National College of Ireland

BSHC

Cyber Security

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Alena Raspopa

17124671

x17124671@student.ncirl.ie

Build My PC

Technical Report

Contents

Executive Summary

In this document I will explain how my application works, what is the purpose of the application, what languages and software I have used to develop the application.

1.0   Introduction

1.1. Background

In now days there are a lot of Laptops, PC's and many other devices. Most of the people when they are buying one product they are getting it for specific purpose for example one person is looking to get PC to play games, another person is looking for a convertible laptop for college, or another person wants to watch movies only on it. After researching the market of all this product, I was a bit confused there are so many devices that you can lost in there. So people to be able to find the PC on their needs they are going for example PC world or Harvey Norman and they are asking for advice from the seller. The purpose of the seller is to sell as much as he can and on the best price for the store.

1.2. Aims

The aim of the project is to create a web application where user can search a laptop or pc for the user needs. If people will be using the application that I am working on it they will be able to save some cash, cause the web application is using the search platform like amazon and eBay

1.3. Technology

I am using 000Webhost where I am hosting my application. All my files for the project are stored there, and another application that I am using is CodeAnywhere, is connected to 000webhotst where I am storing my files. So when I am accessing Codeanywhere I can work on my project from anywhere, as the files are stored on cloud, and on code anywhere I am connecting through the 000webhost host

1.4. Structure

In this document I will explain the the system of the application, which will include, user requirements, functional requirements, use case diagram, design and the architecture of the application.

2.0 System

2.1. Requirements

The user needs to be registered for accessing the web application

2.1.1. Functional Requirements

The application will have a database. The data base is taken from API from RAWG games. I will use from this data base the game name, description and PC requirements.

2.1.1.1. Use Case Diagram
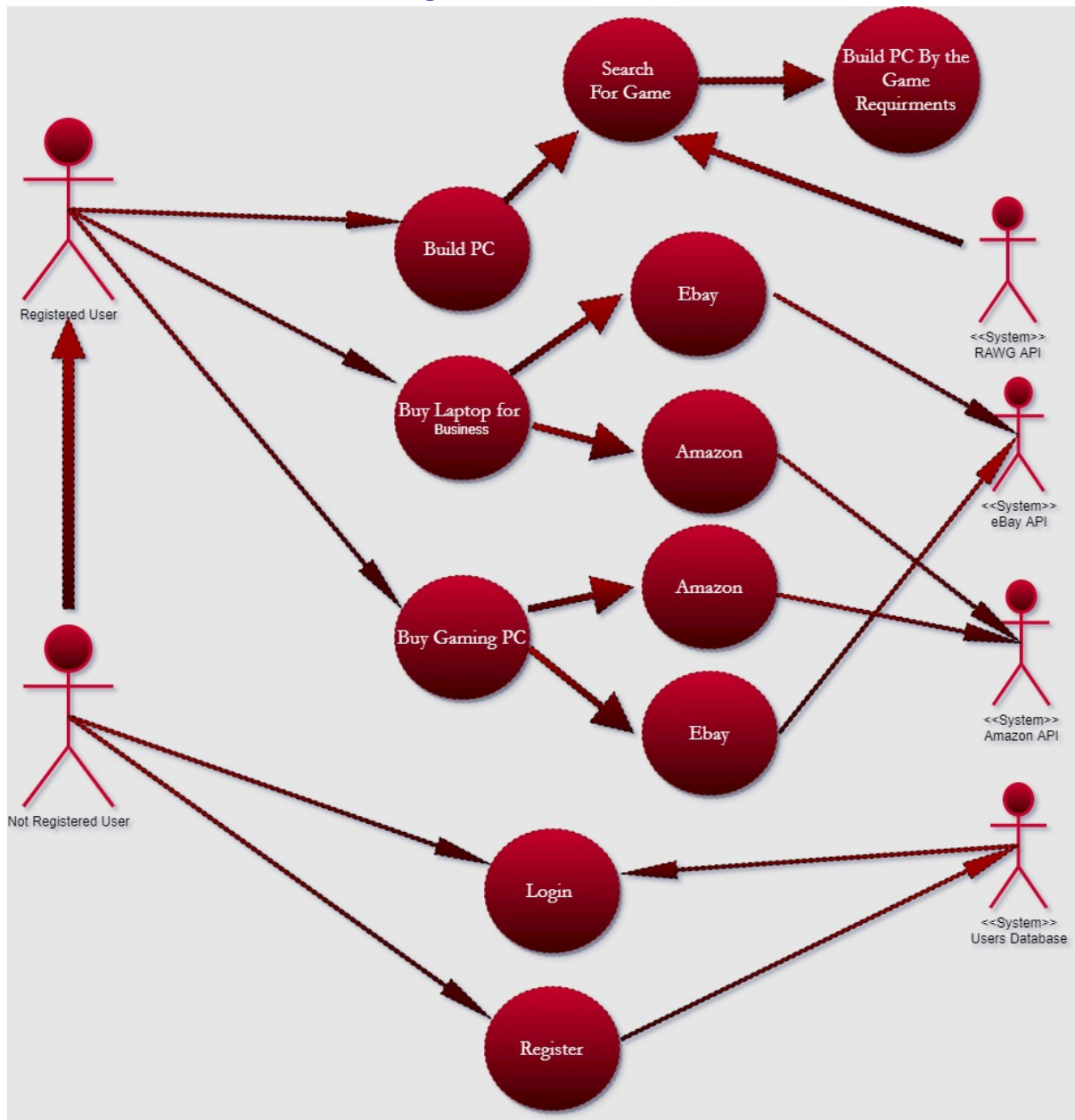
2.1.1.2. Requirement 1 <Registration>

For the user Registration I will require to register with strong password, proper email format.

