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MSC THESIS

Inauguration of Financial system for the University (Follow,Forcasts)

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for the degree of Master of Computer Modeling of Knowledge and Reasoning*

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Department of Computing

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Declaration of Authorship

I, Mohamed Abderrahmane MIMOUNI, declare that this thesis titled, "Inauguration of Financial system for the University (Follow,Forcasts)" and the work presented in it are my own. I confirm that:

- This work was done wholly or mainly while in candidature for a research degree at this University.
- Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated.
- Where I have consulted the published work of others, this is always clearly attributed.
- Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work.
- I have acknowledged all main sources of help.
- Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself.

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Date:

“Your decisions from today forward will affect not only your life, but also your entire legacy.”

Dave Ramsey

UNIVERSITY OF SAIDA DR MOULAY TAHAR

Abstract

Faculty of Technology
Department of Computing

Master of Computer Modeling of Knowledge and Reasoning

Inauguration of Financial system for the University (Follow,Forcasts)

by Mohamed Abderrahmane MIMOUNI

In the purpose of facilitate university's financial transactions we inaugurate this computing system by make all financial operations automatic also to give the opportunity to authority to control all financial operations just by one click without forgetting the ML usage to make financial previsions more precise and more easy than doing it by human accountant. . .

بهدف تسهيل

المعاملات المالية للجامعة ، قمنا بانشاء نظام الحوسبة هذا من خلال جعل جميع العمليات المالية تلقائية أيضًا لإعطاء الفرصة للمسؤولين للتحكم في جميع العمليات المالية بنقرة واحدة فقط و أيضا قمنا باستخدام تعلم الآلة لجعل المراجعات المالية أكثر دقة و أسهل من أن يقوم بها محاسب بشري

Dans le but de faciliter les transactions financières de l'université, nous inaugurons ce système informatique en rendant toutes les opérations financières automatiques également pour donner la possibilité à l'autorité de contrôler toutes les opérations financières en un seul clic sans oublier l'utilisation du ML pour rendre les prévisions financières plus précises et plus faciles que le faire par un comptable humain. . .

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List of Abbreviations

ML	Machine Learning
AI	Artificial Intelligence
KNN	K Nearest Neighbors
UI	User Interface

Dedicated to my Parents, my family and all my friends...

0.1 Introduction:

0.1.1 History:

According to James C. Van Horne³ Financial management appears at the beginning of the twentieth century as a field of study distinct from economics but is limited to the instruments, institutions and procedural aspects of capital markets. The era was marked by company mergers, of which that of the "US Steel Corporation" in 1900 is the most emblematic. These cases result in the issuance of huge amounts of stocks and bonds and arouse great interest among analysts on all matters relating to business mergers and mergers. In their form and content, accounting or financial data remains embryonic.

In the 1920s, technological innovations and new industries led to concern about firm financing and liquidity issues^{4,5}. The description of external funding obscures aspects of internal management. The role and function of the Investment Banker are particularly studied.

During the depression of the thirties, the financial reflection is marked by the necessities of survival: Attention is focused on the preservation of liquidity, bankruptcy, liquidation and restructuring of organizations. Questions dealing with the soundness of the financial structure of firms are particularly on the agenda. Questions of regulation and increasing control by public authorities soon follow. The consequences were the increase in the quantity and quality of financial information disseminated by companies, a better understanding of the object of financial analysis in general as well as the introduction of comparative analysis between firms. in terms of their funding and performance.

During the 1940s and early 1950s, the predominant angle of analysis was that of the external analyst (lender or investor) who paid little attention to the internal decision-making processes of the firm. However, this point of view will evolve with the introduction of cash flow analysis and the question of their internal control.

In the mid-1950s, the notion of capital budgeting inaugurated a series of developments and techniques which provided the basis for current financial theory and practice. The need to select investments is at the root of the theory of the efficient allocation of capital. The financial manager of the organization is therefore invested with "all the funds committed to assets and the allocation of capital to the most relevant assets on the basis of appropriate and objective selection criteria".

Henceforth the question of the valuation of the firm and that of the internal decisions which modify it are indissolubly linked. To respond to this, recourse to the use of forecasts, a critical assessment of the capital structure, and the taking into account of the dividend distribution policy become essential. We then witness the formalization of an integral theory of finance.

From the 1960s onwards, finance then benefited greatly from the use of new information systems resulting from the introduction of IT in organizations: The processing of data is carried out more quickly and facilitates consolidation operations and opens the door to simulation practices.

0.1.2 Importance of Finance and currency in our life:

Our life is based on financial transactions for example buying and selling , without forgetting that the development of any administration or society is related to its finance management and just a little mistake can cause a fatal damages.

0.1.3 Primary definition of project :

In the university of saida to avoid this damages and mistakes and also to give to authority's the possibility of control and supervising of all the finance of university we think about inaugurate a specialized financial system for financial transactions and also to predict future budget needs.

About follow, operations part we globally used web application based on php and html as fundamental tools and for previsions we added a supervised classification method to take the decision.

0.1.4 Our addition in the domain:

There is a lot of financial computing tools as like as ODOO open source tool for finance management and also without going far the MS EXCEL but the addition in our system is :

Security: In our system we are sure that the financial information in the university is stocked in our local data center also the access management that means that whatever the employee he will see only his authorized informations.

Machine learning usage : To be sure that the calculus of previsions is with a big precision we think about using the old financial informations to benefits from it in the future by classifying the real time information based on old informations dataset.

Working structure: In this research we wil begin by studying the budget nomenclature of the university and the general operations.

We will also see how to install manually an Apache server.

The general conception of our system.

The implementation of our system and used technologies also why we used web technologies.

Finally screenshots and general conclusion.

Chapter 1

Budget operations

1.1 Introduction:

The university's budget is divided into two operational budgets the first is the primary budget (given in the first semester beginning) and the supplementary budget for cover the manque of primary budget in the end of year, foreach budget there is a hierarchical organization and this is applicable foreach faculty at the same way.

1.2 Budget nomenclature :

In the university of saida to avoid this damages and mistakes and also to give to authority's the possibility of control and supervising of all the finance of university we think about inaugurate a specialized financial system for financial transactions and also to predict future budget needs.

About follow, operations part we globally used web application based on php and html as fundamental tools and for previsions we added a supervised classification method to take the decision.

1.2.1 Sections:

Firstly lets take the primary budget as example, The primary budget is divided into two sections:

section 1: contain all financial employees payment operations.

Section2 : contain all other operations as like as buying materials and consumable articles and projects financement ... (fig: Sections example)

Dépenses du personnel (Section I)
Dépenses de fonctionnement (Section II)

FIGURE 1.1: Sections example

1.2.2 Chapters:

Each section is divided into a global chapters that regroup each category of operations for example : chapter of students insurance.(fig: chapters example)

1.2.3 Articles:

There is another level descending to the details called the articles that is regrouped by chapters, each chapter contain more detailed groups called article and each article is specialized low level financial operation.(fig: Articles example)

1.3 Operations on budget:

1.3.1 The filling operation:

Lets suppose that our system this nomenclature on database firstly we have to add amounts in the beginning of year or after receive each budget(primary, secondary) and this amounts will be added article by article for each faculty and our system will calculate automatically the chapters amounts and the sections amounts.

1.3.2 Consummations operations:

There is three kinds of consummations operations the first one is the engagements that is only for a little part of articles, the second one is purchase order, and consultation.

Engagements: Generally we use this operation for employees payment and this operation will be applied in the beginning of year for all year consummation for example we engage the professors payment for all the year in the beginning contain a card of engagement.

Purchase: This is the most simple operation used to dependes less than 1 million Dzd whatever the articles or the chapters contained a purchase card and statement of purchase and report of statement and general statement.

