Web Site to Select a Best and Optimal Personal Computer within the Budget

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Web Site to Select a Best and Optimal Personal Computer within the Budget

A dissertation submitted for the Degree of Master of Information Technology

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University of Colombo School of Computing

2019

Declaration

The thesis is my original work and has not been submitted previously for a degree at this or any other university/institute.

To the best of my knowledge it does not contain any material published or written by another person, except as acknowledged in the text.

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Abstract

Fifteen years ago, only a limited number of people had personal computers in Sri Lanka. However, in the present day, most of the people are having their own personal computers at home. Buying a personal computer gives a variety of choices to every customer nowadays. In Sri Lanka, people prefer to buy an assembled computer rather than a branded computer. The main reason for this is, assembled computers are cost effective than branded computers. People assembling a computer instead of buying a branded system, allows them to have a good and satisfactory quality of what they want.

The main problem addressed in this project is to give a platform to customers to assemble a computer from their place without visiting a computer shop. Customers have to allocate time to visit a computer shop and buy an assembled computer based on their requirements. By providing a web-based platform, expected to reduce their time and give them more choice and flexibility to assemble a computer.

This project presents a platform, where assembled and completed computers from a vendor nearby get delivered to customers' doorstep. This platform also provides an option where customers can choose an assembled computer based on their budget. There is an opportunity for IT support technicians in this platform, where they can register in the website and provide IT support for the customers based on their requirements. Customer can choose an IT support technician to get computer-related support and pay for them based on their service. Customer is able to choose the nearest support technician to get the support quickly.

This Platform is open for everyone in Sri Lanka. The vendors who wish to display their computer parts can utilize this platform to maximize their business. The experienced and qualified IT support technicians are able to use this platform as a part time job by registering in this platform. This web platform allows customer, vendor and the support technicians to register and give their services.

This system can be modified or changed in the future based on customer's opinions and vendors requirements. The most important requirements for a computer assembling are built up with this platform. This system is mainly developed using HTML, PHP, CSS and JAVA programming languages.

Acknowledgement

I would like to express my sincere gratitude to all the people who contributed for the success of this work. I would like to especially thank my supervisor Dr. M D J S Goonetillake for her valuable time and support from the begging to the completion of the project.

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Table of content

Declaration ... **ii**
Abstract ... **iii**
Acknowledgement ... **iv**
List of Figure ... **viii**
List of Table ... **x**
List of Acronyms ... **xi**
1 Introduction ... **1**
1.1 Introduction ... 1
1.2 Aim and Objective ... 2
1.3 Motivation ... 2
1.4 Scope ... 3
2 Background ... **4**
2.1 Introduction ... 4
2.2 Background study ... 4
2.3 Statement of the problem ... 4
2.4 Business process ... 5
2.5 Current process ... 6
2.6 Existing Systems ... 6
2.6.1 Amazon, eBay and Ali express ... 6
2.6.2 Personal company websites in Sri Lanka ... 8
3 **Methodology** ... **9**
3.1 Analysis ... 9
3.2 Stakeholders Analysis ... 9
3.3 Functional Requirements ... 9
3.3.1 Customer management module ... 10
3.3.2 Product display module ... 10
3.3.3 Budget based suggestion module ... 10
3.3.4 Cart and payment module ... 10
3.3.5 Product details update module ... 10
3.3.6 Admin Module ... 11
3.3.7 Reporting module ... 11
3.4 Non-functional requirements ... 11
3.5 Methodology ... 12
3.5.1 Scrum ... 12
3.6 Use Case Diagram ... 14

3.6.1 Actors 15
3.6.2 Use Cases 15
3.6.3 Entity Relationship Diagram 20
3.6.4 Database design 21
3.7 Database 22
3.8 PHP 23
3.9 Brackets 23
4 Implementation 24
4.1 Introduction 24
4.2 Development tool 24
4.2.1 Hardware and Software requirements 24
4.3 User Interfaces 25
4.3.1 Front page of the website 25
4.3.2 Home Page 25
4.3.3 User login Interface 26
4.3.4 Side bar menus 26
4.3.5 Compatibility Display Page 27
4.3.6 Billing information page 28
4.3.7 Confirmation Page 29
4.3.8 Search option 29
4.4 Admin Panel and Dashboard 30
4.4.1 Admin Dashboard login interface 30
4.4.2 Admin Dashboard Home Page 30
4.4.3 Add product details interfaces 31
4.4.4 Add and display vendor and technician details interfaces 33
5 Evaluation 34
5.1 Introduction 34
5.2 Techniques of Software Testing 34
5.2.1 Black Box Testing 34
5.2.2 White Box Testing 34
5.3 Type of Testing 35
5.3.1 Unit Testing 35
5.3.2 Integration Testing 36
5.3.3 System Testing 36
5.3.4 Acceptance Testing 36
5.4 Test Plan and Test Cases 36
5.5 User Evaluation 38

6 Conclusion 40
6.1 Introduction 40
6.2 Critical evaluation of the system 40
6.3 Problems encountered 40
6.4 Future enhancements 41
6.5 Personal Conclusion 41
7 References 42
8 Appendices 43
9 Appendices A System Documentation 43
10 Appendices B User Manual 44

List of Figure

Figure 2.1 B2C Service Experience 5

Figure 3.1 Scrum Flow.....13

Figure 3.2 User Case Diagram 14

Figure 3.3 ER Diagram 20

Figure 3.4 Database Diagram.....21

Figure 4.1 Front page 25

Figure 4.2 Home page 25

Figure 4.3 Login interface.....26

Figure 4.4 Vendors menu.....26

Figure 4.5 Parts menu 27

Figure 4.6 Compatibility display page 27

Figure 4.7 Billing Information page 28

Figure 4.8 Confirmation page 29

Figure 4.9 Search option 29

Figure 4.10 Admin Login Interface 30

Figure 4.11 Admin Home Page.....31

Figure 4.12 Product brand.....31

Figure 4.13 Product Category 32

Figure 4.14 Product Subcategory.....32

Figure 4.15 Vendor’s Details 33

Figure 4.16 Add New Vendor.....33

Figure 5.1 Type of Testing.....35

Figure 5.2 Summary of evaluation.....39

Figure B.1 Start page.....44

Figure B.2 User registration.....45

Figure B.3 User login 45
Figure B.4 Navigation between pages 45
Figure B.5 Search option 46
Figure B.6 Filter - Provinces 46
Figure B.7 Filter - Part 46
Figure B.8 Filter - Vendors 47
Figure B.9 Parts display 47
Figure B.10 Compatibility check and display 48
Figure B.11 Billing and Delivery 48
Figure B.12 Payment and confirmation 49
Figure B.13 User profile 50
Figure B.14 Admin dashboard login 50
Figure B.15 Vendor menu 51
Figure B.16 vendor added items list 51

List of Table

Table 2.1 Website comparison.....7
Table 3.1 Use case 1.....15
Table 3.2 Use case 2.....16
Table 3.3 Use case 3.....17
Table 3.4 Use Case 4.....18
Table 3.5 Use Case 5.....19
Table 3.6 Use Case 6.....19
Table 3.7 Database comparison 22
Table 5.1 Test case for Login to the system 37
Table 5.2 Test case for User registration 37
Table 5.3 Test case for Select PC parts.....38

List of Acronyms

IT	- Information Technology
XP	- Extreme Programming
FDD	- Feature-Driven Development
DSDM	- Dynamic Systems Development Method
UC	- Use Case
SQL	- Structured Query Language
MySQL	- My Structured Query Language
DBMS	- Database Management System
PHP	- Hypertext Preprocessor / Personal Home Page
HTML	- Hypertext Markup Language
UNIX	- Uniplexed Information and Computing Service
POP3	- Post office Protocol
IMAP	- Internet Message Access Protocol
LDAP	- Lightweight Directory Access Protocol
COM	- Commercial
CORBA	- Consolidated Omnibus Budget Reconciliation Act
CSS	- Cascading Style Sheet
ID	- IDentification
LESS	- Leaner Style Sheets
XAMPP	- Cross-Platform (X), Apache (A), MariaDB (M), PHP (P) and Perl (P)
PC	- Personal Computer

Chapter 1

1 Introduction

1.1 Introduction

Choosing from numerous alternatives has been a great challenge for mankind much more with the advent of the internet which has resulted in information overload. The internet users are constantly in need of a way to assist them in handling the situation, too many options are available to choose from with limited time. The ability to access wealthy information has given the consumer power and choice to control their product consumption over the internet.

Purchasing an item from the web is now quite simple and easy for any of the consumer. There are plenty of choices available for people to select and compare an item before purchase. There are thousands of websites which provide enough facilities to buy an item from their place without visiting a vendor. The way the websites are created and how they provide details, help vendors to develop the business. Websites allow vendors to reach out to their customers from any part of the world easily.

With the development of information technology, buying computers and related peripherals is becoming more natural and regular part of people's life. There is numerous option available to purchase computers and related products. Branded and assembled computers are two main choices of buying computers, where people can choose the best, based on their requirements. There are more and more websites available to provide the facility of choosing the best computer and parts for users from all over the world.

In Sri Lanka, there are companies selling computer and parts through their websites, but those websites are just displaying their products and the company contact details. Customer have visited the location and buy a computer. If a customer wanted to assemble a computer based on certain requirements, they have to select the required parts at the vendor's place. The salesperson at the vendor's places are the main node of getting details of the computer parts or customer have to visit various websites to find the details of computer parts before they purchase, which is time-consuming. The information given by a salesperson can be limited and not accurate.

In Sri Lanka, is there a website to assemble an optimal computer online? Is there a website to provide product details and guidance about computer assembling? Is there a website to choose

a best seller based on the customer's rating close by customer's location? Is there a website helps to find an IT technician closed by the customer's place? If not, why not? And what is the way forward? These are some of the research questions this work will seek to investigate and attempt to resolve.

1.2 Aim and Objective

The overall aim of the project is to assist a user by providing a more user-friendly and effective platform for assembling a computer based on their requirement within the budget. This will be in the form of a web application that will help to choose computer parts and get assembled from a vendor close by. The first part will allow users to select the compatible parts that need to be assembled. The second will be a route suggestion service, where the user can enter their budget and the application will attempt to supply a cost-effective to assemble the computer. The user will have the opportunity to change the parts if they want. The web application will also provide some of the functionality given below.

- Allow user to choose the best seller close by the user's location to assemble the computer.
- Enough support videos and details are available on the site for users to get the knowledge of computer parts and assembling.
- Users can make the payment online through the website and get the assembled computer to their home within a quick time.
- Sellers' contact details and their ratings displayed for users to choose among the best.
- The system allows finding the nearest vendor by selecting their location
- Allow user to selecting the best and closest IT technician to get assembled or technical support faster.

1.3 Motivation

In many countries, people use websites to compare and purchase products from their computers without even visiting the shops. Retails shops and companies are providing enough details and education through their websites to the users to select the best product among listed items. When it comes to assembling computers, the same strategy is followed by the retail's shops. The website is ensuring the security of the purchase and the user's details provided to the website and make sure to list guaranteed products. The motivation for the project is to address

the people in Sri Lanka and allow them to assemble an optimal computer through a website within few minutes. The project is to give details to choose the best parts to assembling a best computer form a best seller based on their requirement by users themselves.

1.4 Scope

When we decided to develop a system, the scope is an important factor to take into account. The scope of this project will be as follows.

- Add, remove, edit vendor and IT technician details
- Vendor and IT technician authentication
- Input details of computer parts and accessories
- Edit and modify computer parts and accessories details
- Display the computer parts and accessories details
- Option to select the parts and accessories and submit
- Option for customer to enter their details for delivery
- Option for customer to make the payment
- Display support guidance of computer assembling
- Display IT technician details
- Give suggestion to the customer to choosing parts based on their budget
- Option for customer filter and select the nearest vendor and IT technician
- Generate reports for vendor

Chapter 2

2 Background

2.1 Introduction

Currently, customers are assembling computers by visiting the shop. Now people are happy to do their purchasing through online since it is more convenient and give them a variety of choices. Allowing customers to assemble a computer that they require, in an online platform is more flexible and timesaving. The aim of this project is to give a platform to customers to assemble a computer from their personal computer with a few clicks. This platform is expected to increase the sales of vendors who are thus happy to get involved into this system.

2.2 Background study

Assembling a desktop computer through a web-based platform begins with gathering different components and devices of desktop computers that need to assemble to get a well-functioning computer. Thus, this project will cover selecting parts, emerging parts, purchasing parts, selecting vendor, selecting technician, and so on. Assembling a computer on a web platform brings significant benefits which are identified below.

- Know about computer parts and how they work together.
- Understand how the web platform can provide the details about the computer parts
- Learn the computer terminology
- Learn how to customize a computer according to specialized specifications
- Technical problem solving

2.3 Statement of the problem

The purpose of this study is to, develop a web platform to assemble a computer so that it provides solutions to the problems of assembling a computer on a computer shop. The problem can be for both the vendor and the customer.

- The problem of traveling to the computer shop location.
- Need to step into different shops to know the price differences and may have to do the product comparison.
- Time-consuming to get the details when there is a lot of customers in a shop

- Human errors while getting details from salespeople in the shop
- Lack of knowledge of a salesperson can mislead in the selection of computer parts.
- Computer dealers might try to sell the most expensive product which may not be the customer's requirement
- Computer shop workers cannot remember all the compatible combinations of the product
- Normal way of getting price details through the phone, which is not a convenient way at all times where there are limited no of phone lines and availability
- Vendors need to remember all the product details and their prices up to date
- Vendors have to update themselves about the products and details time to time
- Vendors have to manage multiple clients at a time
- The manual way of processing business activities such as identifying the customer requirement, providing solutions and processing payments are more time-consuming.
- Need to allocate more space on their business premises for customers

2.4 Business process

This project aims to provide an effective business to customer experience and better customer service. Here it is focused on compatible product selection, requirement-based suggestion and help and support to choose suitable products. Five main components have used B2C service experience, which is shown here in the figure below.

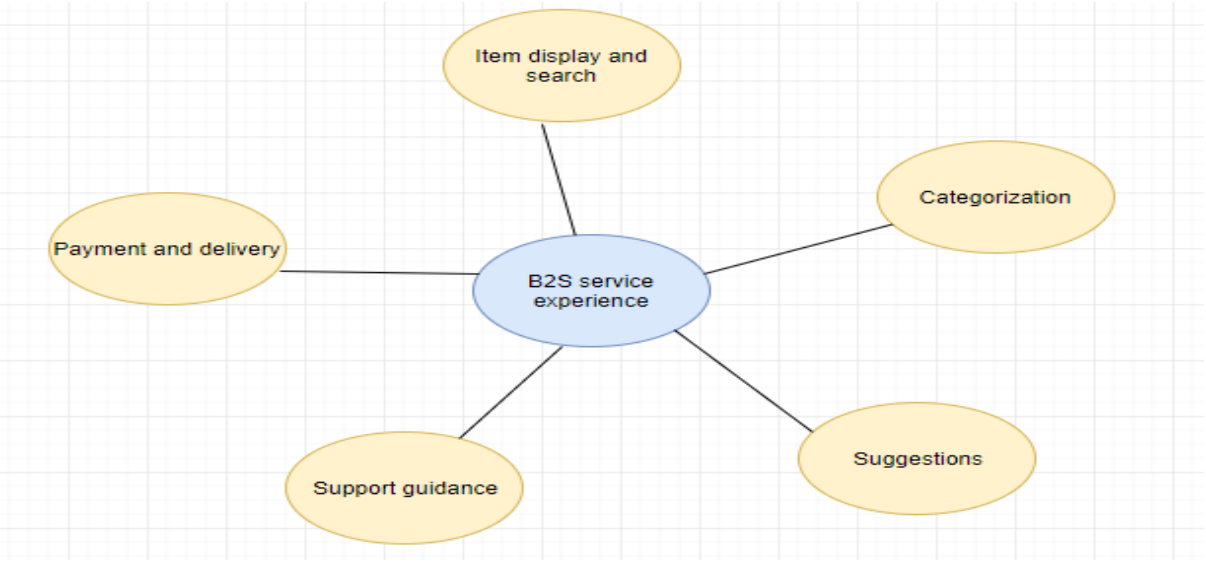

Figure 2.1 B2C Service Experience

2.5 Current process

The current process of assembling a computer is as below.

