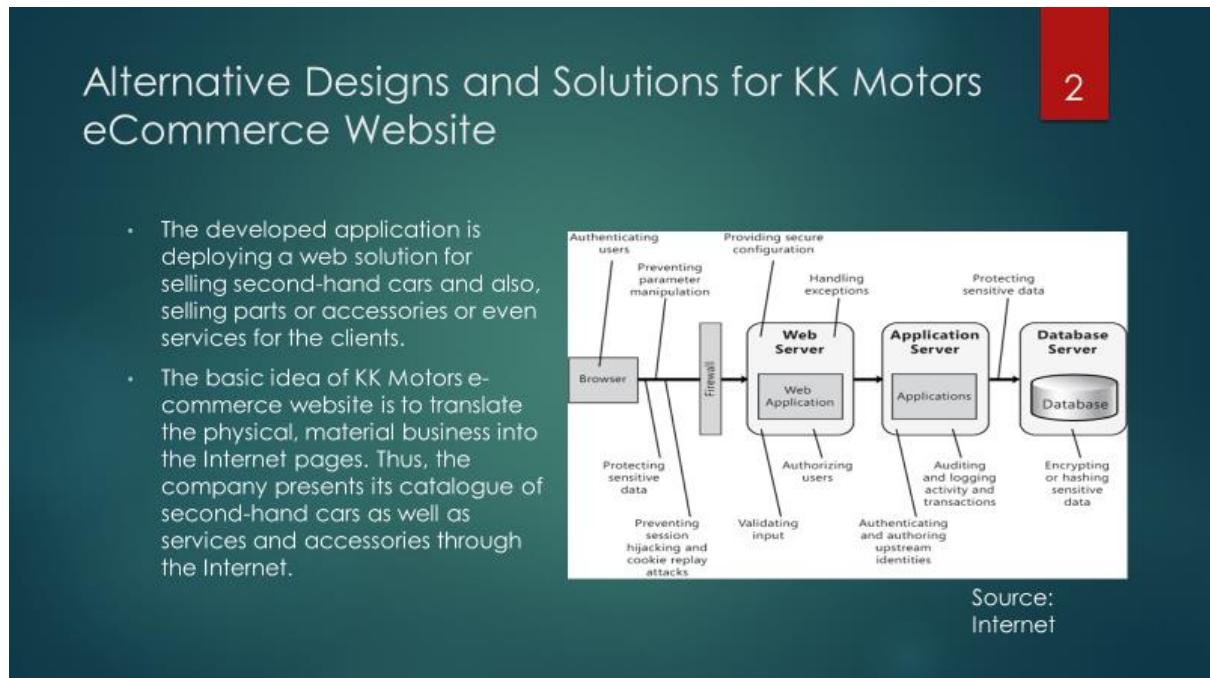


Assignment 2
Design and Implement a Web application

1

EVALUATE ALTERNATIVE DESIGNS AND SOLUTIONS TO MEET A GIVEN REQUIREMENT

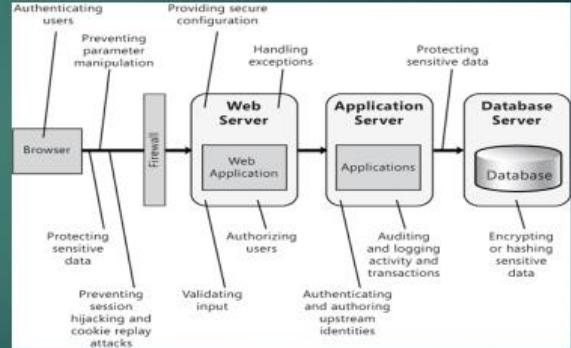
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Alternative Designs and Solutions for KK Motors eCommerce Website

2

- The developed application is deploying a web solution for selling second-hand cars and also, selling parts or accessories or even services for the clients.
- The basic idea of KK Motors e-commerce website is to translate the physical, material business into the Internet pages. Thus, the company presents its catalogue of second-hand cars as well as services and accessories through the Internet.



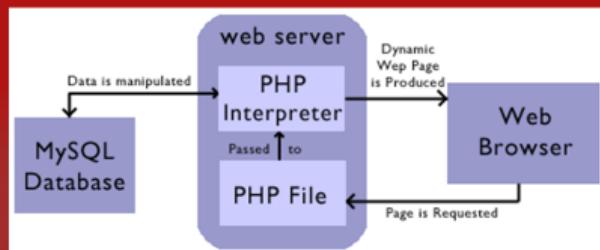
The diagram illustrates a layered security architecture for a web application. It consists of four main components: Browser, Firewall, Web Server, and Database Server. The Browser interacts with the Firewall, which then connects to the Web Server. The Web Server is connected to the Application Server, which finally links to the Database Server. Various security measures are shown as arrows between these components:

- Browser to Firewall: Authenticating users, Preventing parameter manipulation, Protecting sensitive data, Preventing session hijacking and cookie replay attacks.
- Firewall to Web Server: Providing secure configuration, Handling exceptions.
- Web Server to Application Server: Authorizing users, Validating input.
- Application Server to Database Server: Protecting sensitive data, Auditing activity and transactions, Authenticating and authorizing upstream identities.
- Database Server: Encrypting or hashing sensitive data.

Source: Internet

Selected Design and Solutions for KK Motors Website³

PHP Solution for Company's Webpages



php dynamic web page
Source: Internet

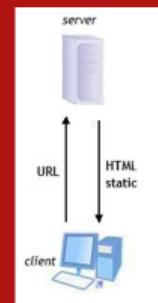
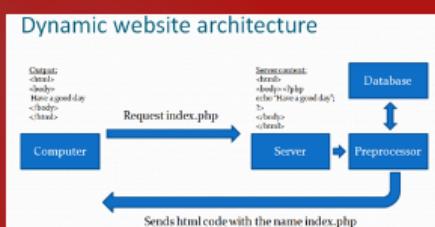
- ▶ PHP, an acronym derived from "PHP: Hypertext Pre-processor," is a widely used, developed and distributed scripting language in Open Source that is specifically designed to develop web applications by integrating PHP code into HTML documents.
- ▶ PHP will run on the server of KK Motors website and JavaScript will be executed on the client's computer (by the web browser).
- ▶ For a script similar to a server shown in the left figure, the user of KK Motors website would only receive the results of the script being run without seeing the code behind it. It can even set up the web server to process all HTML files with PHP, and so there is no way for a user to know what exists in the files.

Selected Design and Solutions for KK Motors Website 4

PHP Solution for KK Motors webpages – Server Side Scripting

For a script similar to a server shown in the left figure, the client would only receive the results of the script being run without seeing the code behind it. It can even set up the web server to process all HTML files with PHP, and so there is no way for a user of KK Motors website to know what exists in the files.

Serving a static page without the interpreter's intervention PHP, these it is related to KK Motors static Web Pages like: Services page, Parts/Accessories page and User Guide page



Static page without PHP interpreter's intervention

Selected Design and Solutions for KK Motors Website

5

Advantages of using Php for KK Motors webpages

- ▶ It's suitable for web programming, good documentation
- ▶ Dedicated to the development of dynamic web pages
- ▶ Allows simple dynamic applications but also complex applications that contain interactions with databases
- ▶ Most often used in conjunction with MySQL
- ▶ Starting with version 5 contains object oriented programming features

Selected Design and Solutions for KK Motors Website

6

Advantages of using Php for KK Motors webpages

- ▶ It's free and open source
- ▶ It does not depend on the platform
- ▶ As strong as the paid averages
- ▶ Adapted for traffic generated on a web server
- ▶ Is dedicated to web development
- ▶ Has rich documentation
- ▶ A huge active development community
- ▶ Will be used with apache web server of Xampp, which is also free and robust

Selected Design and Solutions for KK Motors Website

7

PHP Technology Versus ASP from Microsoft

- ▶ The advantages of using the PHP scripting language instead of ASP technology to implement the presentation website, in particular the virtual presentation of the company, are:
- ▶ The price because PHP is cheaper to implement than the ASP;
- ▶ Additional features that PHP offers compared to ASP;
- ▶ PHP is an OpenSource programming environment
- ▶ PHP is a very flexible environment because it can be expanded and customized according to customer requirements. PHP is much faster than ASP. PHP is platform independent: it can run as well on operating systems: Linux, Solaris, Windows, or others.
- ▶ PHP is more efficient than ASP because the same functionality can be written with less source code in PHP than in ASP.
- ▶ Speed, PHP is faster than ASP. In PHP modules, everything runs in PHP memory space. Which means: PHP code will run in a much shorter time because there is no overload due to communication between existing COM objects in different processes.

Selected Design and Solutions for KK Motors Website

8

Using MySQL as Database Server Management

Database Server Management

- ▶ MySQL extension of MySQL Server from Xampp application was used for the database part.
- ▶ It has an essential role in the good functioning of the application, but especially for registering a new user, for user logging (log in and log out) and updating of admin and user data - making it available for Administrator rights, a powerful and easy-to-use interface.



The screenshot shows the Xampp Control Panel with three main sections:

- Database server:**
 - Server: 127.0.0.1 via TCP/IP
 - Server type: MariaDB
 - Server version: 10.1.21-MariaDB - mariadb.org binary distribution
 - Protocol version: 10
 - User: root@localhost
 - Server charset: UTF-8 Unicode (utf8)
- Web server:**
 - Apache/2.4.25 (Win32) OpenSSL/1.0.2j PHP/7.0.16
 - Database client version: libmysql - mysqlnd 5.0.12-dev - 20150407 - \$Id: b5c5906d4452ec590732a93b051f3827e02749b83 \$
 - PHP extension: mysqli curl mbstring
 - PHP version: 7.0.16
- phpMyAdmin:**
 - Version Information: 4.6.5.2, latest stable version: 4.7.1

Connect to MySQL server using Xampp app

Selected Design and Solutions for KK Motors Website

9

Using phpMyAdmin - MySQL as Database Management

Database Management

The administration module consists of the following sections:

- Sign Up section - registering a new user, whose personal data as a name, email address, and login password on the KK Motors website
- Log In section - login to the website with user authentication and access data by entering the email address and password associated with this email account registered in the web site's database
- The Log Out - User section logs out at the active session of his presence at that time
- User Data Update section - updating user data such as their name and their email address and also, changing their password.
- The Register of a Car section - search and display of car data, car models and other car details such as chassis, year of production of the car and its sale price

PHP + MySQL

Interaction with the database requires five steps:

1. creates the connection to the database system
2. a database is selected
3. executes an SQL statement
4. data is used
5. close the connection

+ Options				
	id	name	email	password
	1	George Mitrea	george@kkmotors.com	*8CDB4F9759BC3C7C267D4E81145B53EE61655
	2	Administrator	admin@kkmotors.com	*8CDB4F9759BC3C7C267D4E81145B53EE61655
	3	User	user@tva.ro	*50633E8E1250DE531F5B3E40D948C78747A8
	4	Andrei	andrei@tower.co.uk	*8CDB4F9759BC3C7C267D4E81145B53EE61655
	6	Alex	alex@kkmotors.com	*8CDB4F9759BC3C7C267D4E81145B53EE61655

10

Selected Design and Solutions for KK Motors Website

Using MySQL - phpMyAdmin - Advantages

Advantages:

- PhpMyAdmin is free and open source
- Is a web interface
- MySQL has Prepared Statements that can help us in many ways, but the most important helps us eliminate the risk of SQL Injection
- Is a relational database management system and is distributed in Open Source
- The MySQL database server is very fast, reliable and easy to use
- MySQL Database Software is a client/server system consisting of a MySQL multithreaded server that supports various client and library programs, administrative tools and a wide range of Application Programming Interfaces (APIs)
- Works on different platforms
- A memory allocation system very fast and based on threads

Advantages:

- Easier to backup/restore
- Save SQL database slots
- Easier to link user accounts within separate software
- Is one of widely used open-source relational database management system RDBMS
- Provides transactional and non-transactional data storage engines
- Join tables of very fast tables
- The server is available as a separate program that can be used in a client/server network environment. It is also available as a library that can be included in standalone applications
- A very flexible and secure privilege and password system that allows for host-based verification.
- Passwords are secure because all password-related traffic is encrypted when connecting to the server.

Selected Design and Solutions for KK Motors Website

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JavaScript– related to Client Side Scripting

- ▶ Used to program the behaviour of KK Motors web pages. The best-known client-side scripting language is JavaScript, which is supported (much or less) by almost any existing browser. Using JavaScript can be done the form validation, insert a text and image animation, drop-down menus and navigation controls, numeric or word processing and much more.
- ▶ All JavaScript-based build systems need Node.js to run. They are also all installed through npm, the package manager for Node.js and running from the command line.
- ▶ WWW browsers interpret JavaScript scripts from HTML pages. They read the page, interpret the bookmarks and display it while executing the JavaScript scripts as they meet within the page. The result of this interpretation/execution process is viewed by the user in the browser window.
- ▶ Client-side JavaScript, which additionally contains objects for navigator and DOM and server-side JavaScript controls that contain server-side support objects (e.g., for communicating with a relational database).

Selected Design and Solutions for KK Motors Website

12

JavaScript– related to Client Side Scripting

- All JavaScript-based build systems need Node.js to run. They are also all installed through npm, the package manager for Node.js and running from the command line.
- WWW browsers interpret JavaScript scripts from HTML pages. They read the page, interpret the bookmarks and display it while executing the JavaScript scripts as they meet within the page. The result of this interpretation/execution process is viewed by the user in the browser window.
- Client-side JavaScript, which additionally contains objects for navigator and DOM and server-side JavaScript controls that contain server-side support objects (e.g., for communicating with a relational database).

```
<script>
var myCenter = new google.maps.LatLng(51.508742, -0.120856);
var map;
var marker;

function initialize() {
  var mapProp = {
    center: myCenter,
    zoom: 12,
    mapTypeId: google.maps.MapTypeId.ROADMAP
  };
  map = new google.maps.Map(document.getElementById("googleMap"), mapProp);

  marker = new google.maps.Marker({
    position: myCenter,
    animation: google.maps.Animation.BOUNCE
  });

  marker.setMap(map);
}

google.maps.event.addDomListener(window, 'load', initialize);
google.maps.event.addDomListener(window, "resize", function () {
  var center = map.getCenter();
  google.maps.event.trigger(map, "resize");
  map.setCenter(center);
});
</script>
```

Use JavaScript to introduce Google Map on Contact Us page from KK Motors

Selected Design and Solutions for KK Motors Website

JavaScript– Advantages and Disadvantages

13

Advantages

- ▶ JavaScript can be entered in HTML
- ▶ JavaScript is environmentally friendly
- ▶ JavaScript is a fully interpreted language
- ▶ Validating the content of a form;
- ▶ Communicating with java applets
- ▶ Creating custom animations;
- ▶ JavaScript is a flexible language
- ▶ JavaScript is based on objects

Advantages

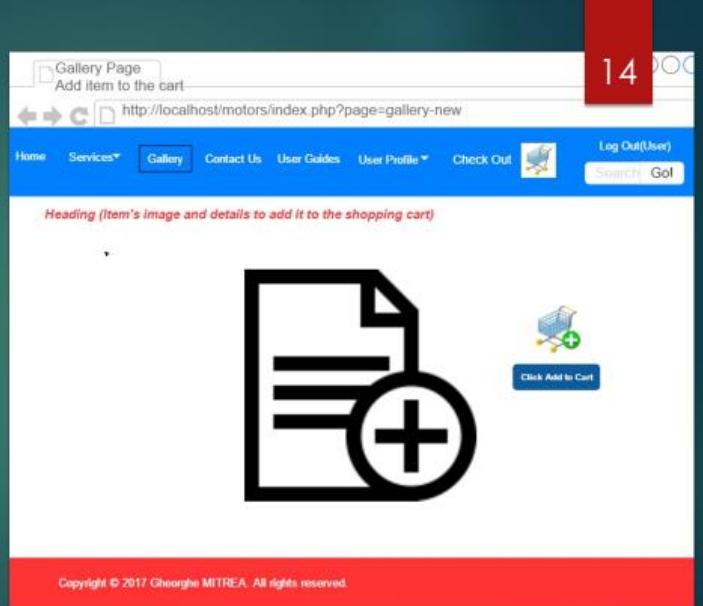
- The most important role for JavaScript is the improvement it brings to the user interface: This is done by providing user help, by validating input forms, by calculating form results, by manipulating images. JavaScript improves HTML by interactivity. It works at the client level, thus releasing the server.
- Client-level JavaScript scripts are secure against the vast majority of clients on the web
- Generate custom webpages and dynamically modify their presentation

Alternative Designs and Solutions

14

Alternative design and solutions of KK Motors Website - Gallery page with Add to Cart

- ▶ In the Gallery page, an alternative to the design page could be to add a **Search** box for the cars to give an easy search for the cars
- ▶ Also, as an alternative design on the same page, when the client is selecting a car and wants to add it to the shopping cart he can check the box to add it to the cart and then press the submit button **Click Add to Cart**
- ▶ It was decided to do not include an Add item function to Gallery page because it will not be implemented an Shopping Card function now, due to the fact that for the moment it is a website where the company is promoting only the business, but in the future these functions will be implemented to the next versions of the website



The screenshot shows a web browser window with the following details:

- Title Bar:** Gallery Page
- Address Bar:** http://localhost/motors/index.php?page=gallery-new
- Header:** Home, Services, **Gallery**, Contact Us, User Guides, User Profile, Check Out, Log Out/User, Search, Go!
- Content Area:**
 - A heading: "Heading (item's image and details to add it to the shopping cart)"
 - An image of a document with a large plus sign inside a circle.
 - A shopping cart icon with a plus sign.
 - A button labeled "Click Add to Cart".
- Page Footer:** Copyright © 2017 Gheorghe MITREA. All rights reserved.

