MINI PROJECT

Presented to

Private Higher School of Engineers of Gafsa

In the Software Engineering discipline

Realized
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REALIZATION AND DESIGN OF 'AN E-COMMERCE SITE

Plan

➢ General introduction

➢ General framework

➢ Preliminary study & specification of needs

➢ Design

➢ Realization

➢ Conclusion and outlook

General introduction

From hand to hand sales, to virtual sales, the priorities of the sales operations of goods and services are shifting, which forces us to give more importance to electronic sales.

Online stores have been widely recommended for years for companies that are based on the sale of products and even services. These types of websites represent a global device providing customers with a bridge to all information, products, and services from a single portal related to its activity.

The online sales sites allow customers to enjoy a virtual fair available is updated daily without any constraint, which will allow them to never miss the favorites, so a fair without problems of geographical distance, nor schedule of work or availability of transport. On the other hand, these sites offer the company to take advantage of this space to expose its products to a wider customer base.

Our project is realized within the framework of the mini project having as main objective: the conception and the creation of an online store for the sale of computer and technological materials.

Chapter 1: General Framework

I. Project framework

Our project will focus on the design and implementation of a commercial website for the sale of computer and technological equipment

II. The Host Organization:

Description:

The online store is a company that represents computer and technological products, the main activities are the sale of cell phones and laptops printers ...

III. Presentation of the topic:

The subject of our project is to develop an online store to present, market and deliver our products to our customers, which we believe will become more and more numerous.

The objective of this project is to design and develop a commercial website that will allow the registration of visitors to become customers, the follow-up of orders made, the management of online payments and the follow-up of deliveries.

IV. Work Plan:

Report Organization:

For a good work we need a well structured report that can be exploited after the implementation of this site, for that we will organize our present report in the following way:

In the first chapter "*General Framework*", we will put our project in its general framework by defining the host company and introducing the subject.

In the second chapter entitled "Study of the existing and specification of the needs" we are going to firstly, study the currently used sales procedures by noting the lacks and the insufficiencies and proposing the suitable solutions. Secondly, we specify the main solutions offered by our project taking into account its functional and non-functional needs. And finally, we present the global context of our project

Finally, in the last chapter entitled

In the *"Realization" section*, we will present our website, mentioning the different hardware and software working environments used to start the project, as well as citing the main interfaces realized.

Conclusion

In this first chapter we have put the subject in its general framework. We are going to start a second chapter entitled "Existence study and requirements specification" in which we will specify our functional and non-functional requirements in our project.

Chapter 2: Study of the existing situation & specification of needs

Introduction:

In this second chapter, we will put the subject in its general framework. Afterwards, we will study the current way of selling, followed by a critique in order to focus on the problems to be solved during the realization of our project.

Thus, this chapter presents a set of functional and non-functional requirements.

I. Study of the existing situation

1. Description of the existing

This way is divided into two main steps, the first step is the exhibition of the products through advertising posters, leaflets, radio and television commercials and also through showcases within the company, the second step is to sell the products at the counter or through commercial agents.

2. Critique of the existing

Since its establishment, the existing procedure achieves these objectives with a limited and not extensible frequency, as it concerns only a limited number of customers who are very close to the company to be able to visit the showcases, see the products exposed and know the availability of the latter as well as their prices and technical characteristics, all of which represents a hindrance to the commercialization of the products

3. Proposed **solution**

In order to compensate for these deficiencies, we propose to computerize the marketing of our products by creating a virtual store on the Internet.

It is essential to specify at this stage that our project will take into consideration all these constraints by trying to present the necessary solutions while respecting the rules of the games of a Web site such as the simplicity of navigation between the pages, the good ergonomics and the safety of the confidential data of the customers.

II. Study of the needs

In this section of the chapter, we are interested in the needs of the users treated in our project i.e. the registration of the customer, the choice of the products, the launching of the orders finally the confirmation and thus the payment on line through the functional and not functional specifications to lead to a site of quality which answers the needs for the customers

1. Functional needs

The functional requirements are presented in five main parts - Product display, price and characteristics.