- Customers have to visit the computer shop
- Tell the requirement to the salesperson in the shop
- Discuss with him/her to find the correct computer parts that the customer requires
- Finalize the parts after the discussion
- If the salesperson can assemble the computer, request him/ her to assemble it
- Make the payment and bring the assembled computer home
- If no one is available in the shop to assemble the computer, customers have to bring the parts home and assemble it by themselves or have to find the technician to do that.
- Customer needs to find an IT technician from a known platform or have to search and find a person from online if anyone listed in any websites.

2.6 Existing Systems

The initial goal of the literature review is to establish whether the same kind of websites exists already, and if so, whether there are possibilities to enhance them further to give the best solution for the users. When looking at the market, there are some famous globally accepted websites available for purchasing items, including computers and computer parts. Amazon, eBay, Ali express are some of the famous global websites and wow.lk, daraz.lk, ikman.lk and some personal company owned websites are available in Sri Lanka for purchasing computers, and it is parts. All these websites are good for a user to purchase a computer or a part as an individual item. These do not allow users to assemble an optimum computer for their need.

2.6.1 Amazon, eBay and Ali express

These three websites are the most popular and globally accepted website for purchasing items. When it comes to computer shopping, you can purchase already assembled or branded computer, computer parts you want. But there is no option to select computer parts that you want and assemble a computer or no option to check the compatibility of the computer parts in the website itself. From Sri Lanka, if you want to buy a computer, you should order and get the item through shipment from the vendor. You should wait for some time to get the item after

the order. Some time it will get delayed more than the time promised by the vendor and there is a possibility of breakage or missing the item during the shipment. One more disadvantage is that, some items that you prefer may not to be possible to ship to Sri Lanka, so customers from Sri Lanka cannot get those items. In case of a claim of a warranty or replacement of damaged items, you have to send back via shipping to the vendor and have to wait some more time to get the item back. The current project is to overcome such issues and provide a website that allows users to assemble a computer they wish and get it from a vendor close to their living place. Within a short time period can not only get the items and they're after services but also the reliability is higher than the global websites.

User Stories	eBay.com	AliExpress.com	Ikman.lk
Home Page	Yes	Yes	Yes
Registration	Yes	Yes	Yes
Login	Yes	Yes	Yes
Personal Page	Yes	Yes	Yes
Search	Yes	Yes	Yes
Browse	Yes	Yes	Yes
Item Page	Yes	Yes	Yes
Selecting a vendor	Yes	Yes	Yes
Help	Yes	Yes	Yes
Chat	Yes	No	No
Administration	Yes	Yes	Yes
Product compatibility Comparison	No	No	No
Selecting a nearest Vendor	No	No	No
Choose a Technician nearby	No	No	No
Product based on budget	No	No	No

Table 2.1 Website comparison

As shown in the table, all three systems give the possibility to register, login to the website and have a home page with a general description of the portal. They also offer a personal page, where each user can check the status of their auctions or of their offers. Another characteristic of this portal is to have an item page. The search functionality is also very important: in

addiction to a normal keyword search, eBay offers also the possibility to search excluding a given word, search in a given category, and search for auctions regarding a given city and to make price range search. All three systems also give help pages that explain the aim of the portals and the functionality.

None of the portals have the possibility to compare the product with associate compatibility products. There is no way of selecting a nearest vendor and systems are not good enough to suggest a best product based on users' budget. Also, none of the websites allow to select a technician for their IT support from the nearest place.

2.6.2 Personal company websites in Sri Lanka

There are a lot of personal company websites for selling computers and parts available in Sri Lanka. Metropolitan, Barclays computers, ABC computers are a few examples of them. These companies have their own websites that only show their product and their prices. They are limited with their own product ranges and no option is given for users to compare and select products to assemble a computer. Moreover, they were not updated with the details. Users have to visit multiple sites to get their computer parts and need to search the web to check the compatibility. No user guidance or details of the products available on their sites. Users have to visit the vendor's permission to get more details. Users from the different geographical area have no option to find the best place nearby them to get an assembled computer. To overcome more and more incompatible, not user-friendly web sites, the current website project is proposed, and it is expected to solve these problems and provide a better future.

Chapter 3

3 Methodology

3.1 Analysis

It is important to find the stakeholders involved in this project first. Since this is a project developed for the benefit of the general public and vendors without the limitation, it is necessary to identify their needs in general in the first stage. Once the stakeholders start to use the web platform, it can be improved by gendering their requirements further. Initially, it is important to list the functional and not functional requirements.

3.2 Stakeholders Analysis

Potential clients of this project are the general public and the vendors who is involved with this web platform. The general public who is involved with this project simplified as a customer from now on. Customers need a system that they can assemble a computer or purchase a computer part without visiting a vendor's place. Customers always look for varieties of computer parts and details in a single platform before they assemble a computer.

The next potential stakeholder is the vendors who are looking forward to selling their products and grow their business. The project allows them to list available products that they have in the web platform. It is not necessary for them to remember all the products and the details to give information when a customer arrives at their place, by listing them on the website. They allow multiple customers to see their products at a time, and it is allowing them to increase the business volume.

3.3 Functional Requirements

Functional requirements are a statement of services the platform should provide and how they should react when there is an input. It may also clearly express what the platform should not do. This platform should provide common features of a regular e-commerce platform. It has been considered that the initial appropriate functionality of this project includes browsing and purchasing products, vendor management, and customer management.

3.3.1 Customer management module

- User (customer and vendor) able to register by providing their information
- User can log into the platform securely by validating username and password.
- The system has provided facilities to add, edit, view, and delete user information.
- The system has provided options to assign user-based access privileges based on their level and category
- User can change their details and log out from the system.

3.3.2 Product display module

- User is able to see the product that required for computer assemble
- User can select the products one by one for assemble
- The system has provided facilities to backward and change the selection
- The system has provided facilities submit the selection and sign-out from the system

3.3.3 Budget based suggestion module

- The system has provided facilities to add customers budget
- The system has provided a suggestion on parts for a computer to be assembled within the budget
- User can edit and see the suggestion based on their requirements

3.3.4 Cart and payment module

- User is asked to provide to fill a form with delivering and contact details
- The system has displayed the order summary details
- The system has provided facilities to user to make the payment by providing their card details
- Once the payment is made, another summary is shown along with a successful purchase message.

3.3.5 Product details update module

- The vendor can login to the admin panel with their username and password
- The system has displayed the menu to update product details based on their access privilege

- The system has provided list of forms to update the product details into the system

3.3.6 Admin Module

- Admin can login to the admin panel with their username and password
- The system has displayed all the menu and details
- The system has provided a list of forms to update the product and customer details into the system

3.3.7 Reporting module

- The system has provided sales and system administration related reports

3.4 Non-functional requirements

It is important to mainly analyze the platform capabilities and attract the customer. For this reason, it is important to focus on non-functional requirements. Other areas that need to be focused are reliability, performance, usability, and security.

- **Reliability**

  Requirements about how often the system fails. It is important to minimize the failure of the system and make sure that the system should be available when requested by users

- **Performance**

  Performance requirement is the speed of the system. The system should consider the resources required, response time, throughput, and others having to do with performance.

- **Security**

  Security requirements are including the production of the system, and it is data. The system should ensure unauthorized access to the system are not allowed, and accidental or malicious damage of the system integrity are not allowed.

- **Usability**

  Usability requirements are how difficult or easy to access the system.

3.5 Methodology

Using trusted and standardized approach to web development would go a long way to helping avoid the mistakes. We need a better way of doing things. The solution should fulfill the client's requirements, and a proven way of the development process will make things easy and make sure the best final product.

There are a lot of methodologies in practice, but all of them are not suitable for website development. When choosing a methodology, one must consider a few factors such as complexity, size of the project, time, cost, and so on. This project is going to be developed using agile methodology since it is a lightweight methodology. Some of the other popular agile methodologies are XP, scrum, crystal, FDD, and DSDM. Out of these, scrum is chosen for this project development.

3.5.1 Scrum

Scrum is an agile process. It is consisting of phase and activities. The phases are planning, staging, development, and release. The Planning and staging help to prepare the workload and development done iteratively. Scrum has three main roles that are product owner, scrum master, and team.

The scrum process consists of followings.

Sprint – Set period of time which defined work needs to done and ready for review.

Daily standup – A standup meeting where the statues are exchanged, progress and drawbacks are shared.

Product backlog – List of thing needs to be done during the project work.

Spring planning meeting – Where each sprint is planning.

Sprint review meeting – Where the results of the sprint are reviewed.

Product owner – the person who is responsible for maximizing the value of the product and deliver the product to the customer.

Development team – The team that develops the system

Scrum master - The scrum master is a servant or the leader for the scrum team. Scrum master is responsible for the Scrum process and productivity.

The figure below shows the flow of the scrum.

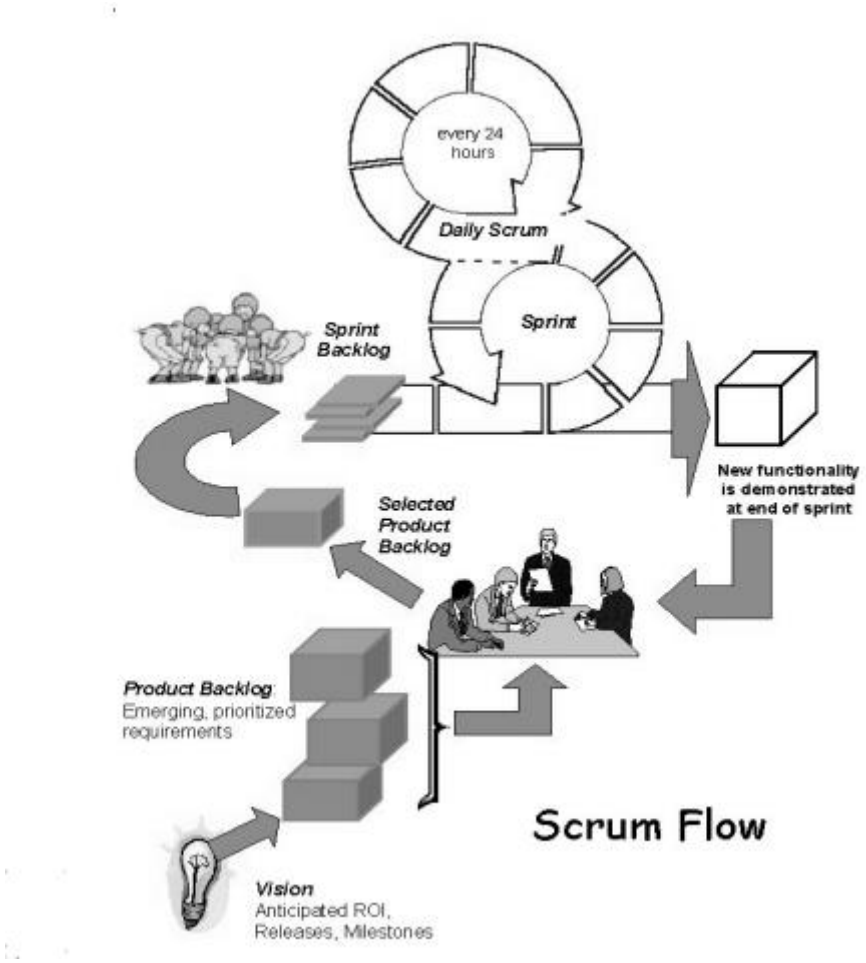

Figure 3.1 Scrum Flow

3.6 Use Case Diagram

After the analysis, the use case diagram is drawn to identify the actors and their requirements.

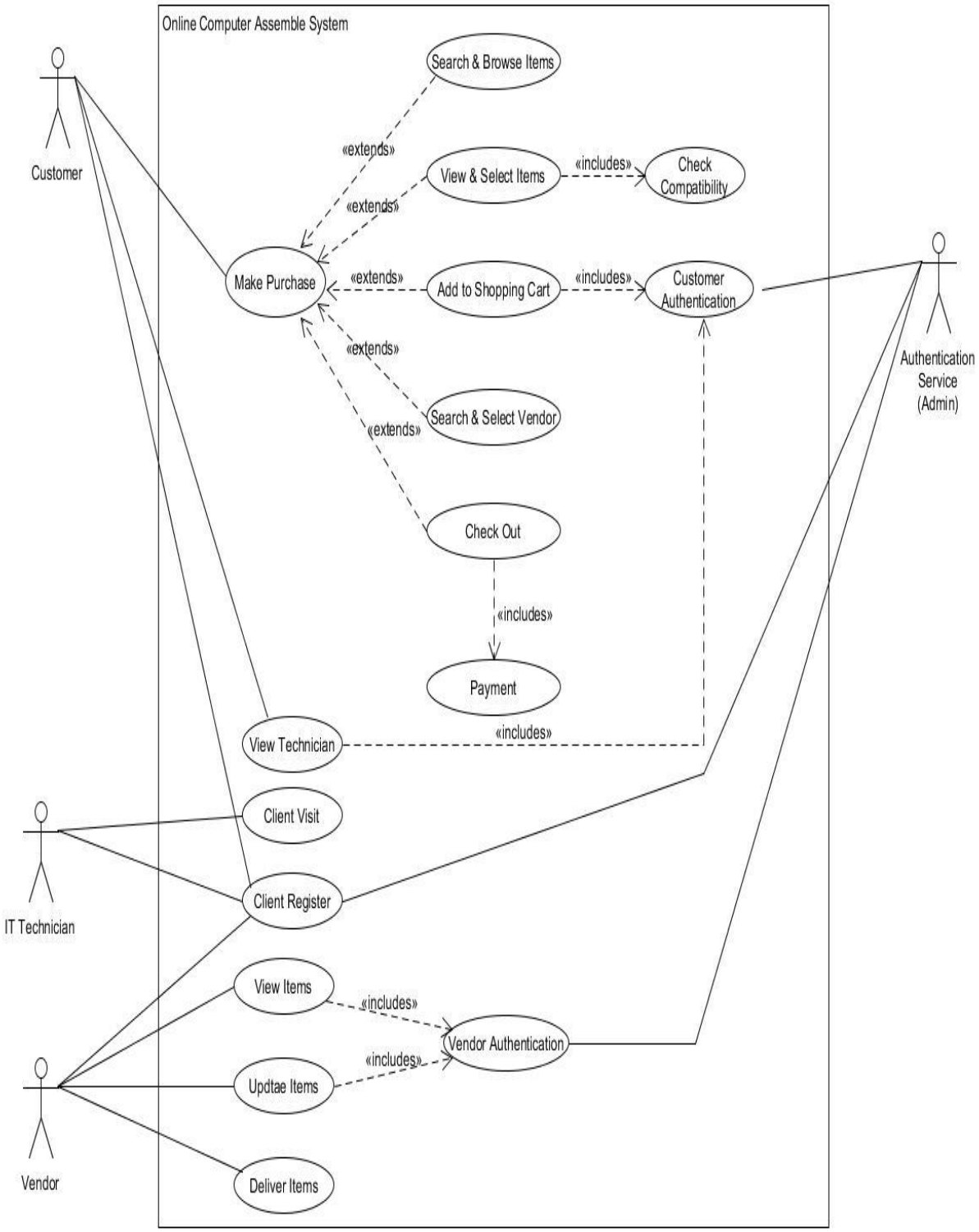

Figure 3.2 User Case Diagram

3.6.1 Actors

There are four actors who are involved in the application. These consist of the user who represents the end of the user application, and the system represents where the application is involved in functionality which requires some business logic, the vendor and the IT technician acts as a service provider of the website.