Alternative design and solutions of KK Motors Website – Add Shopping Cart page

- ▶ As alternative design to the website could be to add Shopping Cart page
- ▶ On this page could be **Choose Item form** where the customer can chose one or more selected items like a car or a car accessory to buy them
- ▶ The last step to proceed the the shipping is to submit the completed forms by click on **CHECK OUT** button



15

Alternative design and solutions of KK Motors Website – Shopping Cart

16

Disadvantages in adopting Shopping Cart function in KK Motors Website project

The shopping cart function has not been chosen for various reasons:

- ▶ KK Motors website is meant to promote company's business not to have online shopping for the moment because when a potential buyer wants to buy a second-hand car, he comes to check it out, test it physically and of course the payment method.
- ▶ Its implementation implies the third part, which means more insecurity, both in financial terms and in terms of personal data that KK Motors holds
- ▶ Involves greater responsibility from the company's management that requires research time in its implementation
- ▶ The implementation of this design method consumes many resources, it needs time to have all the staff necessary to have it
- ▶ If the company needs support documentation and explanation of using some features this cost a huge amount of money and are available only in paid editions
- ▶ The frequent occurrence of buggy

Alternative design and solutions of KK Motors Website – Cloud Computing 17

Cloud computing is a distributed set of computing, applications, access to information and data storage without the need for the user to know the location and physical configuration of the systems that provide these services.

Disadvantages in adopting Cloud Computing function in KK Motors project Website

- ▶ The need for a fast and stable Internet connection;
- ▶ Secure data security in the cloud may present problems and may cause users to mistrust;
- ▶ The legal situation is usually complex because the user does not find even the country or countries in which the servers host their data.

Alternative design and solutions of KK Motors Website – Content Management System Function 18

CMS function was not implemented in the design of KK Motors website because:

- ▶ Hidden implementation costs for perfecting the system for users' needs;
- ▶ Server resources: Some CMSs (e.g. Joomla) can put a load on website server resources;
- ▶ Some technical skillset requirements: If users have an aversion to learning the basics of using a CMS, the usage of a CMS will not be as efficient. This means that hiring experienced staff or contracting technical help might be necessary for the company;
- ▶ Maintenance: In the wrong hands, an unmaintained and outdated CMS can do much harm to KK Motors website and lead to serious security vulnerabilities;
- ▶ Direct assistance: for group-based CMS systems, direct assistance may not be easy to find, and the website has to rely on user forums and existing documentation.

Alternative design and solutions of KK Motors Website – ASP.NET

19

Microsoft's ASP language is a server-side software in which is included its Internet server (IIS) and can also, be used on other web servers using a so-called soft-intermediate.

Disadvantages in adopting ASP.NET over PHP for KK Motors website

- ▶ - Being developed by Microsoft does not benefit from an open-source developer community that can provide quick solutions to detected errors;
- ▶ - Can only be used on a server that comes with the Windows operating system and the Microsoft Internet Information Server web server. The disadvantages of this combination are both the cost, that is, the fee to pay for the site hosting service and the execution time that is quite high.
- ▶ Uploading and downloading files via FTP or HTTP, encryption, sending emails from a Web page, requires the purchase of ancillary software for ASP.
- ▶ ASP.NET only runs on Web servers in Microsoft Windows systems. In this case, it will be difficult to change your web hosting provider to another if the latter is using Linux.

Alternative design and solutions of KK Motors Website – Microsoft SQL

20

Microsoft SQL Server 2005 is a complete programme, with integrated data management and analysis application that enables KK Motors website to reliably manage critical information and reliably execute increasingly complex business applications.

Disadvantages in adopting Microsoft SQL Server over MySQL for KK Motors website:

- ▶ Is very expensive. It's priced at £20,494 per processor + £7,592.00 for server + £164.00 for CAL (Client Access Licence)
- ▶ The company should be part of Microsoft's Ecosystem to work on SQL server. This involves purchasing their Server products which would again be expensive.
- ▶ KK Motors website will depend on Microsoft for any further updates and Microsoft ships updates in 2 years period

4. Task 4 Be able to implement web applications

4.1 The use of client side and server side scripting

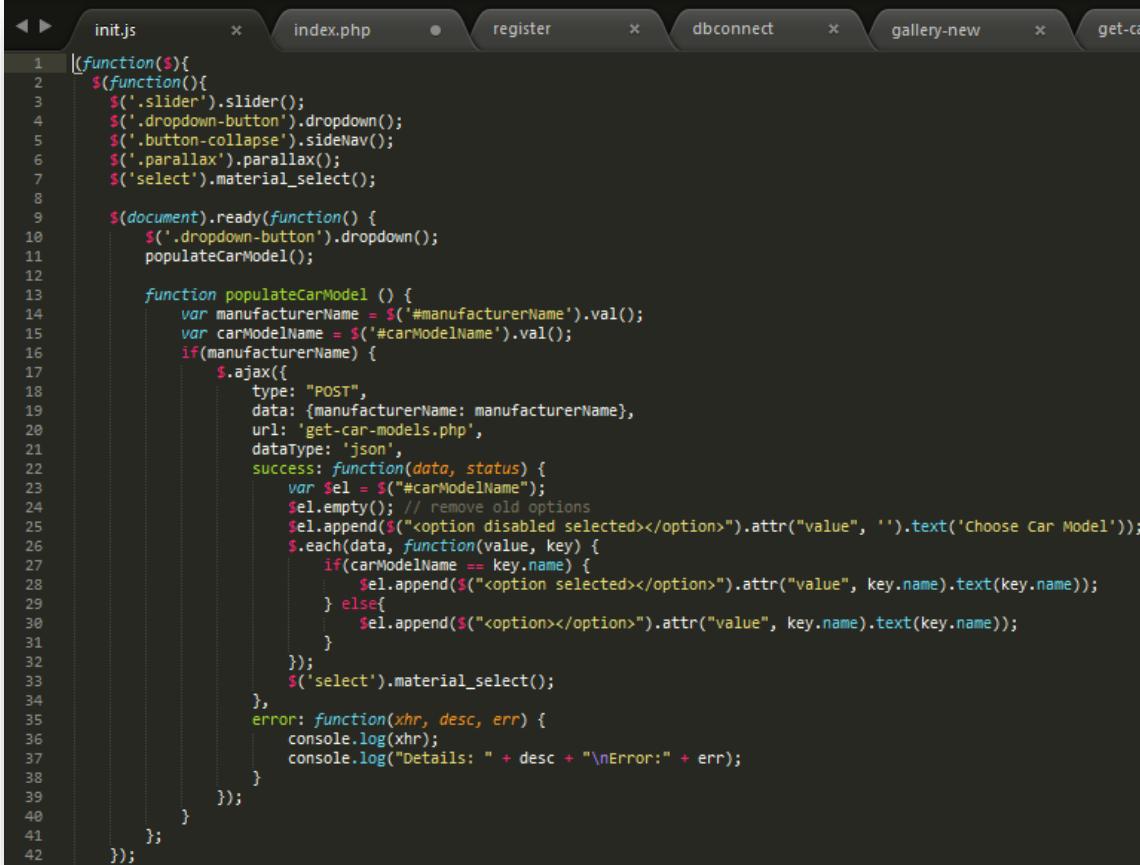
The implementation of KK Motors website was made by using Materialize JavaScript framework



```
1  /*!
2   * Materialize v0.98.2 (http://materializecss.com)
3   * Copyright 2014-2015 Materialize
4   * MIT License (https://raw.githubusercontent.com/Dogfalo/materialize/master/LICENSE)
5   */
6  // Check for jQuery.
7  if (typeof(jQuery) === 'undefined') {
8      var jQuery;
9      // Check if require is a defined function.
10     if (typeof(require) === 'function') {
11         jQuery = $ = require('jquery');
12         // Else use the dollar sign alias.
13     } else {
14         jQuery = $;
15     }
16 }
17 ;
18 // t: current time, b: beginning value, c: change In value, d: duration
19 jQuery.easing['jswing'] = jQuery.easing['swing'];
20
21 jQuery.extend( jQuery.easing,
22 {
23     def: 'easeOutQuad',
24     swing: function (x, t, b, c, d) {
25         //alert(jQuery.easing.default);
26         return jQuery.easing[jQuery.easing.def](x, t, b, c, d);
27     },
28     easeInQuad: function (x, t, b, c, d) {
29         return c*(t/d)*t + b;
30     },
31     easeOutQuad: function (x, t, b, c, d) {
```

Figure 22 The implementation of KK Motors website was made by using Materialize JavaScript framework

Also, was used jQuery JavaScript framework to facilitate and improve processes such as crossing the DOM tree in HTML, event inter-browser management, animations:



```

1 $(function($){
2     $('#manufacturerName').change(function() {
3         var manufacturerName = $('#manufacturerName').val();
4         var carModelName = $('#carModelName').val();
5         if(manufacturerName) {
6             $.ajax({
7                 type: "POST",
8                 data: {manufacturerName: manufacturerName},
9                 url: 'get-car-models.php',
10                dataType: 'json',
11                success: function(data, status) {
12                    var $sel = $("#carModelName");
13                    $sel.empty(); // remove old options
14                    $sel.append($("<option disabled selected></option>").attr("value", '').text('Choose Car Model'));
15                    $.each(data, function(value, key) {
16                        if(carModelName == key.name) {
17                            $sel.append($("<option selected></option>").attr("value", key.name).text(key.name));
18                        } else{
19                            $sel.append($("<option></option>").attr("value", key.name).text(key.name));
20                        }
21                    });
22                    $('#carModelName').material_select();
23                },
24                error: function(xhr, desc, err) {
25                    console.log(xhr);
26                    console.log("Details: " + desc + "\nError:" + err);
27                }
28            });
29        }
30    });
31 });
32 });
33 });
34 });
35 });
36 });
37 });
38 });
39 });
40 });
41 });
42 });

```

Figure 23 Used jQuery framework to facilitate and improve processes

and AJAX type requests:

```

$(document).on("change", '#manufacturerName', function(e) {
    var manufacturerName = $(this).val();
    $.ajax({
        type: "POST",
        data: {manufacturerName: manufacturerName},
        url: 'get-car-models.php',
        dataType: 'json',
        success: function(data, status) {
            var $sel = $("#carModelName");
            $sel.empty(); // remove old options
            $sel.append($("<option disabled selected></option>").attr("value", '').text('Choose Car Model'));
            $.each(data, function(value, key) {
                $sel.append($("<option></option>").attr("value", key.name).text(key.name));
            });
            $('#carModelName').material_select();
        },
        error: function(xhr, desc, err) {
            console.log(xhr);
            console.log("Details: " + desc + "\nError:" + err);
        }
    });
}); // end of document ready
$(jQuery); // end of jQuery name space

```

Figure 24 In jQuery framework code using Ajax

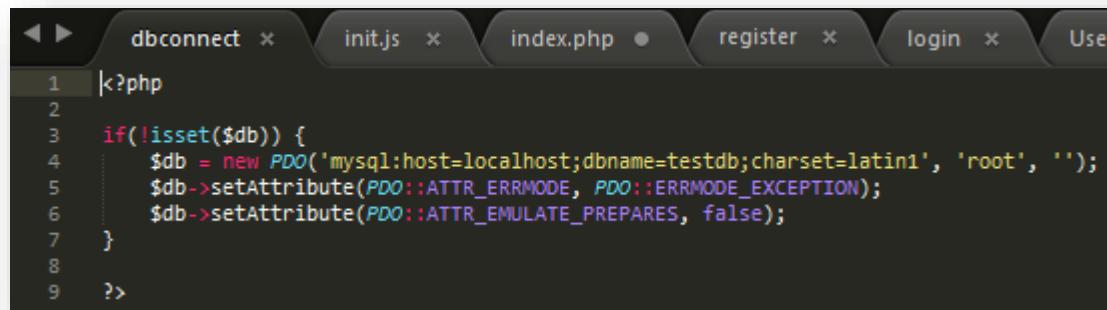
When the Server-Side script (.php in this case) is required by the browser, the server executes the script and sends the result back to the browser.

E.g.: On the Server KK Motors web application has ***index.php*** file that contains the following lines of code where the browser asks the server through PHP code script to show the details of some images from ***testdb*** database:

```
<?php } ?>
<div class="col s12 m3">
  <div class="card hoverable">
    <div class="card-image">
      
    </div>
    <div class="card-content">
      <span class="card-title activator grey-text text-darken-4"><?php echo $car->manufacturer_name . ' ' . $car->car_model_name; ?><i class="material-icons right">more_vert</i></span>
      <p>Year: <?php echo $car->year; ?></p>
    </div>
    <div class="card-reveal">
      <span class="card-title grey-text text-darken-4"><?php echo $car->manufacturer_name . ' ' . $car->car_model_name; ?><i class="material-icons right">close</i></span>
      <p>Year: <?php echo $car->year; ?></p>
      <p>Chassis No.: <?php echo $car->chassis_no; ?></p>
      <p>Price: <?php echo $car->price; ?></p>
    </div>
  </div>
</div>
<?php if($index % 4 == 0) { ?>
</div>
<?php } ?>
<?php $index++;
```

Figure 25 Using PHP code script for the server-side of the web application

Also, as a server-side was used MySQL through Xampp and used phpMyAdmin as a web based application to access the data from ***testdb*** database of KK Motors webpages:



```
1 |?php
2
3 if(!isset($db)) {
4     $db = new PDO('mysql:host=localhost;dbname=testdb;charset=latin1', 'root', '');
5     $db->setAttribute(PDO::ATTR_ERRMODE, PDO::ERRMODE_EXCEPTION);
6     $db->setAttribute(PDO::ATTR_EMULATE_PREPARES, false);
7 }
8 ?>
```

Figure 26 Using MySQL to access the data of testdb database

These lines of code are interpreted by the compiler and the result will be the display of details of the required images.

4.2 Use of error handling and reporting

If a user write an incorrect email format then an **error message** is displayed to introduce a correctly email format:

```
// Email should be compliant with the proper format (i.e. name@domain.tld)
if(!filter_var($email, FILTER_VALIDATE_EMAIL)) {
    $error = true;
    $email_error = "Please Enter Valid Email ID";
}
```

Figure 27 Error handling for introducing a correct email address

Another function of error handling is when a new user is registering in Sign Up page and he must type the same password as he wrote it in the first field dedicated confirming the password for his new account of KK Motors. In case he introduced a password less than six characters then will be displayed an error message “Password and Confirm Password doesn't match” and it is asked to retype both fields of validating it:

```
// Check that the password and the confirmed password are exactly the same
if($password != $cpassword) {
    $error = true;
    $cpassword_error = "Password and Confirm Password doesn't match";
}
```

Figure 28 Error handling confirming the request of at least 6 characters

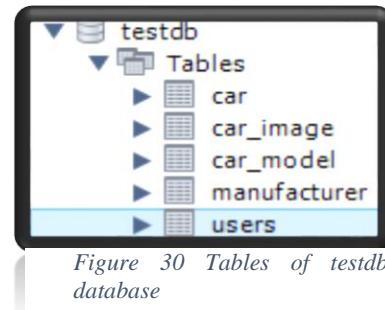
If there is an error when is submit a registration the rollback to the previous status of filing the form:

```
catch(PDOException $ex) {  
    //Something went wrong rollback!  
    $db->rollBack();  
    $errormsg = $ex->getMessage();  
}
```

Figure 29 Rollback in case there is an error message after submitting a registration

4.3 How data is manipulated using testdb database of KK Motors website

The database **testdb** has five tables shown in the below figure:



Tables use the **primary keys** to identify the records in a table and are shown in the figure below:

car	PRIMARY	Yes	BTREE	id
car_image	PRIMARY	Yes	BTREE	id
car_model	PRIMARY	Yes	BTREE	id
manufacturer	PRIMARY	Yes	BTREE	id
users	PRIMARY	Yes	BTREE	id

Figure 31 Primary keys of the database for KK Motors website

Also, tables use **unique keys** whose values can uniquely identify the records and are represented by the id of each table and are shown in the figure below:

Table	Name	Unique	Index...	Index Comment	Column
manufacturer	uk_manufacturer	Yes	BTREE		name
car_model	uk_car_model	Yes	BTREE		name
car_model	uk_car_model	Yes	BTREE		manufacturer_id
car	uk_car	Yes	BTREE		chassis_no
car	PRIMARY	Yes	BTREE		id
car_image	PRIMARY	Yes	BTREE		id
car_model	PRIMARY	Yes	BTREE		id
manufacturer	PRIMARY	Yes	BTREE		id
users	PRIMARY	Yes	BTREE		id
users	email	Yes	BTREE		email

Figure 32 Unique keys of testdb database

Moreover, last but not least the tables are linked together by **foreign keys**. These are a set of fields in a table that is a candidate key in another table. Foreign keys were created to establish links between database tables:

car	manufacturer_id	No	BTREE	manufacturer_id
car_model	manufacturer_id	No	BTREE	manufacturer_id
car_image	car_id	No	BTREE	car_id
car	car_ibfk_1	No	BTREE	car_model_id

Figure 33 Foreign keys of database

Flowchart of `user` table from testdb database

The Administrator and any user of KK Motors website have to follow two steps to get access into their account. First step is to register through **Sign Up** page by introducing his personal details like the name, email and password and after registration their account details are kept in **users** table where are stored their personal details. After registration, the user needs only to log in from **Login** page placed on the navigation menu. The user needs to write his email address and the password afferent to this email account.

