# Development of WEB-Based Correspondence Management Application Programs Faculty of Mathematics and Natural Sciences UNIMED

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## Abstract

*Faculty of Mathematics and Natural Sciences which is one of the faculty at Unimed in organizing the activities scheduled and archive mail incoming and outgoing mail is still using manual diary. This is less efficient because it will be difficult to find so many archives of letters that have been stored for a long time. Currently, technological advances in the world are growing rapidly and are very much needed. Especially with the emergence of the Corona Virus Disease (Covid-19) Pandemic, most of the community's activities are disrupted so that activities are carried out online. Likewise, with the student activities of FMIPA Unimed. Now students carry out lectures online. However, for final year students who want to apply for a thesis research letter or active students who want to apply for a scholarship need an active college letter, they must come to campus to take care of the files in order to get the required letter. Therefore, there is a need for a correspondence management application in the administration of FMIPA Unimed so that FMIPA Unimed students can take care of the required letters online, employees can speed up searching for mail data and print out their letter reports. This application is designed web-based using PHP and MySQL. This application has the ability to be accessed anywhere by admins, employees and students so that employees can manage mail with a user login, be it adding, updating, deleting, uploading, downloading and searching for letters and printing mail reports. In addition, it also makes it easier for students to take care of research letters and active lecture letters online until the letters are completed and can be downloaded. This application also provides a place to send messages to each other between employees and students.*

*Keywords: Letter, Employee, Student, PHP, MySQL.*

## Introduction

Based on the regulation of the Minister of Education and Culture of the Republic of Indonesia Number 148 of 2014 concerning Organization and Work Procedure of Medan State University in Article 55, the Faculty consists of the Faculty of Mathematics and Natural Sciences, Faculty of Engineering, Faculty of Sports Science, Faculty of Education, Faculty of Languages and Arts, Faculty of Social Sciences and Faculty of Economics. Article 56 states that the Faculty has the task of organizing and managing academic, vocational, and/or professional education in a Science and Technology clump, then Article 57 states that in carrying out the tasks as referred to in Article 56, the Faculty carries out the function of implementing and developing education in Faculty environment, implementation of research for the development of Science and Technology, implementation of community service, implementation of the development of the academic community and implementation of administrative affairs.

In accordance with article 57-point e, namely the Faculty carries out the function of carrying out administrative affairs, it means that the Faculty organizes services around information that is manifested in six patterns of action, namely collecting, recording, processing, duplicating, sending, and storing information needed in each case. cooperative effort, in accordance with the understanding of administration according to The Liang Gie (1996) (Ida Nuraida, 2008). One series of these activities are scheduled and archive mail incoming and outgoing mail. Incoming letters are letters received by an organization or company from another person, organization or company. Outgoing letters are letters made and issued by an organization or company to be sent to other parties, whether individuals, organizations or companies.

Faculty of Mathematics and Natural Sciences which is one of the Faculty UNIMED in carrying out scheduled activities, archive mail incoming and

outgoing correspondence and other activities use manual and computerized. However, the correspondence activity is carried out by means of computerization, but it has not been fully accessible for residents of the Faculty of Mathematics and Natural Sciences UNIMED, but access rights are still given only to employees, access has not been made for students as well. So that students still do activities mail correspondence by hand.

Activity mail correspondence manually it still may be used. However, technological advances in today's world are growing rapidly and are very much needed. Especially with the emergence of the Corona Virus Disease (Covid-19) Pandemic, most of the community's activities are disrupted so that activities are carried out online. Likewise with the student activities of FMIPA UNIMED. Now students carry out lectures online. However, for final year students who wish to apply for their thesis research letter or active students who want to apply for scholarships or other needs requiring an active lecture letter, they must come to campus to take care of the files in order to get the required letter. This is very constrained for students who are outside the city of Medan because during this pandemic it is difficult to travel. Therefore, it is necessary to develop information technology in the administration of FMIPA UNIMED.

One of the developments in information technology is the advancement of information systems. Information can be obtained quickly, accurately, and easily known by the user with a good information system. Through an information system based on computer technology, users are given the convenience of doing a job or accessing information which ultimately makes the work easier, effective and efficient. Work that previously had to be done manually is now being replaced by the use of computer technology-based information systems or CBIS (Computer Base Information System) (Jenar Kuswidiardi, 2015).