Consultation: An operation used to dependes that is more than 1 million Dzd whatever the article else the engagements articles or chapters, Consultation folder contain statement of purchase and general statement and contract.

1.4 Conclusion:

To inaugurate an active and usable financial system we have to firstly understand the budget general nomenclature and hierarchy and integrate it automatically to our system with the possible operations to each section or chapter,article.

Chap.	Libelles
21.01	Traitement et salaires
21.02	Personnels contractuels, Salaires, prestations familiales et cotisations à la sécurité
21.03	Indemnités et allocations diverses
21.04	Présalaires des apprentis
21.05	Charges Sociales et Fiscales
21.06	Œuvres Sociales
21.07	Assurance des étudiants
21.08	Rémunération des enseignants vacataires, associés et invités
21.09	Pensions de service et pour dommages corporels
Total Section I	
21.11	Remboursement de frais
21.12	Matériels et mobiliers de bureaux
21.13	Fournitures
21.14	Documentation
21.15	Charges annexes
21.16	Habillement du personnel de service
21.17	Parc automobiles
21.18	Travaux d'entretien
21.19	Frais formation - stage de courte durée à l'étranger
21.20	Frais de formation et de perfectionnement de courte durée en Algérie du personnel
21.21	Matériels et fournitures informatiques
21.22	Matériels et mobiliers pédagogique
21.23	Frais liées aux études post graduées
21.24	Participation aux organismes nationaux et internationaux
21.25	Frais d'organisation des manifestations scientifiques et techniques (séminaires - cc
21.26	Frais de transport des étudiants pour formation de longue durée à l'étranger
21.27	Activités culturelles, sportives et scientifiques aux profits des étudiants
21.28	Coopération scientifique et accords des programmes de recherche
21.29	Frais de conférences régionales
21.30	Frais de stage en milieu professionnel au profit des étudiants
Total Section II	

FIGURE 1.2: Chapters example

Chapitre 21.01 - Traitement et salaires	
Art.	Libelles
1	rémunération principale du personnel titulaire et stagiaire
2	rémunération principale des enseignants algériens
3	rémunération principale des enseignants étrangers
4	rémunération principale des enseignants détachés
5	Bonification indiciaire
Total du chapitre 21.01	
Chapitre 21.02 - Personnels contractuels, Salaires, prestations familiales et cotisa	
1	rémunération du personnel contractuel
2	Prime de rendement
3	Prestations à caractère familiales
4	Indemnité de nuisance
5	Sécurité sociale (25%)
6	Indemnité de Zone
7	Indemnité forfaitaire compensatrice
8	Indemnité d'expérience professionnelle
9	Indemnité forfaitaire de service
10	Indemnité de risque et d'astreinte
11	Indemnité de soutien aux activités de l'administration

FIGURE 1.3: Articles example

Chapter 2

Server LAMP : Linux Apache MySql Php

2.1 Definition:

LAMP is an acronym for Linux, Apache, MySQL, PHP. It is a software stack comprising the operating system, an HTTP server, a database management system and an interpreted programming language, and which makes it possible to set up a web server.[7]

2.1.1 Linux:

The operating system, we can deploy the LAMP stack on most GNU / Linux distributions; Apache: the HTTP server, it allows the server to communicate with the browser using the HTTP (S) protocol;

Why Linux: The Linux system is very stable and is not prone to crashes. The Linux OS runs exactly as fast as it did when first installed, even after several years. ... Unlike Windows, you need not reboot a Linux server after every update or patch. Due to this, Linux has the highest number of servers running on the Internet.

Used distribution(linux mint): Linux Mint is a community-driven Linux distribution based on Ubuntu (in turn based on Debian), bundled with a variety of free and open-source applications.[6][7] It can provide full out-of-the-box multimedia support for those who choose (by ticking one box during its installation process) to include proprietary software such as multimedia codecs.

Why Linux Mint: Linux Mint primarily uses free and open-source software. Up to and including version 17.3, the installation process included some proprietary software, such as plug-ins and codecs that provide Adobe Flash, MP3, and DVD playback, by default. The installer for version 18 no longer included any proprietary software. Since version 18.1, the installer has provided an option to include third-party and proprietary software (graphics and Wi-Fi drivers, Flash, MP3 and other codecs).

Linux Mint comes with a wide range of software installed, including LibreOffice, Firefox, Thunderbird, HexChat, Pidgin, Transmission, and VLC media player. Additional software that is not installed by default can be downloaded using the package manager, adding a PPA, or adding a source to the sources file in the etc directory. Linux Mint allows networking ports to be closed using its firewall, with customized port selection available. The default Linux Mint desktop environments,

Cinnamon and MATE, support many languages. Linux Mint can also run many programs designed for Microsoft Windows (such as Microsoft Office), using the Wine Windows compatibility layer software for Linux, or virtualization software, including VMware Workstation and VirtualBox, or KVM (Kernel-based Virtual Machine, built into the Linux kernel) hypervisor using Virtual Machine Manager.

Linux Mint is available with a number of desktop environments to choose from, including the default Cinnamon desktop, MATE and Xfce. Other desktop environments can be installed via APT, Synaptic, or via the custom Mint Software Manager.

Linux Mint actively develops software for its operating system. Most of the development is done in Python and the source code is available on GitHub.

2.1.2 MySQL:

This is a database server. It is used to store, manipulate and access lists of data organized in tables. This service can be provided by the MySQL software or by MariaDB (a more open, more efficient fork, and 100/100 MySQL compatible).

2.1.3 PHP:

PHP is an interpreted programming language which allows to generate web content dynamically. Most of the time these are HTML pages). A typical example: a user wants to display his profile on a website. By means of his browser he makes a request on a web server by calling a URL on the domain of the server. Apache's PHP module will interpret a script that sends a request to the MySQL server asking for the user's information. Once this information is retrieved, the PHP script formats the result as a web page (HTML) which is sent to the web browser.

2.2 Setting up an apache server:

If we say web application automatically we have to set up our server, in this case we will use linux mint/ubuntu as exploitation system of our server and we will use apache technology

- 1- we need to install apache using command line so we open terminal and enter to the root of our system using the order : `sudo su`
- 2- install apache server on our machine using the order : `apt install apache`
- 3- verify if apache is active with the order : `systemctl status apache2`
- 4- we have to move the root folder of our application to the root folder of the apache server using : `cp -R (our root name with the gateway) /var/www/html/`
- 5- change the owner of our application root to the user of apache with this order : `chown -R www-data : www-data /var/www/html/(our folder)`
- 6- now we need to install the sql server (mariadb) : `apt install mariadb-server`
- 7- to access to mariadb and begin the creation of database we use the order : `mysql -u root`
- 8- and now we can create our database using mysql orders.
- 9- finally we have to install php using the order : `sudo install php php-mysql php-xml`
- 10- you can now test your application from browser using the link : `localhost/(the name of root of your application)`.

2.3 PHP Configuration :

When you work with LAMP technologies, there are very few things that influence your coding decisions more than how PHP is configured. The backbone of any PHP installation is the configuration file, `php.ini`. The settings found in this file can greatly affect how you code your applications, how well the server performs, and even how secure it is. This chapter tells you what settings to look for and change in order to improve your PHP installation and provides you with a set of scripts to automatically prepare your PHP environment and configuration settings to your liking.[7]

2.3.1 Modifying `php.ini`:

`Register globals = off`: One of the most common problems with moving older PHP code to a newer system is how PHP handles form data and variables. In older versions of PHP, form fields were automatically converted into global variables that shared the same name with the PHP engine. While some found this convenient, it eventually became a security risk because of naming and usage confusion. Since PHP 4.2.0, the value for `register globals` was off by default. You should keep this set to off, and use the `$GET`, `$POST`, and `$COOKIE` superglobals, instead of relying on the automatically created variables.[7]

When you develop your applications, it is especially imperative to keep `register globals` set to off, as you can't always be sure of the settings of any production servers where it might end up.