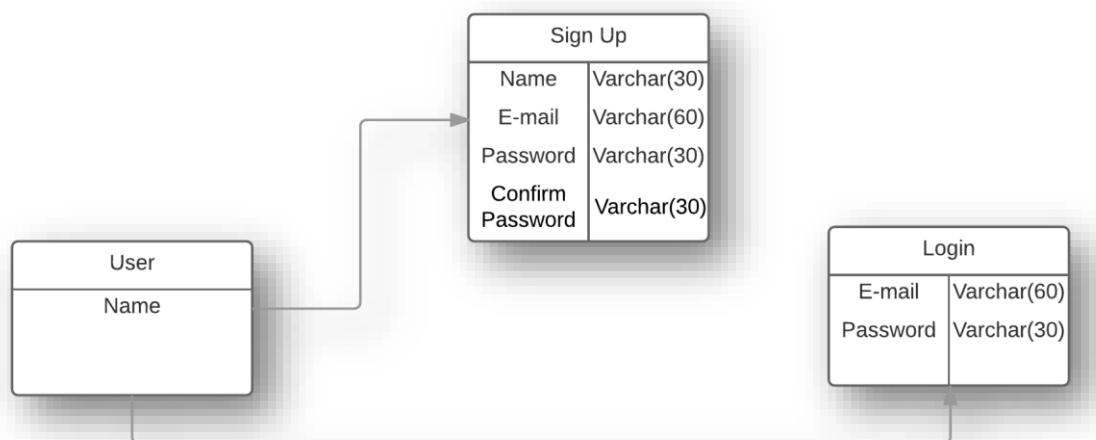


Figure 34 ER diagram for user account of KK Motors

4.4 The Dynamic Webpages of KK Motors

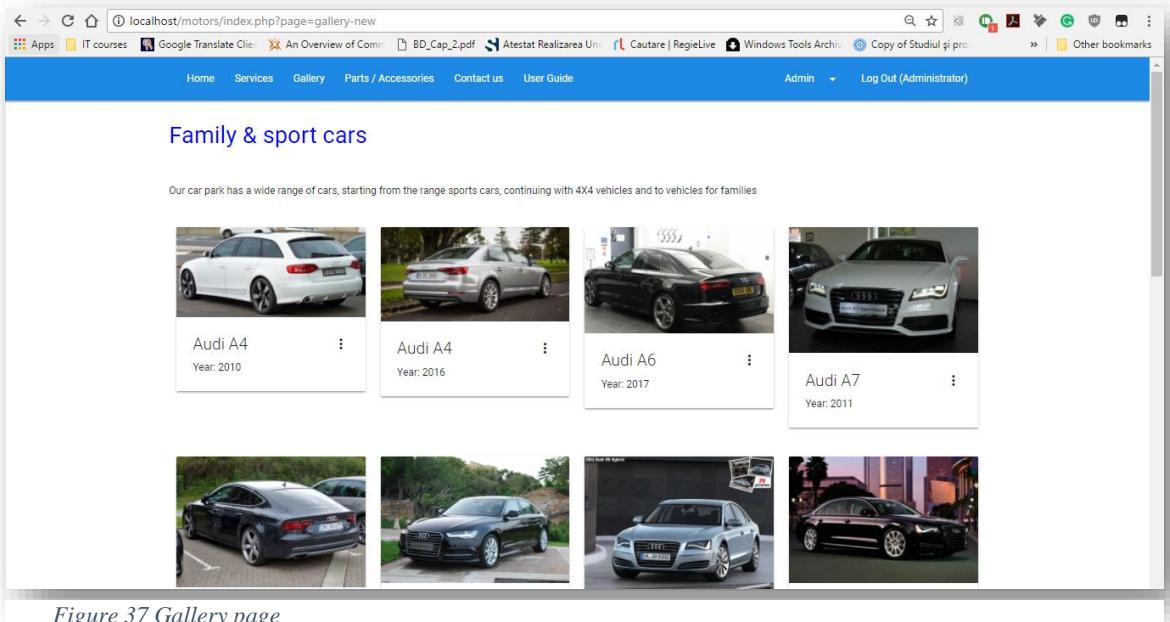


Figure 37 Gallery page

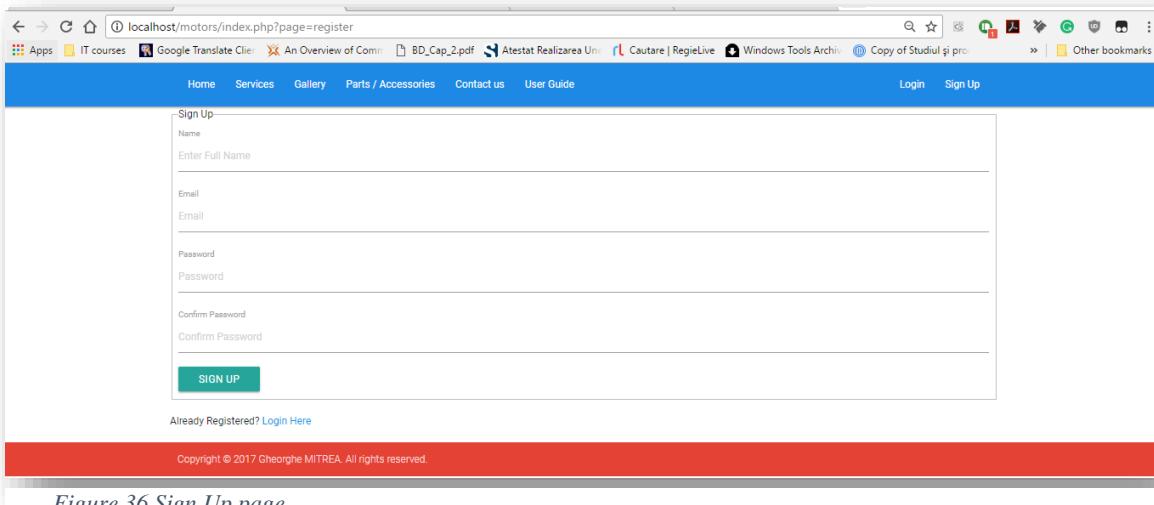


Figure 36 Sign Up page

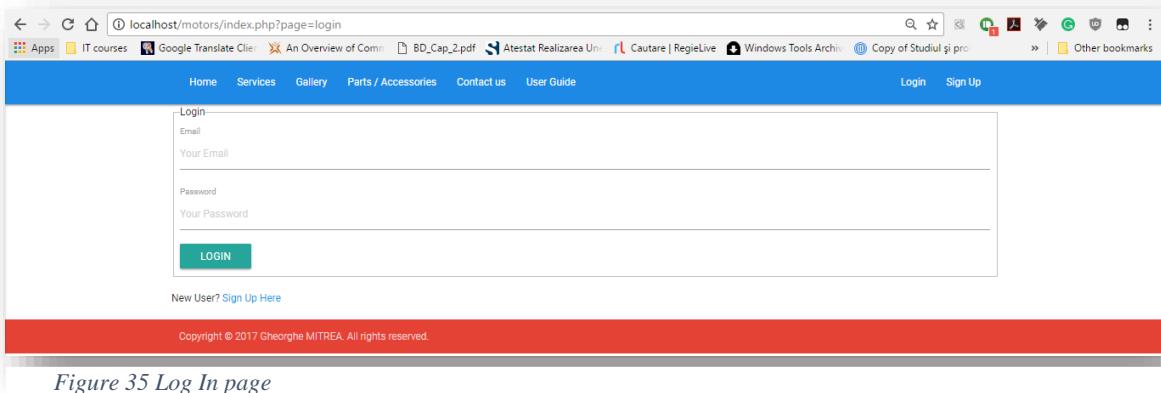
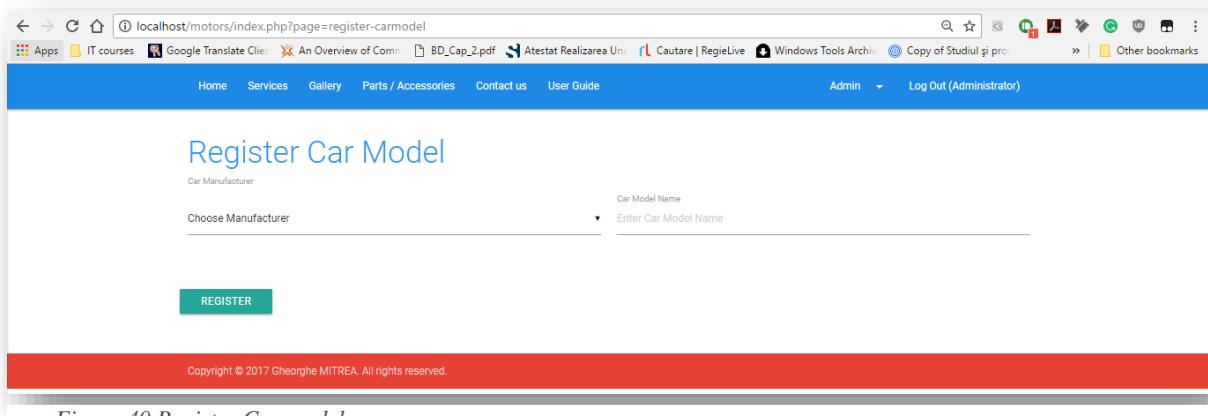
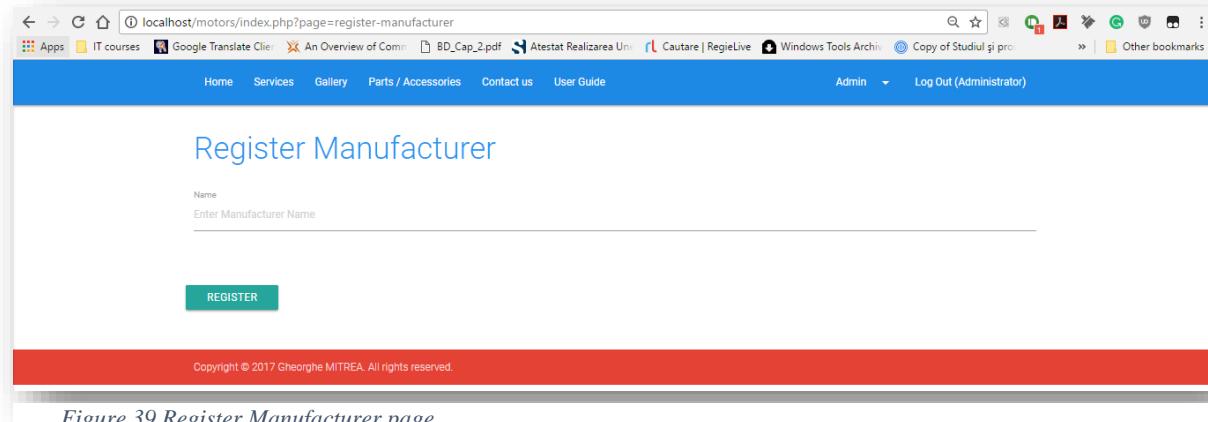


Figure 35 Log In page



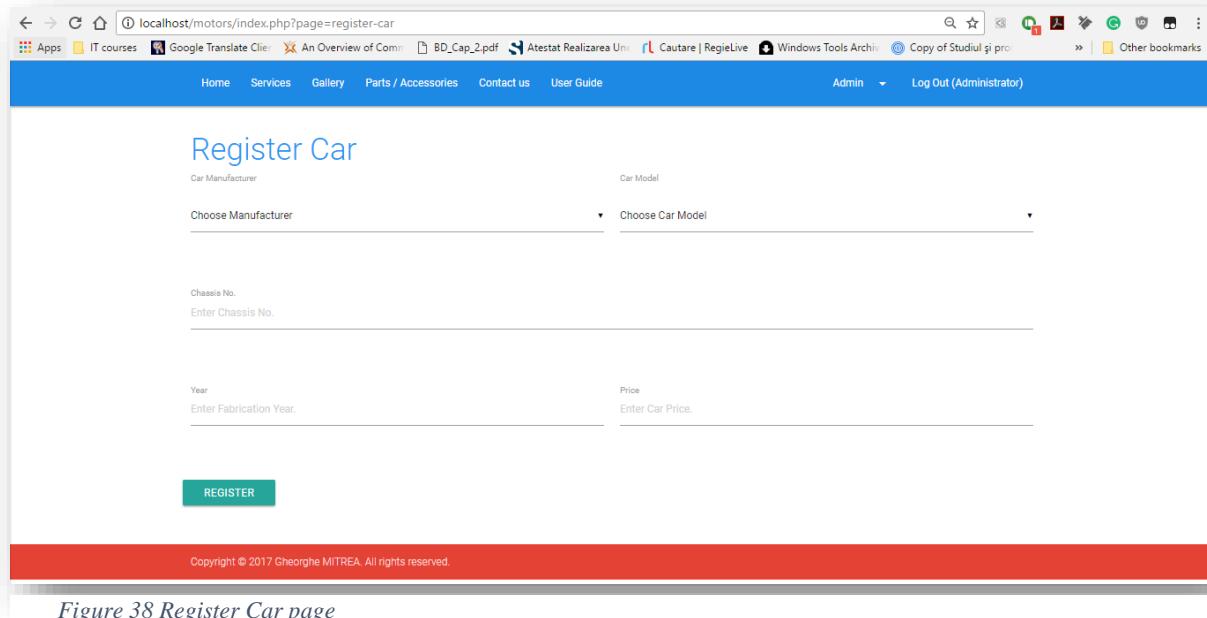
The screenshot shows a web browser window with the URL localhost/motors/index.php?page=register-carmodel. The page title is "Register Car Model". It features a blue header bar with navigation links: Home, Services, Gallery, Parts / Accessories, Contact us, User Guide, Admin, and Log Out (Administrator). Below the header, there are two input fields: "Car Manufacturer" (dropdown menu showing "Choose Manufacturer") and "Car Model Name" (text input field with placeholder "Enter Car Model Name"). A green "REGISTER" button is located at the bottom left. A red footer bar at the bottom of the page contains the text "Copyright © 2017 Gheorghe MITREA. All rights reserved."

Figure 40 Register Car model page



The screenshot shows a web browser window with the URL localhost/motors/index.php?page=register-manufacturer. The page title is "Register Manufacturer". It has a blue header bar with the same navigation links as Figure 40. Below the header, there is a single input field labeled "Name" (placeholder "Enter Manufacturer Name") with a green "REGISTER" button below it. A red footer bar at the bottom contains the text "Copyright © 2017 Gheorghe MITREA. All rights reserved."

Figure 39 Register Manufacturer page



The screenshot shows a web browser window with the URL localhost/motors/index.php?page=register-car. The page title is "Register Car". It has a blue header bar with the same navigation links. The form consists of several input fields: "Car Manufacturer" (dropdown menu showing "Choose Manufacturer"), "Car Model" (dropdown menu showing "Choose Car Model"), "Chassis No." (text input field with placeholder "Enter Chassis No."), "Year" (text input field with placeholder "Enter Fabrication Year."), and "Price" (text input field with placeholder "Enter Car Price."). A green "REGISTER" button is at the bottom left. A red footer bar at the bottom contains the text "Copyright © 2017 Gheorghe MITREA. All rights reserved."