3.6.2 Use Cases

Use-Case ID:	UC-01
Use-Case Name:	Client Registration and Login
Description:	The user, vendor and the IT technician need to be registered with the system in order to start their operation with the website
Primary Business Actor:	• User • Vendor • IT Technician
Other Interested Stakeholders:	• System
Main Success Scenario:	• Select registration button from the website • Fill the required details such as email address, Username & Password. • Click the registration button • Notification message of registration confirmation sent to email • Receiving registration confirmation email • Click Login button • Enter the username and the password • Login to the website
Extensions	• Not filled the mandatory field on registration page • Message highlight and displayed that mandatory fields should fill • Enter weak password • Message highlight and displayed to enter strong password • Enter mismatch password confirmation • Message highlight and displayed to enter correct password • Notification message of request not sent due to system error
Priority	High

Table 3.1 Use case 1

Use-Case ID:	UC-02
Use-Case Name:	Browse and select items
Description:	The user has to browse and select the items that need to be assemble
Primary Business Actor:	• User
Other Interested Stakeholders:	• None
Main Success Scenario:	• Select relevant category from the menu bar • Type the relevant item on search bar • Select the main item from the image and details display. • Mark the final product that user required • Select the compatible sub items that display. • Check the pricing • Change the product if the price not convenient. • Select budget-based section. • Enter your budget range • Select the set of items from proposed list • Confirm the details to move payment option
Extensions	• Message display item not available • Message display item not found • Message display that product is not compatible • Message that product is changed • Message highlight and displayed to enter strong password • Message display that products not available within the budget • Confirmation message of items selected
Priority	High

Table 3.2 Use case 2

Use-Case ID:	UC-03
Use-Case Name:	Place the Order
Description:	Once user select the product, have to select the best nearest vendor and the payment mode to finalized and complete transection.
Primary Business Actor:	• User
Other Interested Stakeholders:	• System • Bank
Main Success Scenario:	• Search for a best, nearest vendor • Select the vendor • Confirm the vendor • Select the payment mode • Confirm the payment mode • Enter the password again • Complete the transection • Confirmation message of truncation successful • Receiving confirmation email
Extensions	• Message display vendor not available • Message display vendor is too far • Message display payment mode selection confirmation • Enter wrong password • Display the password error • Confirmation message of truncation unsuccessful
Priority	High

Table 3.3 Use case 3

Use-Case ID:	UC-04
Use-Case Name:	Deliver the order
Description:	When the computer assemble is completed, vendor need to deliver the item on time to customers place
Primary Business Actor:	• Vendor
Other Interested Stakeholders:	• User
Main Success Scenario:	• Assemble the computer • Find the deliver mode • Deliver the item • Update the system about the delivery • Sending email about the delivery • Receiving the delivery confirmation email • Rating the vendor
Extensions	• Delay in the delivery • Send an email about items delay • Update the system about delay
Priority	High

Table 3.4 Use Case 4

Use-Case ID:	UC-05
Use-Case Name:	Preparing ordered Items
Description:	Once user placed the order, vendor will get a notification email with the details to prepare the order.
Primary Business Actor:	• Vendor
Other Interested Stakeholders:	• User
Main Success Scenario:	• Receiving an order email • Check the details from the web site • Send the confirmation email to user • Prepare the order and assemble the computer • Update the delivery details on web site • Received the payment

Extensions	• Product out of stock • Send emails to user about out of stock • Message display on in appropriate delivery details • Warning email of delivery details not update • Delay in the payment receive
Priority	High

Table 3.5 Use Case 5

Use-Case ID:	UC-06
Use-Case Name:	Select an IT Technician
Description:	When user needs to assemble the computer from his/her place, user can select a technician nearby from the system.
Primary Business Actor:	• User
Other Interested Stakeholders:	• Technician
Main Success Scenario:	• Select the technician from menu • Select the location from drop down • Find the rating of the Technician • Select the Technician • Send an email by clicking the email tab • Receiving confirmation notification
Extensions	• Could not find any in the menu • Location not available • Rating not available • Message notification that technician not available • Email not sent notification message
Priority	High

Table 3.6 Use Case 6

3.6.3 Entity Relationship Diagram

Entity relationship diagram shows the entities involves in this project and the relationships between them.

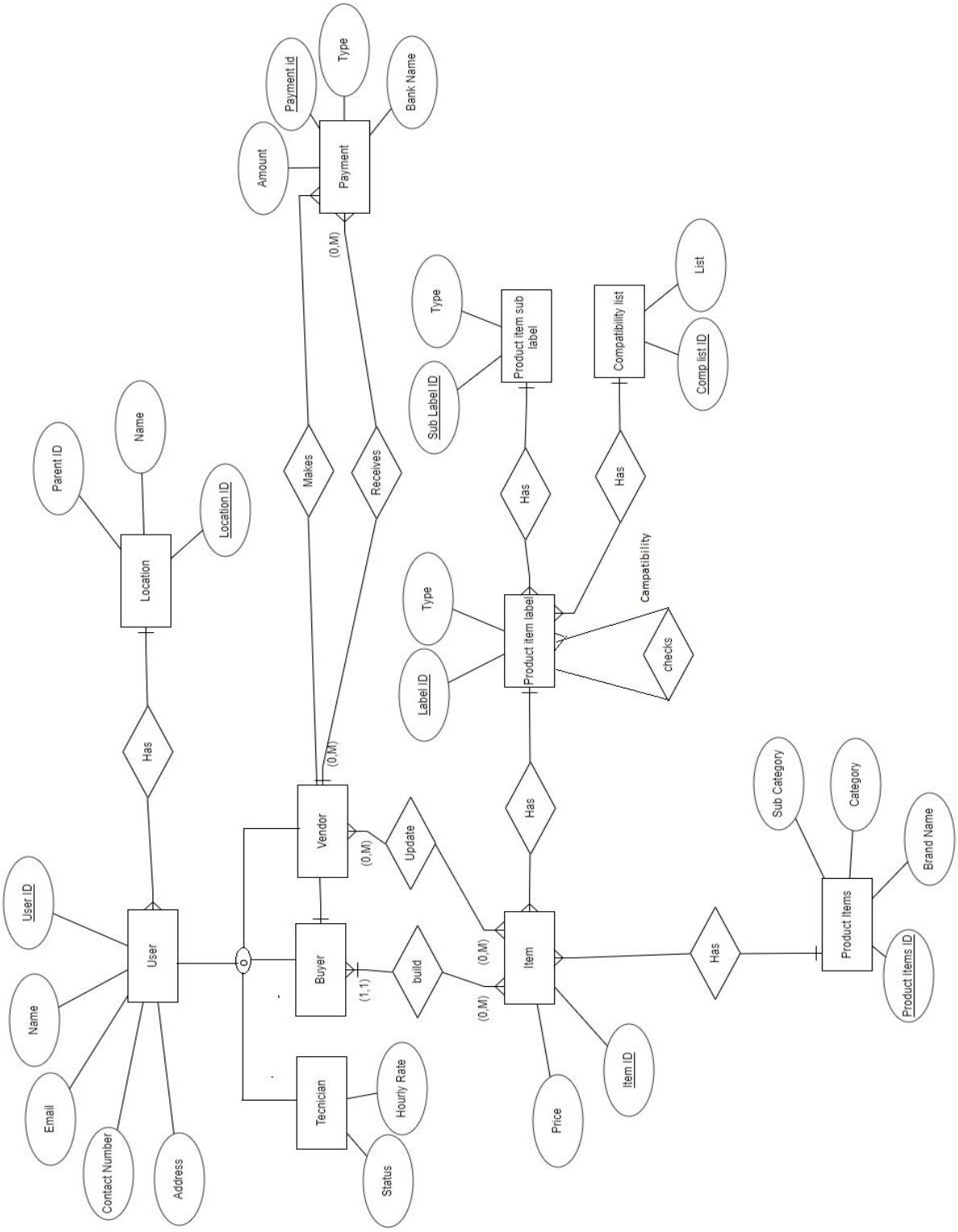

Figure 3.3 ER Diagram

3.6.4 Database design

Database design is one of the main components of the project. Very good database preparation lead to improve the data performance, integrity, and reduce redundancy.

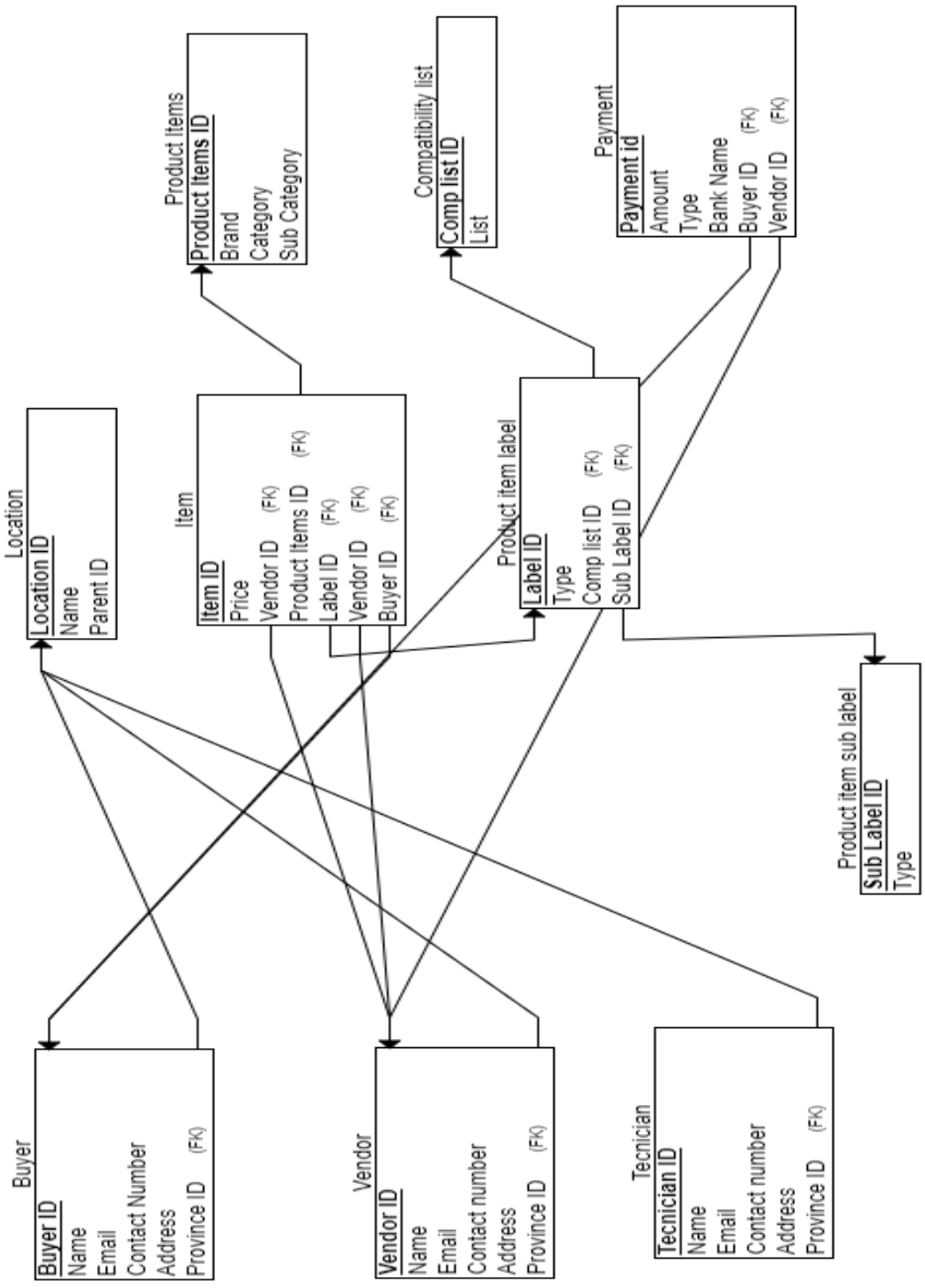

Figure 3.4 Database Diagram

3.7 Database

As a database for the project using MySQL, that is an open-source relational database. A relational database is a type of database management system (DBMS) that stores data in the form of related tables. Relational databases are powerful because they require few assumptions about how data is related or how it will be extracted from the database. As a result, the same database can be viewed in many ways. The most common options when choosing a DBMS are Oracle, MySQL, and PostgreSQL. Here is a table that summarizes the pros and cons of this database.

Systems:

	Oracle	**MySQL**	**PostgreSQL**
Pros	- Fastest commercial DBMS -Writers never block readers - Transactions, rollbacks, and sub selects support.	- Open source - Low machine requirements - Easy to setup	- Open source - Easy to administer - Transactions and rollbacks support
Cons	- Not open source (Oracle licenses are expensive)	- No transactions, rollbacks and sub select.	- No support to fault Tolerant installations.

Table 3.7 Database comparison

The main difference between these three systems is that MySQL and PostgreSQL are open source while Oracle is not. Oracle offers more advanced functionality than the other two systems: it is the fastest, supports transactions (sets of basic operations considered as single operations) and has enterprise-level data protection and distribution capabilities, such as full-scale clustered replication. On the other hand, of all open-source database solutions available, MySQL is the most impressively complete, easy to set up, a query optimizer and essential data integrity controls, etc. MySQL and PHP used together to get better output for this project.

3.8 PHP

The main language that is used is PHP (Hypertext Preprocessor). PHP is a server-side scripting language that is embedded in HTML. It is used to manage dynamic content, databases, session tracking, even building entire e-commerce sites. It is integrated with a number of popular databases, including MySQL, PostgreSQL, Oracle, Sybase, Informix, and Microsoft SQL Server. PHP is pleasingly zippy in its execution, especially when compiled as an Apache module on the UNIX side. The MySQL server once started, executes even very complex queries with huge result sets in record-setting time PHP supports a large number of major protocols such as POP3, IMAP, and LDAP. PHP4 added support for Java and distributed object architectures (COM and CORBA), making n-tier development a possibility for the first time.

3.9 Brackets

For the programming part of the project, Brackets text editor has been users. Brackets is a lightweight, yet powerful, modern text editor. Instead of jumping between file tabs, Brackets allows opening a window into the code we care about most. Want to work on the CSS that applies to a specific ID? Put your mouse cursor on that ID, push Command / Ctrl+E and Brackets will show you all the CSS selectors with that ID in an inline window so can work on code side-by-side without any popups.

Get a real-time connection to your browser. Make changes to CSS and HTML, and it will instantly show those changes on screen. Also, see where your CSS selector is being applied in the browser by simply putting your cursor on it. It's the power of a code editor with the convenience of in-browser dev tools.

Work with preprocessors in a whole new way. Brackets the best code editor for preprocessors out there. With Brackets, we can use quick edit and live highlight with LESS and SCSS files which will make working with them easier than ever.

Chapter 4

4 Implementation

4.1 Introduction

The implantation section is a very extended phase in the software development life cycle. It is describing how the design phase has to turn into an executable system effectively. PHP is chosen as the main language because it is widely used and best suitable for dynamic and interactive Web development, it is easy and can be easily modified.

4.2 Development tool

The XAMPP server version 3.2.3 is used as a development environment. It is an open source free web development environment. It is allowed to create web sites along with Apache server, PHP, and MySQL database language. In XAMPP, PhpMyAdmin allows us to create and manage our database for development. Brackets and notepad++ are used as a source code writer.