`display errors = off`: While not necessary and actually a burden in a development environment, it's a good idea to set `display errors` to off for any PHP applications on a production or public web server. Turning `display errors` off prohibits PHP from displaying any parse or runtime errors to the user's web browser. Any error the end-user sees can give insight as to the inner workings of the application, which could be helpful information to any malicious individuals who wish to attack your site. In a development or debugging situation, it's perfectly acceptable to leave `display errors` on, to help with debugging.[7]

`log errors = on`: This setting, usually used in conjunction with `display errors`, tells PHP to log all errors normally seen on the screen to a file. You can use that file for later analysis or debugging, or use your own choice of tools to regularly and automatically notify the webmaster.[7]

`error log = filename` or `error log = syslog`: The `error log` directive tells PHP where to send errors when `log errors` is enabled. You can either specify a filename where PHP will write the errors, or specify `syslog`, and it will send the errors to the system logging daemon.[7]

`error reporting = E_ALL`: This directive simply tells PHP to report all errors, warnings, and notices it encounters. By default, PHP shows everything except notices. Showing notices is usually a good idea, especially during development, as it can help you track down uninitialized variables and other minor code gaps.[7]

magic quotes gpc = off: The magic quotes gpc directive tells PHP whether it should automatically escape input/form data when a script is loaded. While this setting is intended as a time-saver, it can actually cause problems if you decide to switch databases, or use a database that doesn't escape special characters with a backslash. If you think you might one day switch database systems, or you currently use a mixed database environment or even no database at all, it's a good idea to set this to off.[7]

2.4 Using MySQL with Apache:

By now, you've created a security zone or two using Apache and basic authentication, and for most situations, that might be all you need. You may find, however, that basic authentication with Apache, while simple, is a little too limited in the amount of control and customization you can incorporate. For many such situations, you can actually use a combination of Apache basic authentication and the power of relational databases via MySQL. For such a purpose, the mod auth mysql Apache module exists. Like standard Apache basic authentication, mod auth mysql can control access per-directory, and can be configured inside both .htaccess files and a <Directory> section inside httpd.conf. Unlike standard Apache basic authentication, all user credentials are stored in a database, instead of in flat files.[8]

2.4.1 Setting Up the database:

Installing and configuring mod auth mysql involves a few steps, the first of which is to create the necessary database structures to hold the user data. Start by loading up your favorite MySQL client, and creating the database. For example:

```
CREATE DATABASE finance;
```

Next, create a user that will be used by Apache to access the credentials:

```
GRANT SELECT ON apacheauth. TO apache@localhost IDENTIFIED BY 'apache-  
pass';
```

Now that the database user is created, it's time to add a table to hold the login information. For now start out with a simple table that just holds the username and password:

```
USE apacheauth;  
CREATE TABLE userinfo (  
  username varchar(50) NOT NULL,  
  userpassword varchar(50) NOT NULL,  
  PRIMARY KEY (userinfo) );
```

You can name the table and columns however you like. In the preceding example, userinfo is used for the table name, and username and userpassword are used for the login/password combination because these are the default names recognized by mod auth mysql.

Next, create an initial test user account that you'll use later when testing the authentication:

```
INSERT INTO userinfo (username, userpassword)
VALUES ('testuser', SHA1('testpass'));
```

Finally, restart Apache.

2.5 Conclusion :

Apache server and the installation of apache is one of the more important part of inaugurating of our system because for the web solutions if we haven't install thye server we can't use the solution.

Chapter 3

Conception

3.1 General conception:

3.1.1 Data base:

To stock our system information we used an SQL oriented object data base divided into many of tables (fig: classes diagram) and to be sure about integrity constraints of our system we used Triggers and sql functions technology.

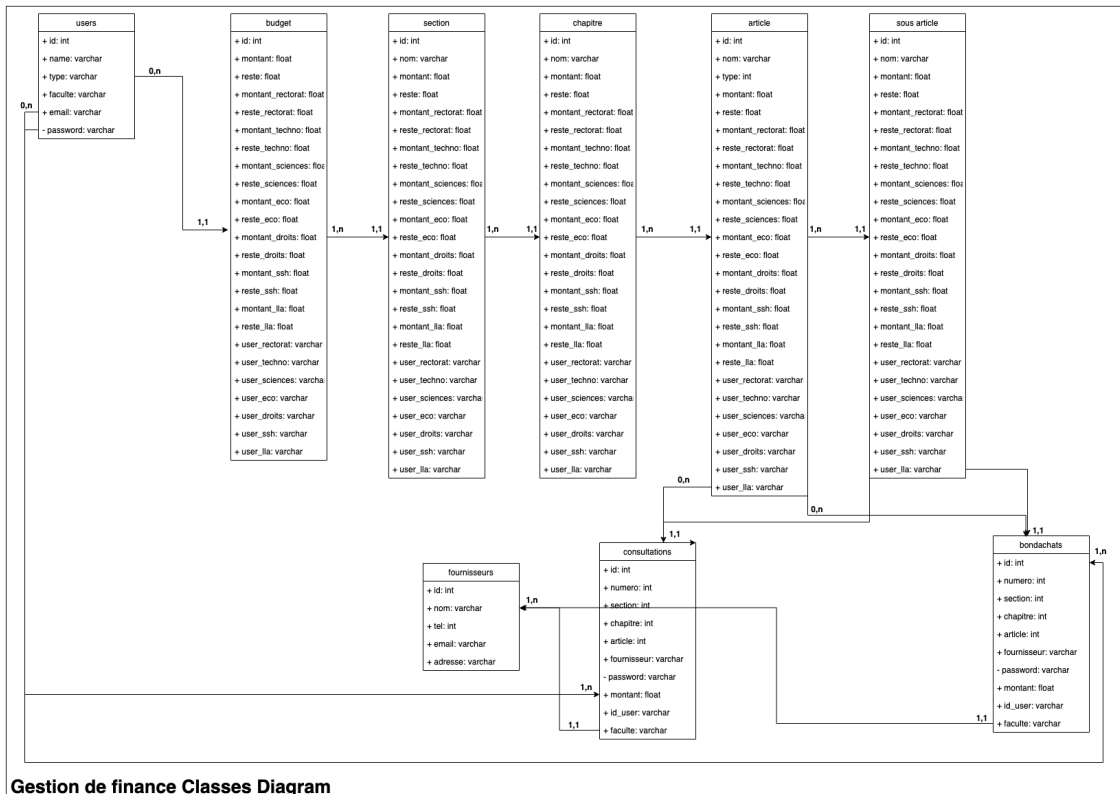


FIGURE 3.1: Classes diagram

Our budget nomenclature is stocked in our database to avoid human mistakes and also we used an automated fulling of information the mostly possible in our database to avoid nulls.

3.1.2 Security:

The security part in our system is in the access by user we give each user the possibility to show only the authorized informations from the authority without forgetting that user informations is encrypted in our database using the SHA1 algorithm, in the end of year to avoid information stealing we export them from our system and we get only a zipped form for it in our database, only authority or user superior can see the user's operation whatever the others see only their transactions.[9]

3.1.3 Interaction and operations:

Our system is divided into six major operations:(fig: interaction diagram)

Connection: Is the users into system connection by user id or user mail and password and this operation is for all users.

System administration: The creation of users account and fulfillment of informations form and this operation is only accessed by the application administrator.

Budget fulfillment: This operation is accessed by finance employees only in the beginning of budget to fulfill each article amount and system will do all the rest automatically.