Figure 38 Register Car page

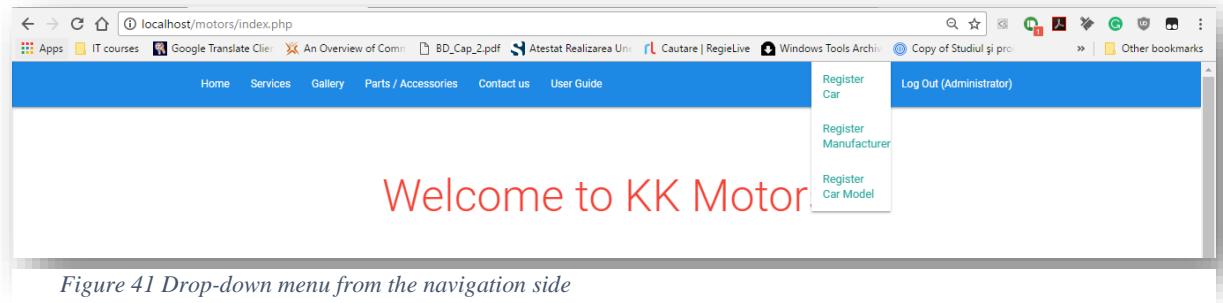


Figure 41 Drop-down menu from the navigation side

4.5 Static Webpages of KK Motors

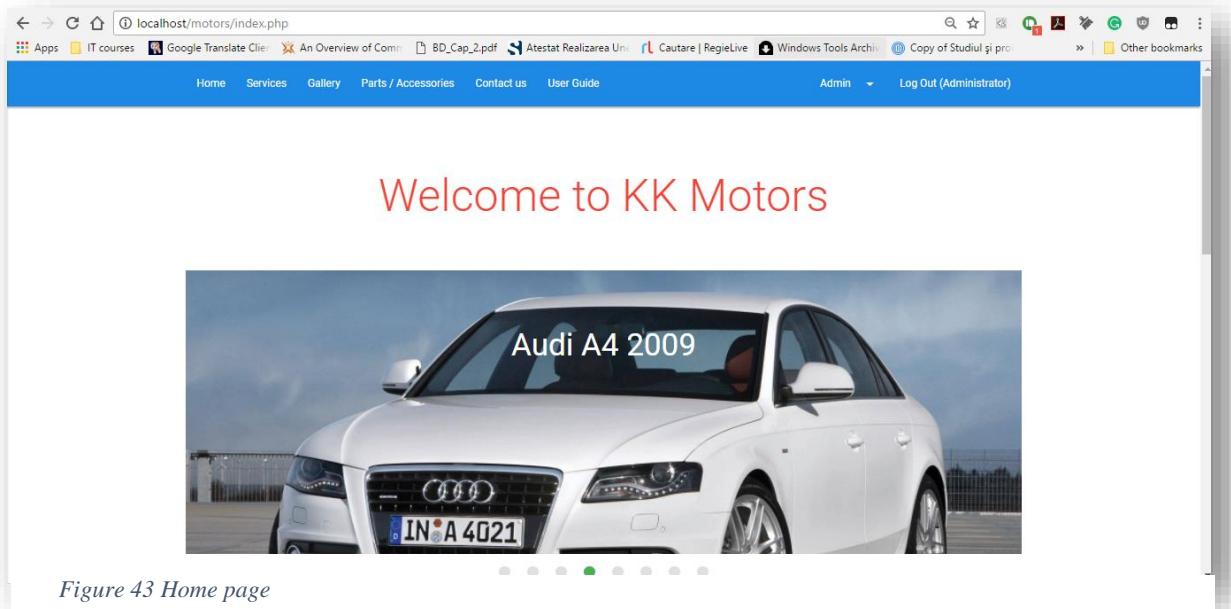


Figure 43 Home page

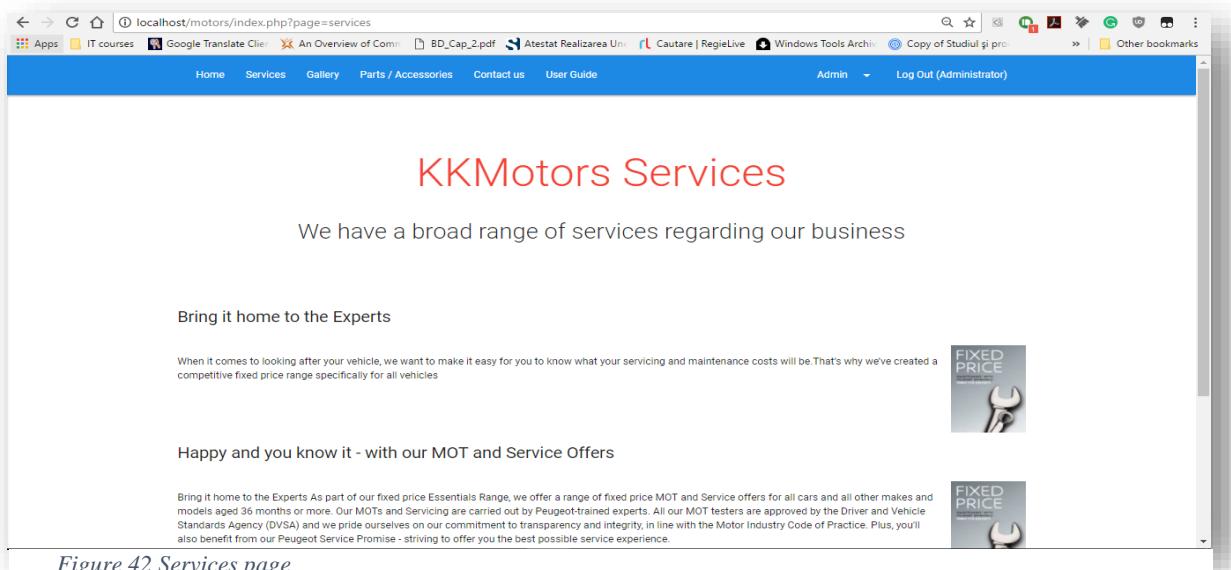
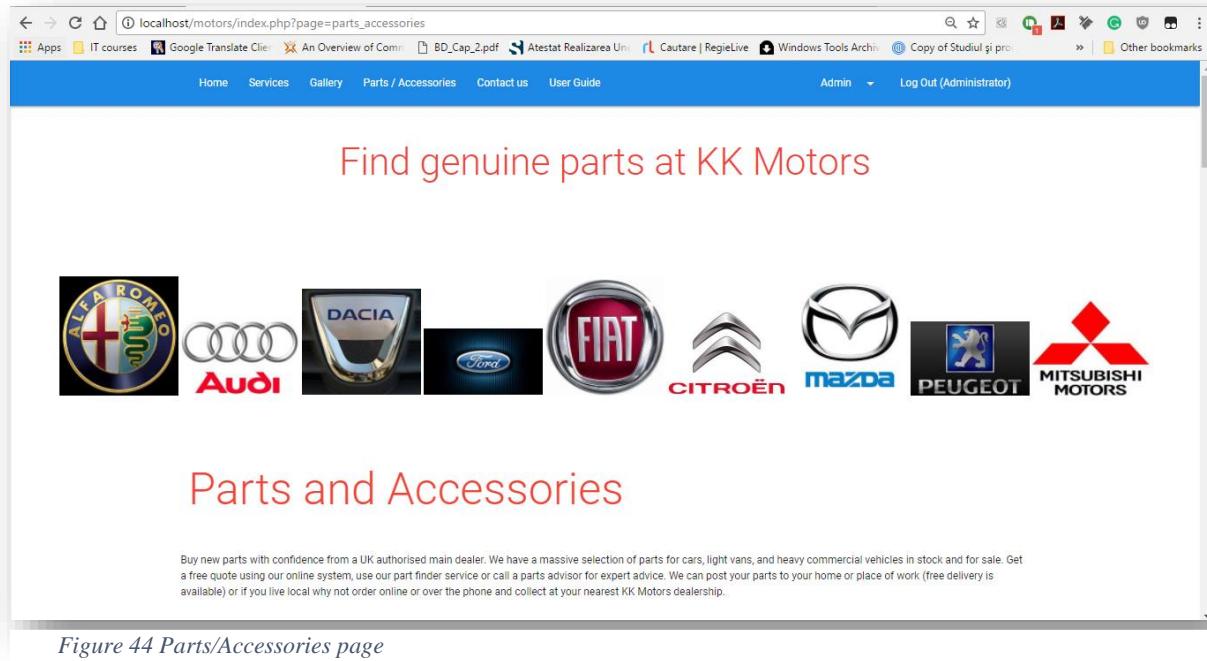
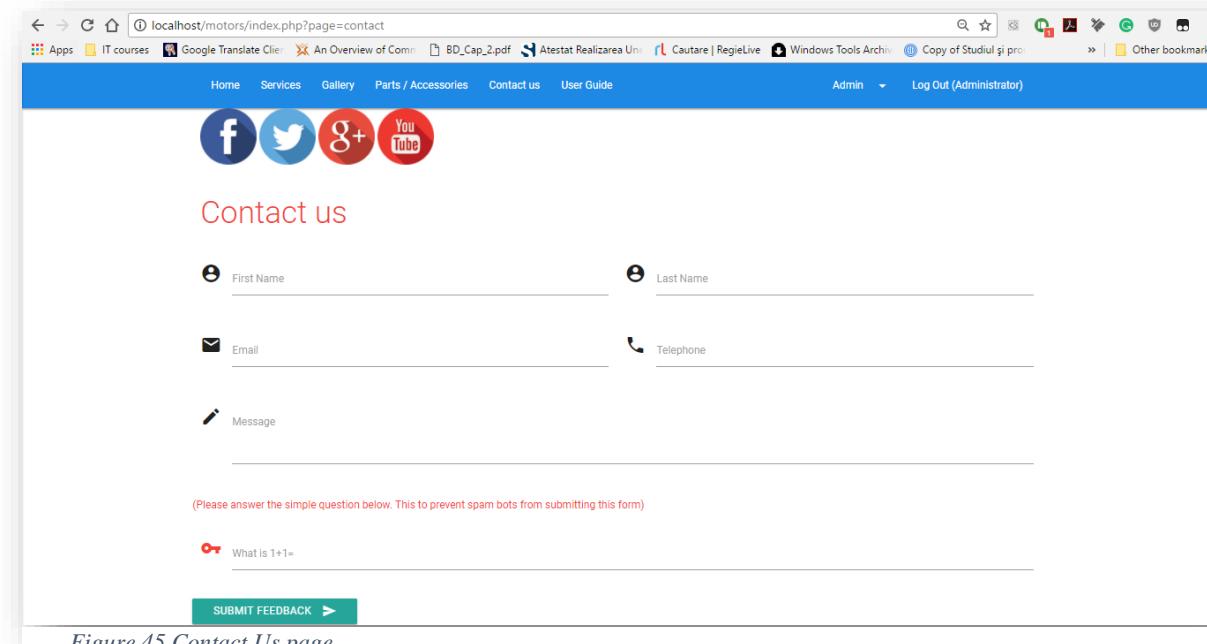


Figure 42 Services page



The screenshot shows a web browser window with the URL localhost/motors/index.php?page=parts_accessories. The page header includes a navigation bar with links for Home, Services, Gallery, Parts / Accessories, Contact us, and User Guide. On the right, there are Admin and Log Out (Administrator) options. The main content features a red header "Find genuine parts at KK Motors". Below it is a row of ten car manufacturer logos: Alfa Romeo, Audi, Dacia, Ford, Fiat, Citroën, Mazda, Peugeot, and Mitsubishi. A sub-header "Parts and Accessories" is followed by a paragraph of text about buying parts with confidence from an authorised dealer. At the bottom is a contact form with fields for First Name, Last Name, Email, Telephone, and Message, along with a CAPTCHA question "What is 1+1=". A "SUBMIT FEEDBACK >" button is at the bottom.

Figure 44 Parts/Accessories page



The screenshot shows a web browser window with the URL localhost/motors/index.php?page=contact. The page header is identical to Figure 44. The main content features a red header "Contact us". Below it is a feedback form with fields for First Name, Last Name, Email, Telephone, and Message. A note at the bottom says "(Please answer the simple question below. This to prevent spam bots from submitting this form)". A CAPTCHA question "What is 1+1=" is present. A "SUBMIT FEEDBACK >" button is at the bottom.

Figure 45 Contact Us page

localhost/motors/index.php?page=user

Apps IT courses Google Translate Client An Overview of Comm BD_Cap_2.pdf Atestat Realizarea Uni Cautare | RegieLive Windows Tools Archiv Copy of Studiul și pro > Other bookmarks

Home Services Gallery Parts / Accessories Contact us User Guide Admin Log Out (Administrator)

Documentation and User Guide

Introduction to the new website

KK Motors website promote a series of functions of the auto second cars market which highlight the usefulness to such as:

- To provide information to both the buyer and the seller;
- neutralization of adverse information what are popping especially by some rumor spreading;
- to stimulate demand is the purpose of directly and immediately;
- attenuation of the fluctuations in demand, especially in the case of seasonal products;

Product differentiation:

- reminder of the advantages of the products in order to remain loyal consumers;
- countering competitors of second hand cars dealers;
- Formation of an image on the auto market;
- justification of the prices of the cars and services;



Figure 46 User Guide page

Assignment 3 Test and Document a Web Application

1. Task 1 Critically Review and Test the Website

1.1 Critically Review and Test the Website

Functional testing is performed to determine if the website behaves according to its specifications:

Table 1 Functional Tests Cases

Test Cases	Expected Result	Current Result	Functional/ Non- Functional	Comments	Action Required
Check all the Links	All the internal and the outside links should work inside the website pages, no cracked links, navigation should be easy to use	All the internal and external links inside the website are working correctly, no defected pages of the website found, the navigation from a page to other is smoothly.	✓	Were tested the internal and outgoing links from the pages of the website, was tested if the navigation from a page to other of the website is easy, tested if there is a broken webpage of the website, the, checked different controls like buttons, fields and boxes.	Passed
Test Forms for all the Pages	Validate the fields; default values of the fields; Incorrect inputs in the forms; options for the forms like delete, view or modify the forms	The fields of the forms are working correctly, error messages are shown in case of incorrect inputs in the fields, only function to add a car; the forms to modify or delete a car or a user haven't been created	✓ X	Were tested the validation of sign up, log in, log out, add a car manufacturer, add a car model and add a car forms are responding correctly with successful registration in case the registration was correctly introduced or with an error message in case the data for the required forms were incorrectly introduced	Passed

Validate HTML/CSS Syntaxes	Optimised KK Motors webpages for search engines	Quick load of pages, no syntax errors of HTML and CSS. Correct layout of texts, images and files animation and video within the website	✓	It was used W3C (World Wide Web Consortium – http://validator.w3.org) to validate the HTML and CSS syntaxes. Through this, it was intended to see the correctness and layout of the animation and video texts, images and files within the website.	Passed
Database Testing	Data consistency of KK Motors database	Correctly executes queries and operations for adding and updating data as well as checking connections between the Web site and the database.	✓	Was tested the data flexibility which is essential for the website of KK Motors. Was tested the data probity and errors while it was edited, deleted, modified the forms. Testing databases involved checking the correct execution of queries and operations for adding and updating data as well as checking connections between the Web site and the database.	Passed
Test and validate the user interface	The interaction between the servers of the website should be responsive	All the communications between the web application (PHP), web server (Apache through Xampp webserver) and database server interface are performed correctly. Also, the errors are managed properly.	✓	Were tested the interactions between the servers of the website like PHP application server, web server through Apache web server and MySQL database server of Xampp web application.	Passed
Compatibility testing	The website should be responsive to all the most used browsers included mobile	The webpages of KK Motors website are compatible with all the browsers and also to the mobile browsers; are compatible also	✓	Were checked if the web application is responding correctly to Chrome, Microsoft Edge and Firefox browsers for workstations and also for mobile browsers using inspect page option of the browsers. Additionally, were tested the compatibility	Passed

	devices; should be responsive to the operating system used and also printing function	with other system operating other than Windows platforms, like Linux, Unix and Solaris.			of the web application on other system operation platform other than Windows. The pages were able to be printed in correct format	
Problem log test	Should be a log errors in PHP coding	The PHP log file is showing the coding errors	✓		Was tested if there is a log file to show the errors linked to php code scripting,	Passed
Protected pages	The website should have protected pages	There are protected pages inside the website	✓		Were tested if the pages like Register Manufacturer, register Car and Register Car Model are visible to unregister users.	Passed
Correct Spelling and Content verification	Verify if are spelling errors and the formatting content of the webpages is clear	All the pages have correct spelling and the formatting of the pages is well designed.	✓		Was verified the spelling errors and generally are not big issues of grammar spelling of the text areas. Also, was verified if all the forms are correct spelling and the content area is well formatted as headings.	Passed

1.2 Analyse Actual Test Results Against Expected Results to Identify Discrepancies

- a) **Using HTML5 together with PHP server side scripting language and MySQL database**

As a result of the test, it was noticed that the dynamic pages of the KK Motors website such as Register, Log In, Log Out, Get-Car Models, Gallery, Register Producer, Register Car Model and Register car used HTML 5 together with PHP with access to MySQL database **testdb**.

- b) **Tested the use of Materialize.css and Style.css**

It was tested the use of CSS labels and Materialize CSS to format KK Motors web pages (for example, text, background, or page layout, etc.). By testing the syntaxes of the Materialize.css and Style.css it was seen the benefits of using them and these are:

- formatting is entered in one place for the entire document
- Rapid editing of labels
- Due to the insertion of labels in one place, the page code is reduced, thus faster loading of the page

Also, following the test, it was observed that the CSS syntax is structured on three levels:

- i. Level 1 is the label properties of the HTML document, inline type
- ii. Level 2 is the information entered in the embedded HEAD block
- iii. Level 3 is the commands on separate pages, external type

c) Correct Spelling and Content verification

The content of webpages of KK Motors is rational and clear to learn it. Was verified the spelling errors and generally are not big issues of grammar spelling of the text areas.