Management information system is a structured system that is used to manage computerized databases. In the information system there are several functions needed by a company, including data retrieval, updating data regularly, informing the public of data (can be in the form of text reports or in the form of tables), data storage. With this information system, a company expects a system that can work quickly and accurately so that work productivity in the company will increase (Bagus Karuniawan, 2002).

MySQL (My Structured Query Language) is very popular especially for web applications. MySQL is an "M" database component in LAMP, BAMP, MAMP, and WAMP (Linux/BSD/Mac/Windows-Apache-MySQL-PHP/Perl/Phyton). In addition, it is used in bugtracking tools such as Bugzilla. Some of

the reasons why MySQL is popular, among others, is that MySQL is very popular with the development of programming languages for the web, such as PHP (Hypertext Preprocessor) and RoR (Ruby on Rails). MySQL is proven to be stable because it is used by many large projects, such as mediaWiki, Flickr, Facebook, Google, Nokia and Youtube. In addition, free CMS (Content Management System) projects such as WordPress, Drupal, Joomla, all use MySQL as their database server (Wahana Computer, 2010).

An information system can be created using a programming language. The programming language that will be used to design correspondence management software is PHP (Hypertext Preprocessor). PHP is a web-based programming language written by and for web developers. PHP was first developed by Rasmus Lerdorf, a software developer and member of the Apache team , and was released at the end of 1994. PHP was developed with the initial goal of logging visitors to Rasmus Lerdurf's personal website. In the second release , the Form Interpreter was added, a tool for translating SQL commands (Achmad Solichin, 2016).

Every time you access the database, you need a connection that connects the PHP code with MySQL. This connection is used to access MySQL tables, both for writing and reading data. The syntax for connecting to MySQL is to use the mysql_ connect( ) function available in PHP. The general form of this function is: mysql_ connect( servername, username, password) (Diar Puji Oktavian, 2010).

Several previous studies have created a database using MySQL and the PHP programming language. As has been done by Ade Suryadi (2019), namely the design of a web-based mail archive management system using the waterfall method (case study: Karangrau Banyumas Village Office) which produces a web-based mail archive information system application program that will facilitate the process of accurately searching mail archives. , fast and efficient and can document incoming and outgoing letters so as to facilitate access when needed at the Karangrau Village Office Banyumas.

As for Tia Windea (2018), who created a web-based correspondence processing application (a case study at Madrasah Tsanawiyah BPI Baturompe, Tasikmalaya City) which resulted in this web-based correspondence processing application, mail processing could be carried out quickly and efficiently.

In Zulaifa Rumaf's research (2019), a web-based mail data management information system at the Ternate City agricultural office that produces an application to facilitate the processing of incoming

and outgoing mail data using PHP and MySQL tools as databases and XAMPP as the offline server.

Based on the existing problems, there is a need for research related to the development of web-based mail management applications using the PHP programming language and MySQL database with the title "Development of WEB-Based Correspondence Management Application Programs, Faculty of Mathematics and Natural Sciences UNIMED".

## Research Method

### 1. Research Time and Place

This research will be conducted in October 2020 and at the Administrative Office of the Faculty of Mathematics and Natural Sciences UNIMED which is located at Jl. William Iskandar Ps. V District. Percut Sei Tuan, Kab. Deli Serdang, North Sumatra Province postal code 20371.

### 2. Data collection

a. *Interview*

This interview aimed to obtain complete information, and to obtain this, a question and answer method was carried out regarding all activities related to the management of correspondence at the Administrative Office of the Faculty of Mathematics and Natural Sciences UNIMED.

b. *Observation*

Observations are carried out directly on activities related to the problem taken. The results of these observations were immediately recorded so that the shortcomings of the current letter management process at the Administrative Office of the Faculty of Mathematics and Natural Sciences UNIMED could be identified.

c. *Literature review*

Literature study aims to collect and study data from various book sources as well as find information needed and related to the preparation of reports.