Consummation: There is two ways in our system that we have talked about in chapter one the purchase and consultation and this operation is accessed by finance users to fill the forms of transaction and valid it but the fulfill and consummation is always supervised by university's authority

Previsions: This is not a user operation is totally automated operation by system to predict the new years' financial need and we will talk exactly about how it work in ML modelization section.

Password/informations update: This operation is generalized for all users to update their profile informations or their passwords without forgetting that if any user forget the access password the application admin can create a new password for him without having the access to his account or his password when he will change it.

3.1.4 Transactions and system organization:

All the previous operations are organized into html interfaces and php pages here down in the activity diagram.

3.2 Machine learning usage:

We have a structured data so the best way is using KNN classifier to predict the new year financial needs by calculate the euclidean distance between the realtime year expenses and all old years expenses and detect the new year expenses based on reel time expenses.

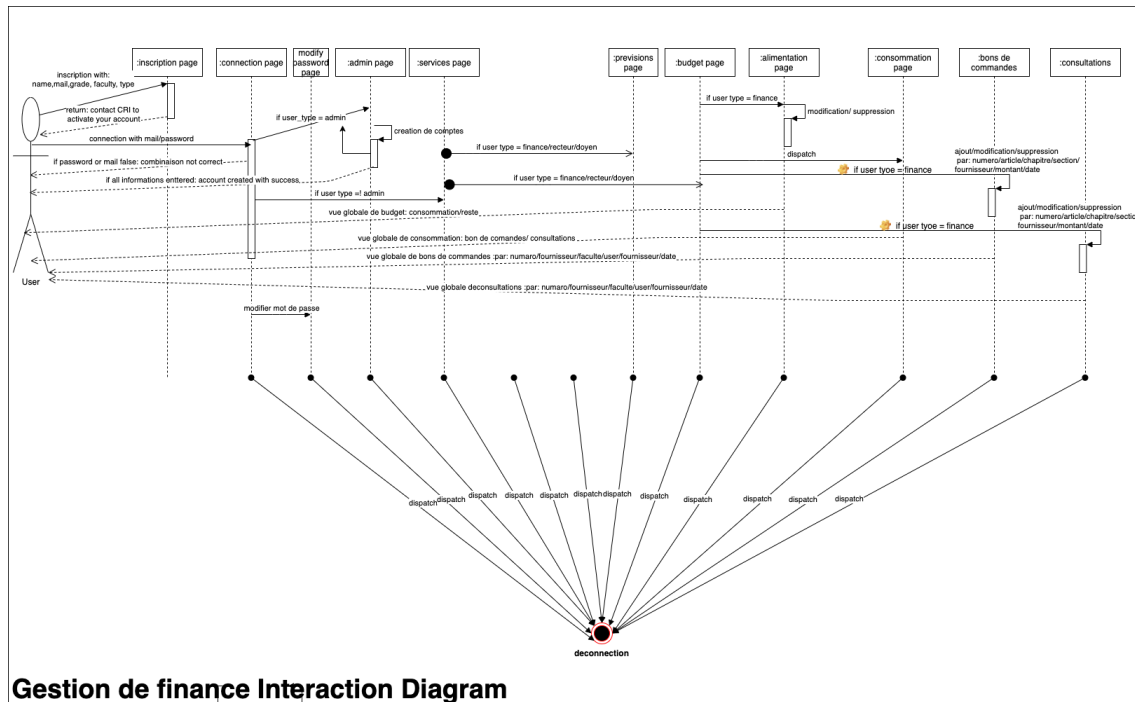


FIGURE 3.2: Interactions diagram

3.2.1 Formalism:

Choosing the right value for K (in our case 1) To select the K that's right for your data, we run the KNN algorithm several times with different values of K and choose the K that reduces the number of errors we encounter while maintaining the algorithm's ability to accurately make predictions when it's given data it hasn't seen before. Here are some things to keep in mind: 1. As we decrease the value of K to 1, our predictions become less stable. Just think for a minute, imagine $K=1$ and we have a query point surrounded by several reds and one green (I'm thinking about the top left corner of the colored plot above), but the green is the single nearest neighbor. Reasonably, we would think the query point is most likely red, but because $K=1$, KNN incorrectly predicts that the query point is green. 2. Inversely, as we increase the value of K , our predictions become more stable due to majority voting / averaging, and thus, more likely to make more accurate predictions (up to a certain point). Eventually, we begin to witness an increasing number of errors. It is at this point we know we have pushed the value of K too far. 3. In cases where we are taking a majority vote (e.g. picking the mode in a classification problem) among labels, we usually make K an odd number to have a tiebreaker.[3]

3.3 UI Conception:

We have designed the user interfaces based on the graphical basic colorgraphy of our university (Blue and white) simple and beautiful to more usability without forgetting the usage of Responsive web design technology by developing only one computer version but compatible with all devices like phones and tablets and TVs, all that was possible in only one click with the framework of bootstrap, also we used many of php graphical frameworks to more comfortable user experience with our

system for example the graphical representation of previsions with JGraph framework.

3.4 Conclusion:

After our studies about the budget and the installation of our system we have to create a secured and fast system because of the sensibility of our systems' informations and to ensure that fluidity we used UML diagrams to see all the failures and errors before the implementation, without forgetting that we this system can't be usable and easy to manipulate without a good graphical conception applied to the UI.