4.2.1 Hardware and Software requirements

- **Web server**

  Web server is the main hardware component to host the website

- **Database system**

  A cloud-based or in-house database is required to store the data

- **Web browser**

  I web browser from any computer is required to access the website

- **Domain name**

  A domain name is required to search the website with the specific name

- **Internet connection**

  An uninterrupted internet connection is required to access the website continuously

4.3 User Interfaces

4.3.1 Front page of the website

The main interface of the web site is allowed the user to choose pc to assemble, pc parts, and service based on their requirement. Based on the selection, it will redirect to the main window.

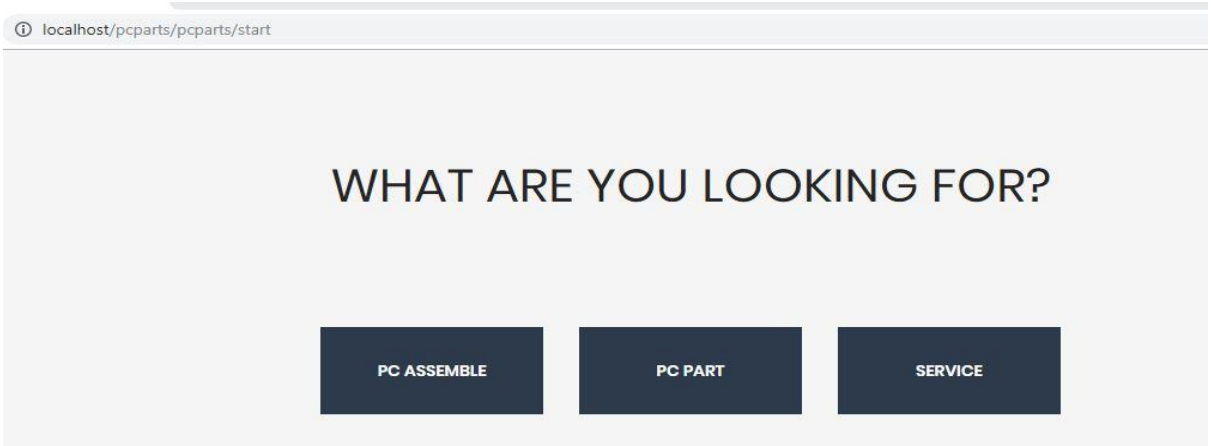

Figure 4.1 Front page

4.3.2 Home Page

The Home page is displayed in the below figure. Home page displayed the items in the body based on the selection in the front page. Customer can select and add the parts to their purchasing list.

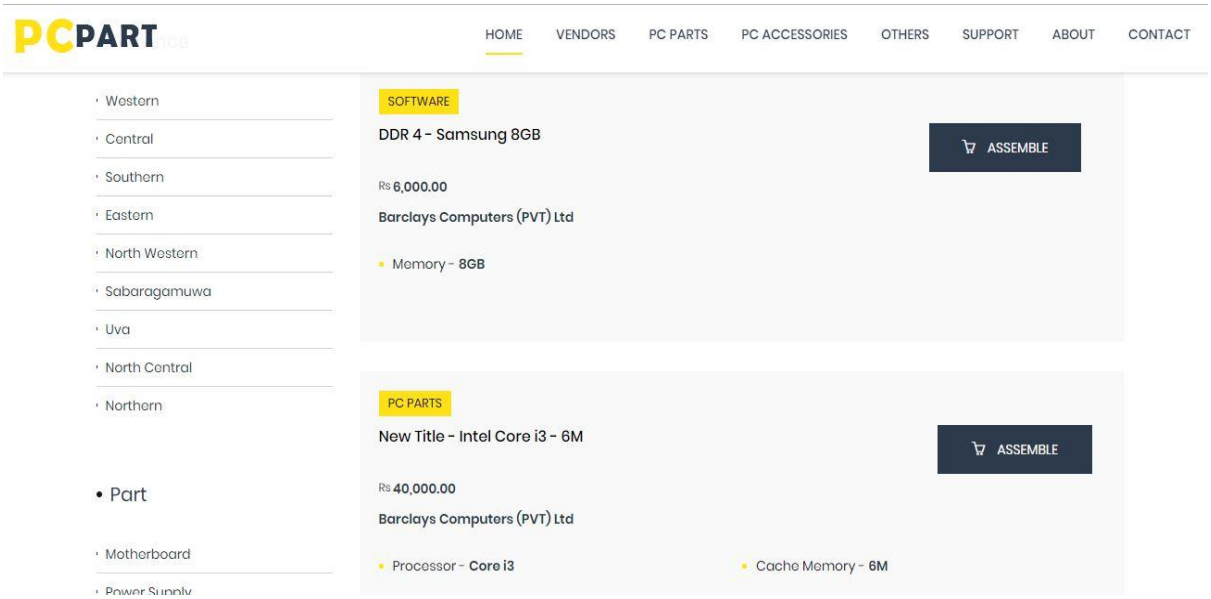

Figure 4.2 Home page

4.3.3 User login Interface

In the home page right top corner, login in button is available. By clicking the login button, user, vendor, or technician can login to the website. Below figure shows the login interface.

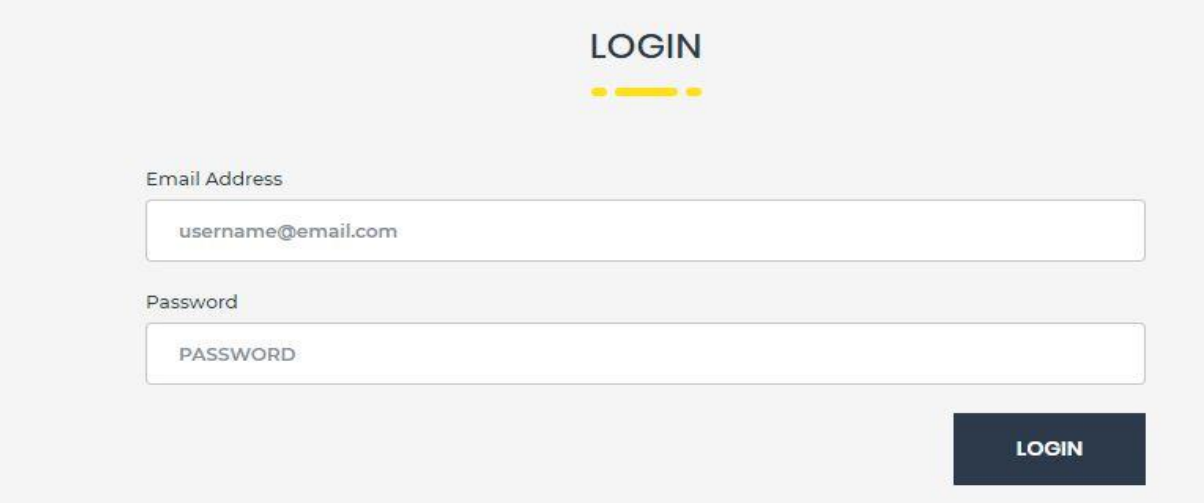

Figure 4.3 Login interface

4.3.4 Side bar menus

In the home page, sidebar menus available in the left side. If the user selects the PC to assemble first in the front page, user redirected to vendors menu to select the vendor as the next option. If user select PC parts, user redirected to parts menu.

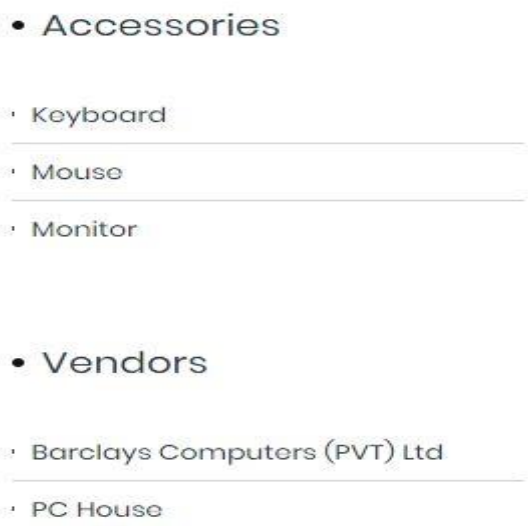

Figure 4.4 Vendors menu

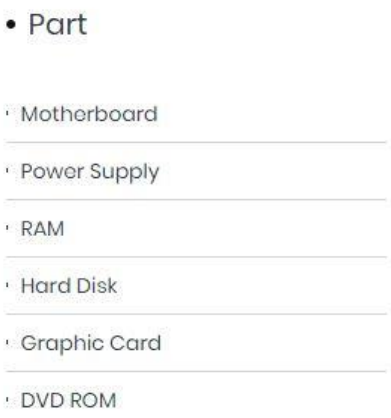

Figure 4.5 Parts menu

4.3.5 Compatibility Display Page

Once the customer selected the parts, customer can select my pc option in the right top corner to view the selected items and check the compatibility of the selected item.

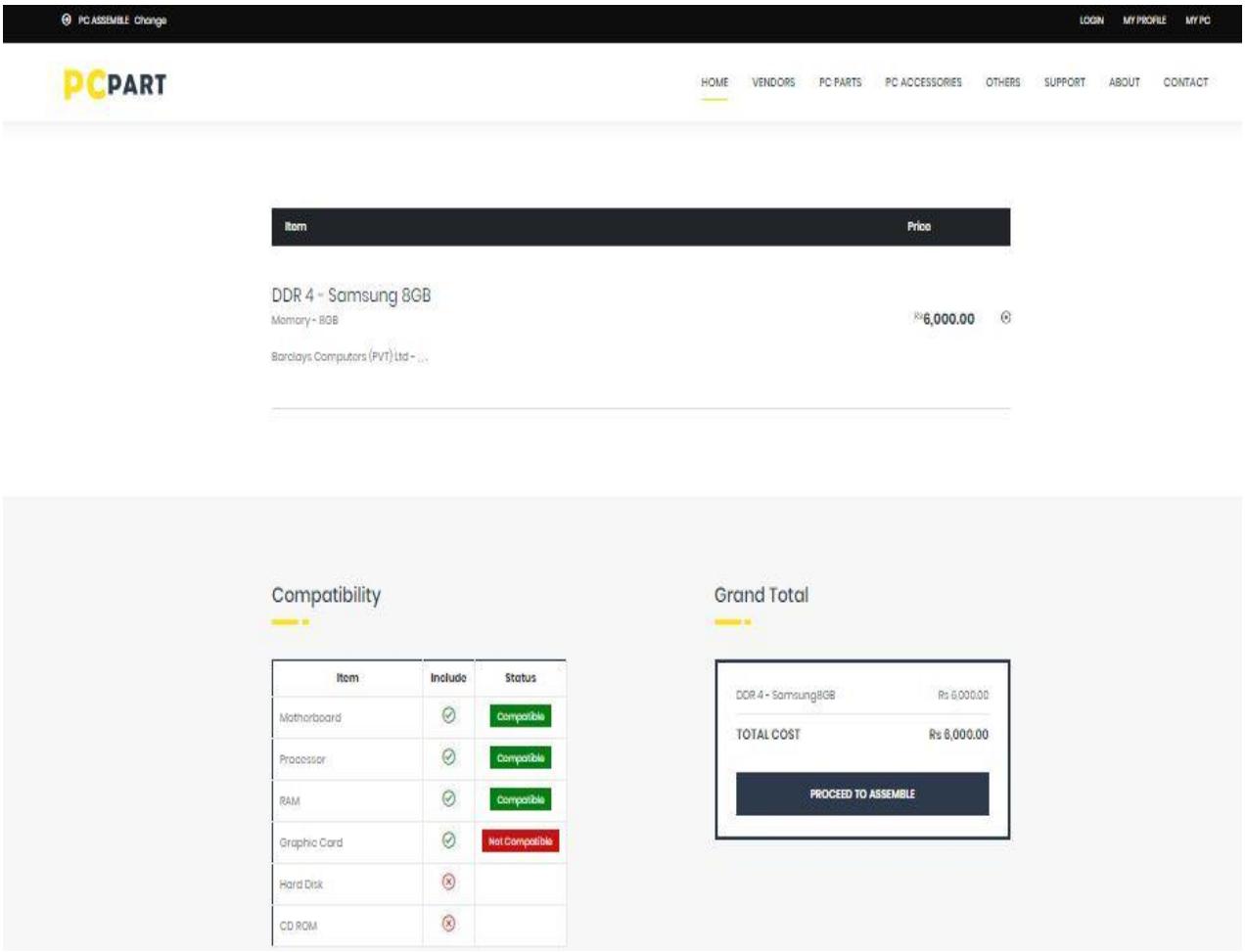

Figure 4.6 Compatibility display page

4.3.6 Billing information page

Once customer selected all the required part and proceeded to assemble of purchase the individual part, customer redirected to the billing page to fill the billing and transport details.

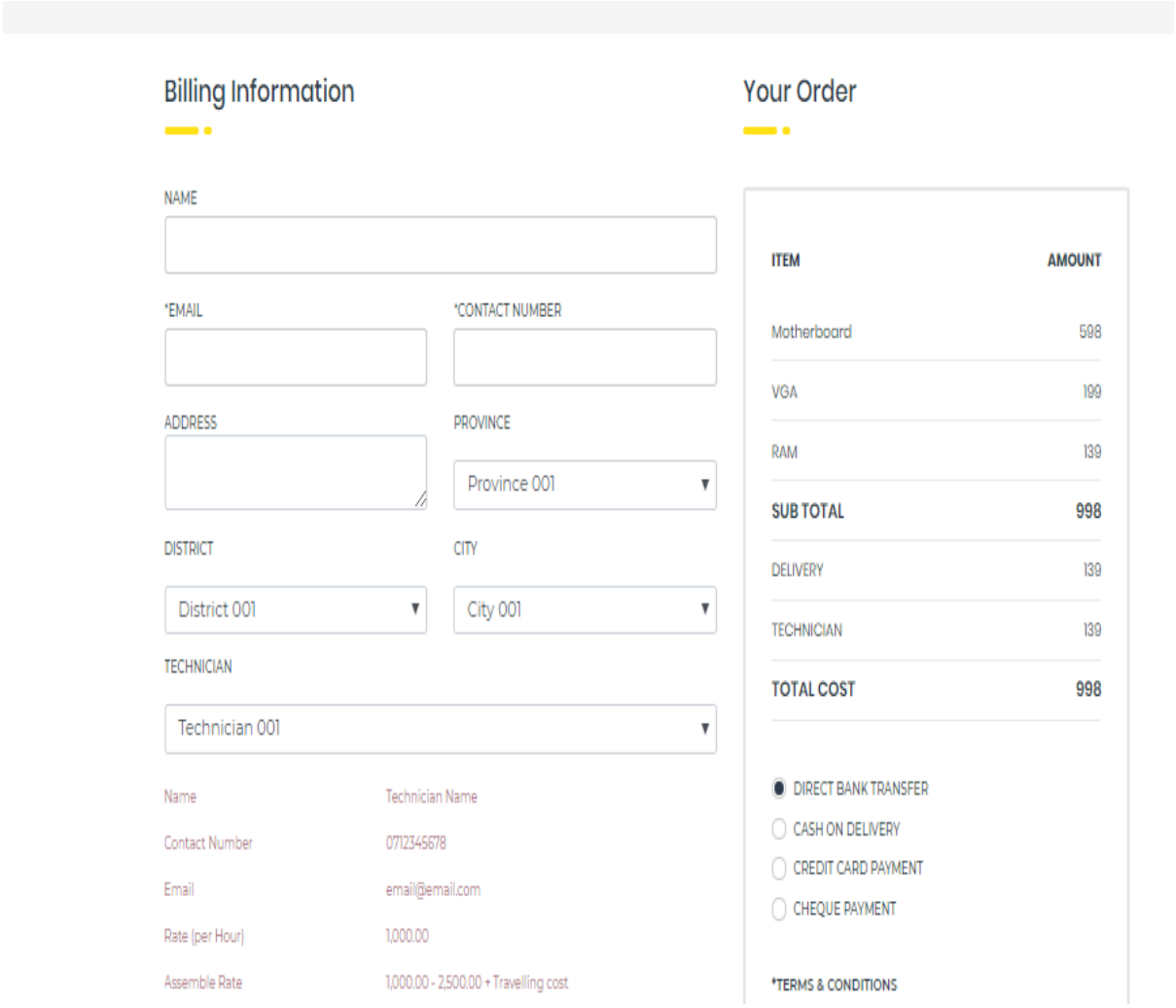

Figure 4.7 Billing Information page

4.3.7 Confirmation Page

Once Customer filled the billing details, can move the confirmation page by click proceed. The confirmation page displayed the final details of selected products and the billing information to proceed and confirm the order.