### 3. Software Development Method

This research is a type of development research that is used to produce products according to needs. The product development model adopts a software development model consisting of:

a. *Software requirements analysis*

At this stage of software requirements analysis, a survey of the current system is carried out by means of interviews, observations and literature studies in order to obtain data information that aims to analyze the needs of the software to be built. In this case, it is about the Web-Based UNIMED Correspondence Management Application Program.

b. *Design*

The design stage is the media design stage which includes the making of program flow diagrams. To realize the results of the ideas based on the theory studied so as to produce a design that can assist in making Web-Based Correspondence Management applications that have functions to use and are efficient in their use. Program design using Notepad++ and database in Appserv.

c. *Code writing*

In making the application must go through the process of writing code to form the program properly. Writing this code using a specific programming language according to the purpose. In this case the programming language used is PHP.

d. *Test*

The completed application will be tested to see how it performs and then evaluate it. With the evaluation, it is hoped that a solution will be implemented immediately.

### 4. Research Tools and Materials

Supporting devices used in this study are:

a: *Computer hardware*

This web-based correspondence management application program was created using a laptop with an Intel Core i5 Processor, 87.6 GB memory and a 32-bit Operating System type.

b: *Software*

Process management application programming mail correspondence using web-based software Notepad ++ and Appserv.

## Result and Discussion

### 1. Software Requirements Analysis

a. *User Needs Analysis*

In the correspondence management web application program at FMIPA Unimed, there are three types of users, namely:

1) Admin Needs Analysis
    i. Requires access to manage the main web page.
    ii. Requires access to register new web users.
    iii. Requires access to block and unblock web users.
    iv. Requires access to be able to edit profile and password.

2) Employee Needs Analysis
    i. Requires access to log in to the employee page using the registered username and password.
    ii. Requires access to add, delete, edit letter of incoming and outgoing mail.

iii. Requires access to print the report mail incoming and outgoing mail.
iv. Requires access to process letters needed by students, namely thesis research letters and active lecture letters to completion.
v. Requires access to be able to send messages to each other to students.
vi. Requires access to be able to edit profile and password.

3) Student Needs Analysis
i. Requires access to log in to the student page using the registered username and password.
ii. Requires access to be able to write a thesis research letter or a lecture.
iii. Requires access to be able to find out the status of letters processed by employees.
iv. Requires access to be able to download letters that have been processed by employees.
v. Requires access to be able to send messages to each other to employees.
vi. Requires access to be able to edit profile and password.

b. *System Requirements Analysis*
1) Access Rights
i. Admin
a) Access the main page.
b) Access the manage page contact page.
c) Access the manage page about page.
d) Access the manage issue report page.
e) Access the account manage page.
f) Access the profile page.
ii. Employee
a) Access the main page.
b) Access pages of letters.
c) Access the mail request page.
d) Access the incoming mail archive page .
e) Access the outgoing mail archive page .
f) Access the incoming mail report page .
g) Access the outgoing mail report page .
h) Access the profile page.
iii. College student
a) Access the main page.
b) Access the mail page .
c) Access the message page.
d) Access the profile page.

2) Data Processing
In the correspondence management web application program at FMIPA Unimed there is data management that will be managed, namely:
i. In making this web application program the data is created and stored in the MySQL database application.
ii. User data is data used to access web pages according to the type of access

rights and user status.
iii. Contact data and about on the web are data that can be changed by the admin according to needs.
iv. Data letter entry is data that contains information about incoming mail.
v. Data letter out is data that contains information about the outgoing mail.
vi. Incoming mail report data is data that contains information on incoming mail reports.
vii. Data reports a letter out is data that contains information about the outgoing mail report.
viii. Letter data is a letter that will be processed by the employee when the student requests the letter.
ix. Letter request data is personal data and student files when students want to request the required letter .
x. Data message is data that contains messages between employees and students.