The usage of light colours like blue colour for navigation side and light red colour for the bottoms of the web pages, together with the white colour for the body of pages were used as a site theme to give the sensation of comfortable surfing of the website. Also, the Roboto font style is clear and well proportionately to the users of the site. Was tested if the registration forms inside the website have space and are not crowded to give the feeling of crowded pages. The content of web pages is meaningful. All the internal and outgoing links of the website are working properly. The images are well proportionated and clear to the users.

Parts and Accessories

Buy new parts with confidence from a UK authorised main dealer. We have a massive selection of parts for cars, light vans, and heavy commercial vehicles in stock and for sale. Get a free quote using our online system, use our part finder service or call a parts advisor for expert advice. We can post your parts to your home or place of work (free delivery is available) or if you live local why not order online or over the phone and collect at your nearest KK Motors dealership.



Accessories

Come to KK Motors for a wide range of genuine vehicle accessories for your vehicle. We have carpet and rubber mats that fit exactly into the footwell, a choice of roof and bike carrier systems and many other accessories for your vehicle.

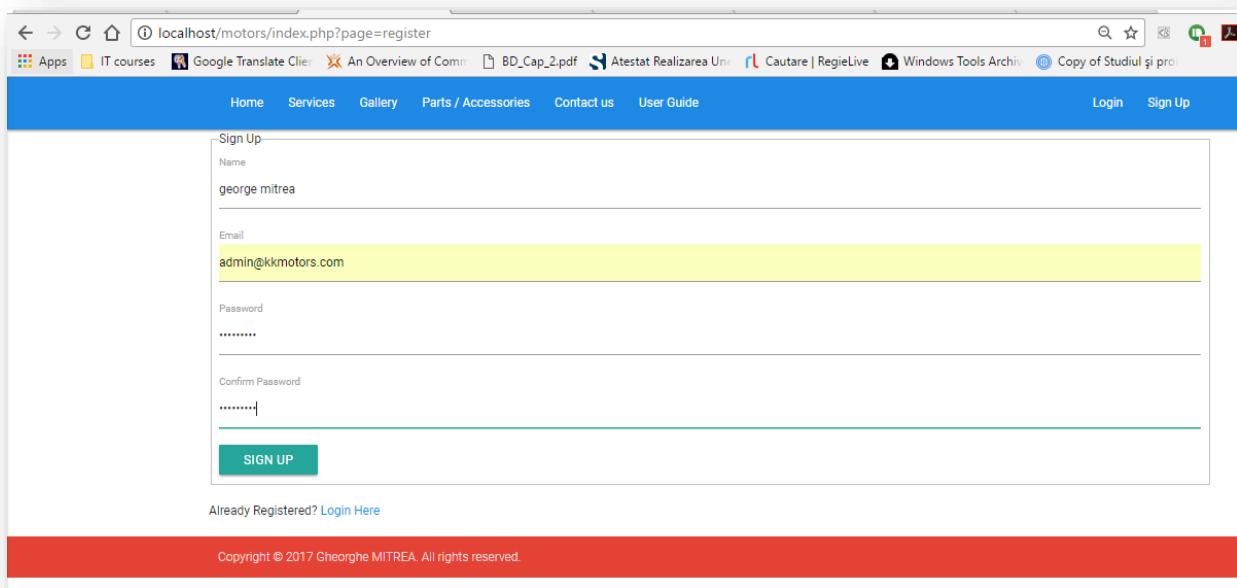


Figure 47 Spelling validation

d) *Validation of user input*

The forms of inserting the names of the car manufacturer, the car model or the registration of the new users to the tests proposed for self-control have been implemented and correspond to the specifications of the web application.

On the other hand, the options for modifying or deleting the data of a user, car manufacturer, car model haven't been implemented. It was decided together with the client that the next update of the website to include this options of updating or deleting the details of a user or a car manufacturer or car model.



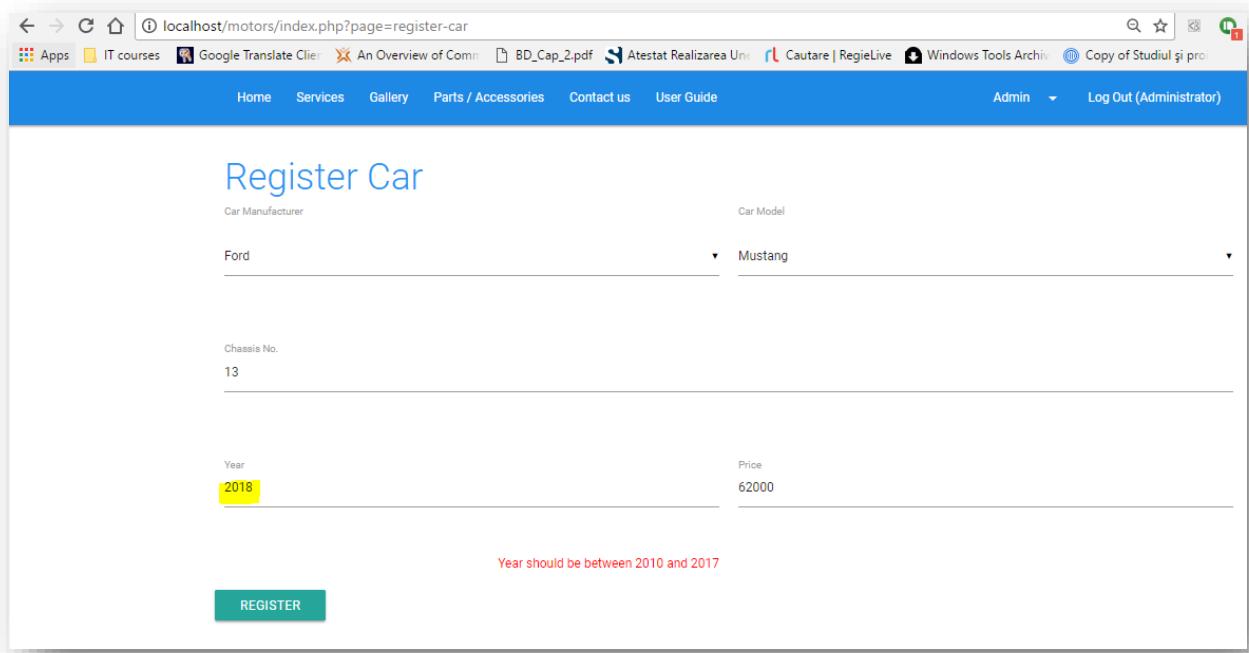
The screenshot shows a web browser window with the URL `localhost/motors/index.php?page=register`. The page has a blue header with navigation links: Home, Services, Gallery, Parts / Accessories, Contact us, User Guide, Login, and Sign Up. The main content area is titled "Sign Up". It contains four input fields: "Name" with the value "george mitrea", "Email" with the value "admin@kkmotors.com" (which is highlighted with a yellow background), "Password" with the value "*****", and "Confirm Password" with the value "*****". Below the fields is a green "SIGN UP" button. At the bottom of the page, there is a red footer bar with the text "Already Registered? [Login Here](#)" and "Copyright © 2017 Gheorghe MITREA. All rights reserved."

Figure 48 Validation of the user inputs

e) **Testing the handling of error messages –**

The error handling validation was completed and it was noticed, for example, that by a misspelling of the format of an email address, the validation comes with an error message retying the correct email address using "@" or the domain of the email address is written wrong. The same thing happens when creating a user password, it must contain at least six characters and be entered in the confirmation field as well. If something is wrong in following these password creation rules, then validation comes with an error message of data input.

In the bellow figure, it can be seen that if the Administrator of KK Motors website is registering a car which has year registration for 2018 then by click on Register button it will appear an error message with the specification that a car should have year production between 2010 and 2017 otherwise the car registration cannot be validated:



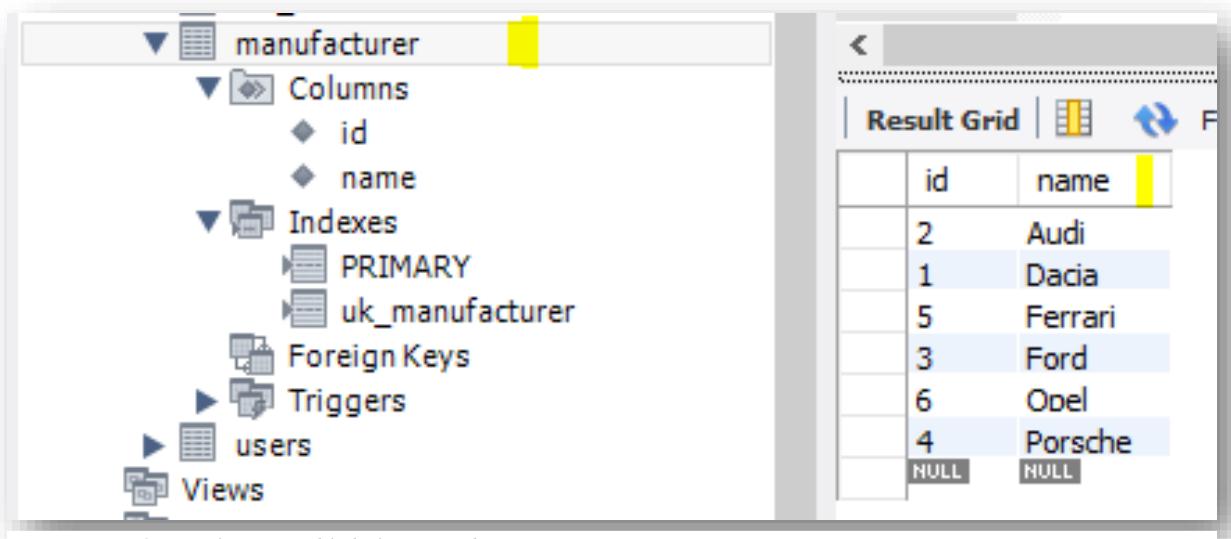
The screenshot shows a web browser window with the URL `localhost/motors/index.php?page=register-car`. The page title is "Register Car". The form fields include "Car Manufacturer" (set to "Ford"), "Car Model" (set to "Mustang"), "Chassis No." (set to "13"), "Year" (set to "2018" and highlighted with a yellow box), and "Price" (set to "62000"). Below the form, a red error message reads "Year should be between 2010 and 2017". At the bottom left is a green "REGISTER" button.

Figure 49 Validation of error handling

f) Testing the validation of inserting a new car, a new manufacturer name or new car model –

Was validated the test of add a new car, manufacturer name or car model in the database of the website. When the client wanted to add a new manufacturer name into the form of Manufacturer Registration page it was observed that the car model and the chassis number are unique and cannot be duplicated in another registration of the same car model or chassis number and is coming with an error message in case of duplicating it. Also, when introducing details of car, the validation shows that for each manufacturer name selected it appears the right models of this car model.

In the next figures, it can be seen the validation of introducing a car manufacturing name in the list of manufacturing name

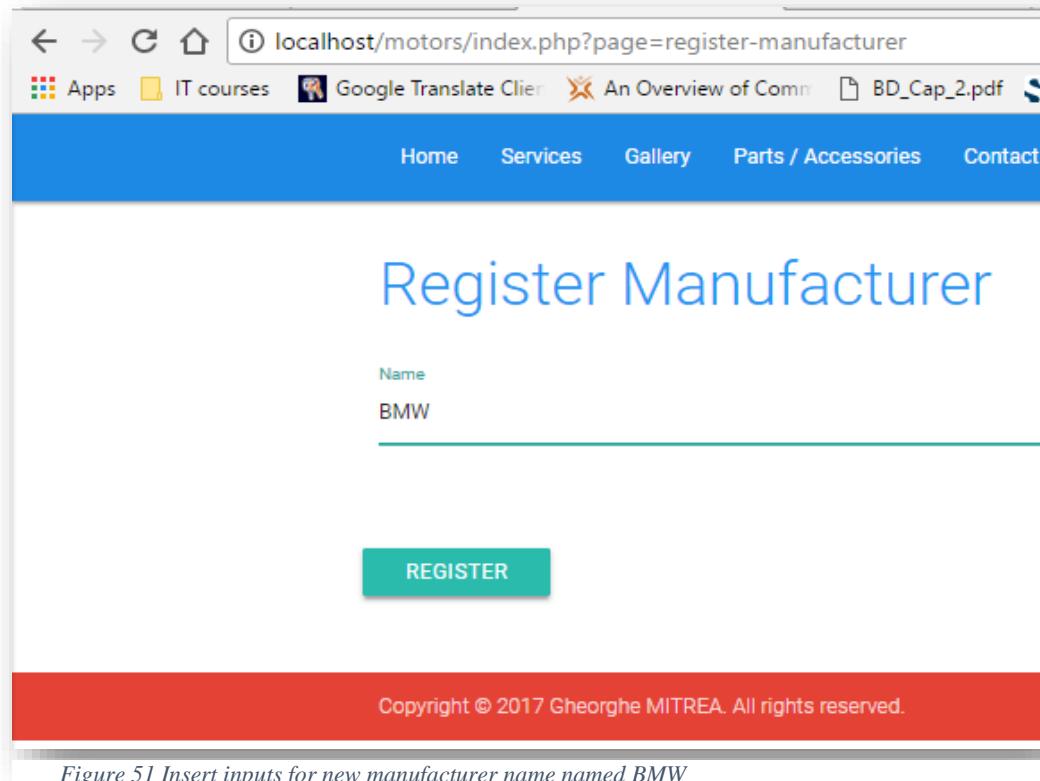


The screenshot shows a database management interface. On the left, the 'manufacturer' table structure is displayed, including columns 'id' and 'name', indexes 'PRIMARY' and 'uk_manufacturer', and foreign keys. On the right, a 'Result Grid' shows the current data in the table:

	id	name
	2	Audi
	1	Dacia
	5	Ferrari
	3	Ford
	6	Oeol
	4	Porsche
	NONE	NONE

Figure 50 Manufacturer table before introducing BMW name

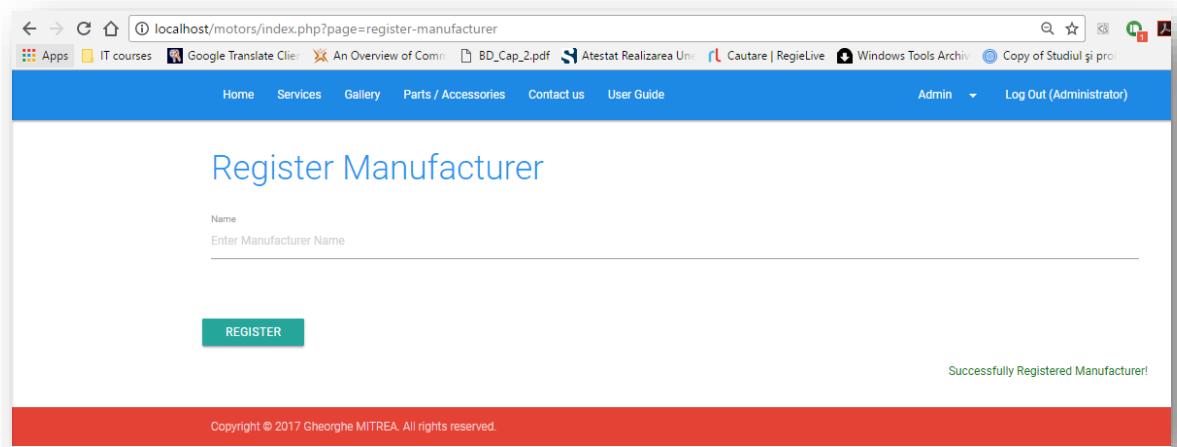
Register a new Manufacturer name in Register Manufacturer page:



The screenshot shows a web browser window with the address bar displaying `localhost/motors/index.php?page=register-manufacturer`. The page title is "Register Manufacturer". There is a single input field labeled "Name" containing the value "BMW". Below the input field is a green "REGISTER" button. At the bottom of the page is a red footer bar with the text "Copyright © 2017 Gheorghe MITREA. All rights reserved."