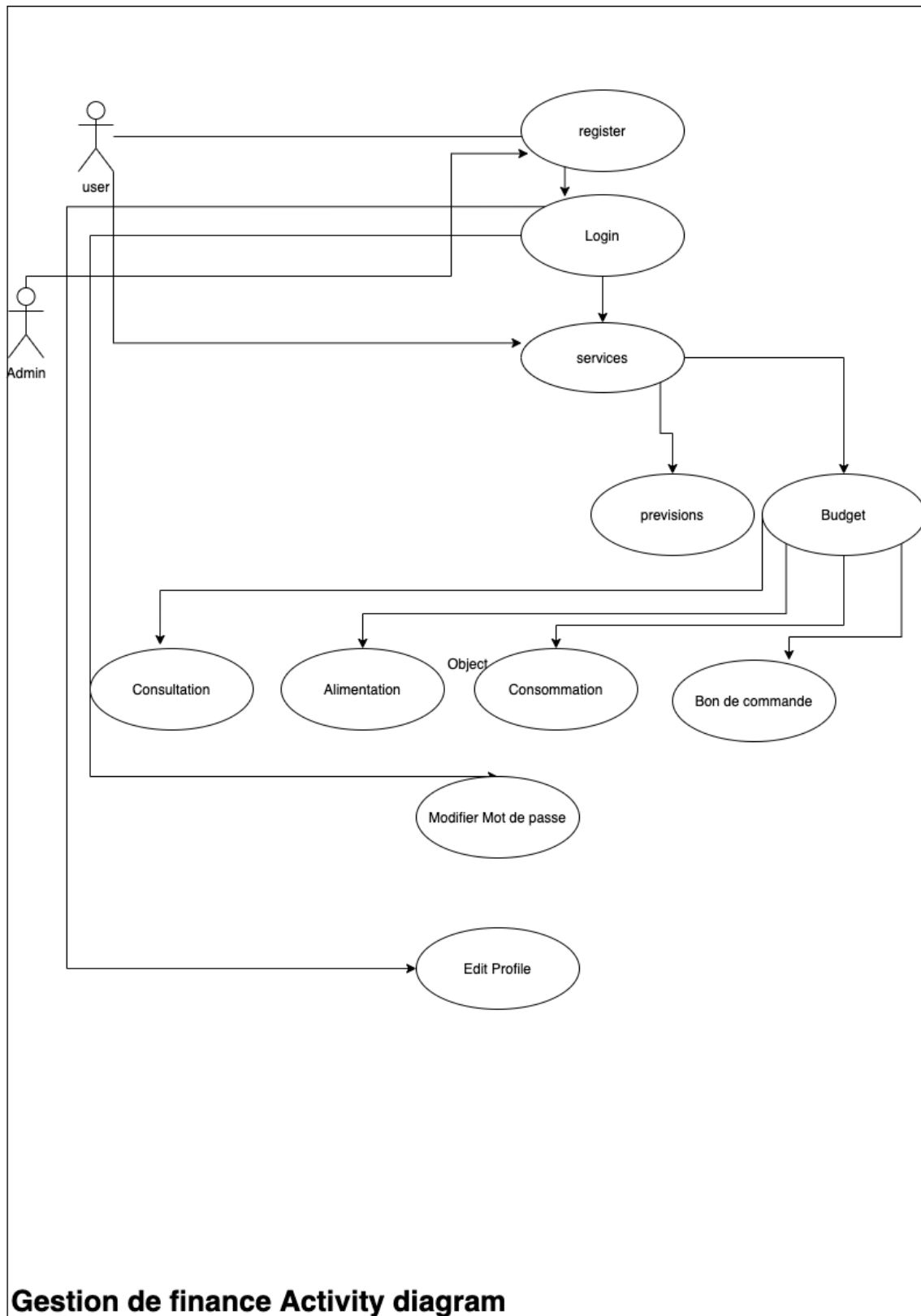


FIGURE 3.3: Activity diagram

Chapter 4

Implementation:

4.1 Used tools:

To implement this system we have used a pure web technologies as like as php and html and css also javascript without forgetting the frameworks as codeigniter for MVC pattern design and jpgraph for graphical representations .

4.1.1 Html

The HyperText Markup Language, or HTML is the standard markup language for documents designed to be displayed in a web browser. It can be assisted by technologies such as Cascading Style Sheets and scripting languages such as JavaScript.[3]

4.1.2 Css

Cascading Style Sheets is a style sheet language used for describing the presentation of a document written in a markup language such as HTML. CSS is a cornerstone technology of the World Wide Web, alongside HTML and JavaScript.[3]

4.1.3 Javascript

JavaScript, often abbreviated as JS, is a programming language that conforms to the ECMAScript specification. JavaScript is high-level, often just-in-time compiled, and multi-paradigm. It has curly-bracket syntax, dynamic typing, prototype-based object-orientation, and first-class functions.[3]

4.1.4 Codeigniter

CodeIgniter is a PHP MVC framework used for developing web applications rapidly. CodeIgniter provides out of the box libraries for connecting to the database and performing various operations like sending emails, uploading files, managing sessions, etc.[4]

4.1.5 jpgraph

JpGraph is an Object-Oriented Graph creating library for PHP5 (>=5.1) and PHP7.0 The library is completely written in PHP and ready to be used in any PHP scripts[5]

4.2 Why web solution?

4.2.1 Faster access

If we think about how to use PC and mobile devices, we achieve something very important. Most people choose to use a web application from their mobile devices for more speed, and with the same quality as from the PC.

4.2.2 Works on all operating systems

Since it is not a native application, one of the advantages of web application development is that, regardless of the operating system, it is designed to suit the screen and the "language" of the application. the device. It is precisely this quality of web applications that makes them run through the browsers themselves. Likewise, we can say that they are "easy to program" because they use the classic languages we know very well like CSS, HTML and Javascript. Our browser will always be interpreted by a unique development whether for a Nexus 6 to an iPad, or any other.

4.2.3 Accessible from everywhere

The main reason you should choose with web application development is accessibility. It offers great mobility and easy access from any mobile device, anywhere, anytime with just an Internet connection. The ability to not rely on a single PC to access the information you have stored in the app is also a plus. An example is the Evernote app (considered in a list as one of the best mobile apps of 2014), with which you can take notes and create documents from your PC, from a smartphone or tablet and access these files anywhere just by entering your credentials.

4.2.4 Simultaneous work in the "Cloud"

Many web applications allow multiple users to work on the same content. These are, for example, services for teamwork such as the Concept Inbox prototyping tool. Google's tools also allow multiple users to work on the same document, either from the native application or from the web application, with simple access to the Internet.

4.2.5 Content security

Something to keep in mind is security in web application development. Since access to the content of the application is via the Internet, there is always the possibility that our content is exposed. Therefore, we must include the necessary protocols to secure our information, developers and users when choosing their posse password.

4.2.6 Conclusion:

the final step of this researche arrived now by implement all our conception but to be sure that our system is one of the best existing systems we have to use the best existing web technologies, code igniter for MVC pattern designs, html css for the interface and jpgraph for graphical presentations to facilitate information understanding.

Chapter 5

Screenshots:

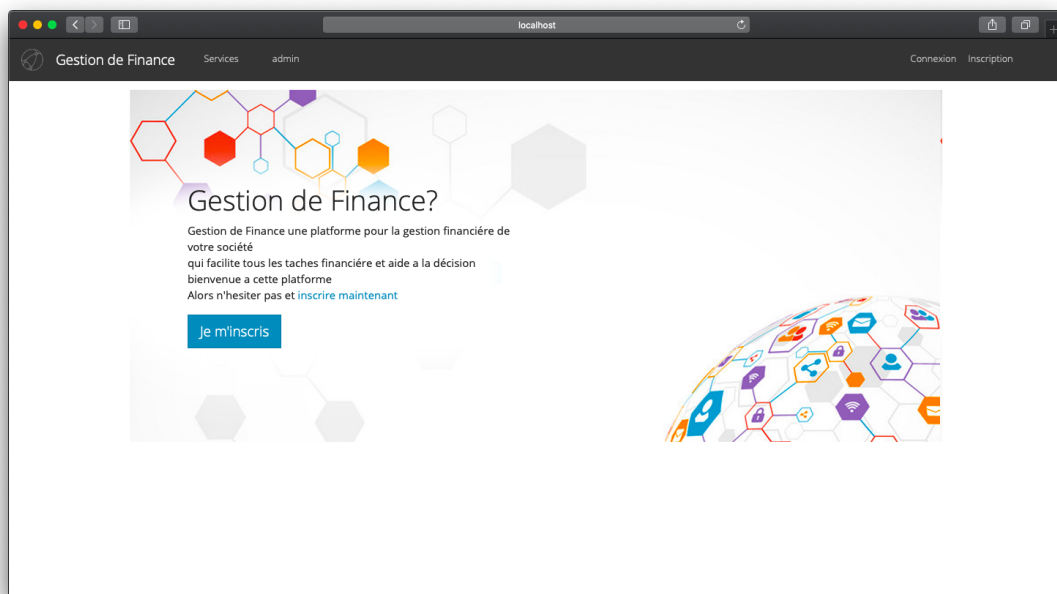
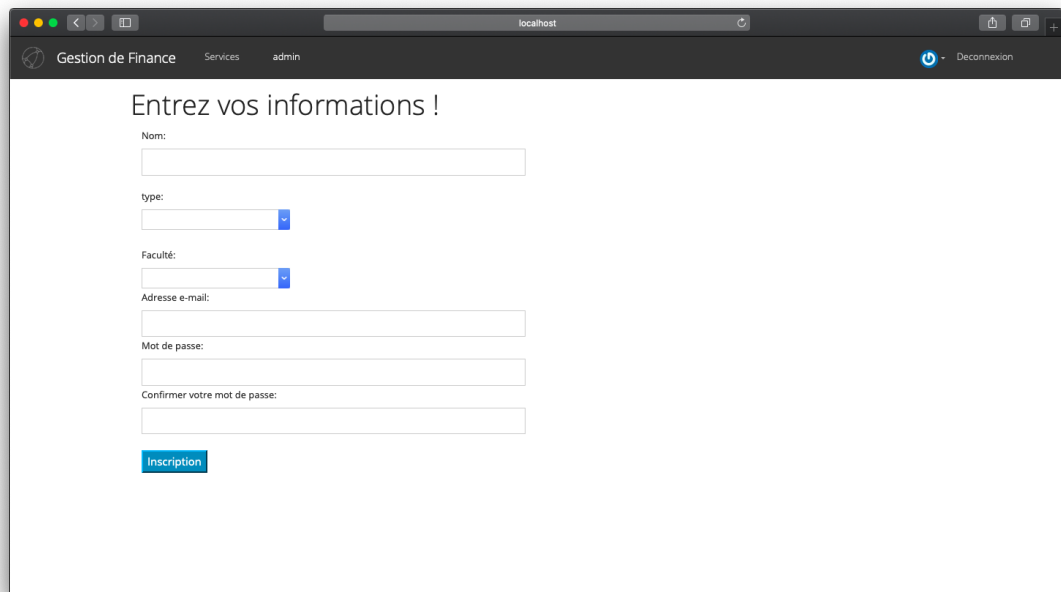