**2. Design Design**
a. *Program Flowchart*
The program flow chart is a diagram to describe the flow of data or information between parts of the correspondence management program at FMIPA Unimed.
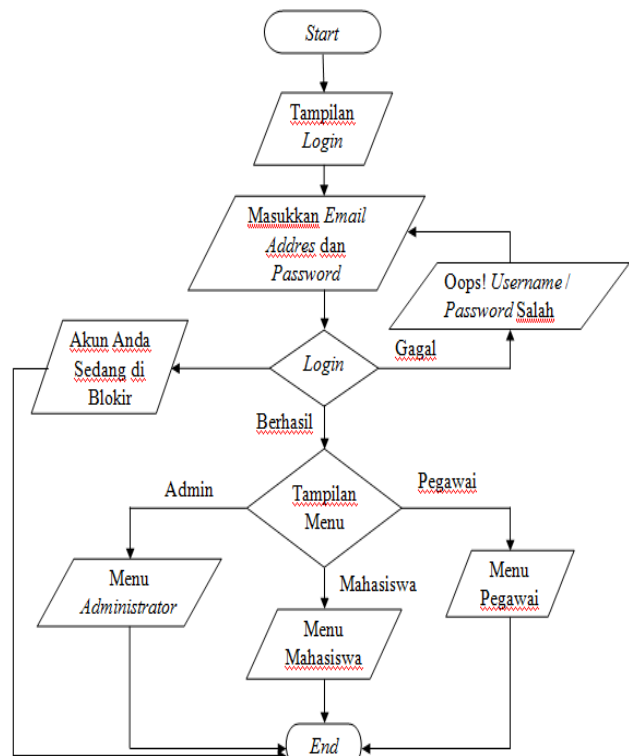


**Figure 1**. Login Process Flowchart.
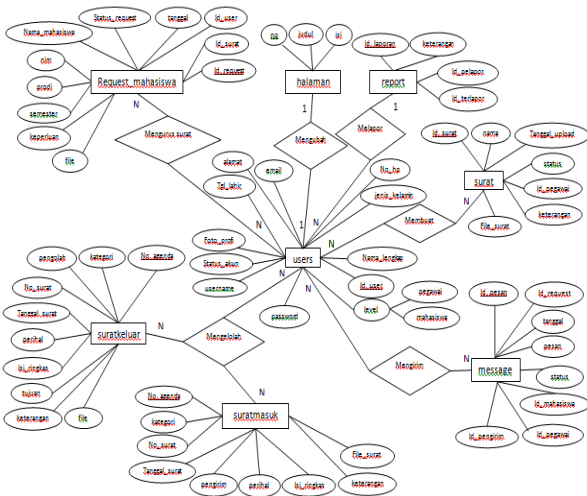
## b. Entity Relationship Diagram (ERD)



**Figure 2**. Entity Relationship Diagram (ERD).
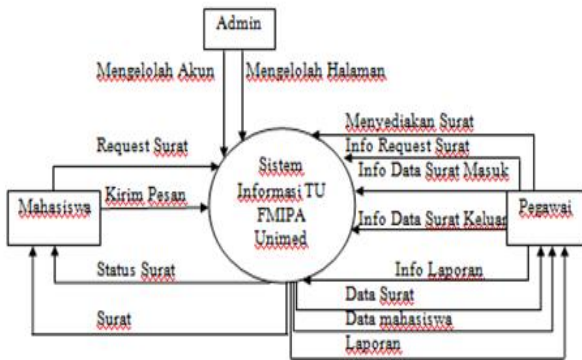
## c. Data Flow Diagram (DFD)



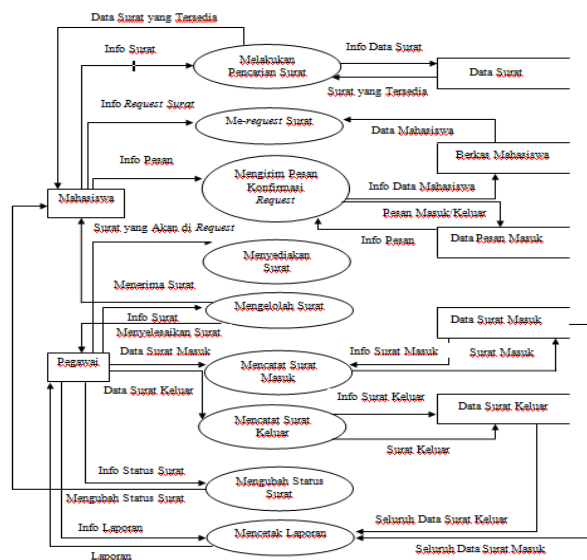**Figure 3**. Data Flow Diagram (DFD) Level 0.