2.1.1.3. Requirement 1 <Login>

The user will have only 3 attempts to login to the Web Application. If the user has failed it will the user for some time, and the user can try again.

2.1.1.4. Description & Priority

The Login and Registration are essential for the application for the security purposes.

2.1.1.5. Use Cases

Register Page

Use Case ID:	REGISTER_USER		
Use Case Name:	Register User		
Created By:	Alena Raspopa	Student Number:	17124671
Date Created	22/11/2020		
Description:	This Use case Register a new user on the System. The user enters An Email address, Password and Confirm password details. The system will test for a correctly formatted E-mail address, the Validate password use case that will be used to check the password requirements. If details are compliant the details are entered into the database and the System displays The Login Page.		
Actors: Primary Secondary	Registered User, New User New User Registered User,		
Triggers:	This Use Case is triggered from Display Homepage use case		
Pre-conditions:	The User Name is not on the system		
Post-Conditions:	The user has been registered in to the system		
Normal Flow:	1. User clicks Register 2. User complete the form 3. Data send to Database server 4. Successful registration Message 5. User click back to the login page 6. User inserts his credentials 7. User click login but 8. Login details are reading by the Database local host 9. On success login the page will bring the user page		
Alternate Flows:	1. User clicks Register 2. User complete the form 3. Data send to database server 4. Unsuccessful message displayed 5. Application will need proper email format, password format with one of uppercase, lowercase, special character and number, or there is an existing user already, as soon all the requirements are met the registration will be successful.		
Includes:	Validate Password		
Extends:	Home Page		

Priority:	There is no priority the application will generate random role for the new registered user
Special Conditions:	Password and Confirm password match. Password contains a Capital Letter. Password Contains a Lower case Letter. Password Contains a Numeric. Password Contains a special Character. Email should be on the Correct Format

Login Page

Use Case ID:	Login_Page		
Use Case Name:	Register User		
Created By:	Alena Raspopa	Student Number:	17124671
Date Created	22/11/2020		
Description:	This use case represents the case of the login process. If user will try to insert the login user name which is already existing in the database but he is putting wrong password, and he will do that process 3 times in a roll his account will be locked and user will be notified by email.		
Actors: Primary Secondary	Registered User		
Triggers:	This user case will pop up on the web application when user will enter to the application		
Pre-conditions:	Already registered user is logging in		
Post-Conditions:	After success login details inserted, the application will bring the user to home page		
Normal Flow:	1 User Inserts username and password 2 User click button login 3 Application is reading the data from the database 4 Database sees email and password are matching 5 Application receives database approvals 6 Application will bring the user to home page		
Alternate Flows:	1. User Inserts username and password 2. User click button login 3. Application is reading the data from the database 4. Database sees email and password are not matching 5. Application receives database rejection 6. Application is asking the user to try again and shows error message 7. If the user has tried 3 times the database will lock the user for some time 8. The application will send a warning email to the user		
Includes:	Validate Password		
Extends:	Home Page		
Priority:	There is no priority the application		
Special Conditions:	Password must match the user email from the database		

2.2. Design & Architecture

The Web Application is hosted on 000webhost. I have attached a picture of the webapplication architecture see Figure1. It's a free webhosting provider which is allowing to publish the Web application online without any costs on the top. But of course, with some disadvantages. I will discuss more about this in security section. The way how I have developed the application I have started from scratch. As 000webhost provided FTP connection I have used Code Anywhere web application to build the application.
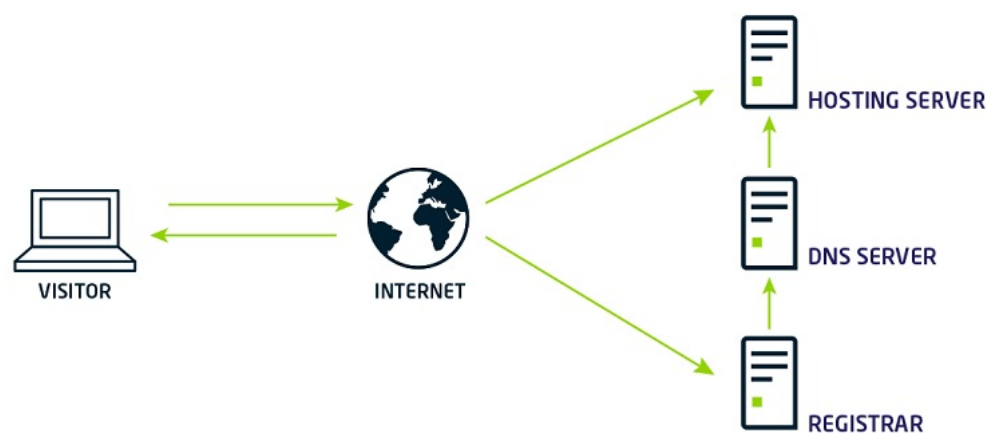