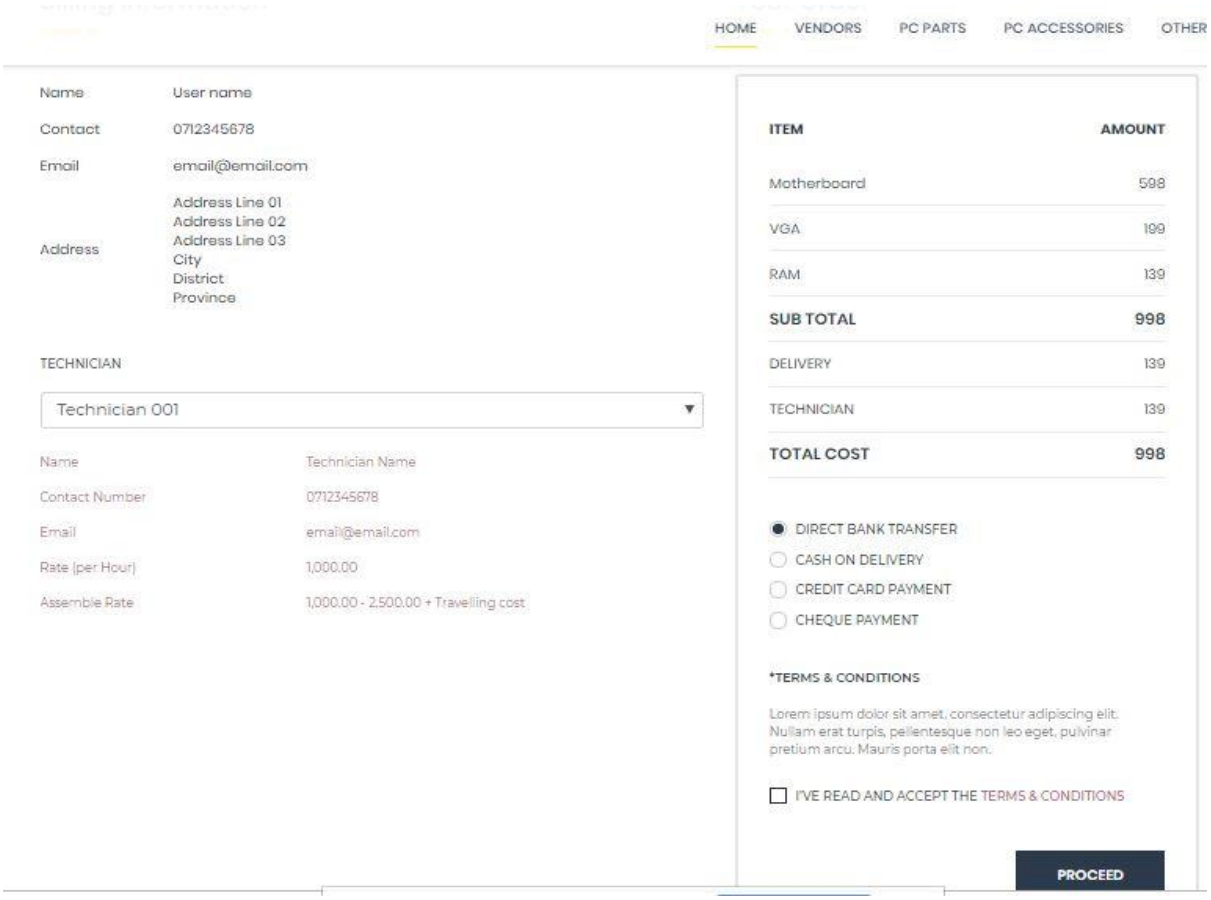

Figure 4.8 Confirmation page

4.3.8 Search option

Below figure shows the search option to search the items in the side bar menus and the pc parts customer required to assemble or purchase.

Figure 4.9 Search option

4.4 Admin Panel and Dashboard

Admin panel is to control the website, and it is users. The vendor and IT technician have access to admin dashboard with limited access based on their role. Admin dashboard gives the options to add product details by admin and vendor. The dashboard allows admin to manage user (customer, vendor, and technician) details, reports generation, and order details.

4.4.1 Admin Dashboard login interface

Admin login interface showed in below figure. It is important to login to get access to the admin dashboard by providing their username and password.

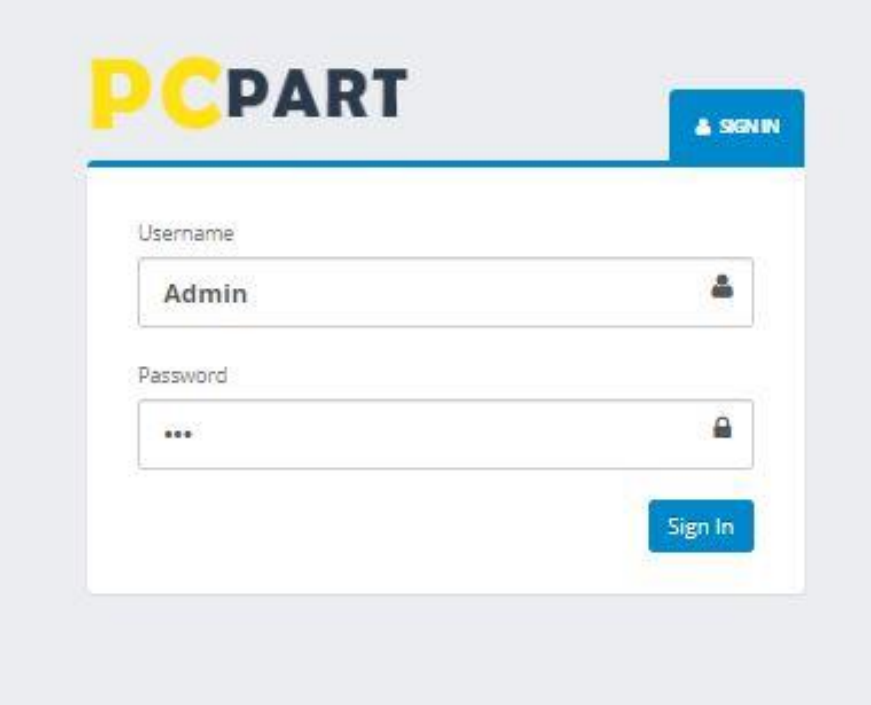

Figure 4.10 Admin Login Interface

4.4.2 Admin Dashboard Home Page

Below figure shows the admin dashboard home page. After successful login users are directed to the dashboard home page. In the home page, inserted product items are listed with the option to view, edit, and delete them.

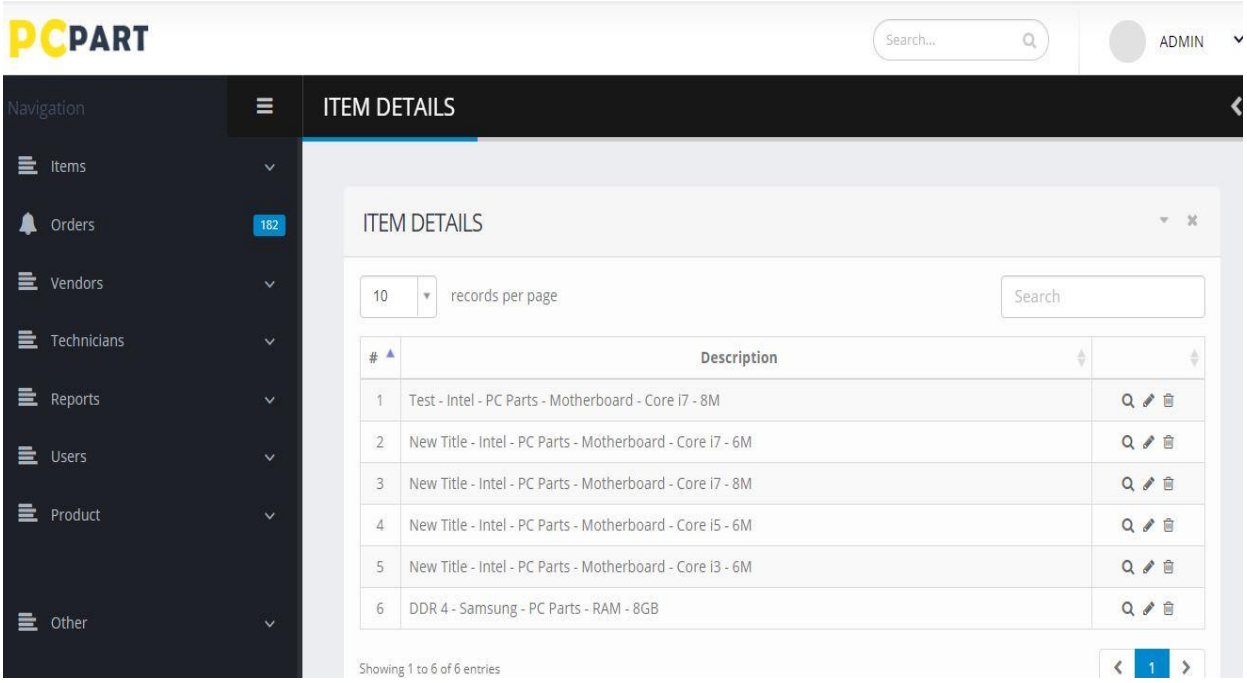

Figure 4.11 Admin Home Page

4.4.3 Add product details interfaces

Below figures represent the interfaces of adding product. Admin or the vendor can add the product brand, category, and subcategory by filling the forms.

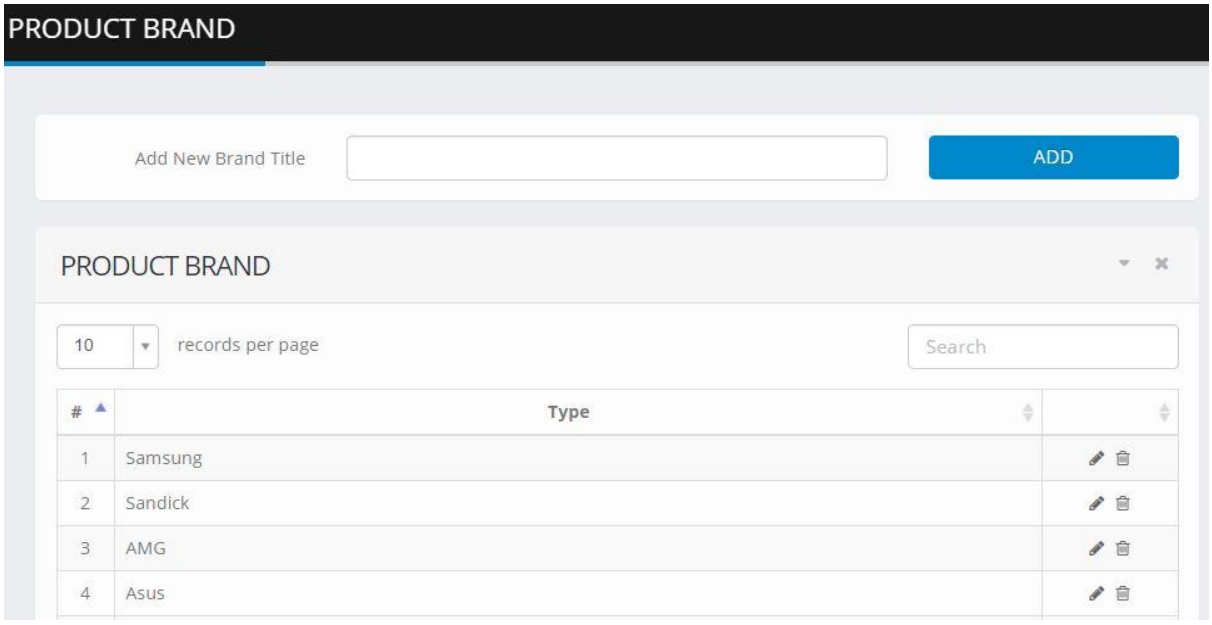

Figure 4.12 Product brand

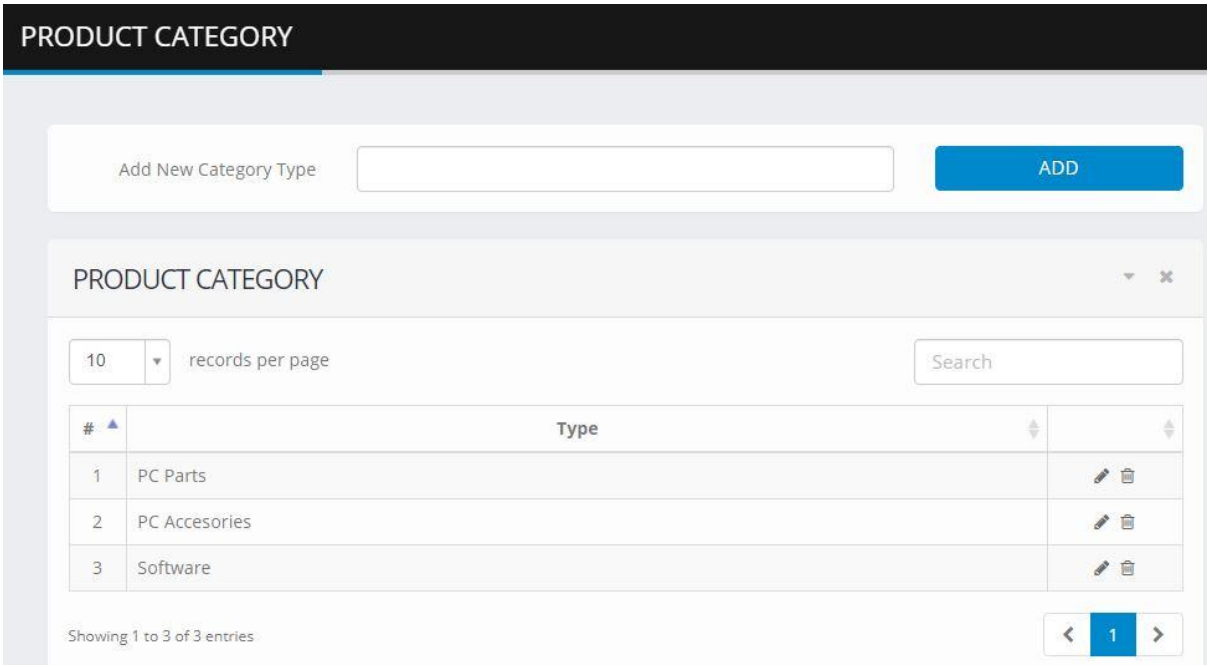

Figure 4.13 Product Category

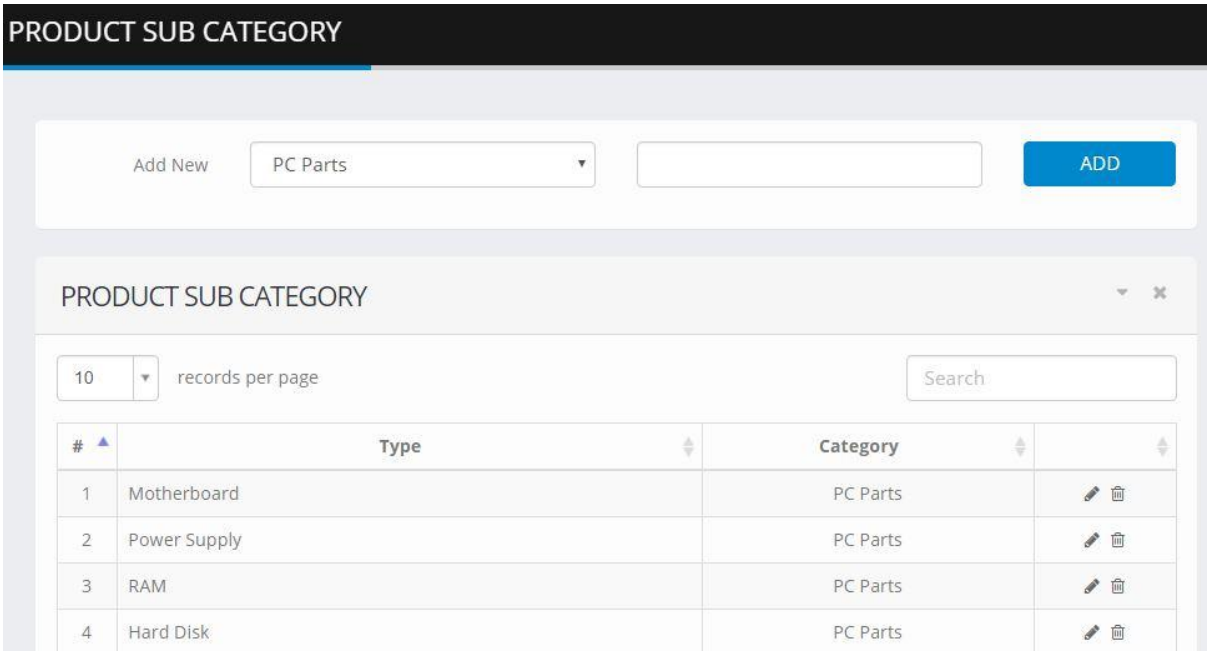

Figure 4.14 Product Subcategory

4.4.4 Add and display vendor and technician details interfaces

Below figures show the interface to add vendors details and display them. Same as vendors details system allows to add IT technician details and display them.