FIGURE 5.1: main page



The screenshot shows a web browser window with the URL localhost. The page title is "Gestion de Finance" and the user is logged in as "admin". The main heading is "Entrez vos informations !". Below the heading are several form fields: "Nom:" (text input), "type:" (dropdown menu), "Faculté:" (dropdown menu), "Adresse e-mail:" (text input), "Mot de passe:" (text input), and "Confirmer votre mot de passe:" (text input). At the bottom of the form is a blue button labeled "Inscription".

FIGURE 5.2: administrator main page

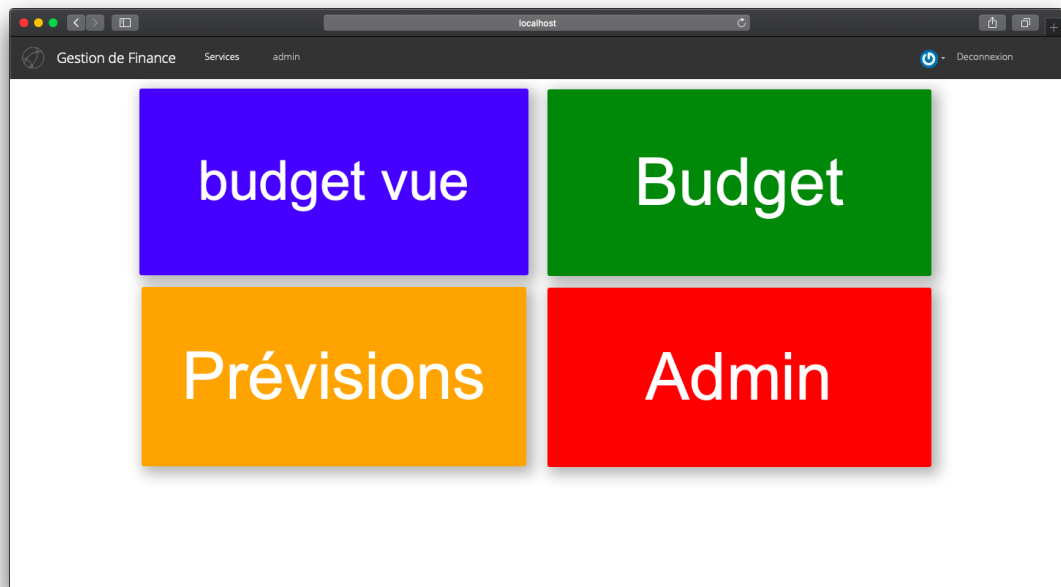


FIGURE 5.3: users main page (services)

Votre Budget !