Figure 1

On Figure 2 is the example of the web application code anywhere. This picture represents how the application is connected with 000webhost. The reason why I have chosen to code anywhere is because this application is allowing to store the web application on the cloud, and I can have access to the code at any time and any location. To build the application I have used MySql, PHP, HTML, JavaSript. The application has 4 pages in total. Al the pages are build using the same bootstrap theme template.
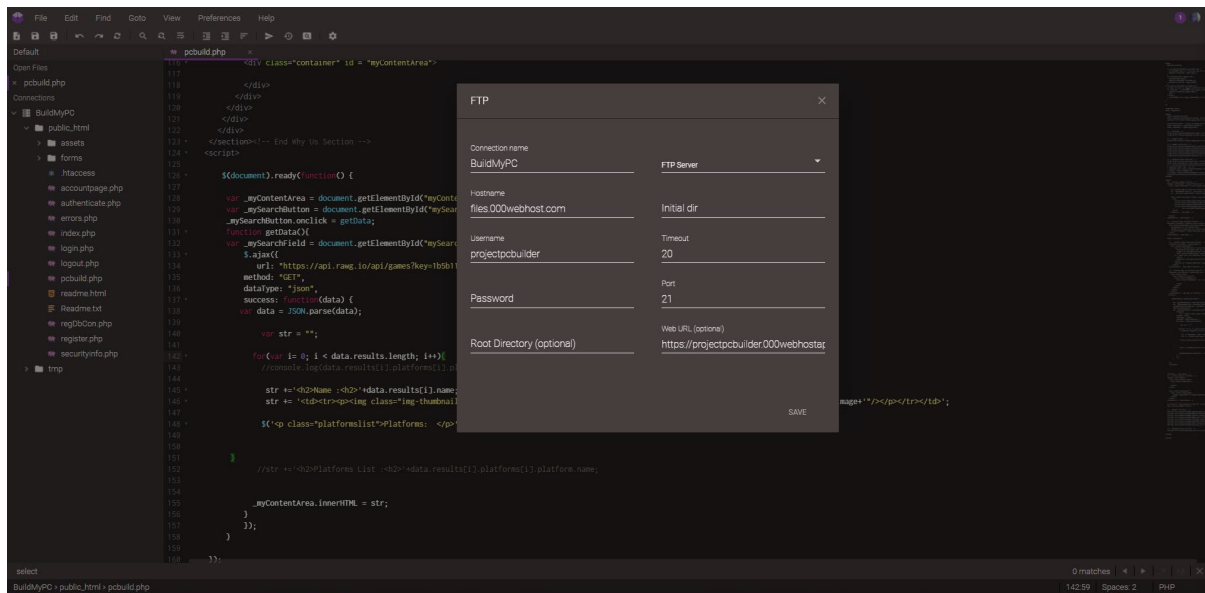
Figure 2

2.3. Implementation

For the application I have used RAWG API, Database, Amazon API, and eBay API.

1. RAWG API is a huge database which contains all the games for any platforms. I have used their database to show list of all the games.
2. I have used API in the Build PC Page. On this page user will be required to search for a game in the search bar. This is where I am using RAWG API.
3. Amazon API, I want to use their data on the home page. If the user will click on selection one "Buy laptop for business" or "Buy Gaming PC" it will show list of shops that application can look for the user. Then it will appear a question what is the budged of the user. As soon as the application will gather the data it will open an Amazon page where it will open all the laptops with the budget inserted from the user from PCBuild Application
4. eBay API, I want to use their data on the home page. If the user will click on selection one "Buy laptop for business" or "Buy Gaming PC" it will show list of shops that application can look for the user. Then it will appear a question what is the budged of the user. As soon as the application will gather the data it will open an eBay page where it will open all the laptops with the budget inserted from the user from PCBuild Application.
5. PHPMyAdmin Database. I have used PHPMyAdmin for the user registration process and for the user login page. In this database are stored all the registered users withing the application

2.4. Security Principles

In this application I have included multiple security principles in order to make the application secure. What is the most important for the webapplications now is to make these applications secured. This is the aspect that I have focused on. My intention of building this application is to demonstrate of how develop a simple secured application without any budget.

2.4.1   000Webhost Security

As the application is hosted in the 000Webhost the application is already secured. This hosting company is giving protection against DDoS, Malware, Hacking Attempts, Botnets, Brute force attacks, Script injection. Picture bellow is representing the application location behind the hosting

company 000Webhost. Figure 3 is representing how 000Webhost operates at the background of the application. As I have not attached a domain to the application. I am using the 000webhost free domain which already is providing security to the application.
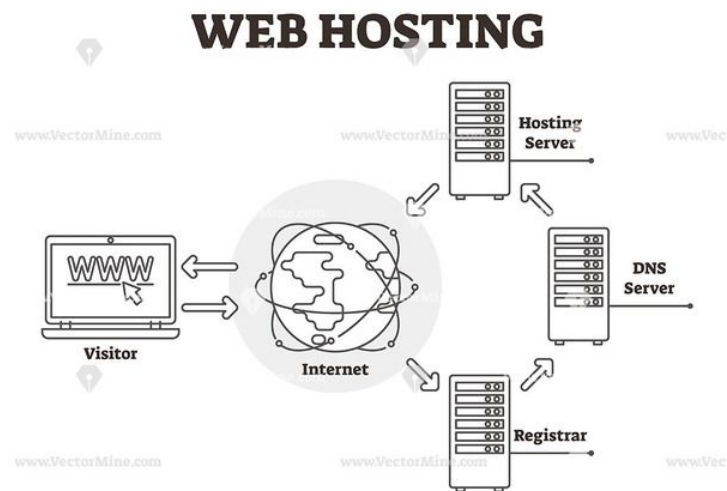

Figure 3

2.4.2   Password Hashing

Besides 000Webhost security I don't think this is enough for secure web application I have implemented some other security principles on the application. The next what I have done I have created a password encryption on the new registered users. What does that mean? So when a user is registering on the application see Figure 4. As soon as the application will accept all the register criteria, the user details will be stored in PHPMyAdmin Database. See Figure 5.