**Figure 4**. Data Flow Diagram (DFD) Level 1.

## d. Database Table Structure

Making a correspondence application program for FMIPA Unimed in its implementation requires a database as a space provider to store application data. In the correspondence management application program, FMIPA Unimed database is created with the name "thesis" and the tables are users, pages, reports, letters, request_mahasiswa, messages, incoming mail, outgoing mail. The following are the types of each table in the database that are used to store data according to what is input into the table. One of these tables is the user table. The users table is a table that contains user data, namely admin, employees and students with the primary key being id_user and username and password used to log in.

**Table 1**. Users.

| No. | Nama Field | Type | Wide | Information |
|-----|-----------|------|------|-------------|
| 1 | id_user | integer | 5 | User ID |
| 2 | Username | varchar | 40 | Login Username |
| 3 | Password | varchar | 50 | Login Password |
| 4 | nama_lengkap | varchar | 40 | User's full name |
| 5 | status_akun | varchar | 10 | User account status |
| 6 | Email | varchar | 40 | User e-mail |
| 7 | no_hp | varchar | 13 | No. User's cellphone |
| 8 | jenis_kelamin | varchar | 10 | User gender |
| 9 | Alamat | varchar | 55 | User address |
| 10 | tgl_lahir | date | | User's birthday |
| 11 | foto_profil | text | | User profile photo |
| 12 | Level | varchar | 10 | Access rights level |

## e. Web Navigation Structure

Web navigation structure is a structure composed of a program designed to link web pages. The following is a web navigation structure based on login permissions.
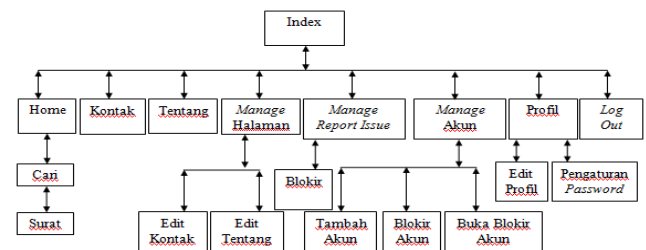
1. Admin Navigation Structure



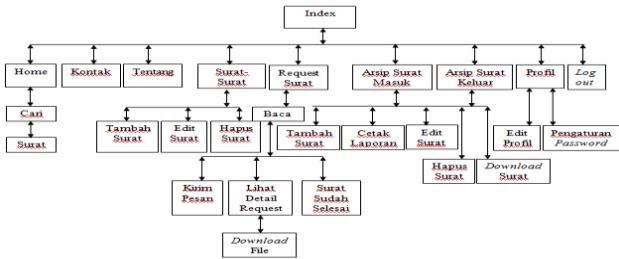**Figure 5**. Admin Navigation Structure.

2. Employee Navigation Structure



**Figure 6**. Employee Navigation Structure.

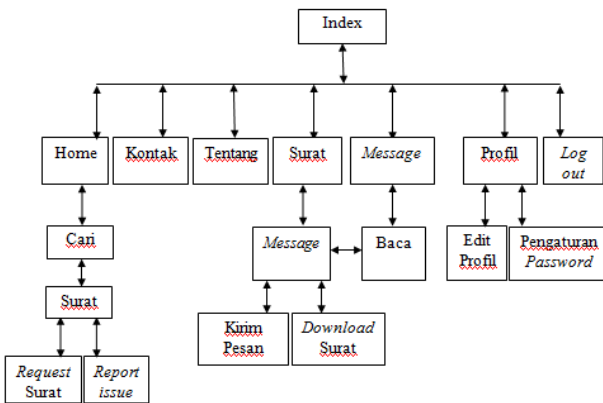3. Student Navigation Structure



**Figure 7**. Student Navigation Structure.

## 3. Implementation

The implementation of the FMIPA Unimed correspondence application program can be seen on the following web page:

*a. Main course*

On the main menu is a starting page that displays the page home, contact, on and log in to be seen by visitors application letter correspondence FMIPA Unimed. However, only employees and students of FMIPA Unimed have the right to log in to the next page. FMIPA Unimed employees and students must first confirm to the FMIPA Unimed information desk so that they are registered and can log in. Here is the home page:
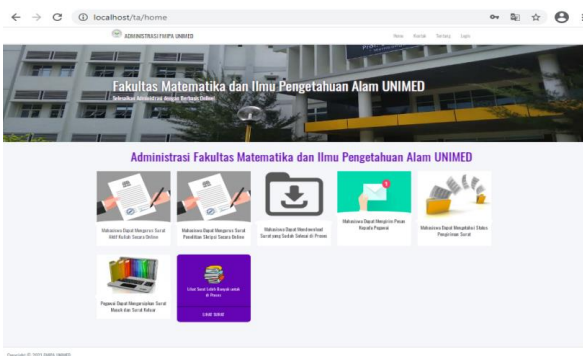


**Figure 8**. Home Page.

At the bottom of the home page, the description "View Letters" is a link to the next page, namely the search page that functions to find letters that will be requested by students. B erikut is view the page to log in:
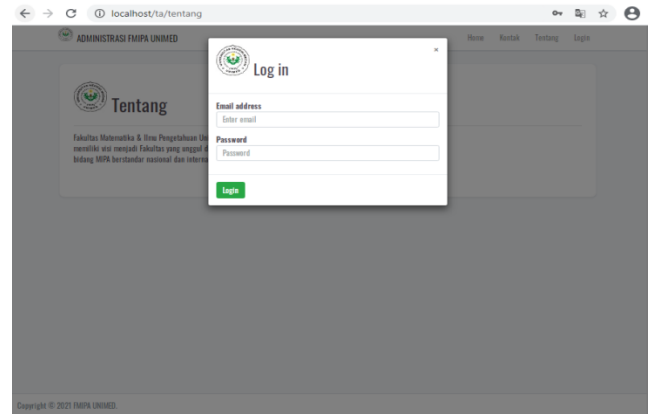


**Figure 9**. Log In Page.

*b. Admin Menu*

The application program mail correspondence Unimed Science Faculty has three types of accounts are admin, staff members and students. Each account type has its own page menu. The admin menu has 5 pages, namely the manage page, the manage issue report page, the account manage page, the profile page and the log out page. The manage page function is to change the contents of the contact and about pages. Here is a view of one of the admin menus, namely manage pages:
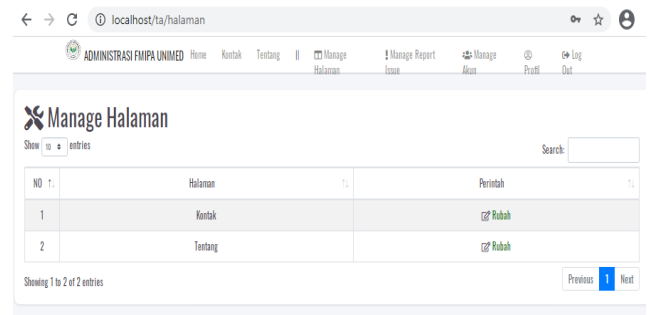


**Figure 10**. Page Manage Page.

*c. Employee Menu*

On the employee menu there are 6 pages, namely the letters page, the letter request page, the incoming mail archive page, the outgoing mail archive page, the profile page and logout. The following is a display of one of the employee menus, namely letters that function to make letters needed by students:
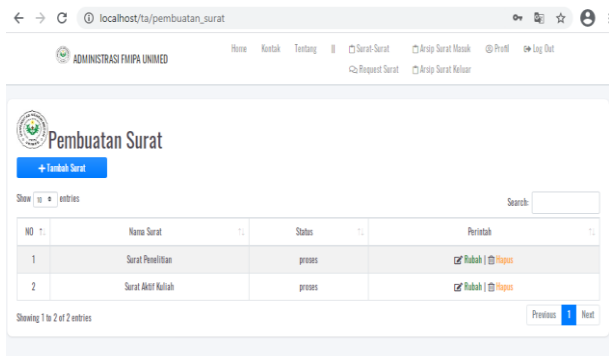
**Figure 11**. Pages of Letters.