- Customer registration.
- Adding the selected products to the cart.
- Confirmation of the order.
- Online payment.
- Confirmation of the purchase transaction and receipt of the invoice.

a. Product display:

Our site must have a virtual window through which the customer can consult a wide variety of products, so it will be essential to present the prices and technical characteristics of each product to facilitate the selection of the product to buy.

b. Customer registration:

Up to this point, the customer is always anonymous but to be able to pass to a more rigorous stage, it is necessary to register, this is done only for the first order but afterwards, our customer can authenticate himself with his E-mail and his password to place other orders.

c. Adding products to the cart :

After choosing a product, the customer has to mention the quantity which is automatically added to his basket with the unit price and the total price.

d. Order confirmation:

Up to this phase we have a customer, an order and a delivery address, the path is now clearer, the order will be placed only after the validation of all the information that are displayed in a single interface before moving to the payment phase.

d.   Payment:

This is a very sensitive phase, so it must be very secure, to complete the payment procedure successfully the customer must choose a type of card from a list of cards offered on our website, indicate the number of his card and its verification value called CVV.

e.   The end of the purchase transaction:

The final page represents a small message of thanks to our customers with an idea about the address, the date, the time of the delivery in question and of course the possibility to print the invoice of the customer.

2. Non-functional needs:

Non-functional requirements are important because they indirectly affect the user's outcome and performance, so they should not be neglected, for which the following requirements must be met:

a. Reliability:

The application must work consistently without errors and must be satisfactory.

b. Mistakes:

Ambiguities should be indicated by well-organized error messages to guide the user and familiarize them with our website.

c. Ergonomics and good Interface:

The application must be adapted to the user without any effort (clear and easy to use) from the point of view of navigation between the different pages, colors and text layout used.

d. Security:

Our solution must respect the confidentiality of the personal data of the customers which remains one of the most important constraints in the Web sites.

e. Suitability for maintenance and reuse:

The system must conform to a standard and clear architecture allowing its maintenance and reuse.

f. Compatibility and portability:

A website whatever its domain, its editor and its programming language can only be reliable with a compatibility with all web browsers and all means that it is PC, IPAD or Mobile.

Conclusion

In this chapter we have presented a study of the existing system, the deficiencies that it includes as well as the solutions that we propose to palliate these problems, we have also cited the functional and non-functional needs that are essential to better facilitate the work to be done.

In the following chapter we will discuss the conceptual study of our site, mentioning all possible scenarios, actors, diagrams ...

Chapter 3: Design

Introduction

In the life cycle of our project, the design phase is the most important and decisive to produce a high quality application. It is in this stage that we

must first clarify the global view, by describing the general architecture that we will follow in the realization part of our project. Then, in a second place, we will detail our conceptual choice through several types of diagrams.

I.   General Design

1. Life Cycle:

1.1 Definition

The life cycle of an application includes all the stages from its design and development to its implementation. The objective of such a division is to define intermediate milestones allowing the validation of the software development and the verification of its development process.

The origin of this division comes from the fact that errors are so costly that they are detected late in the realization process. The life cycle allows errors to be detected as early as possible.

1.2 Life cycle activities

The life cycle followed to create an e-commercial site generally includes at least the following activities:

- **Specification of the needs**: it consists in defining the purpose of the project and its integration in a global strategy.

- **General design**: in this activity, the general architecture of the software is prepared.

- **Detailed design**: it consists in defining precisely each subset of the software.

Development: (Implementation or programming) this is a translation of the functionalities defined in the design phase into a programming language.

- **Unit tests**: they allow to check individually that each subset of the software is implemented according to the standards defined in the design.

- **Integration**: also known as system testing, it consists of verifying that the software corresponds exactly to the project specifications by finally obtaining a detailed user manual.

- **Validation**: i.e. validation of the site's compliance with the goals specified in the first stage of the life cycle.