Figure 4 Register Page

On Figure 5 is represented the users that are registered in application. 1st row 1st column we can see username, Next we see the user email and last this is where the password is stored. The reason why there are so many random slatters and number is not because the user decided to make hard password is because the application has hashed the user password in to the MD5 Format. I have attached a picture of the code from the application. See Figure 6

Figure 5 PHPMyAdminUserRegister

```
// Finally, register user if there are no errors in the form
if (count($errors) == 0) {
  $password = md5($password_1);//encrypt the password before saving in the database

  $query = "INSERT INTO users (username, email, password)
        VALUES('$username', '$email', '$password')";
  mysqli_query($db, $query);
  $_SESSION['username'] = $username;
  $_SESSION['success'] = "You are now logged in";
  header('location: index.php');
  }
}
```

Figure 6 CodePasswordHasshed

2.4.3 User Input validation.

On the registration page I have included another security principle. So when the user will input the email and the password the application will require the following on the password:

- At lest 8 characters long
- The password must contain 1 number.
- The password must contain 1 Capital Letter.
- Password must contain at least 1 lower case letter.
- The password must contain at least 1 special character.

The reason why the password is having so many rules is first of all I want show people that to make a really good secured password this is what is need to be done on all of the applications in order to protect users data from hacking. And the second reason why I made this is to make sure that all the users that are registered are secured and they have nothing to worry about weak passwords.

Another input validation I have on the email. The reason why this is done is to make sure that the user is giving proper valid email in case of lost password.

2.4.4 Copy, Paste and Select.

In the application I have disabled the ability of the users to select, copy or paste items. The reason why this has been made is not just prevent the user from copying the the content is as well to secure the web application data

2.4.5 Login Verification

Another security principle is included is login verification. If the user is not registered in the web application, he is not going to be able browse in any of the webpages withing the application.

2.4.4 Logout Timeout

The next security principle that is added is logout time out. This function is activated when the user has not been using the page for 30 min. Then the web application will log out the user from the system. Even if you just close the window and wont log out. If you will try to access the web page again it will ask for user details.
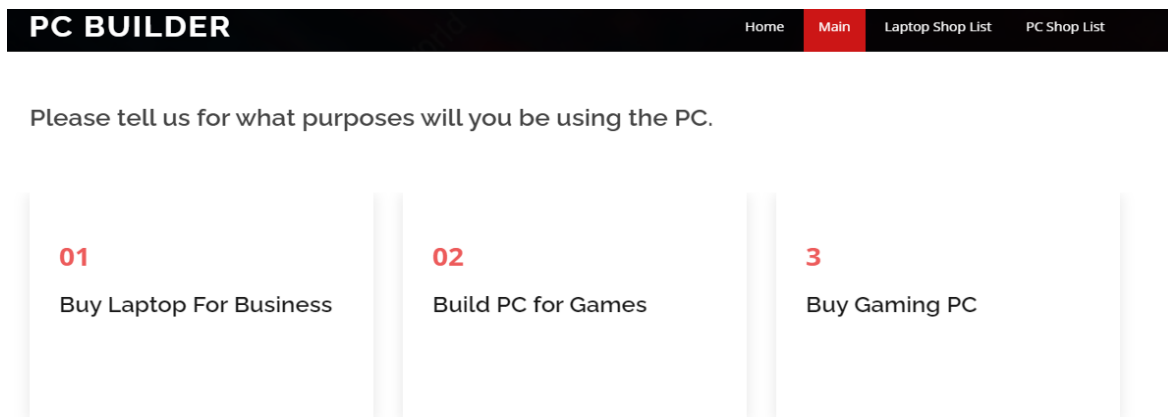
2.4.5 SQL Injection

As I am using PHPMyAdmin I have implemented SQL injection to secure the database.