Figure 51 Insert inputs for new manufacturer name named BMW

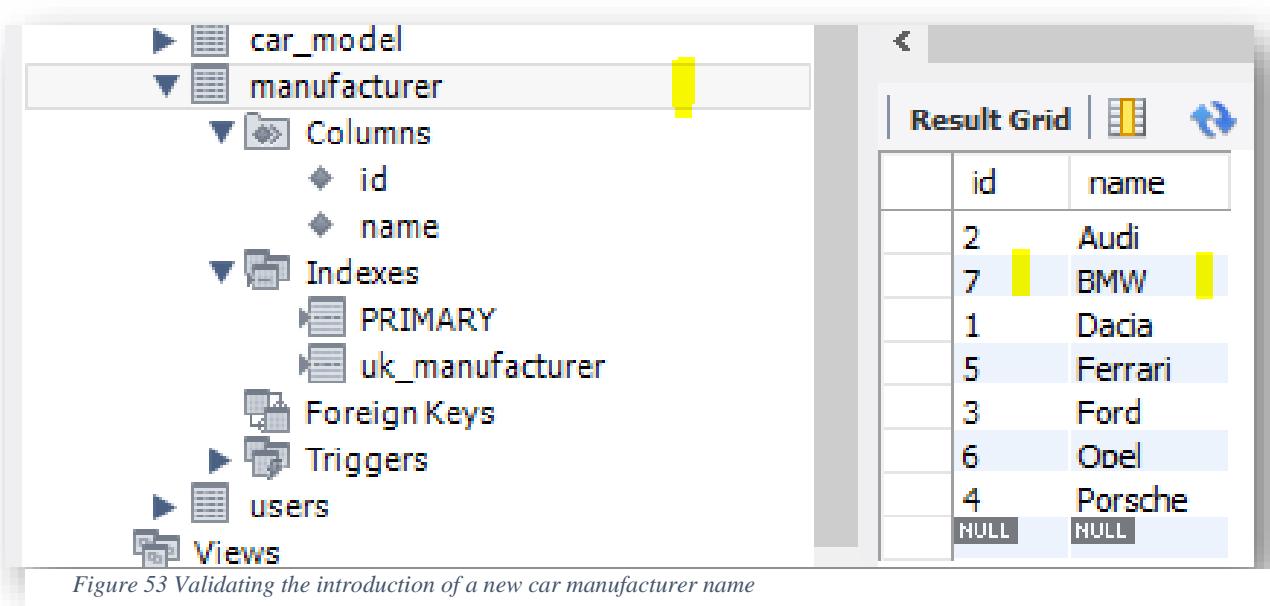
The new manufacturer name BMW was successfully inserted:



The screenshot shows a web browser window with the address bar displaying `localhost/motors/index.php?page=register-manufacturer`. The page title is "Register Manufacturer". The "Name" input field now contains "Enter Manufacturer Name". Below the input field is a green "REGISTER" button. To the right of the input field, there is a message "Successfully Registered Manufacturer!". At the bottom of the page is a red footer bar with the text "Copyright © 2017 Gheorghe MITREA. All rights reserved."

Figure 52 The new manufacturer name BMW was successfully inserted

Validate if the new manufacturer name was added to the database



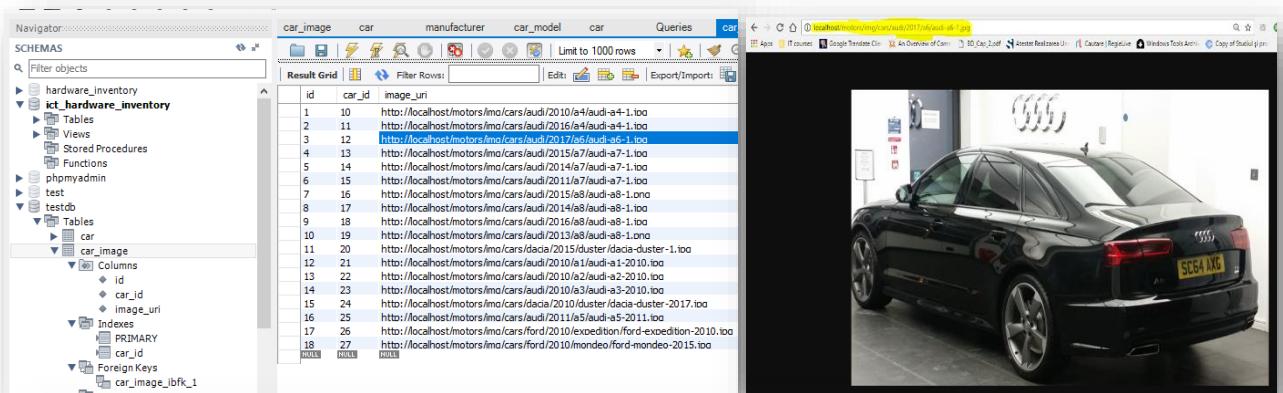
The screenshot shows the MySQL Workbench interface. On the left, the 'Manufacturer' table structure is displayed under the 'car_model' schema. It includes columns for 'id' and 'name', indexes for 'PRIMARY' and 'uk_manufacturer', and foreign keys for 'Foreign Keys'. The 'Result Grid' on the right shows the current data in the 'manufacturer' table:

	id	name
	2	Audi
	7	BMW
	1	Dacia
	5	Ferrari
	3	Ford
	6	Oeel
	4	Porsche
	NUL	NUL

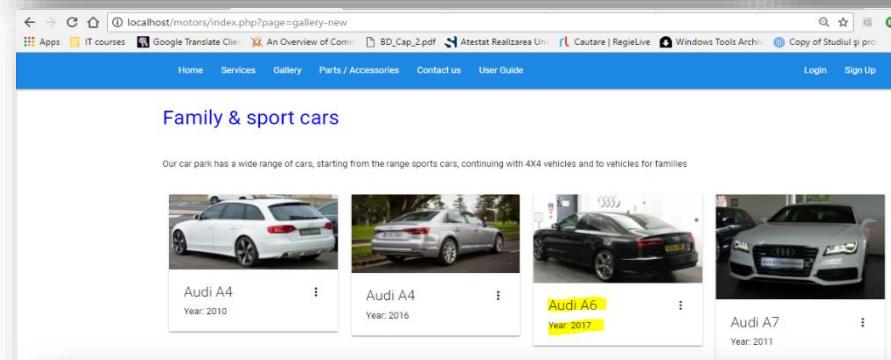
Figure 53 Validating the introduction of a new car manufacturer name

g) Testing if the car images and the details of the car for selling corresponds to the right car –

It was validated the introduction of a car image to a desired car from the database by following the path of image file where the new introduced car image was saved. Also, was validated the details of the car image which correspond to the right car from the Gallery page.



id	car_id	image_url
1	10	http://localhost/motors/lmo/cars/audi/2010/a/audi-a4-1.jpg
2	11	http://localhost/motors/lmo/cars/audi/2016/a/audi-a4-1.jpg
3	12	http://localhost/motors/lmo/cars/audi/2017/a/audi-a6-1.jpg
4	13	http://localhost/motors/lmo/cars/audi/2015/a/audi-a7-1.jpg
5	14	http://localhost/motors/lmo/cars/audi/2014/a/audi-a7-1.jpg
6	15	http://localhost/motors/lmo/cars/audi/2011/a/audi-a7-1.jpg
7	16	http://localhost/motors/lmo/cars/audi/2013/a/audi-a7-1.jpg
8	17	http://localhost/motors/lmo/cars/audi/2014/a/audi-a8-1.jpg
9	18	http://localhost/motors/lmo/cars/audi/2013/a/audi-a8-1.jpg
10	19	http://localhost/motors/lmo/cars/audi/2012/a/audi-a8-1.jpg
11	20	http://localhost/motors/lmo/cars/audi/2015/a/audi-a8-1.jpg
12	21	http://localhost/motors/lmo/cars/audi/2010/a/audi-a1-2010.jpg
13	22	http://localhost/motors/lmo/cars/audi/2010/a/audi-a2-2010.jpg
14	23	http://localhost/motors/lmo/cars/audi/2010/a/audi-a3-2010.jpg
15	24	http://localhost/motors/lmo/cars/audi/2010/a/audi-a4-2010.jpg
16	25	http://localhost/motors/lmo/cars/audi/2011/a/audi-a5-2011.jpg
17	26	http://localhost/motors/lmo/cars/ford/2010/exedition/ford-expedition-2010.jpg
18	27	http://localhost/motors/lmo/cars/ford/2010/mondeo/ford-mondeo-2015.jpg



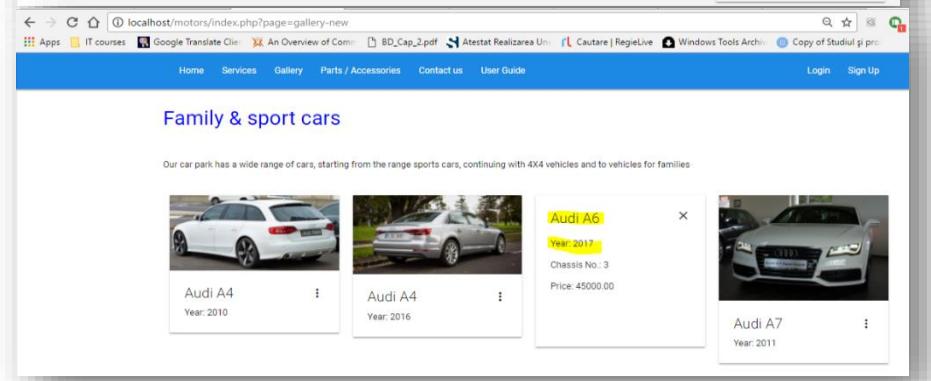


Figure 54 Validating the path of car images from the database into Gallery page

h) Testing the zoom function of the images from the Gallery page

It is confirmed that if a user is clicking on an image from Gallery page this submit responds by resize the image to a larger view of it.

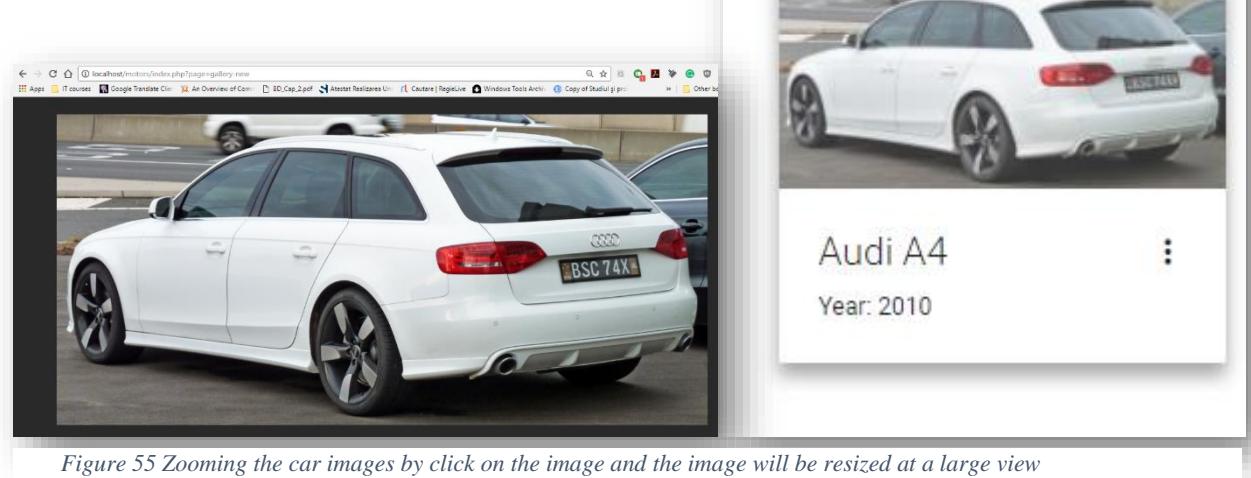
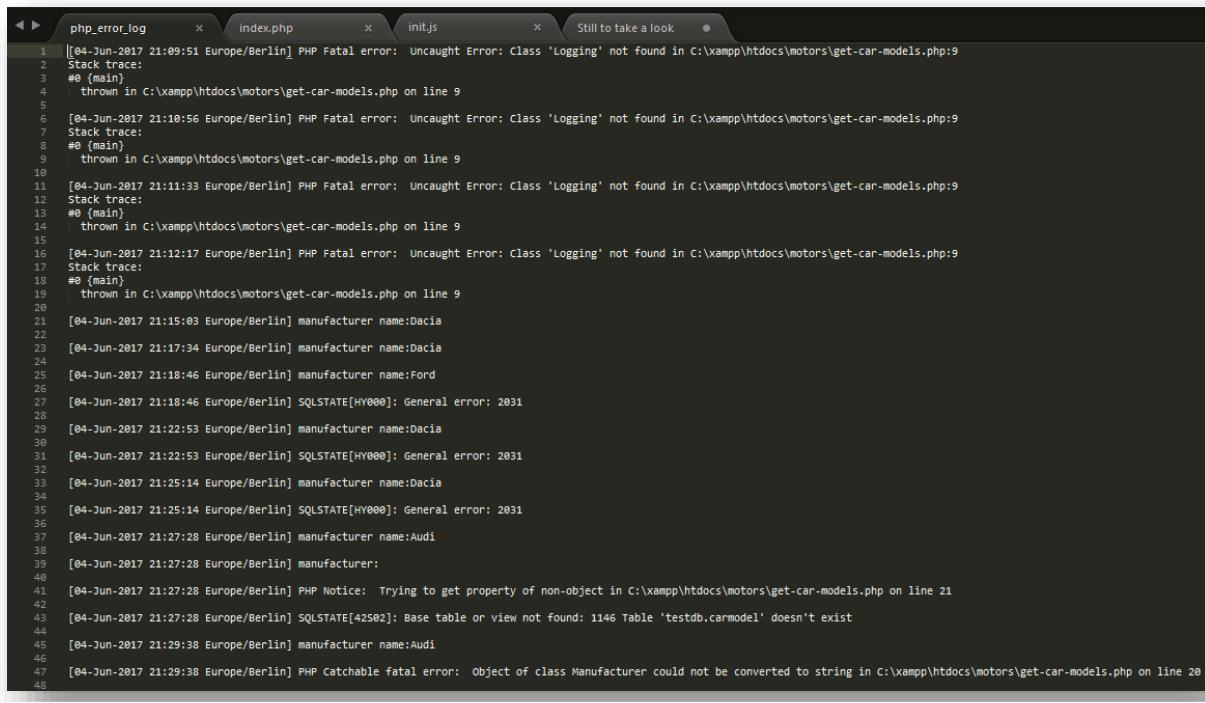


Figure 55 Zooming the car images by click on the image and the image will be resized at a large view

i) Problem log test

The tests included also a review of PHP log file. It was seen errors linked to php code scripting, errors related to getting the correct path of the images from the database into the Gallery page of the website as it is shown in the bellow figure:



```

1 [04-Jun-2017 21:09:51 Europe/Berlin] PHP Fatal error: Uncaught Error: Class 'Logging' not found in C:\xampp\htdocs\motors\get-car-models.php:9
2 Stack trace:
3 #0 {main}
4 | thrown in C:\xampp\htdocs\motors\get-car-models.php on line 9
5 
6 [04-Jun-2017 21:10:56 Europe/Berlin] PHP Fatal error: Uncaught Error: Class 'Logging' not found in C:\xampp\htdocs\motors\get-car-models.php:9
7 Stack trace:
8 #0 {main}
9 | thrown in C:\xampp\htdocs\motors\get-car-models.php on line 9
10 
11 [04-Jun-2017 21:11:33 Europe/Berlin] PHP Fatal error: Uncaught Error: Class 'Logging' not found in C:\xampp\htdocs\motors\get-car-models.php:9
12 Stack trace:
13 #0 {main}
14 | thrown in C:\xampp\htdocs\motors\get-car-models.php on line 9
15 
16 [04-Jun-2017 21:12:17 Europe/Berlin] PHP Fatal error: Uncaught Error: Class 'Logging' not found in C:\xampp\htdocs\motors\get-car-models.php:9
17 Stack trace:
18 #0 {main}
19 | thrown in C:\xampp\htdocs\motors\get-car-models.php on line 9
20 
21 [04-Jun-2017 21:15:03 Europe/Berlin] manufacturer name:Dacia
22 
23 [04-Jun-2017 21:17:34 Europe/Berlin] manufacturer name:Dacia
24 
25 [04-Jun-2017 21:18:46 Europe/Berlin] manufacturer name:Ford
26 
27 [04-Jun-2017 21:18:46 Europe/Berlin] SQLSTATE[HY000]: General error: 2031
28 
29 [04-Jun-2017 21:22:53 Europe/Berlin] manufacturer name:Dacia
30 
31 [04-Jun-2017 21:22:53 Europe/Berlin] SQLSTATE[HY000]: General error: 2031
32 
33 [04-Jun-2017 21:25:14 Europe/Berlin] manufacturer name:Dacia
34 
35 [04-Jun-2017 21:25:14 Europe/Berlin] SQLSTATE[HY000]: General error: 2031
36 
37 [04-Jun-2017 21:27:28 Europe/Berlin] manufacturer name:Audi
38 
39 [04-Jun-2017 21:27:28 Europe/Berlin] manufacturer:
40 
41 [04-Jun-2017 21:27:28 Europe/Berlin] PHP Notice: Trying to get property of non-object in C:\xampp\htdocs\motors\get-car-models.php on line 21
42 
43 [04-Jun-2017 21:27:28 Europe/Berlin] SQLSTATE[42S02]: Base table or view not found: 1146 Table 'testdb.carmodel' doesn't exist
44 
45 [04-Jun-2017 21:29:38 Europe/Berlin] manufacturer name:Audi
46 
47 [04-Jun-2017 21:29:38 Europe/Berlin] PHP Catchable fatal error: Object of class Manufacturer could not be converted to string in C:\xampp\htdocs\motors\get-car-models.php on line 20
48