1.3 Some examples of life cycle models

a. Cascading Life Cycle Model
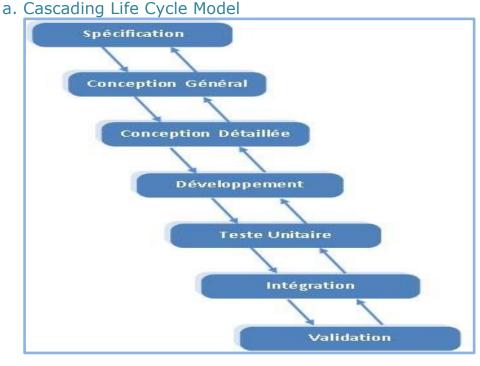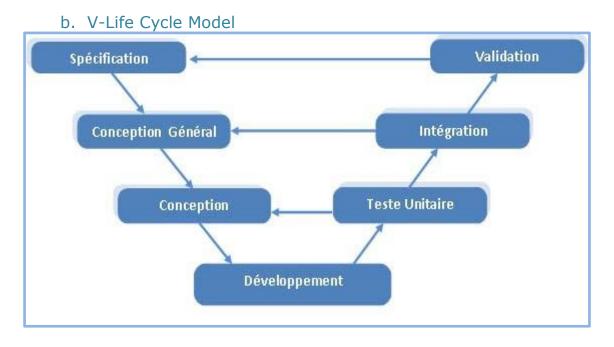
Figure 1: Modele of cyc the cascade of life

In this model, the principle is very simple: each phase ends at a specific date by producing certain documents or software. The results are defined on the basis of the interactions between stages, they are thoroughly reviewed and only if they are judged to be equivalent to the standards are they moved to the next phase. The original model did not include the possibility of rollback. This was added later on the basis that a step only

calls into question the previous step, which has proved insufficient in practice.

b. V-Life Cycle Model

<p align="center">Figure 2 : Model of life cycle in V</p>

The V-shaped life cycle model is a conceptual model of project management, which was devised in response to the reactivity problem of the waterfall model. It allows, in case of anomaly, to eliminate the return to the previous steps late.

The advantages of the V-Life Cycle model are:

- The quality of the test implementation.
- Industry-proven model.
- Standardized (ISO-12207, MILSTD-498...)
- Two types of tasks are performed in parallel:

Vertically, we prepare the next step and horizontally: we prepare the verification of the current task.

Its disadvantages

- The final validation by the customer is very late and increases the risk of overrunning the deadline and therefore the cost.

- Sequential phases.

- Rigidity in the face of changing needs.

c. Spiral Life Cycle Model
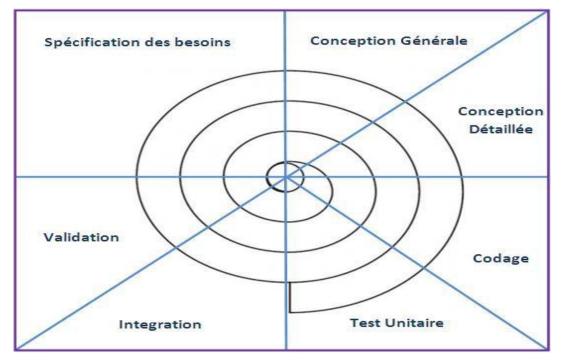
Figure 3: Spiral Life Cycle Model

The *spiral* model is a life cycle model that repeats the different stages of the V-cycle. Through the implementation of successive versions, the cycle starts again, offering a more and more complete product. However, it puts more emphasis on risk management than the V-cycle.

1 .4 Our choice :

In order to design and develop our application, we opted for the V-shaped life cycle model. This choice is due to the fact that this cycle is the most efficient with its working principle that requires the verification of each step and the possibility to correct the faults before launching towards the next step.

2. Design methodology

To facilitate our task, we use the *Unified Modelling Language (*UML*),* a notation that allows us to model a problem in a standard way. This language was born from the fusion of several existing methods before, and

it became a reference in terms of object modeling, to such a point that its knowledge becomes essential for a developer.

II.   Detailed design

1. Use case diagrams.

1.1 Definition

The role of use case diagrams is to collect, analyze and organize requirements, as well as to identify the main functionalities of a system. It is therefore the first UML step in the design of a system.

A use case diagram captures the behavior of a system, subsystem, class or component as seen by an external user. It breaks down the functionality of the system into coherent units, the use cases, that have meaning for the actors. Thus, these use cases make it possible to express the needs of the users of a system; they are therefore a user-oriented vision of these needs, as opposed to a computer vision.

This first step should never be neglected in order to produce a website that meets the expectations of the targeted users. To elaborate the use cases, it is necessary to rely on interviews with the users.

1.2 Composition of the case diagram

The case diagram consists of three main elements:

Acteur

An Actor: it is the idealization of a role played by an external person, a process or a thing that interacts with a system. It is represented by a small man with his name written underneath.