votre budget de rectorat est 10014800/15047 DA

votre section AZE est de montant / DA

votre section aze est de montant 10015100/17693 DA

votre chapitre abdou est de montant 10017800/15281 DA

numero	article	montant	reste	par l'utilisateur
1	A	535	10000300	abdou@mail.com

numero	sous article	montant	reste	par l'utilisateur
1	sarticle			abdou@mail.com

numero	article	montant	reste	par l'utilisateur
2	B		20000	abdou@mail.com

votre section azzz est de montant / DA

FIGURE 5.4: budget general view

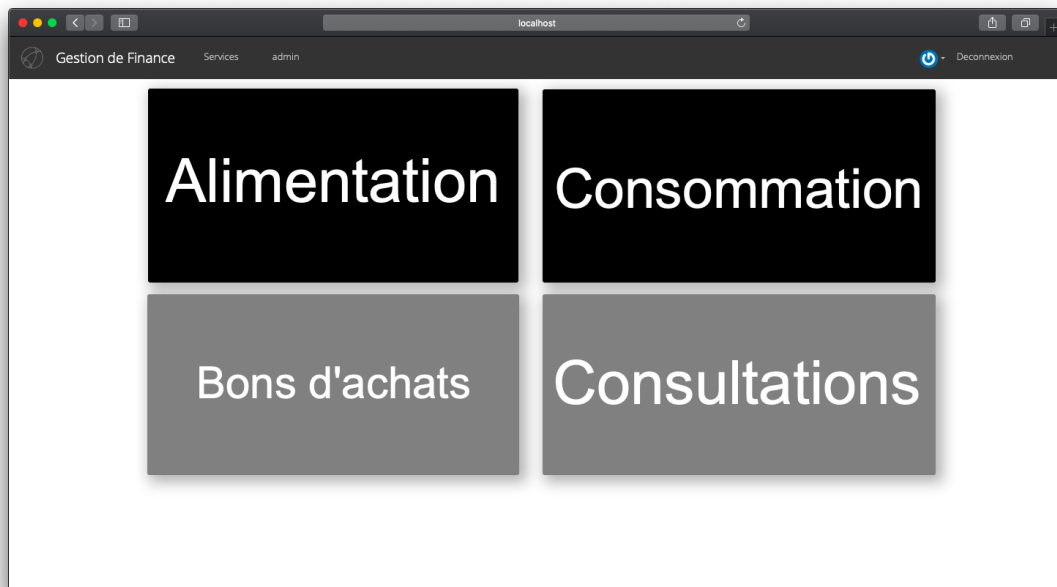


FIGURE 5.5: budget operations page

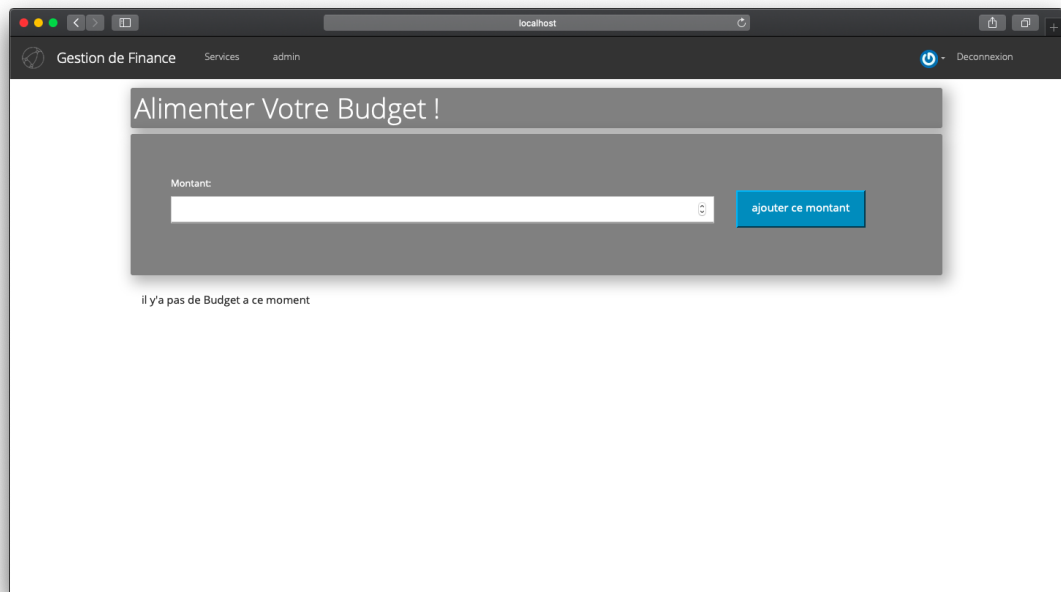


FIGURE 5.6: budget fullfilment page

Utilisateur	faculte	numero	section	chapitre	Article	fournisseur	montant	type
abdou@mail.com	techno	12	12.aze	1.1	2.2	AAAA	20003	Bon de commande
abdou@mail.com	lla	1	12.aze	1.1	2.2	ZZZ	40000	Bon de commande
abdou@mail.com	techno	2	3.32	2.2	1.1	1	1	Bon de commande
abdou@mail.com	techno	1	12.aze	1.1	2.2	bb	20	Bon de commande
techno@mail.com	ssh	1	1.A	1.1	1.1	aaa	100	Bon de commande
abdou@mail.com	sciences	1	12.aze	1.1	1.1	AAAAAAAA	12	Bon de commande
abdou@mail.com	eco	12	12.aze	1.1	1.1	aaa	4000	Bon de commande
abdou@mail.com	droits	12	12.aze	1.1	1.1	1	400	Bon de commande
abdou@mail.com	ssh	1	12.aze	1.1	1.1	1	400	Bon de commande
abdou@mail.com	rectorat	12	12.aze	1.1	1.1	1	4000	Bon de commande
abdou@mail.com	rectorat	1	12.aze	1.1	1.1	1	400	Bon de commande
abdou@mail.com	ssh	12	12.aze	1.1	200.200	AA	4000	une Consultation
abdou@mail.com	lla	2	12.aze	1.1	200.200	Ab	4000	une Consultation
abdou@mail.com	rectorat	1	12.aze	1.1	1.1	1	2000	une Consultation