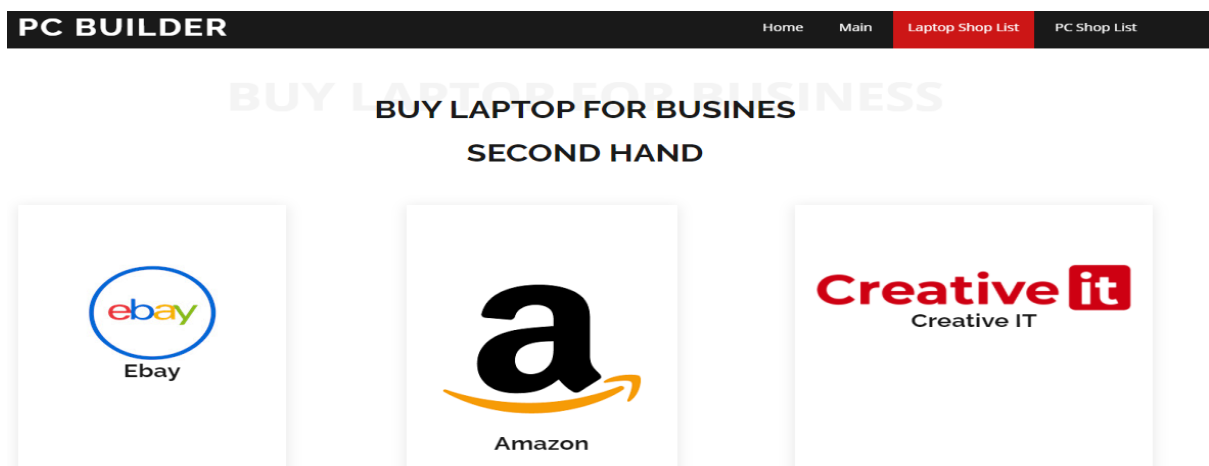## 2.5. Graphical User Interface (GUI)
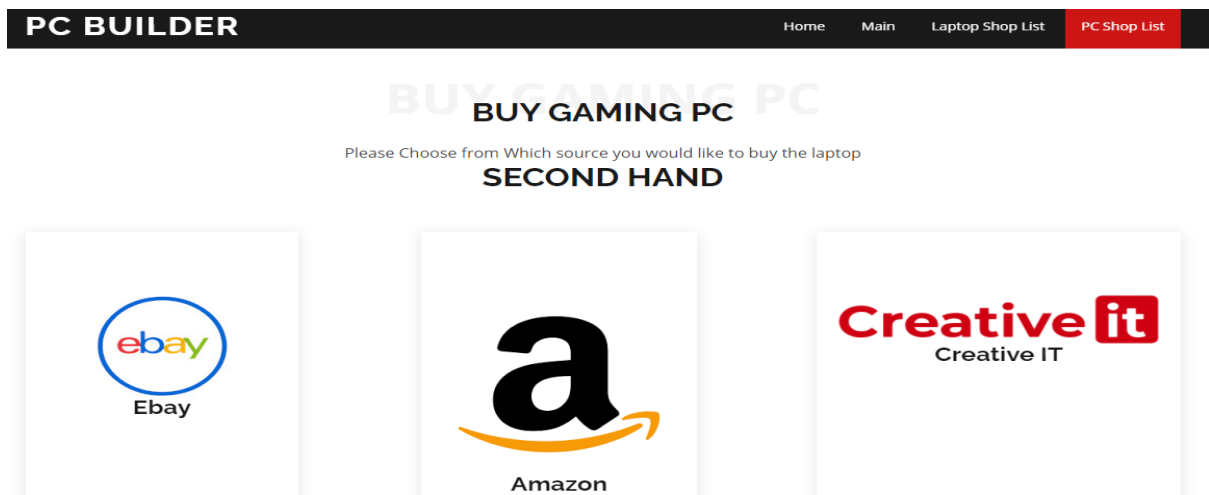
Main Page GUI
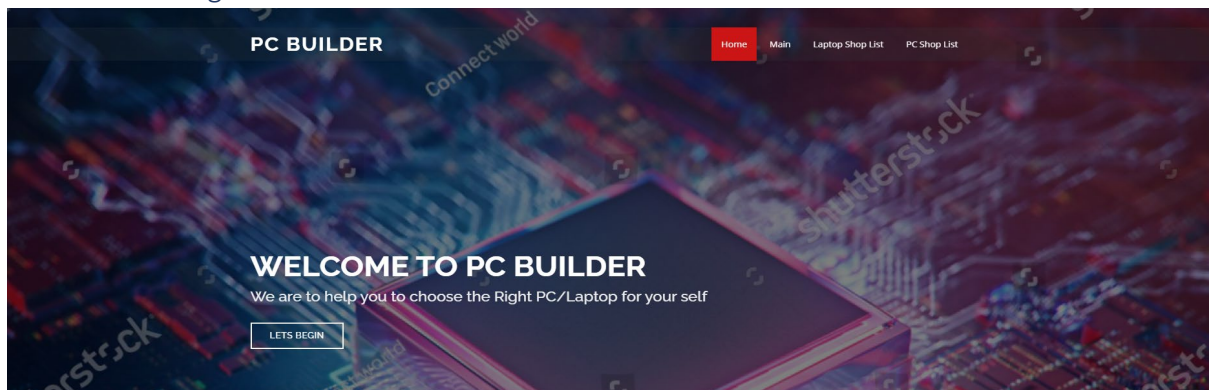
Main Page as well, but this is the main section where user can choose an option depending on the user need
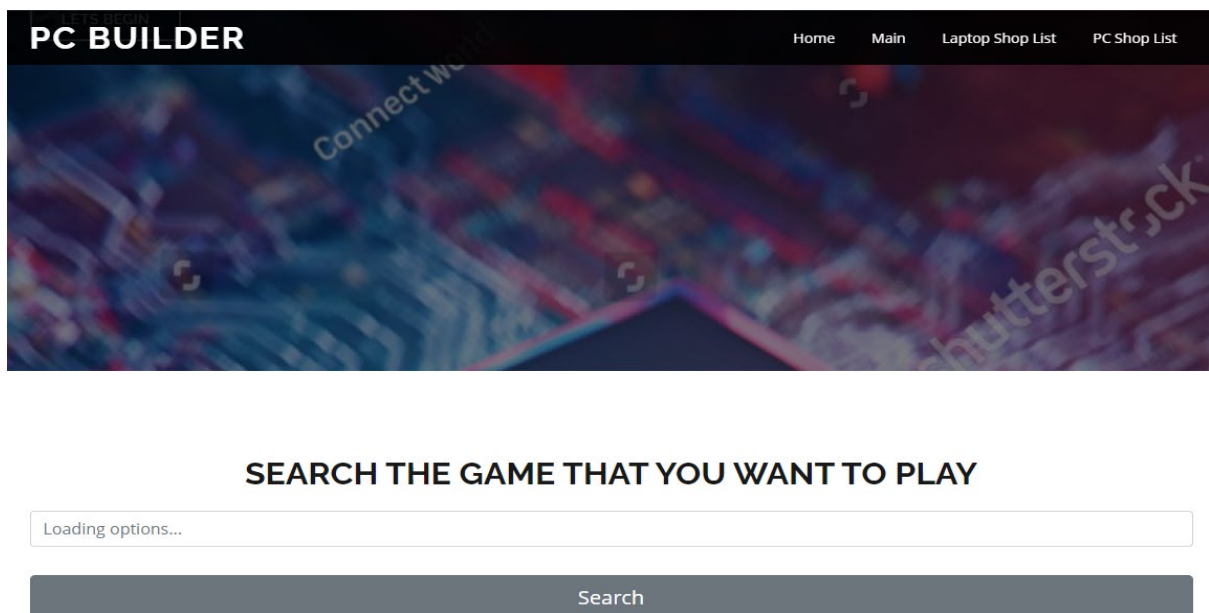