Use cases

A use case: it is a coherent unit representing an externally visible functionality. It performs an end-to-end service, with an initiation, an execution and an end, for the actor who initiates it.

A use case thus models a service rendered by the system, without imposing the mode of realization of this service. It is represented by an ellipsis containing the name of the case (a verb in the infinitive), and optionally, above the name, a stereotype.

Relationships: Three types of relationships are supported by the UML standard and are graphically represented by particular types of these relationships. Relationships indicate that the source use case has the same execution conditions as the output case. A simple relationship between an actor and a use case is a simple trait.

1.3 The actors of our project

The visitor: is an individual who is browsing the net, looking for a product to buy or to have an idea about models and prices. Up to this point he is an unknown user so he is not yet a customer.

The Customer: this is a visitor who has already created an account on our site, so he can follow the process of purchasing products in complete security knowing that our system must be the only one responsible for the confidentiality of personal data of its customers.

1.4 Use case diagrams of our website

a. Case diagram of a visitor
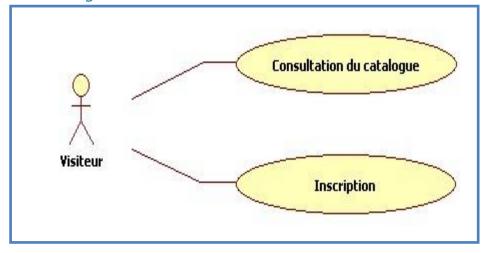
Figure 4   Use case of a visitor

Before becoming a customer, an Internet user has only the possibility to consult the catalog of products available in the supplier's stock and the possibility to register to become a customer on our website.
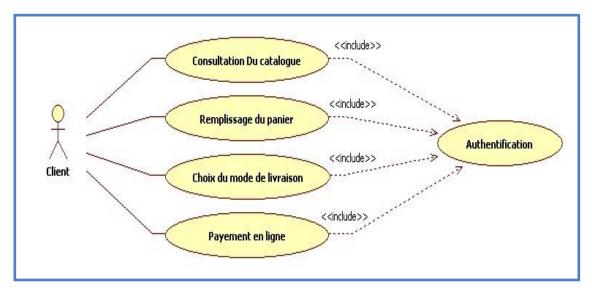
b. Case diagram of a client

Figure 5 : Use cases   n of a client

2: Activity diagrams.
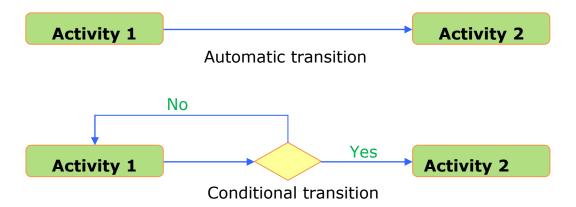
2.1 Definition

It is a diagram associated with a particular object or a set of objects, which illustrates the flows between activities and actions. It is used to graphically represent the flow of a use case.

2.2 Composition of an activity diagram

The activity diagram consists of the following elements:

Activity
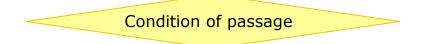
An activity represents an execution of a mechanism, in other words, a sequence of sequential steps.

Activity 1 → **Activity 2**
Automatic transition

No → Yes
Activity 1 → ◇ → **Activity 2**
Conditional transition
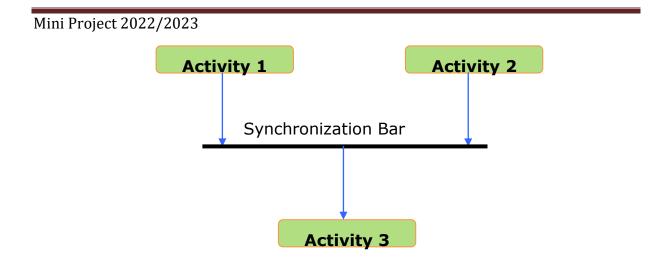
A transition that represents the passage from one activity to another. This transition can be automatic, which is triggered by the end of one activity, causing the immediate start of another, or conditional, which is triggered only after the condition has been met

Also called a guard.

Condition of passage

The guards that represent the condition of passage from one activity to another in the conditional transitions they are symbolized by diamonds as in the following figure:

Synchronization bars are bars represented by a thick line, the role of this bar is to synchronize the start of several transitions that arrive from different activities, all leading to a common activity**.**

2.3 The activities of our website :

Consultation: a catalog is a virtual fair of products. Therefore, it is essential to make the consultation of the latter available to all visitors of the site without exception**.**

Registration: after consultation, and in order to move on to the purchase phase of the products on display, a visitor must become a customer and this is only done after registration.