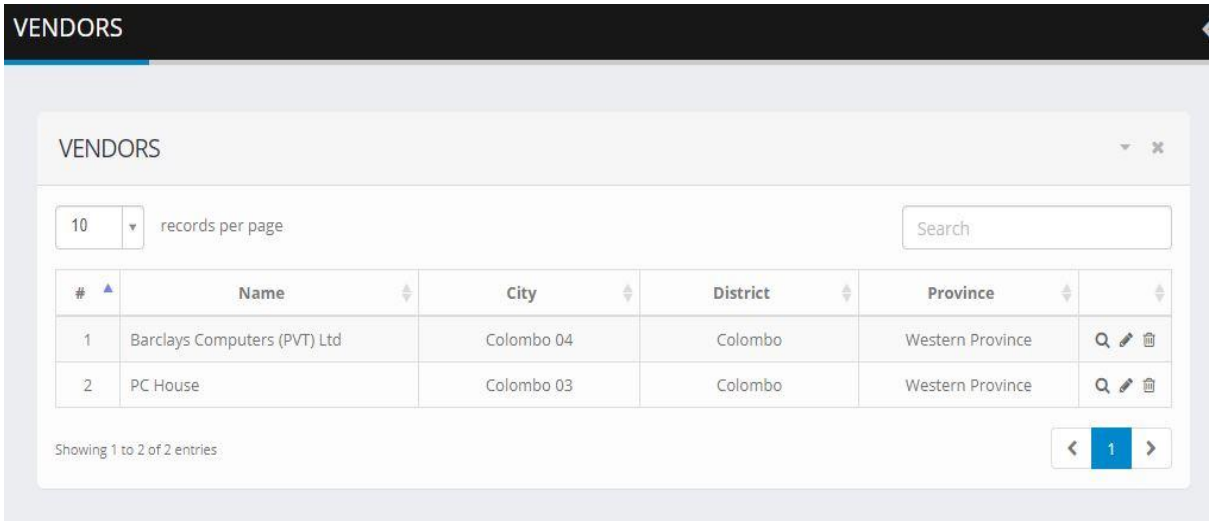

Figure 4.15 Vendor's Details

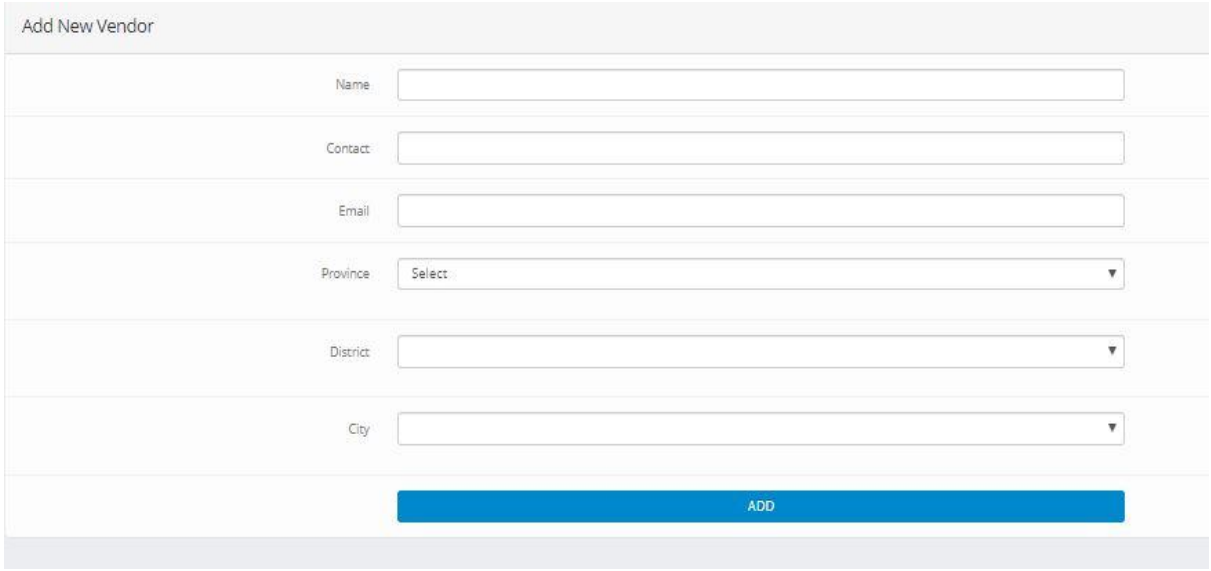

Figure 4.16 Add New Vendor

Chapter 5

5 Evaluation

5.1 Introduction

Once the system is implemented, it is important to evaluate and test the system. When evaluate and test the system, can identify the limitations, error, drawbacks, and opportunities. The section describes the software testing that has been run against the system. In order to check the actual results match user's expectations, software testing helps. Software testing is a validation and verification process.

- **Software Validation**
  It is a process of testing whether we are building the right product.
- **Software Verification**
  It is a process of testing whether we are building the product right.

5.2 Techniques of Software Testing

5.2.1 Black Box Testing

It is a technique of testing the internal structure of the system without the implementation of knowledge. Tester does not have access to the source code. The tester will interact with the system by providing inputs and expecting relevant output.

5.2.2 White Box Testing

It is a technique of testing the details of internal logic and structure if the code. This is usually done by the software developer. Tested should have knowledge of coding and need to have access to the source code.

5.3 Type of Testing

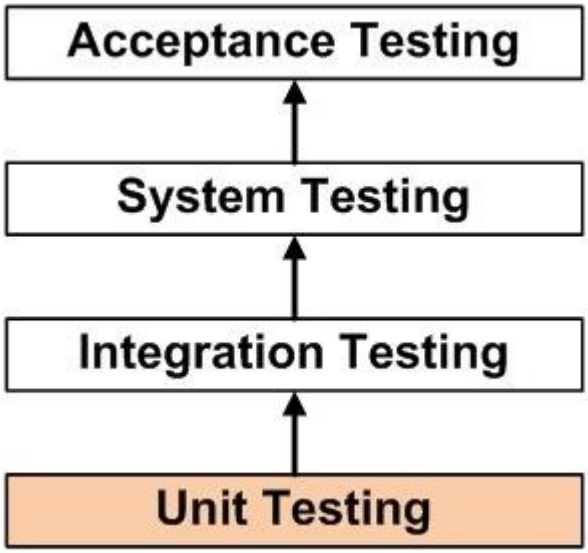

Figure 5.1 Type of Testing

5.3.1 Unit Testing

It is a level of testing where an individual unit of the system is tested. The purpose is to validate that each unit of the software performs as designed. A unit a small part of the system and it usually has one or few inputs and a single output. The unit test is done by white box testing method.

Under the unit test, below module of the computer assembles web platform mainly tests.

- Login Module
- Registration module
- Admin module
- Products input module
- Product display module
- Compatible test module
- Budget based suggestion module
- Payment module
- Search module
- Report generation module

5.3.2 Integration Testing

It is a system testing that individual units are combined as a group and test. The purpose of this level of testing is to expose faults in the interaction between integrated units. For integration testing, it can use white box testing, black box testing, or gray box testing. After the unit test over, modules are integrated one by one till all the modules are integrated, to check the compatibility.

5.3.3 System Testing

It is a system testing that complete and integrated system is tested. The process of testing an integrated system to verify that it meets specified requirements. The black box test method is usually using for system testing. An independent tester does this test usually.

5.3.4 Acceptance Testing

It is a system testing where the system is tested for acceptability of the user. The purpose of the testing is evaluating the system with the business requirements and assess product meets the requirements and works as the customer expected. The black box test method is usually using for acceptance testing.

5.4 Test Plan and Test Cases

It is important to create a test plan to test the system as it works, we expected. Creating test cased is most important and test the system. Test cases are including, the operations and the expected output. If the output comes as expected, test cases consider as successful.

Table 5.1, 5.2, and 5.3 shows some test cases.

Test Case - 1 - Login to the system			
Test Number	Test Data	Purpose	Result
1	Enter valid username and password and click login button	login to the index page	Work as expected

2	Enter invalid username and valid password and click login button	Error message pop up	Work as expected
3	Enter valid username and wrong password and click login button	Error message pop up	Work as expected
4	Enter Wrong User & password and click login button	Error message pop up	Work as expected
5	Click forget password link	Password reset form load	Work as expected
6	Click logout button	Close the session and redirect to login page	Work as expected

Table 5.1 Test case for Login to the system

Test Case - 1 - User registration			
Test Number	Test Data	Purpose	Result
1	Click sign up button	Load user registration form	Work as expected
2	Enter all required fields and click the signup button	Displayed message "Account created successfully " and redirect to login form	Work as expected
3	Missed one required field and click the signup button	"Fields required" error message pop up	Work as expected
4	Enter already registered user details and click the signup button	"User already registered" error message pop up	Work as expected
5	Enter inappropriate email address	"Incorrect email address" error message pop up	Work as expected

Table 5.2 Test case for User registration

Test Case - 3 - Select PC parts for assemble			
Test Number	Test Data	Purpose	Result
1	Selected parts one by one starting from the motherboard	Selected part added to purchase list	Work as expected
2	Missed the selection of RAM	Warning message pop up and allow the user to select again or ignore	Work as expected
3	Completed the parts selection with one missing parts	A message pops up user to confirm	Work as expected
4	Completed the part selection without fill the delivery details	Warning message pop up and load the delivery details fill up the form	Work as expected
5	Completed the part selection with all necessary details and submit the request	"Successfully submitted “message pop up and display the summary details	Work as expected

Table 5.3 Test case for Select PC parts

5.5 User Evaluation

User evaluation performed by selecting different users that use the system. In this platform, the normal public considers as the customer and computer shop owners are considered as the vendor. Apart from that, the IT technician also picked from the general public who are the other set of users. The questionnaire for the evaluation shared and collected the result. Collected result has been summarized.

According to the summary result, most of the user is happy with the system. Most of them marked “very good” for most of the evaluation item. Most of the team are appreciated with the idea and the way it is developed. There are few users give their suggestion for a few of evaluation items to improve. The valuable suggestions given by the evaluated users kept for the future enchantments, and some of them are corrected.

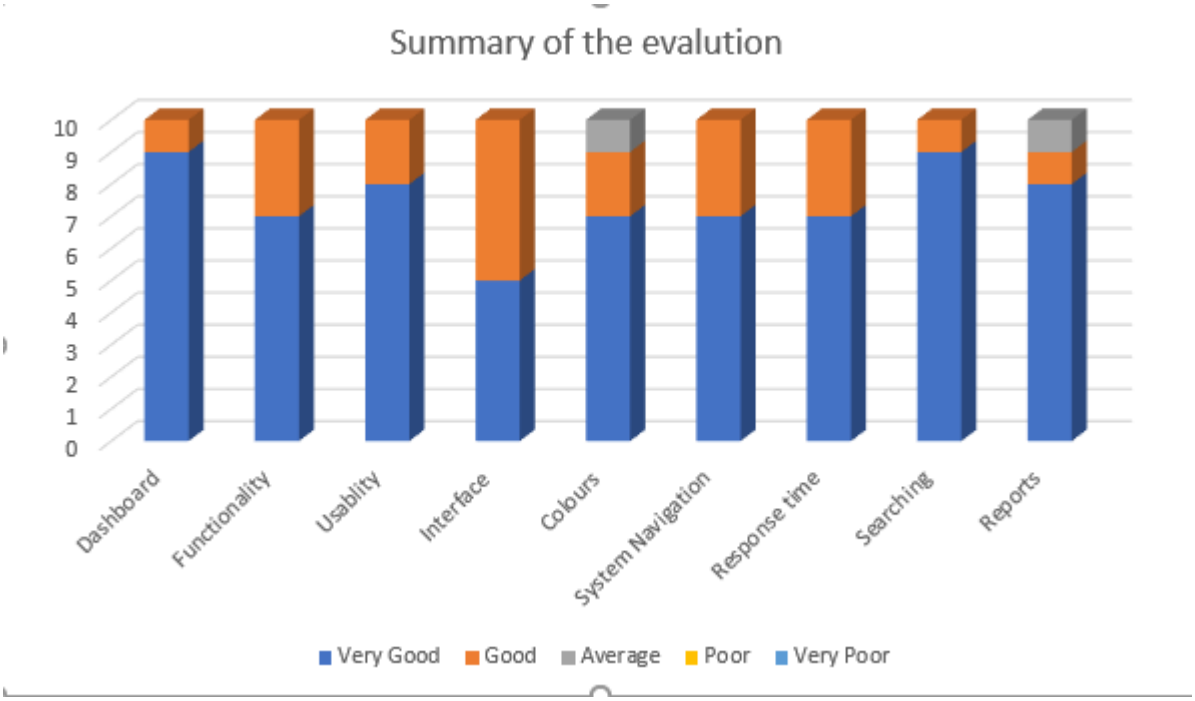

Figure 5.2 Summary of evaluation

Chapter 6

6 Conclusion

6.1 Introduction

Web platforms are born in order to make customers purchasing experience online and maximize the business profit of vendor. With the new technological advancement, it is important to have a web platform to increase the business and give varieties of choices and options to the customers. Customers are happy to have a digital platform to purchase items since it is more flexible and time-saving. Almost all the customers are able to access the web platform in most; therefore, it is convenient for them to do their buying activities online. When it has come to computer parts purchasing and assembling, customers are getting the same benefits by doing it on a web platform.

This project is developed by identified that there are more benefits for the customers as well as the vendor. Initially, the analysis identified how the system going to improve the customers and vendors experience related to computer assembling, the system is proposed and start to develop with the necessary phases. By identified functional and non-functional requirements, it is developed completed in the implementation phase.