This will show if the user will choose option one "Buy Laptop for Business"

This will show if the user will choose option three "Buy Gaming PC"

If user will click on option two "Build PC" it will open a new page where user need to insert specific game which one he wish to play on the future PC

2.6. Testing

1. W3C Markup Validation Service . From World Wide Web Consortium, this validator checks the markup of web documents in HTML, XHTML, SMIL, and MathML, among others. Use other tools to validate specific content, such as RSS and Atom feeds and CSS, or to find broken links.

Test Results with W3C Markup Validation Service I have run a test on main web page https://projectpcbuilder.000webhostapp.com/. After the test results I was not able to find any major issues with the application.

Figure 7 LoginPage

Figure 8 Home Page(index.php)

Figure 9AccountPage

1. **Error** Saw `<?`. Probable cause: Attempt to use an XML processing instruction in HTML. (XML processing instructions are not supported in HTML.)
   At line 1, column 2
   `<?php ↵ session`

2. **Error** Non-space characters found without seeing a doctype first. Expected `<!DOCTYPE html>`.
   From line 15, column 53; to line 15, column 59
   `stamp']) > 900) {↵      h`

3. **Error** Element `head` is missing a required instance of child element `title`.
   From line 15, column 53; to line 15, column 59
   `stamp']) > 900) {↵      h`
   Content model for element `head`:
   If the document is an iframe srcdoc document or if title information is available from a higher-level protocol: Zero or more elements of metadata content, of which no more than one is a title element and no more than one is a base element.
   Otherwise: One or more elements of metadata content, of which exactly one is a title element and no more than one is a base element.

4. **Error** Stray doctype.
   From line 25, column 1; to line 25, column 15
   `↵?>↵↵<!DOCTYPE html>↵<html`

5. **Error** Stray start tag `html`.
   From line 26, column 1; to line 26, column 16
   `YPE html>↵<html lang="en">↵↵<hea`

6. **Fatal Error** Cannot recover after last error. Any further errors will be ignored.
   From line 26, column 1; to line 26, column 16
   `YPE html>↵<html lang="en">↵↵<hea`

Figure 10 PC Build Page

Error Saw `<?`. Probable cause: Attempt to use an XML processing instruction in HTML. (XML processing instructions are not supported in HTML.)
At line 1, column 2
`<?php ↵ session`

Error Non-space characters found without seeing a doctype first. Expected `<!DOCTYPE html>`.
From line 15, column 53; to line 15, column 59
`stamp']) > 900) {↵      h`

Error Element `head` is missing a required instance of child element `title`.
From line 15, column 53; to line 15, column 59
`stamp']) > 900) {↵      h`
Content model for element `head`:
If the document is an iframe srcdoc document or if title information is available from a higher-level protocol: Zero or more elements of metadata content, of which no more than one is a title element and no more than one is a base element.
Otherwise: One or more elements of metadata content, of which exactly one is a title element and no more than one is a base element.

Error Stray doctype.
From line 23, column 1; to line 23, column 15
`↵  )↵)↵?>↵<!DOCTYPE html>↵<html`

Error Stray start tag `html`.
From line 24, column 1; to line 24, column 16
`YPE html>↵<html lang="en">↵↵<hea`

Fatal Error Cannot recover after last error. Any further errors will be ignored.
From line 24, column 1; to line 24, column 16
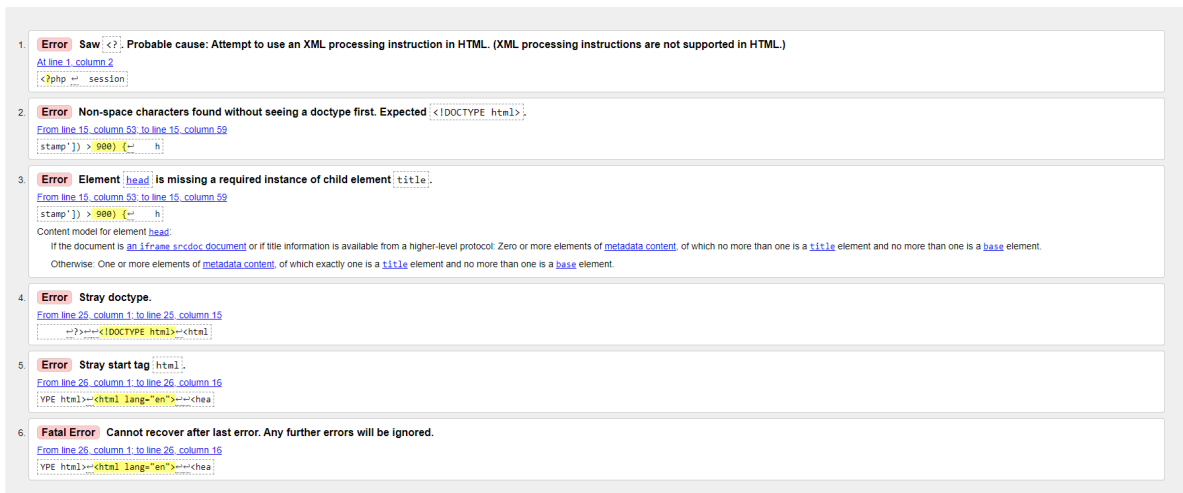`YPE html>↵<html lang="en">↵↵<hea`