Authentication: this is a main activity in all e-commerce sites. It is through this step that we will identify the customer who is loading his cart, paying his invoice and waiting for his delivery.

The management of the basket: following an authentication our visitor is now a customer who can freely add or remove products to his basket, while being able to update the quantity of the ordered article.

2.4 The activity diagrams of our website

Registration diagram

The registration phase is essential to go from a simple visitor of the site who can only consult the products and their prices to a customer who

can buy his desired articles and pay his invoice online and thus wait for the delivery of his order at home.
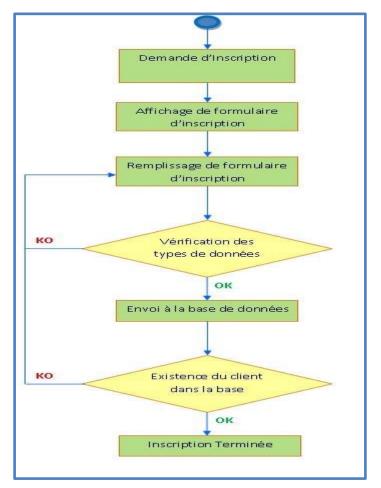

Figure 6 : Activity diagram Registration

- The visitor requests registration.

- The registration form appears on the screen.

- The visitor fills in the fields requested in the form.

- The system checks the data entered.

- If the data is accepted, the system sends it to the database, if not, it returns to the previous step.

- The server checks the existence of the client in the database.
- If the client already exists, an error message is displayed.

- If the client does not exist, the registration is successfully completed.

3 : Sequence diagrams

3.1 Definition

A sequence diagram is an interaction diagram that details how operations are performed: what messages are sent and when.

The sequence diagrams are organized according to the time that elapses as we go through the page.

The objects involved in the operation are listed from left to right according to when they take part in the sequence.

3.2 Composition of a sequence diagram

This type of diagrams is composed by the following elements:

Lifelines: A vertical line that represents the sequence of events, produced by a participant, during an interaction, as time progresses down the line.

This participant can be an instance of a class, a component or an actor.

Messages: two types of messages in the sequence diagram, the first is called synchronous message used to represent ordinary function calls in a program, the second is called asynchronous message, being used to represent communication between separate threads or the creation of a new thread.

Execution occurrences: represents the execution period of an operation.

Comments: A comment can be attached to any point on a lifeline.

Iterations: represents a response message following a verification question.

3.2 The sequence diagrams of our website

a. Enrollment sequence diagram

In order to take advantage of the privileges dedicated to customers, a visitor must first successfully begin the registration phase and for this he must go through all the sequences that we will simplify with the following diagram:
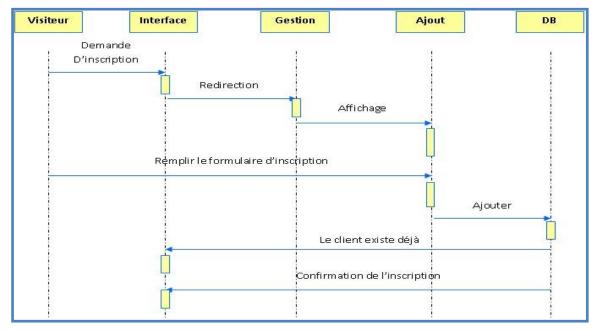

Figure 9: Registration sequence diagram - The

visitor requests the registration form.

- The form is displayed.

- The visitor fills in the form.

- A verification of the existence of the client in the database is launched.

- If the client already exists an error message is displayed.

- If it is a new customer, the registration confirmation is displayed.

4: The class diagram :

A UML class diagram describes the structures of objects and information, used on our website, both internally and in communication with its users. It

describes the information without reference to a particular implementation.