6.2 Critical evaluation of the system

Web-based computer assembling system is proposed to provide an online experience to all the customers. The web site expected to provide user-friendly, efficient, and effective service to all the customers and vendors. The project began with identified the benefit of developing this system. Key feature of the system is assembling a computer with their own choice for their convenient budget.

6.3 Problems encountered

Initial problems were arising when designing the system because of the problem had in requirement analysis. Since it is an open web platform, it is difficult to define all the requirements. Different customers may have different requirements. The next problem arises

when started the coding. There is a lot of knowledge required to do the coding part of the project.

6.4 Future enhancements

Following are some future enhancement of the system.

- Improve user's purchasing interests using an analytical tool
- Incorporate the banks to do the online transaction from the system itself
- Allow already assembled computer details to be recalled

6.5 Personal Conclusion

The past year has been exceptional in which I had worked with different technologies and platforms. I was to try to build a new system where I am not much experience and knowledge with programming languages and design phases. Development of this web-based system has become challenging and motivational to me. I am very happy about that had a big change to learn new things and implemented them in a useful way.

7 References

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8 Appendices

9 Appendices A System Documentation

This document consists set of steps that show, how to set up the local environment for this project development

Computer Hardware requirement

- Processor - Intel Core i5 Processor 3.40 GHz
- Ram – 2GB
- Hard disk – 120 GB
- Display - 17-inch 1024 X 768 resolution monitor
- Internet – 1Mbps internet connection

Software requirement

- Operating System – Windows 8 or 10
- XAMMP – XAMMP version 3.2.3
- Web Browse – Google Chrome Version 63.0.3239 or higher, Firefox version 57.0.0 or higher
- Brackets code editor or notepad
- Email server – Gmail

Step 1

Installing XAMMP

- Install the XAMMP version 3.2.3 from downloading https://www.apachefriends.org/download.html Select C drive as the installation path.

Step 2

Installing Web Browser And code editor

- Download and install chrome from https://www.google.com/chrome/?brand=CHBD&gclid=Cj0KCQjwitPnBRCQARIsAA5n84njpOPyxFz_H_nmmR5zOXwkG5wcsHIsxBzAzUP2DqbxFPp1gIc93zYaAsDSEALw_wcB&gclsrc=aw.ds
- Download and install Firefox from https://www.mozilla.org/en-US/firefox/new/
- Download and install Brackets from http://brackets.io/

Step 3

- Open the web site locally from http://localhost/pcparts

10 Appendices B User Manual

Start page of the website

Open the website using the weblink (http://localhost/pcparts/site/start) and navigate. Then user navigates to start page allows the user to select the 3 options based on their requirement.

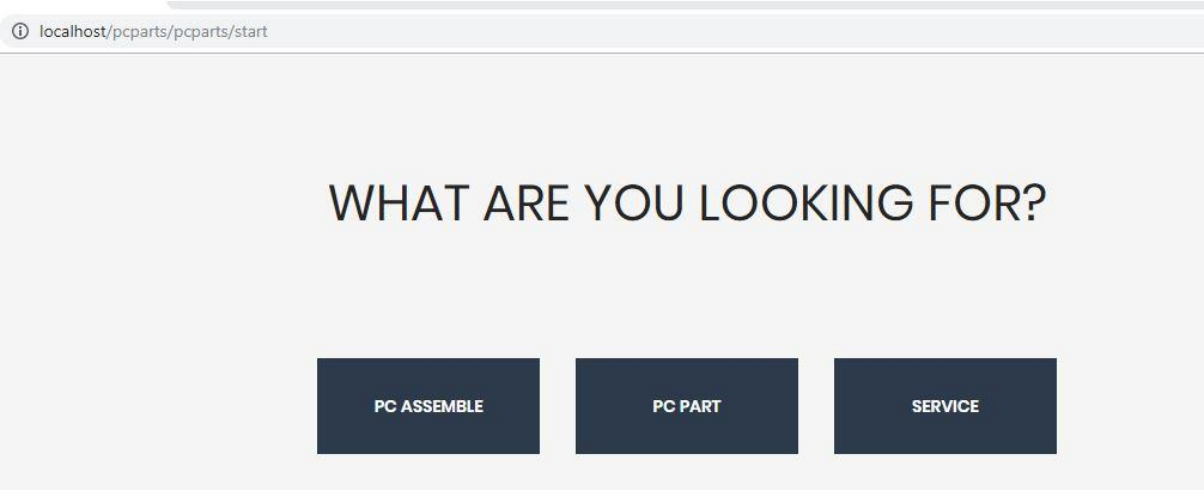

Figure B.1 Start page

User Registration

User redirected to the home page of the site, once select an option in the start page. In the home page, user can register to the website filling the registration form. User can load the registration form by clicking the register button in the top right corner.

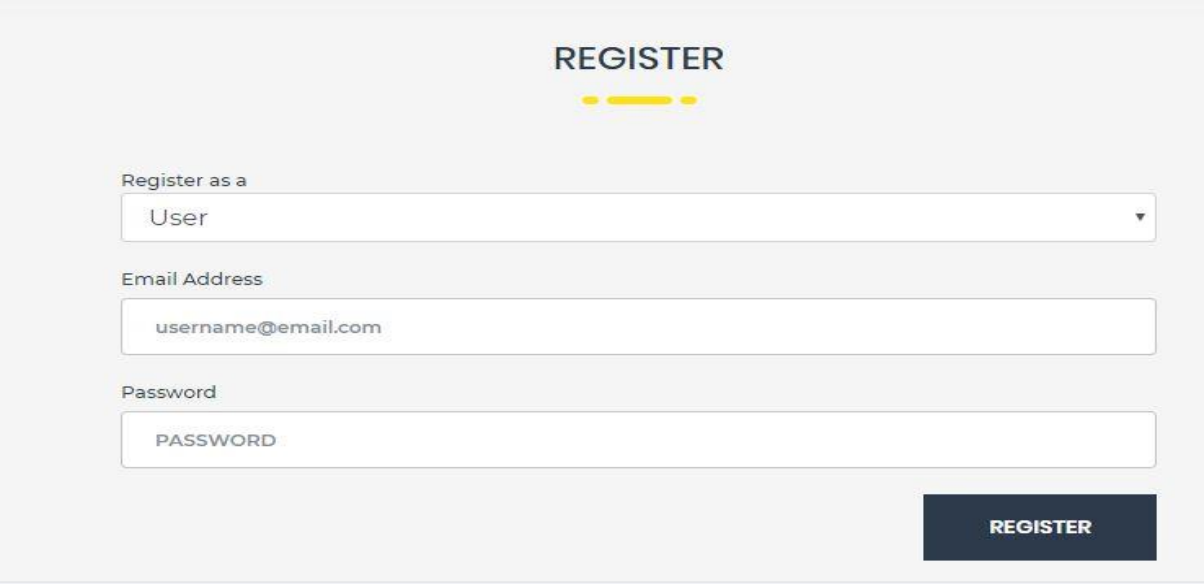

Figure B.2 User registration

User Login

User can login to the system by clicking the login button in the top right corner of the website. If a user logged in before purchase, not required to fill the form for delivery details. User can log out from the site once they have completed the task

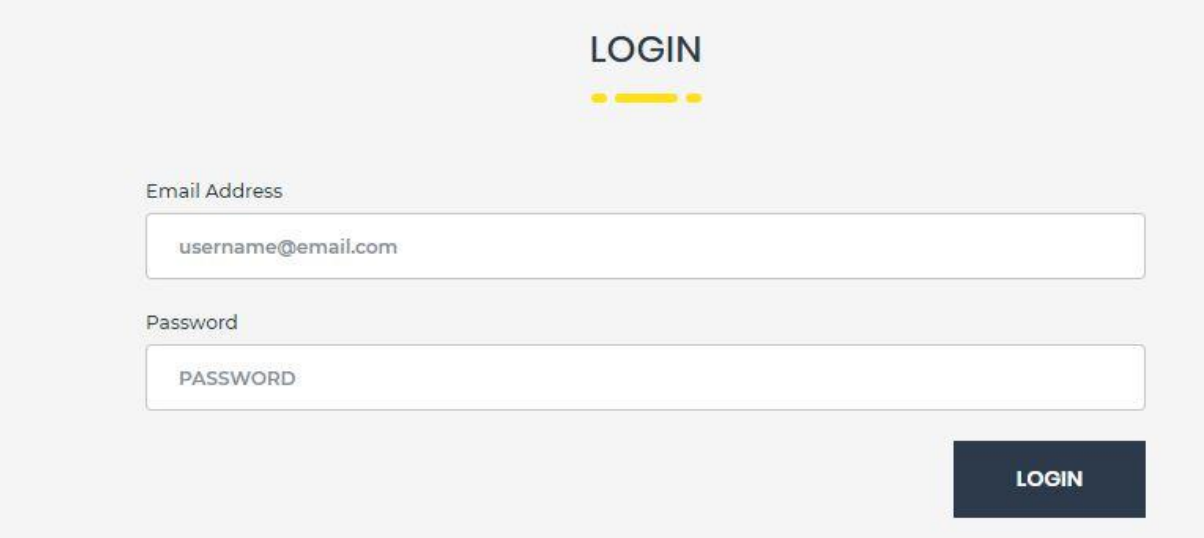

Figure B.3 User login

Navigation Between Pages

Users can navigate between pages by selecting the menus on the home page.

Figure B.4 Navigation between pages

Search Option

User can search items from the website by typing in the search bar in the website.

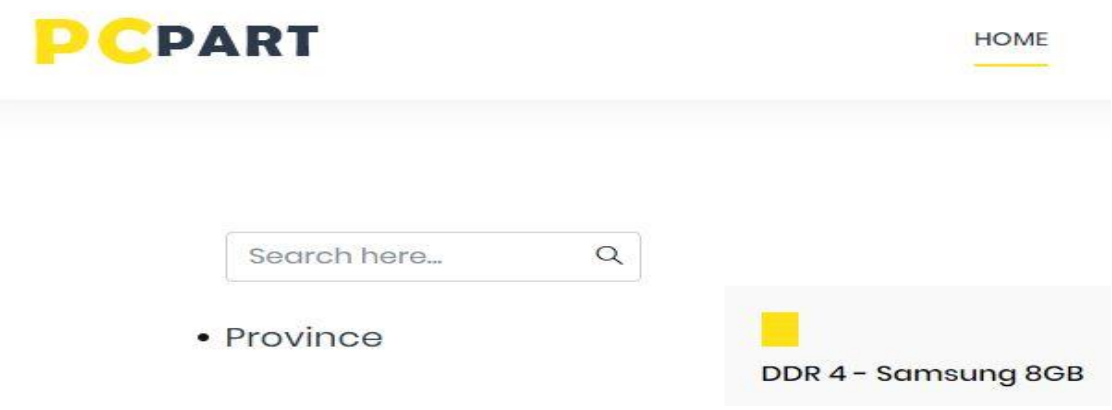

Figure B.5 Search option

Filters

User can filter items, location, and pc parts from left side pane. By selecting an option user redirected to the relevant page with the filter.

Figure B.6 Filter - Provinces

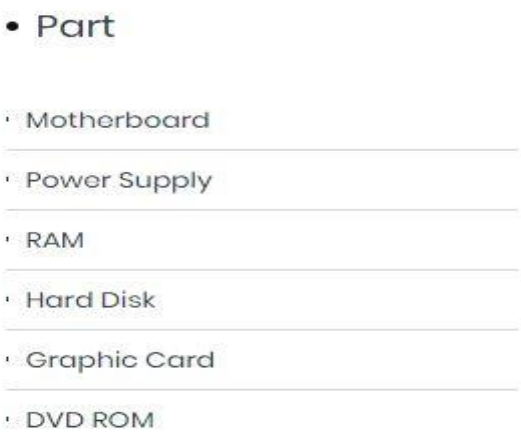

Figure B.7 Filter - Part

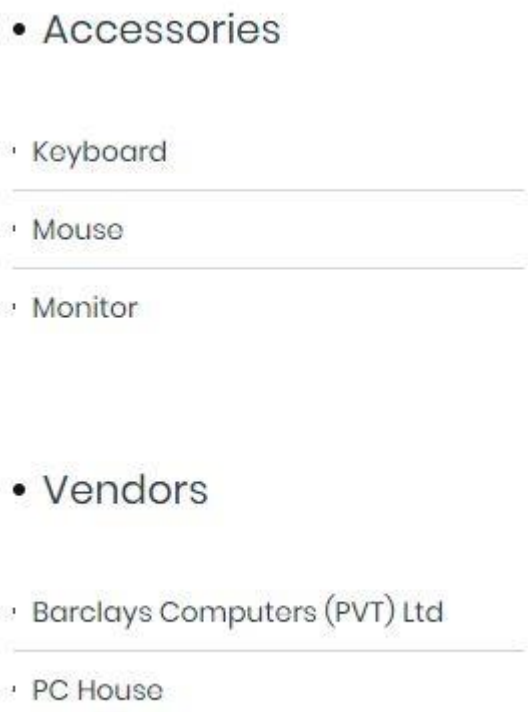

Figure B.8 Filter - Vendors

Parts Display

When a customer filters the items, the customer can see the items based on the filter. From the filtered items customer can choose one by one and add to cart.

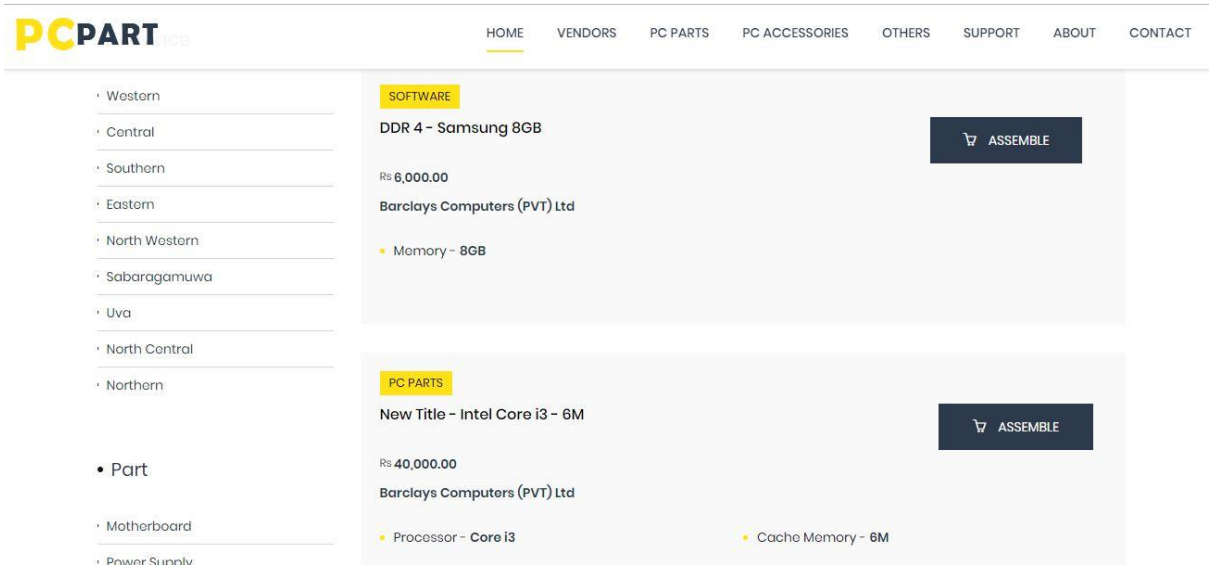

Figure B.9 Parts display

Compatibility check and Display

Once the customer selects the required parts, customer can see the compatibility between parts and the price, by clicking my pc button in the right top corner of the website.