Figure 11 Security Info Page

1. **Error** Saw `<?`. Probable cause: Attempt to use an XML processing instruction in HTML. (XML processing instructions are not supported in HTML.)
   At line 1, column 2
   `<?php include('r`

2. **Error** Bad value `https://fonts.googleapis.com/css?`
   `family=Open+Sans:300,300i,400,400i,600,600i,700,700i|Raleway:300,300i,400,400i,500,500i,600,600i,700,700i|Poppins:300,300i,400,400i,500,500i,600,600i,700,700i` for attribute `href` on element `link`:
   Illegal character in query: `|` is not allowed.
   From line 19, column 3; to line 19, column 224
   `nts -->↵  <link href="https://fonts.googleapis.com/css?family=Open+Sans:300,300i,400,400i,600,600i,700,700i|Ra…i,500,500i,600,600i,700,700i|Poppins:300,300i,400,400i,500,500i,600,600i,700,700i" rel="stylesheet">↵↵  <!`

3. **Error** `style` element between `head` and `body`.
   From line 40, column 1; to line 40, column 7
   `>↵</head>↵<style>↵ * {↵`

4. **Fatal Error** Cannot recover after last error. Any further errors will be ignored.
   From line 40, column 1; to line 40, column 7
   `>↵</head>↵<style>↵ * {↵`

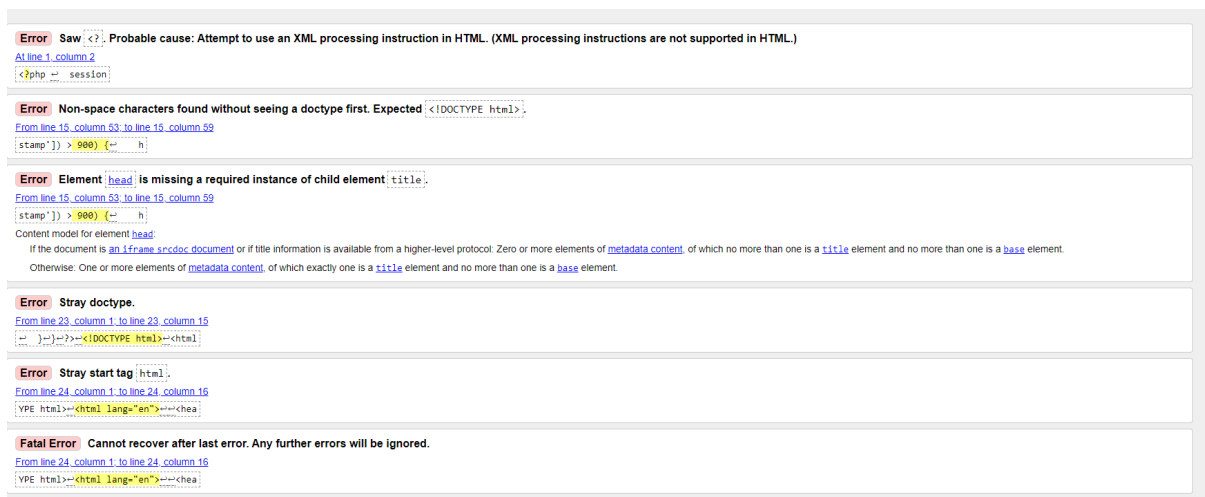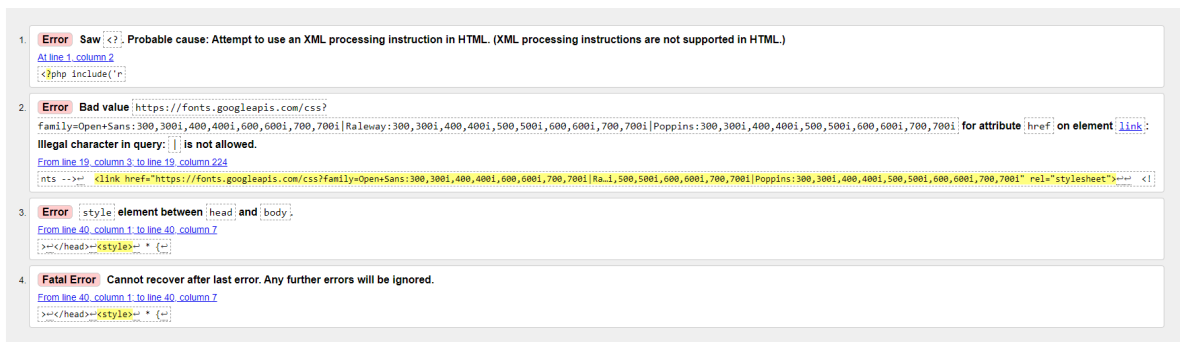*Figure 12 Register Page*

2.7. Evaluation

The application is posted on github. The application is hosted on 000webhost.com tis is the link the application. https://projectpcbuilder.000webhostapp.com/. As well I am using Code anywhere https://codeanywhere.com. My application is hosted there from 000 webhost, so I can develop my application from there. As well I am using this as backup

plan in case If lost the website, so the code of the application store on the cloud, and I am able to access it from anywhere and at any time I want.