Its classes and relationships can be implemented in many ways, like

database tables.
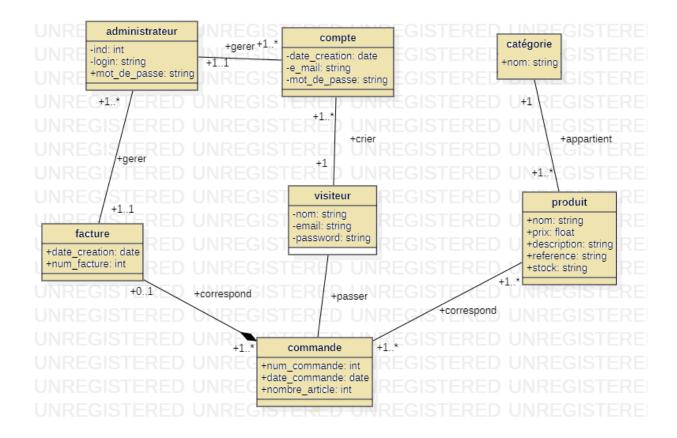
Figure 10: Class diagram

Conclusion

We have just finished this part of design, which consists in determining both the working methods and the graphic charts of our website with its static and dynamic parts. In the next chapter we will approach the last part which represents the realization of our website, based on the mechanisms and solutions determined in the design phase.

Chapter 4: Implementation

I. Work Environment:

In this last part, we will list the soft and hard tools we used to create our site as well as its main interfaces.

1. Hard environment :

- Host : AZUZ

- Microprocessor: Intel **I5** Inside

- RAM : 8GO

2- Software Engineering Workshop :

A- Design Tool :

UML: The Unified *Modelling* Language (**UML) is** a pictogram-based graphical modelling language designed as a standardized method of visualization in software development and object-oriented design.

B-Development environment:

Angular is a platform and framework for building single-page client applications using HTML and Typescript. Angular is written in Typescript. It implements core and optional functionality as a set of Typescript libraries that you import into your applications*.*

HTML HyperText Markup Language (**HTML) is** a type of descriptive computer language. More precisely, it is a data format used in the Internet world for the formatting of Web pages

.

CSS (Cascading Style Sheets) is a language A computer code used to describe the presentation of HTML and XML documents. The standards defining CSS are published by the World Wide Web Consortium (W3C). Introduced in the mid-1990s, CSS became commonly used in web design and well supported by web browsers in the 2000s.

C-Working environment:

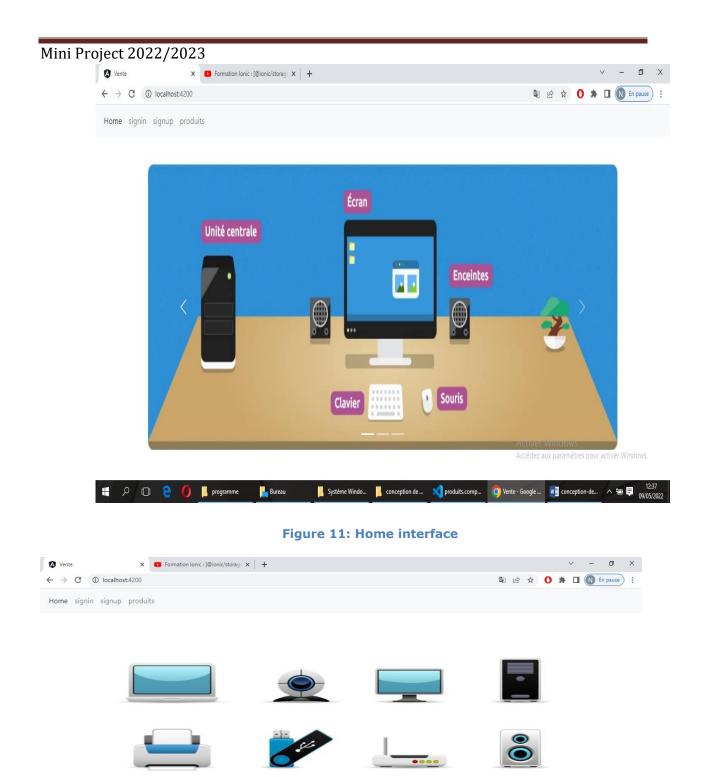Visual Studio Code is an extensible code editor developed by Microsoft for Windows, Linux and MacOs.

Firebase is a set of hosting services for any type of application. It offers NoSQL and real-time hosting of databases, content, social authentication, and notifications, or services, such as a real-time communication server.