```

Figure 56 PHP log file showing the errors of coding

j) Protected pages

The tests to see if Some of the pages cannot be seen by unregistered users or even the users cannot see the dropdown menu list with Register Manufacture, Register Car Model and Register Car where only the registered user and the Administrator of the website can upload the images and the details of the cars. This is the rule for a car to be displayed in the product list from Gallery page. If a unregistered user wants to sell a car and want to upload the images and the details of a wanted car to be sold then he needs to contact the staff of the website by writing an email or by phone them with the contact details provided on Contact Us page. The users and the Administrator can see and can add new products or details only by login into their account with their credentials related to their account. In the next figure is

shown the dropdown menu list with the links Register Car, register Manufacturer and Register Car Model pages hidden from unregistered users:

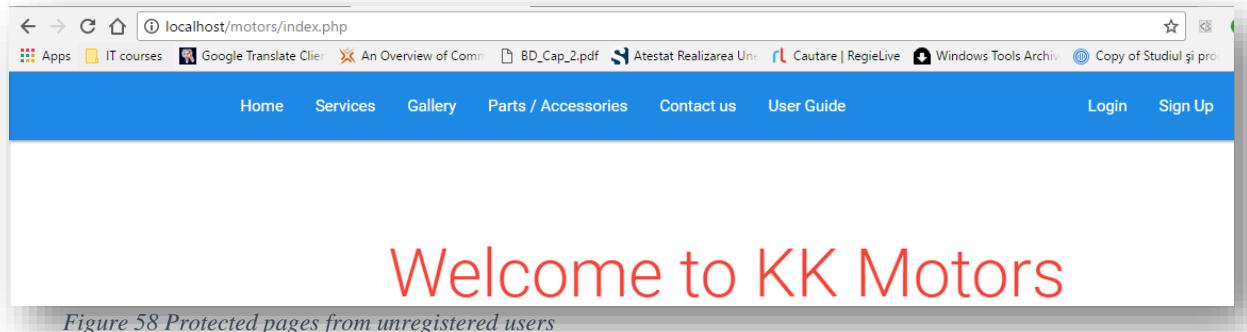


Figure 58 Protected pages from unregistered users

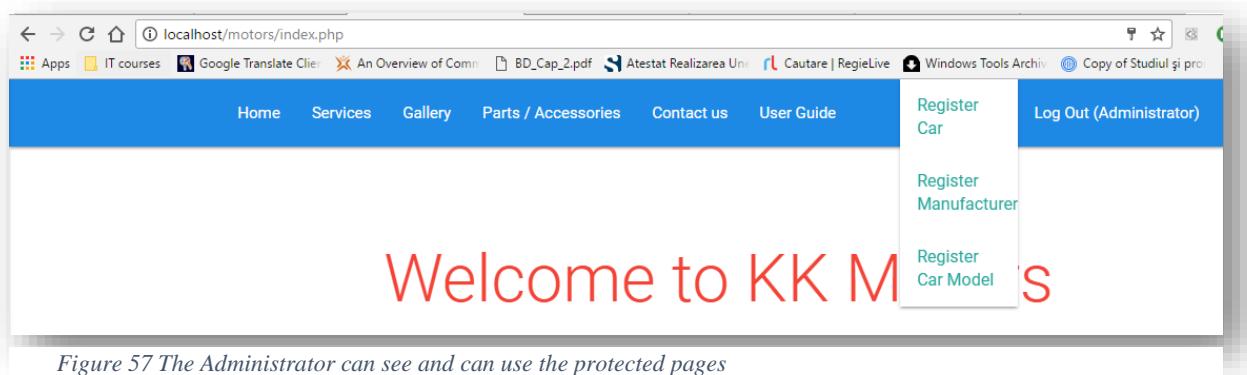


Figure 57 The Administrator can see and can use the protected pages

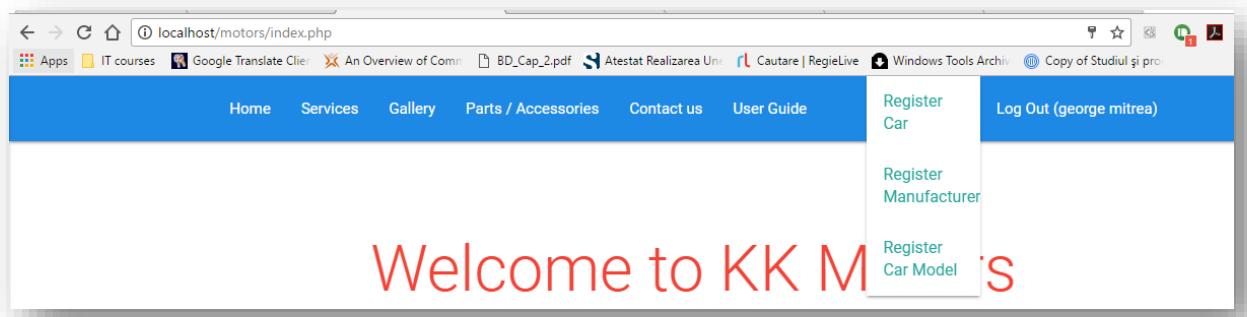


Figure 59 The registered users can see and can use the protected pages

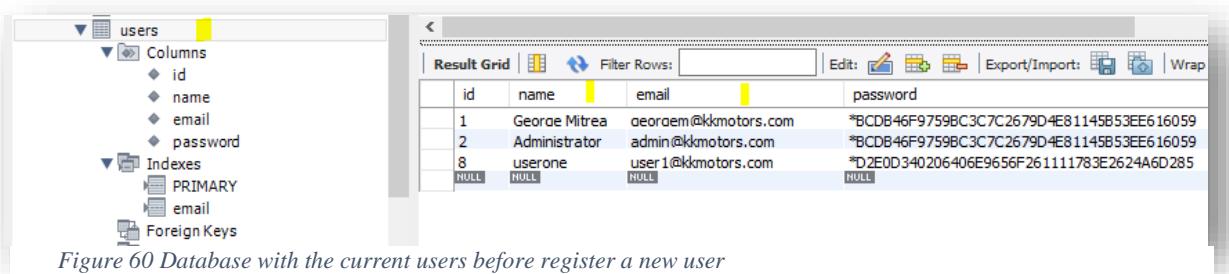
k) Login page making use of KK Motors 'database –

The Administrator and any user of KK Motors website have to follow two steps to get access into their account. First step is to register through Sign Up page by introducing his personal details like the name, email and password and after registration their account details are kept in users table where are stored their personal details. After registration, the user needs only to log in from Login page placed on the navigation menu.

The user needs to write his email address and the password afferent to this email account.

In the bellow figures will be shown the way how a user is registered into the database of KK Motors:

Database with the current users before register a new user:

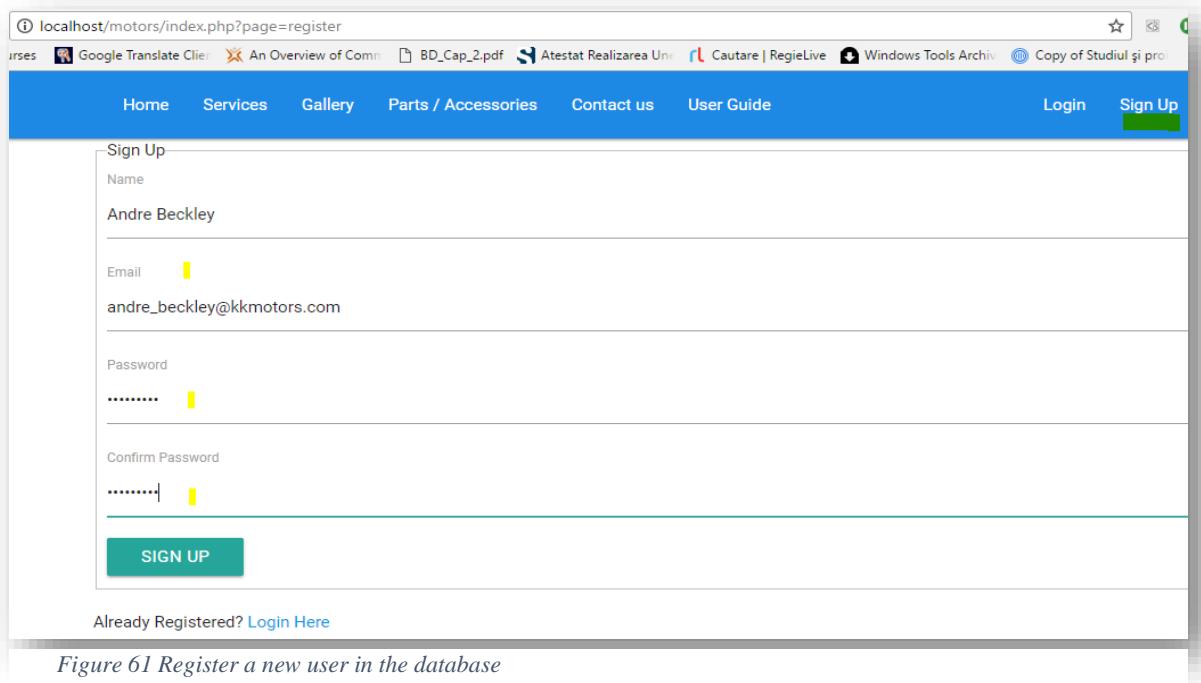


The screenshot shows the MySQL Workbench interface. On the left, the 'users' table structure is displayed with columns: id, name, email, and password. The 'id' column is defined as a primary key. There are three rows of data: 1 (Georgie Mitrea, geordem@kkmotors.com, hashed password), 2 (Administrator, admin@kkmotors.com, hashed password), and 8 (userone, user1@kkmotors.com, hashed password). The 'password' column contains hashed values.

	id	name	email	password
1	1	Georgie Mitrea	geordem@kkmotors.com	*BCDB46F9759BC3C7C2679D4E81145B53EE616059
2	2	Administrator	admin@kkmotors.com	*BCDB46F9759BC3C7C2679D4E81145B53EE616059
8	8	userone	user1@kkmotors.com	*D2E0D340206406E9656F261111783E2624A6D285

Figure 60 Database with the current users before register a new user

A user is registered with Sign Up form:



localhost/motors/index.php?page=register

Home Services Gallery Parts / Accessories Contact us User Guide

Sign Up

Name
Andre Beckley

Email
andre_beckley@kkmotors.com

Password
.....

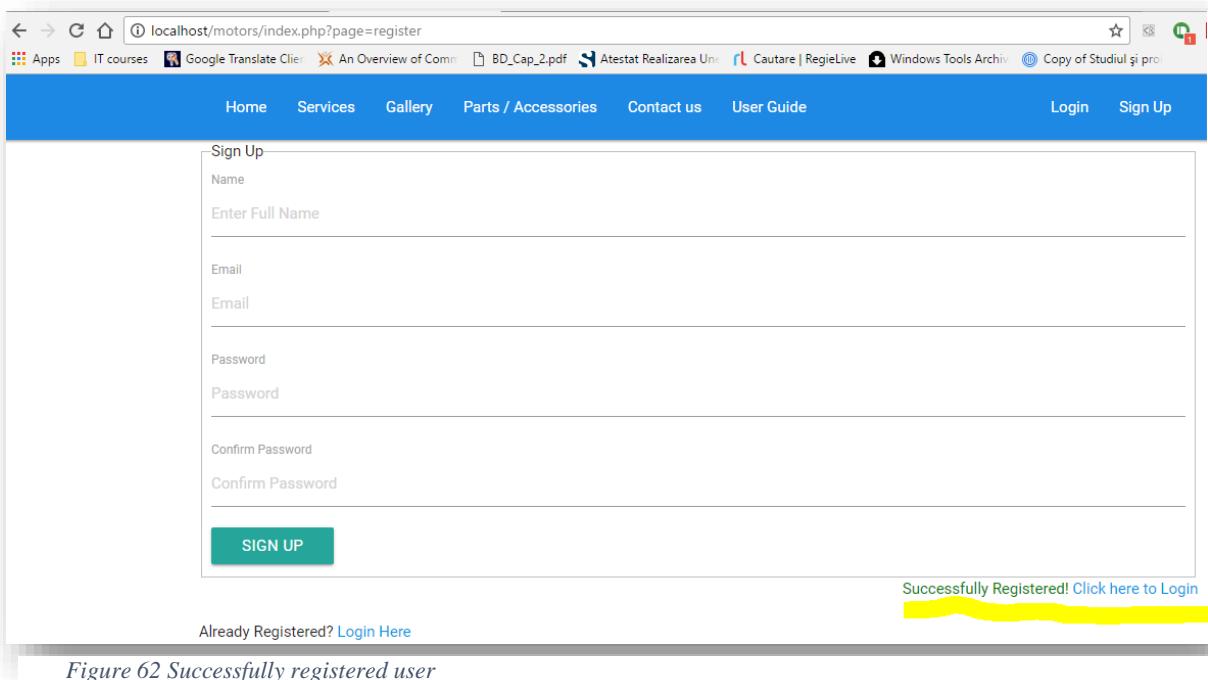
Confirm Password
.....

SIGN UP

Already Registered? [Login Here](#)

Figure 61 Register a new user in the database

Validating the registration of the new user with Successfully Registered user:



localhost/motors/index.php?page=register

Home Services Gallery Parts / Accessories Contact us User Guide

Sign Up

Name
Enter Full Name

Email
Email

Password
Password

Confirm Password
Confirm Password

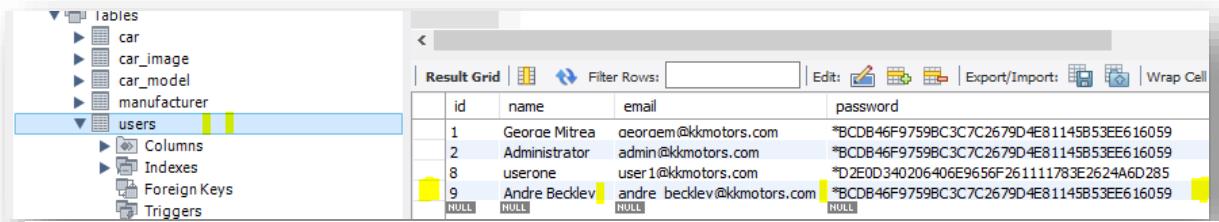
SIGN UP

Successfully Registered! [Click here to Login](#)

Already Registered? [Login Here](#)

Figure 62 Successfully registered user

Checking the database if the new user is register with his credentials:



	id	name	email	password
1	George Mitrea	georgem@kkmotors.com	*BCDB46F9759BC3C7C2679D4E81145B53EE616059	
2	Administrator	admin@kkmotors.com	*BCDB46F9759BC3C7C2679D4E81145B53EE616059	
8	userone	user1@kkmotors.com	*D2E0D340206406E9656F26111783E2624A6D285	
9	Andre Beckley	andre.beckley@kkmotors.com	*BCDB46F9759BC3C7C2679D4E81145B53EE616059	
	HULL	HULL	HULL	HULL

Figure 63 Checking the database if the new registered user was added to the list of users

Log In of the new registered user with his credentials in the Log In form:

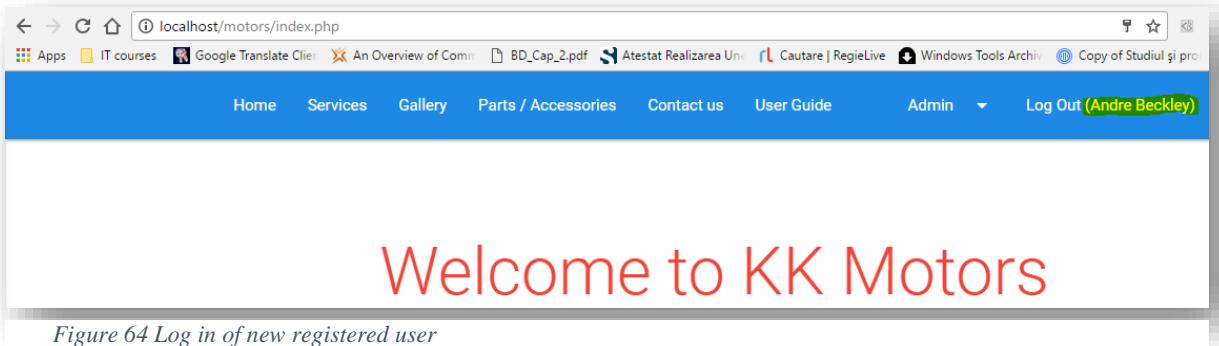


Figure 64 Log in of new registered user

2. Task 2 Evaluate independent feedback and make recommendations for improvements

2.1 Feedback from Samuel Horopciuc related to KK Motors web application

Question1:

How do you think the website is meeting the needs?

Answer:

Has a web address that's easy to remember and spell, pages are loading quickly, the design looks good on PCs and mobile devices. Very good forms related to registration and contact details, the website has pages dedicated to KK Motors products and services and Meta description tags written to incite action in the search engine results.