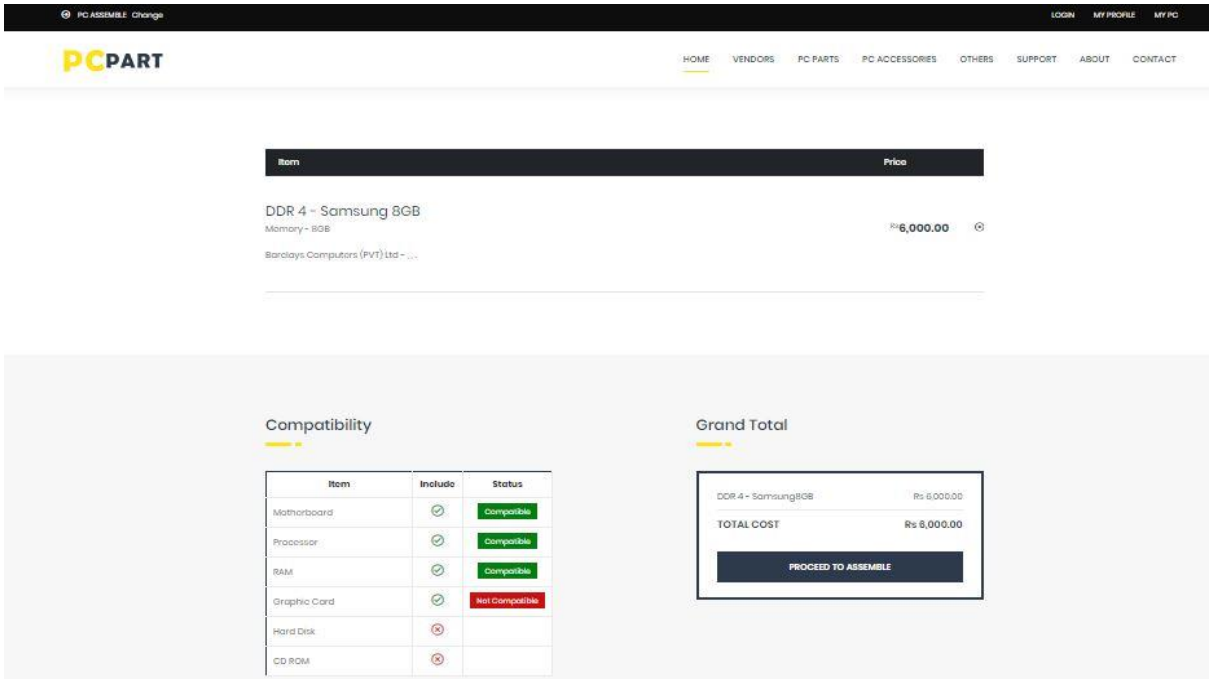

Figure B.10 Compatibility check and display

Billing and Delivery Information

The customer required to fill the billing and delivery details by proceeding once the compatibility is checked is completed. Customer needs to click proceed button to view the Billing and delivery form. Customer also can select a technician to assemble their computer.

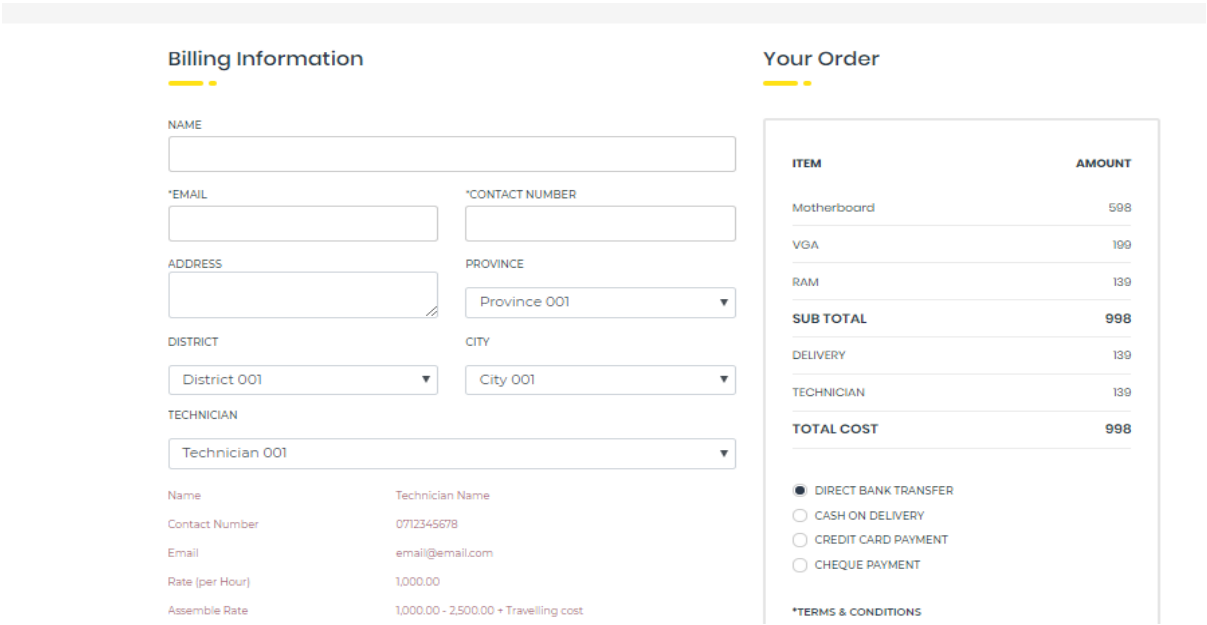

Figure B.11 Billing and Delivery

Once the billing details filled, customer can check the price details and select the payment method. Once the payment method selected, the customer can proceed and confirm the order.

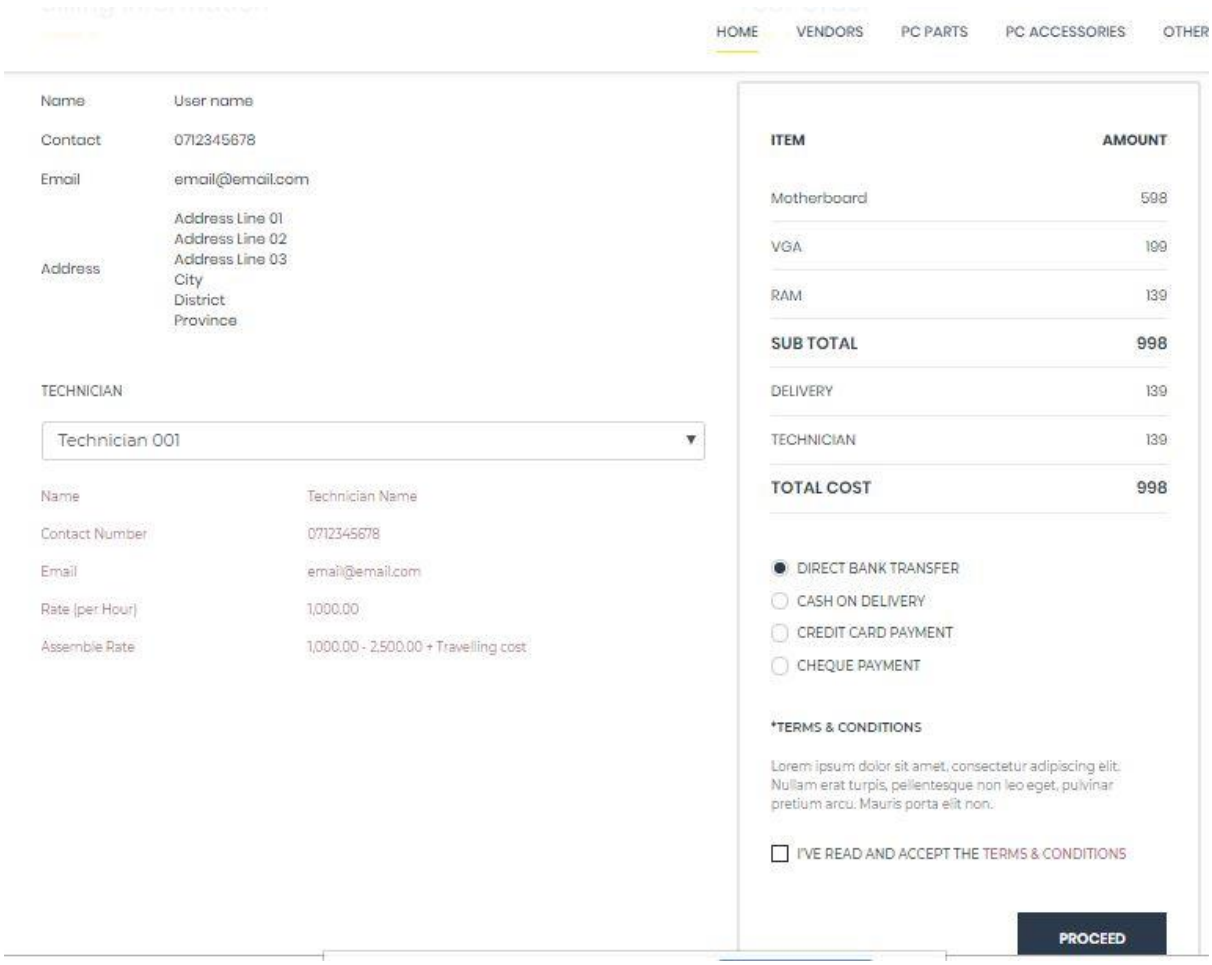

Figure B.12 Payment and confirmation

Email Confirmation

Once confirmed the order by the customer, the customer received an email with the details of the product selected and deliver. Customer also received an order number to track the details of the delivery.

Customer profile

Customer can view and edit their details by loading the profile after login to the website. Customer can load the profile window by clicking my profile icon in the top right corner of the website.

Figure B.13 User profile

Admin Dashboard

Admin dashboard is to available to administrate the website and the stakeholders. Vendors and the IT technician who register with the website will get access to the admin dashboard based on the access permission given by the admin. Vendor and IT technician need to enter their credentials and login to the given link (http://localhost/pcparts/site/system/login)

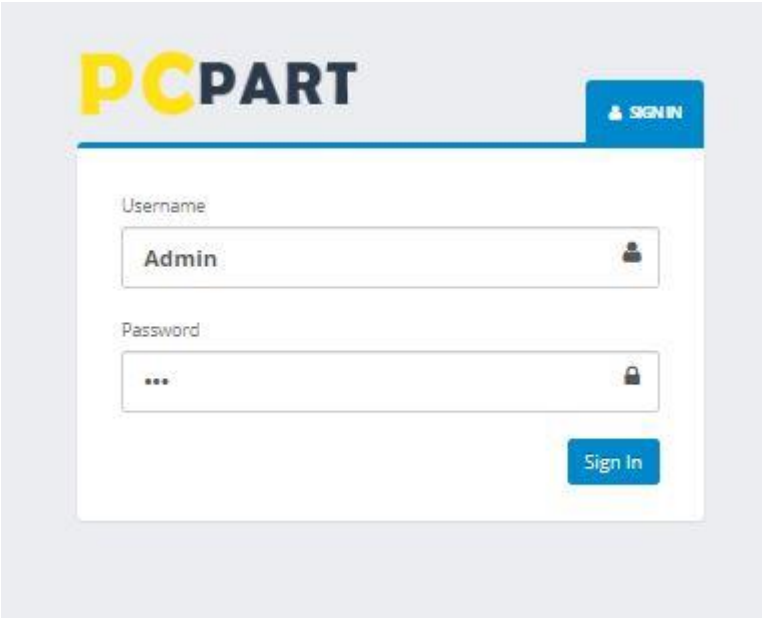

Figure B.14 Admin dashboard login

Vendor Menu

Once the vendor logged in, the vendor can see the menu to update product details and order details. The vendor can navigate between the menus and do check the order that they received and see the product already they updated.

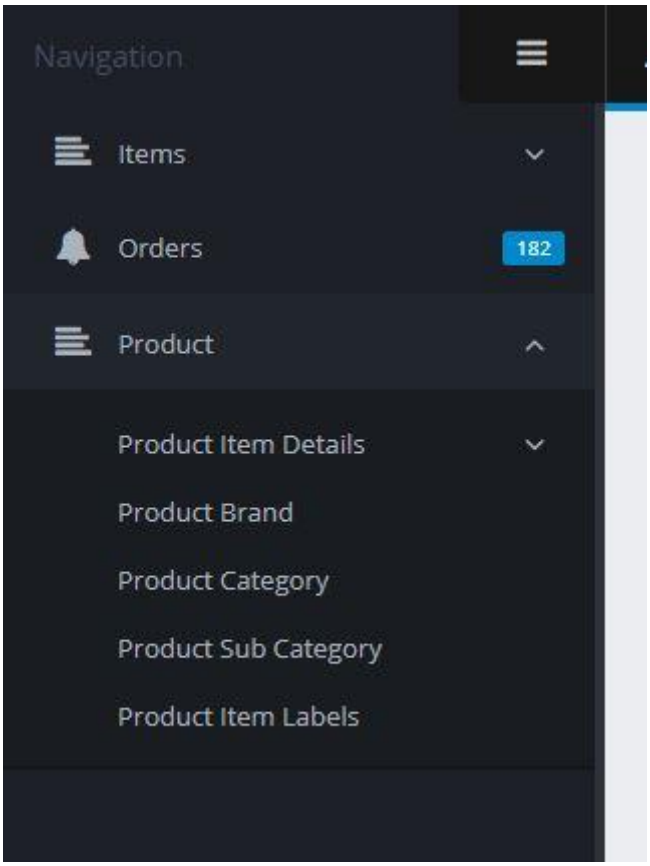

Figure B.15 Vendor menu

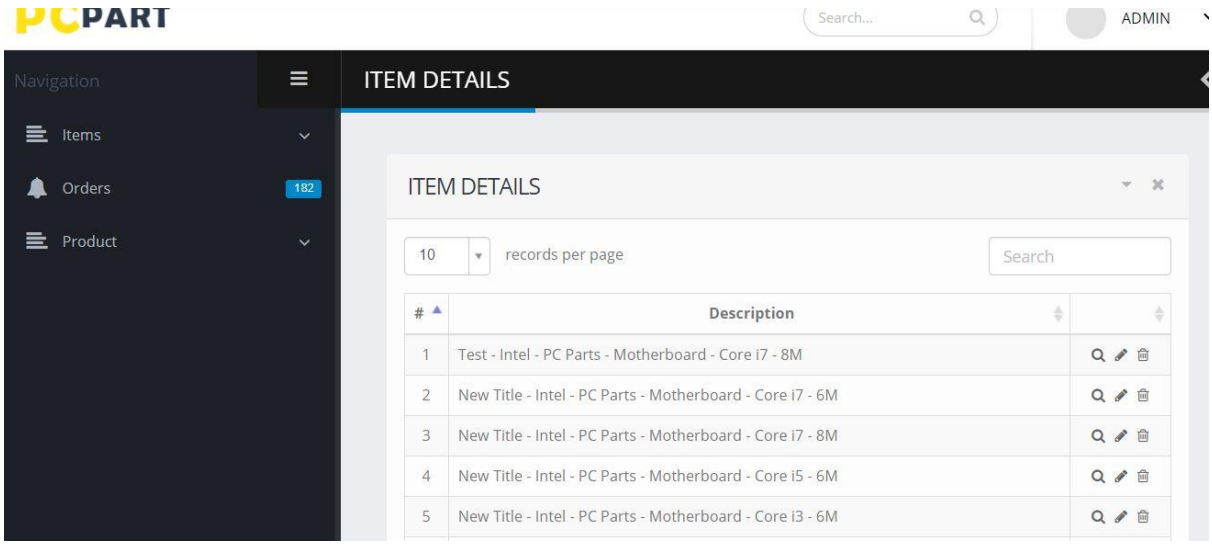

Figure B.16 Vendor added items list

IT technician also get access to the admin dashboard, and they can update their details to display in the website. Vendor and IT technician can log out from the system once they completed their task.