II. Interface Demonstrations:

This part includes the presentation of the application scenarios of the application. In the following, we will present the screen prints of the main interfaces realized in our website.

Figure 11: Home interface
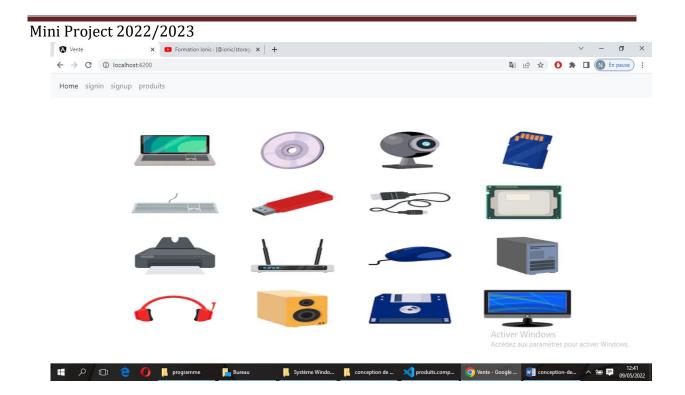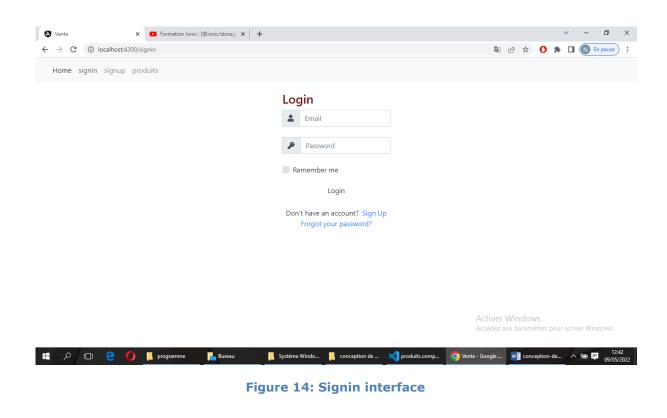
Figure 12: Home interface

Figure 13: Home interface

Figure 14: Signin interface

Figure 15: Signup interface
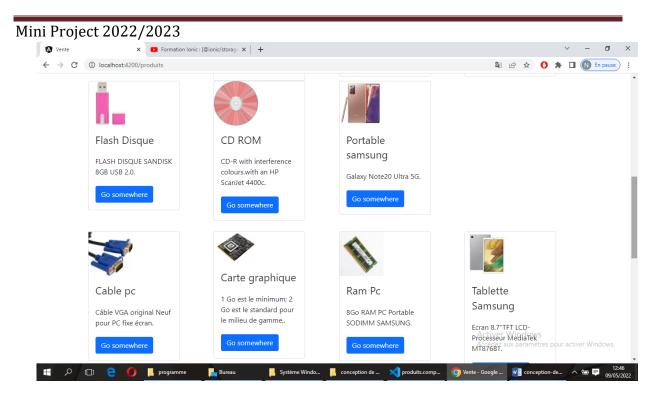

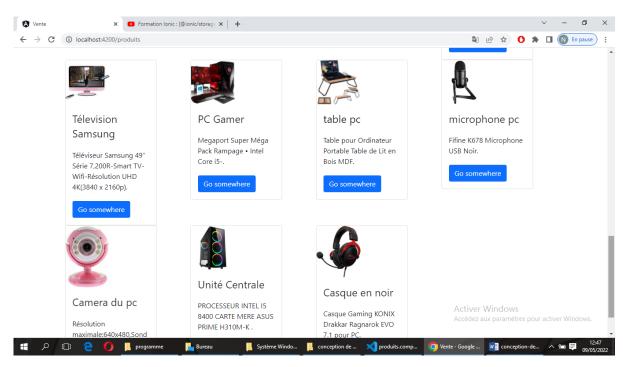**Figure 16: Product interface**

Figure 17: Product interface

Figure 18: Product interface

Conclusion

In the chapter realization we called to present the interfaces realized in our web site to clarify the stages of use of our site with its two static and dynamic parts.

Conclusion and outlook

This project is conducted within the framework of mini Project within the Private Higher School of Engineers of Gafsa

We are called in this work to design and realize a virtual store for the online sale of products,

For the moment the e-commerce site is almost finished we hope that it will find the necessary conditions to come into effect.