FIGURE 5.7: budget consumption general view

FIGURE 5.8: add shopping vouchers page

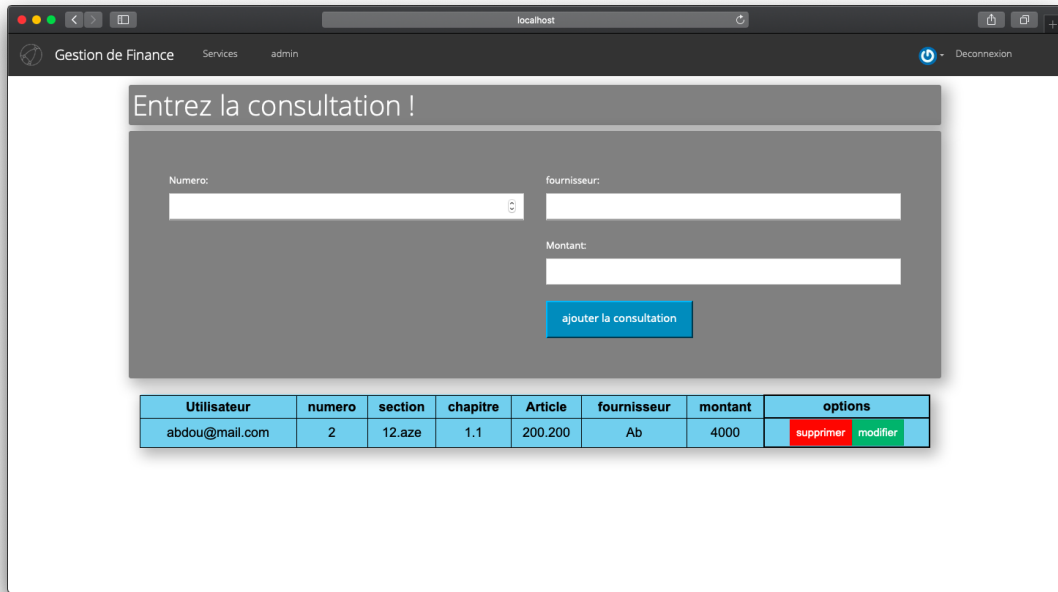


FIGURE 5.9: add consultations page

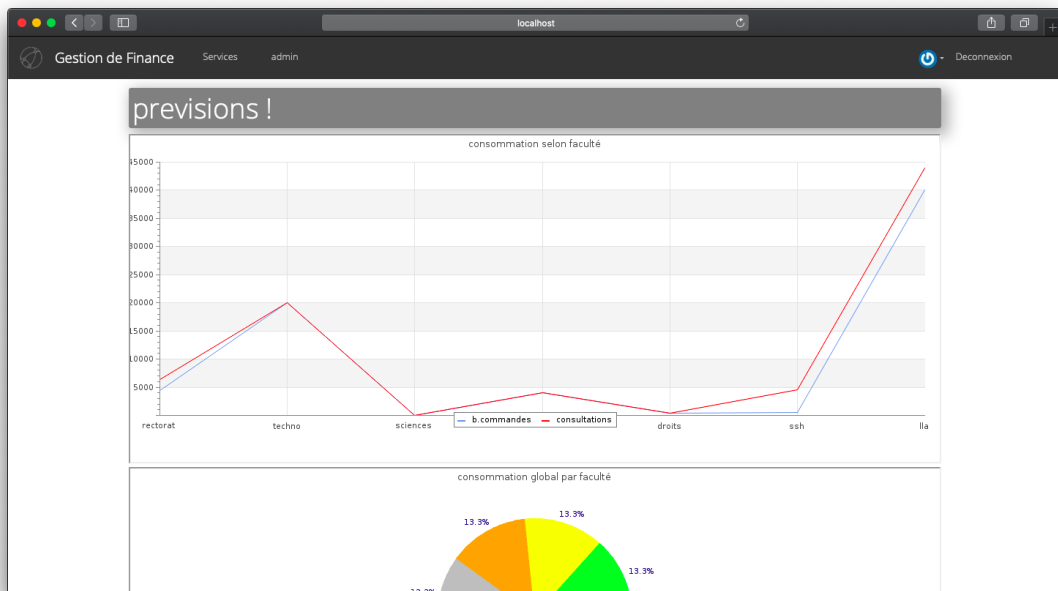


FIGURE 5.10: predictions page by consultations and shopping vouchers

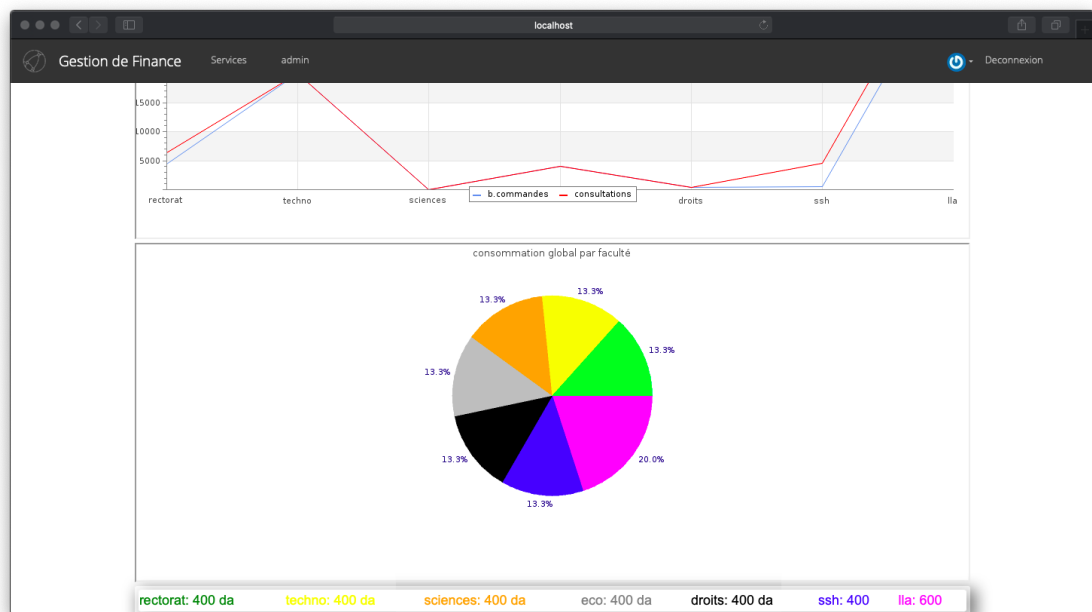


FIGURE 5.11: predictions page by faculty

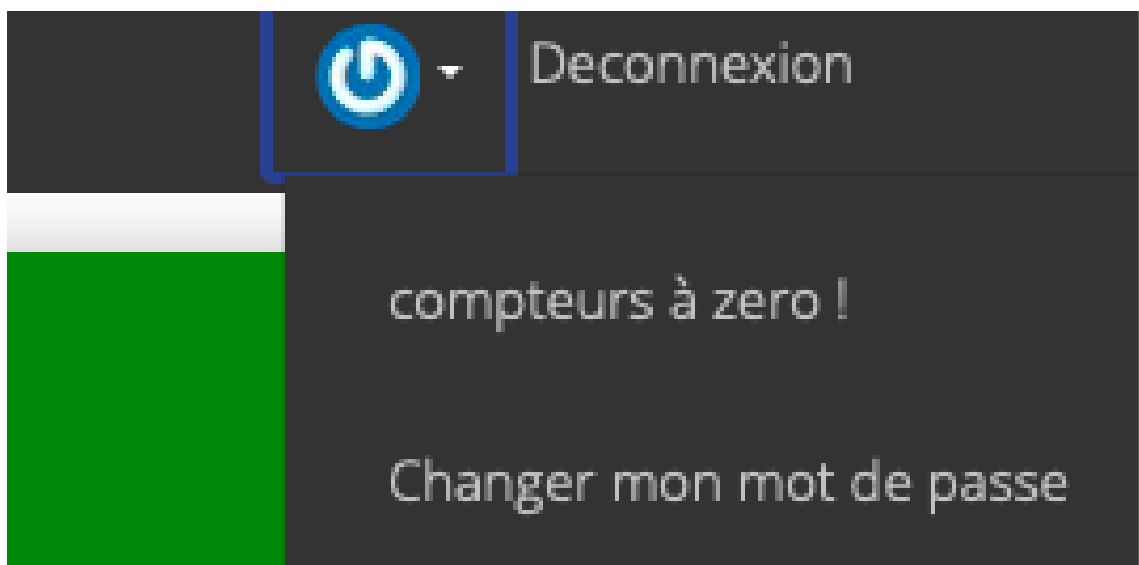


FIGURE 5.12: additional options

Conclusion

5.1 Conclusion

To inaugurate an active and usable financial system we have to firstly understand the budget general nomenclature and hierarchy and integrate it automatically to our system with the possible operations to each section or chapter, article.

Apache server and the installation of apache is one of the more important part of inaugurating of our system because for the web solutions if we haven't install the server we can't use the solution.

After our studies about the budget and the installation of our system we have to create a secured and fast system because of the sensibility of our systems' informations and to ensure that fluidity we used UML diagrams to see all the failures and errors before the implementation, without forgetting that we this system can't be usable and easy to manipulate without a good graphical conception applied to the UI.

The final step of this research arrived now by implement all our conception but to be sure that our system is one of the best existing systems we have to use the best existing web technologies, code igniter for MVC pattern designs, html css for the interface and jgraph for graphical presentations to facilitate information understanding.

Our research in this domain is like a first door to University's financial computation so we expect in the future adding an other offices to this system for more usability like the personnel office and stock office for more precision in the financial calculus and also we expect in the future by adding the other offices most near to exacts previsions by calculate the really financial needs not only using approaches to get it.

Appendix A

University budget nomenclature

Dépenses du personnel (Section I)

Dépenses de fonctionnement (Section II)

Chap.	Libelles
21.01	Traitement et salaires
21.02	Personnels contractuels, Salaires, prestations familiales et cotisations à la sécurité
21.03	Indemnités et allocations diverses
21.04	Présalaires des apprentis
21.05	Charges Sociales et Fiscales
21.06	Œuvres Sociales
21.07	Assurance des étudiants
21.08	Rémunération des enseignants vacataires, associés et invités
21.09	Pensions de service et pour dommages corporels
Total Section I	
21.11	Remboursement de frais
21.12	Matériels et mobiliers de bureaux
21.13	Fournitures
21.14	Documentation
21.15	Charges annexes
21.16	Habillement du personnel de service
21.17	Parc automobiles
21.18	Travaux d'entretien
21.19	Frais formation - stage de courte durée à l'étranger
21.20	Frais de formation et de perfectionnement de courte durée en Algérie du personnel
21.21	Matériels et fournitures informatiques
21.22	Matériels et mobiliers pédagogique
21.23	Frais liées aux études post graduées
21.24	Participation aux organismes nationaux et internationaux
21.25	Frais d'organisation des manifestations scientifiques et techniques (séminaires - cc
21.26	Frais de transport des étudiants pour formation de longue durée à l'étranger
21.27	Activités culturelles, sportives et scientifiques aux profits des étudiants
21.28	Coopération scientifique et accords des programmes de recherche
21.29	Frais de conférences régionales
21.30	Frais de stage en milieu professionnel au profit des étudiants
Total Section II	

Chapitre 21.01 - Traitement et salaires	
Art.	Libelles
1	rémunération principale du personnel titulaire et stagiaire
2	rémunération principale des enseignants algériens
3	rémunération principale des enseignants étrangers
4	rémunération principale des enseignants détachés
5	Bonification indiciaire
Total du chapitre 21.01	
Chapitre 21.02 - Personnels contractuels, Salaires, prestations familiales et cotisa	
1	rémunération du personnel contractuel
2	Prime de rendement
3	Prestations à caractère familiales
4	Indemnité de nuisance
5	Sécurité sociale (25%)
6	Indemnité de Zone
7	Indemnité forfaitaire compensatrice
8	Indemnité d'expérience professionnelle
9	Indemnité forfaitaire de service
10	Indemnité de risque et d'astreinte
11	Indemnité de soutien aux activités de l'administration

Appendix B

Our Systems' User Guide

- Inscription:
- For all employees of the university that will use our system in their tasks (financial office) they have to go to the system administrator to add their information and activate their accounts, also they can create accounts by their self but it can't be active just after the activation of the system administrator.
- afterlogin:
- after login to our system you will find all operations(budget view, budget, previsions, admin).
- Budget view:
- This page is specially for the authorities to being up to date with all the budget that can see for exemple deans of facultys can see only their faculty's budget however the rector can see all faculty's budget.
- Budget :
- The budget page is for the employees of financial office to enter the nomenclature for the first use, add operations on budget and also we can find consumption page that also avoid to authorities to see all operations on their budget as like consultations.
- Previsions :
- previsions is the intelligent part of our system that use ML algorithms to calculate financial needs for the next year.
- Admin :
- This page is specially for the system administrator to add new users or activate users account.
- Other operations :
- the rector can use th "compteur à zero" option to begin new years' budget. all user in our system can change the account password using "chnager mon mot de passe button".

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