Rate Scale



Question2:

How do you think is the suitability of the website for e-commerce

Answer:

The idea of the website is to promote their business having physical selling centers without online shopping facilities.

Rate Scale



Question3:

How do you find the attractiveness of the design?

Answer:

It is attractive from the point of view of the colours used, of the images of the cars that come with the details specific to each car. It is recommended to improve the text blocks in the page and also to enter the pagination function for the car images from Gallery page.

Rate Scale



Question4:

How do you find the ease of navigation and use of website?

Answer:

The website navigation is great having the structure and the labels of the navigation having a huge impact on surfing the website Both for browsers used on PC and mobile devices. The website is easy to use by all types of users. It helps the website's users with information on how to use it. A weak point of using the website is the lack of editing, updating or deleting functions of both the users and the products displayed on the Gallery page.

Rate Scale**Question4:**

In the end of the questionnaire can you came with an overall conclusion, pls?

Answer:

Strengths are: the design, the validation of database records directly from the website, the navigation, the implementation of registration forms.

Weaknesses: use of the website by adding editing, updating and deleting of the recordings by the users of the website as well.

Rate Scale

2.2 Analyse the outcomes of the feedback and compare them with the evaluation of the web developer of KK Motors

Considering what has been said above, the KK Motors website needs updates to incorporate the online solution of selling cars, which would bring immense benefits to KK Motors' business. Also, it is specified that the content of the website should be maximised to attract more users through the attractiveness of their content.

In the questionnaire, it was specified the addition to Gallery page of the pagination links to support divide the high loaded content with images, easier to understand blocks of images and also, to help pages to load faster.

In the feedback was noticed the necessity to add the functions of edit, update or delete for the users who want to change their login credentials for their account. The same features are desirable to implement for car images from Gallery page.

Comparing the feedback results with own evaluation of KK Motors web development solution, there is a need for a wider updated including customers' shopping cart, the usability of user details by adding user settings account and a dashboard to the website administrator account. The won evaluation specified only the edit, update and delete functions for the user to their account details and edit, update, and delete functions for images directly from the website not only from the database.

2.3 Further improvements of KK Motors website

Following the own evaluation and the received the feedback from the users of the website, it is recommend updating the KK Motors web application solution. The upcoming upgrade of the current version of website should include:

- Creating a **logo** that defines the company's image on the website
- Adding **Edit, Update and Delete functions to users** in the form of a dropdown containing a list of user-specific links. These include changing their email address, changing their password, adding an image to their profile, bring more details of user's personal data that pertain to the user's gender, address and phone details.
- Add an **Administrator's dashboard** with functions for Edit, Update, and Delete of product images and details.
- **Implementing the Shopping Cart** solution that would bring many financial advantages as well as image to potential buyers.
- **Pagination** of car images to avoid overloading the **Gallery page**.
- **Vehicle Search Form** for users
- **Using Cookies**

3. Task 3 Create user documentation for KK Motors web application

a) Instructions for use on all customer facing pages,

KK Motors website is simple, easy to surf it where the users' opinion will be that the admins of the website care about them. Nothing is more valued for a website than a simple web pages' surfing and continuous and gets the car information in the quickest time.

The Home page displays the user account name at the end of the navigation menu between the round brackets from where he can Log Out from his account after he finished the surfing on KK Motors. Proportional layouts of the web pages in a popular way as those to which the users await giving well-formed pages which offer greater reliability.:

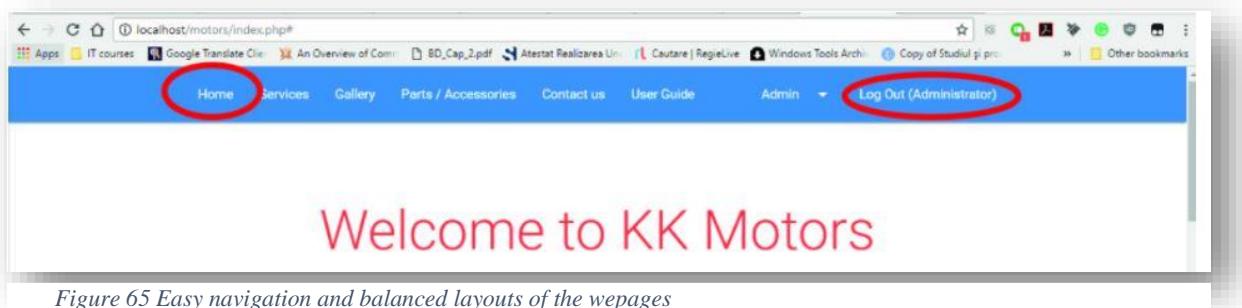


Figure 65 Easy navigation and balanced layouts of the wepages

At the bottom of the Home page, there is a video that if the users click on it will start to play. This video is a promoting video about their services and their second-hand. Also, at the bottom of the page, it can be find their social links like Facebook, G+, YouTube and Twitter. If the user click them then they will be redirected outside of KK Motors.com website to their social pages:

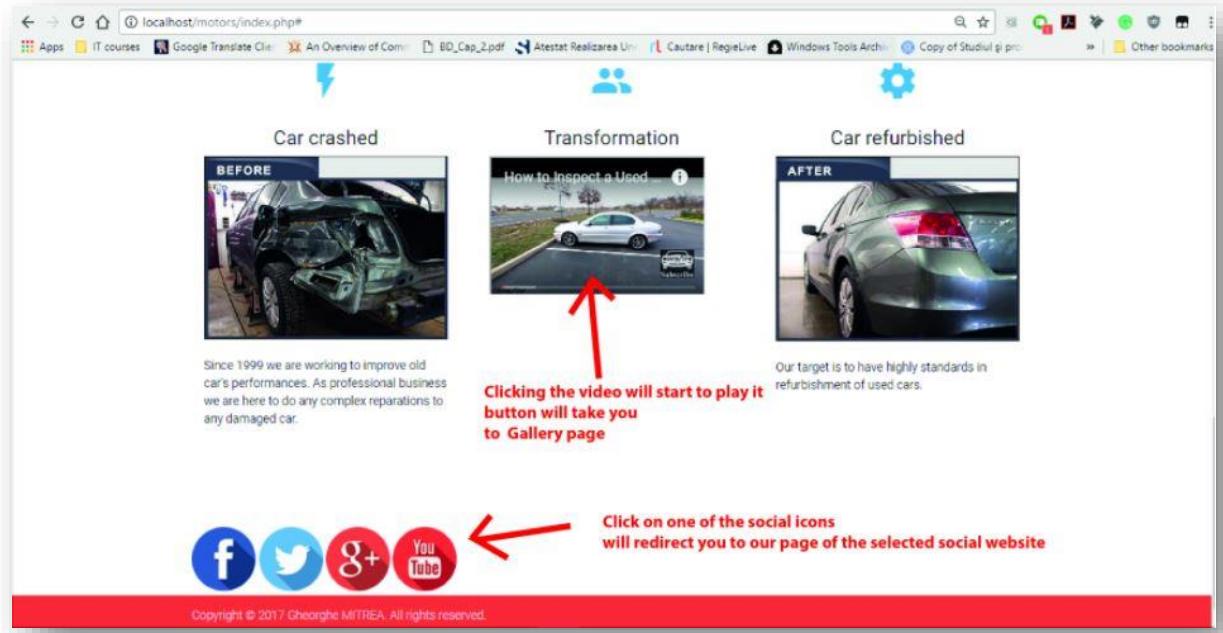


Figure 66 Bottom of Home page with their video presentation and icons links to their social pages

Sitemap

Their website helps the users with the Sitemap of www.kk-motors.com website.

The sitemap is a map containing the list of all web pages of their website:

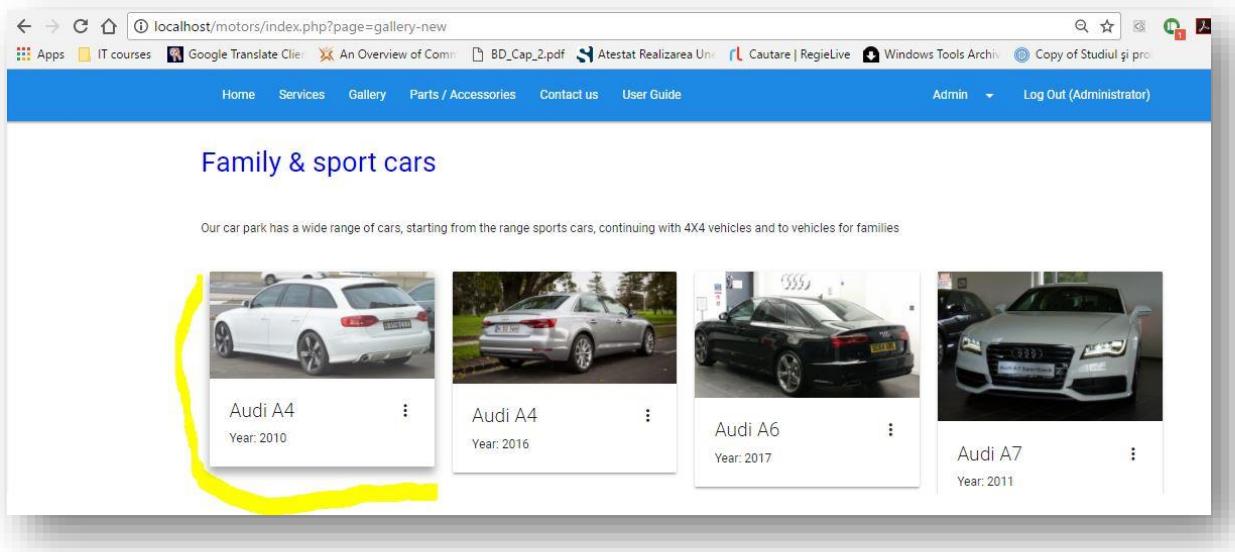
The products catalogue within Gallery page:

Viewing Images - Redesign the images from new Gallery page: Expanding the view of the pictures, enlarge view on photos when they are clicked and there is a highlight of the image



Figure 67 Sitemap with all the pages of the website

when the cursor is located on it. When passing the cursor on one of the images their outline will be grey, otherwise, will not be highlighted:



Registration of a new user

On Sign Up page, the users will find a registration form for a new user account where they have to complete all the required fields:

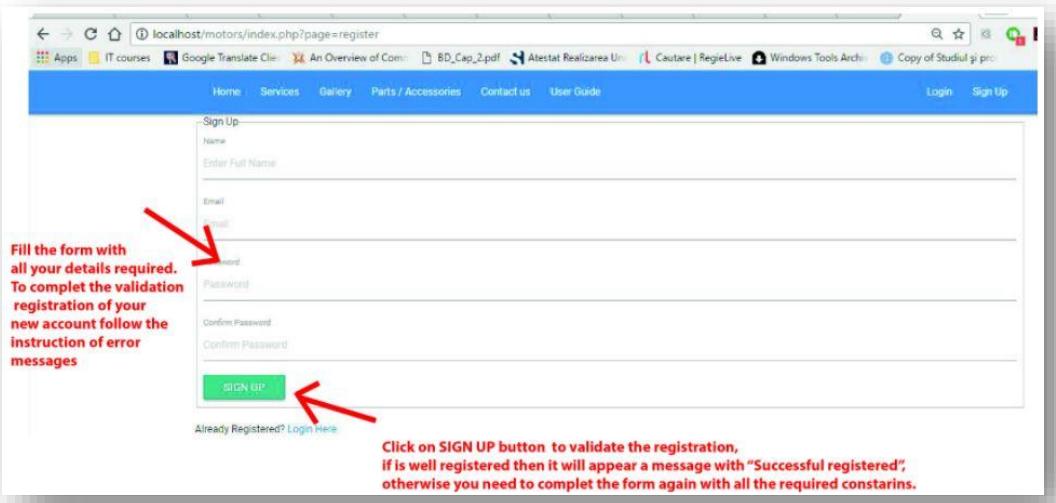
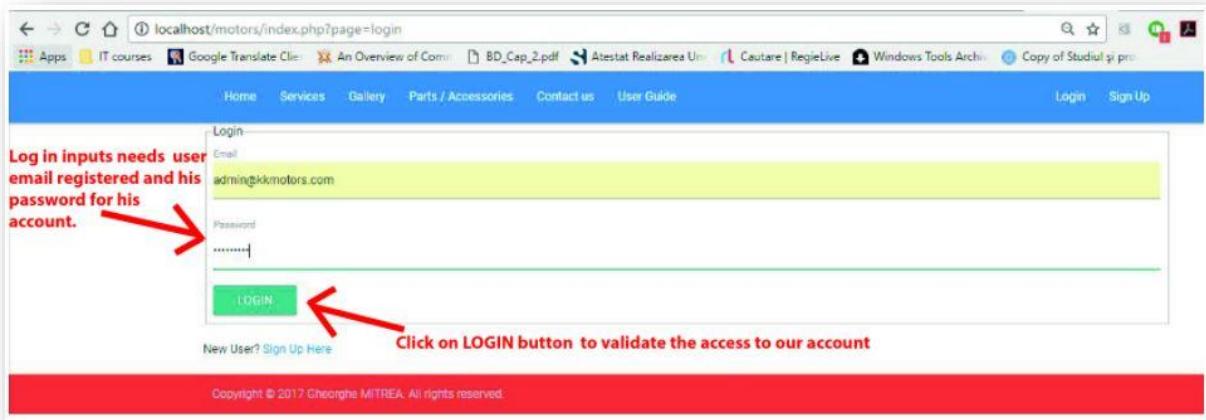


Figure 68 Register a new user

Login page

On Log In page, the user will find a login form for a current user account where he has to fill all the required fields with his registered credentials:



Log in inputs needs user email registered and his password for his account.

Click on LOGIN button to validate the access to our account

Figure 69 User have to input his credentials to access his account

b) What the user can do if they experience difficulty in using the website?

Some issues related to the usability of the website like editing, updating or deleting user account details can be resolved by sending to the admins of the website a request to edit, modify or delete their account and they will change these details from website database with their new details and send the details by email to the user. Until all the user functions as Edit, Update or Delete will be implemented in their next update of the website version they excuse their self for these inconveniences. For any other problems regarding the website usability, the user should write them on Contact Us page.

c) What the user can do if any page does not work or load properly?

Some issues that the users may face with KK Motors web pages or account can be resolved by adjusting their browser settings, reviving the page, or removing the browser cache and cookies.

Supported Browsers -All the pages of the website are working properly on all most used PCs and mobile devices' browsers. The browser itself may generate some problems. For desired viewing and protection, the admins of the website suggest to the users to keep their browser updated to the last version.

Force Refresh - A force refreshes will make the browser to re-check with the web server to make sure it has the latest copy of the web page the user is viewing. Here are keyboard shortcuts for force refreshing of user's browser:

- Windows: Ctrl + F5
- Mac/Apple: Apple + R or Cmd + R
- Linux: F5

d) FAQ

Commonly Asked Questions

If a user has a problem concerning selling/buying, maintaining or fixing their vehicle, then he can well find the answers below.

Whom do I talk if I have any questions concerning my car? – The user must get in touch with Customer Service Information department calling on 0208 4000 300 (calls are free of charge).

Mechanical commonly asked questions

Which person can I talk for precise mechanical information? – The admins of the website suggest to the users to get in touch with KK Motors for technical info, as they not only possess the appropriate knowledge and expertise but also uninterrupted access to our mechanical support assistance. Alternatively, the users can talk to KK Motors Technical Information Centre directly on 0208 4000 300. Please note that this is a normal price line and calls are charged at £0.2p per minute. Also, they can send a message to the KK Motors Technical Information Centre at: KK Motors Technical Information Centre, Address: KK Motors House, London, UK 187 Auto Street, E15 5RR.

“How will I recognise if my car is concerned by a safety recall?” - Sometimes the company needs to recall some of their cars for safety reasons; they will call the customer or will email them or send a letter to the registered owner from KK Motors database, requesting that the repair task is performed as soon as possible. The customer can also talk to Customer Relationship Centre who will be happy to assist them further.

There will be a charge for any recall work taken out of my vehicle? - No. Any recall action conducted by KK Motors Dealer will be free of charge.

“How can I get in touch with the KK Motors about my website account?” - To contact their head office, the user must call Car insurance department on 208 4000 300. Lines are open Monday to Friday 8 am to 17:30 pm, Saturday 9 am to 5 pm.

Conclusion

Through this work, it was intended to implement and deploy the capability of the KK motors website application in which were used the next high-level programming languages like PHP, the Materialize framework for JavaScript and the MySQL database.

Were created dynamic pages like Gallery, Sign Up, Log In, Log Out, Register Producer, Register Car and Register Car Model which gave a more functional website through the dynamic forms created to register a new user, for logging, to add dynamic images and with the afferent details for each.

Testing their deployment has highlighted the need for the next update to integrate a shopping cart, create a logo, create an Admin panel that includes Edit, Update, and Delete functions. The same thing can be said about the users who must have that the same functions added to a dropdown with the links for each function.

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