3.0 Conclusions

At the start when I have started the application, I have had totally different expectation of this project. Now when I am on the end line, I can say that I am satisfied of what I have done to the application in terms of security aspects. I would improve the application if I have had more experience and knowledge. In terms of functionality of the web application there are a lot of things that I would improve.

4.0 References

Ueland, S., 2019. *21 Free Tools To Test Your Website | Practical Ecommerce*. [online] Practical Ecommerce. Available at: <https://www.practicalecommerce.com/18-Free-Tools-to-Test-Your-Website> [Accessed 28 November 2020].

5.0 Appendix

5.1. Project Proposal

5.1.1. Objectives

In this Project will be included:

- Background
- Project Idea
- Project Technical Approach
- Project Scope

5.1.2. Background

In now days there are so many PC, laptops, and tablets that some people even do not see the difference between the devices anymore. By the latest year in 2019, was counted over 2 billion computers in the world, including desktops, laptops, and servers. According to the latest count of how many computers were sold is over 203 million computers. The reason why I have included those figures is to show you that there a lot devices in this world and one person can hold 2 or 3 computers in his hand. Let's imagine how many people are in the world approximative number is 7.8 billion in 2020. What you think how many of those people will know about computers specifications or what kind of laptop they will need. Yes, the technology has grown for the past few years but that does not mean that every single person in the world is a tech person.

5.1.3. Technical Approach

To develop the web application, I will be using 000 webhost, this where I will host the website and implement the databases. The web application will be receiving user inputs in the application and 000 webhost will be responding on the user inputs.

5.1.4.   Special Resources Required

To develop the Web Application, I will not need any special resources so far.

5.1.5.   Project Plan

I have made a Project plan using Microsoft Project. The total estimation of developing and implementing the project will take approximately 161 days. Please have a look on the picture bellow that are attached. These pictures are snipped from the Microsoft Project Repots.
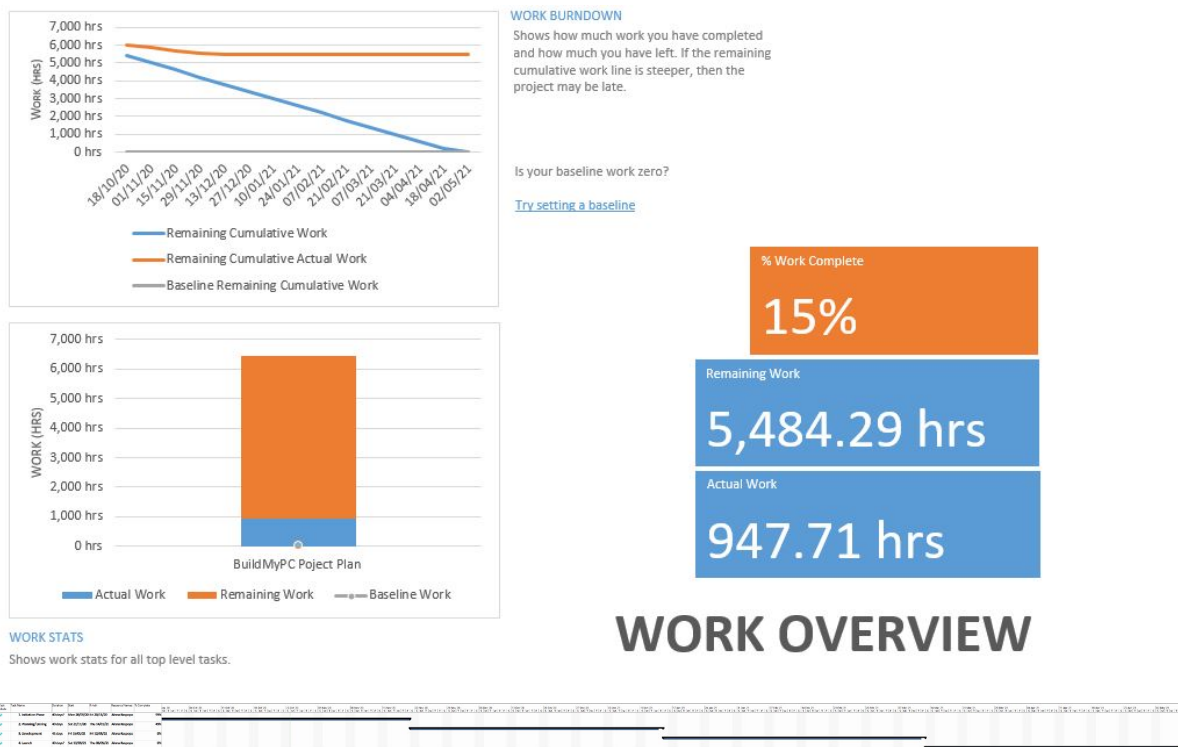
5.1.6.   Technical Details

My main idea is to develop a website application where user can build his own pc by the pc usage. To be able to implement this idea I will be using HTML, CSS, Java Script, Javax and I will include API libraries

5.1.7.   Evaluation

Now I have no experience on testing the web application for vulnerabilities, but I am planning to use the strategies that I will learn in the future lectures