*d. Student Menu*

On the student menu there are 4 pages, namely the letter page, message page, profile page and log out. The letter page serves to display the name of the letter that has been requested by the student, besides that it also displays the name of the employee on duty and the status of the letter. The following is a display of one of the student menus, namely a letter:
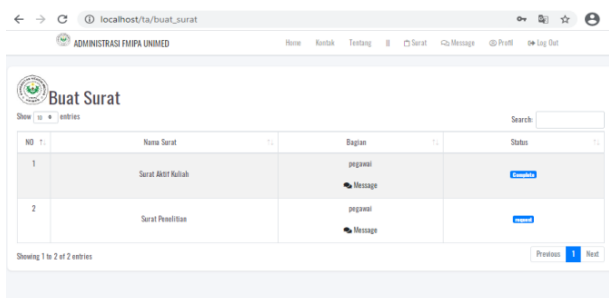


**Figure 12** : Letter Pages

## 4. Discussion

This web result that has been designed has hosting and domain. The purchased hosting has a capacity of 2 Giga Bytes with a period of 1 month and the purchased domain has a 1 year period. Hosting is a service for storing all data, files and images on the web. Domain is a unique name which is the address of a website. This website has a domain name, namely kholilizaa.my.id/skripsi. The way to set up hosting is to log in to cPanel with the account that was available at the time of purchasing hosting. cPanel is a control panel used to manage web hosting services. To find out the hosting specifications can be seen through CPanel statistics. Here is an image of CPanel statistics:
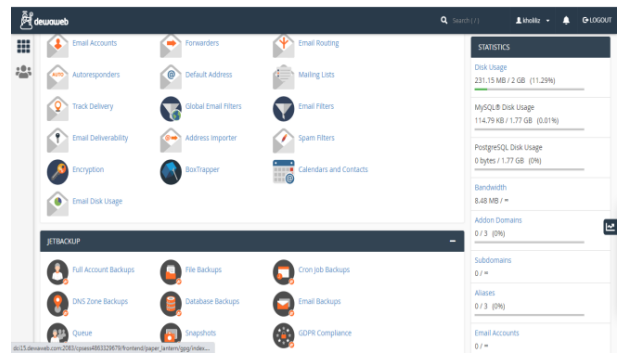


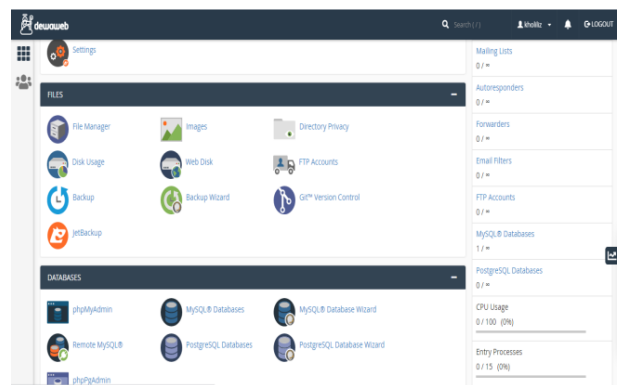**Figure 13** : Statistics cPanel Part 1



**Figure 14** : Statistics cPanel Part 2

Based on the picture above, the following is an explanation of cPanel Statistics:

*a. Disk Usage*

Disk Usage is the value of the storage capacity of a web hosting. Data storage capacity available is 2 Giga Bytes, and it is being used 231, 15 Mega Byte. This storage capacity functions to accommodate databases, website files and emails.

*b. Bandwidth*

Bandwidth is the amount of data traffic accessed on web pages. The available bandwidth is infinite.

*c. Addon Domains*

Addon Domains are new domains that are added to hosting and have a different Uniform Resource Locator (URL) from the main domain. The available addon domains are 3.

*d. Subdomains*

Subdomains are new domains that are still part of the main domain. So the URL used still contains the main domain. The available subdomains are infinite.

e. *Aliases*

Aliases is a feature that serves to direct a domain to another domain. Available aliases are 3.

f. *Email Accounts*

Email Accounts are email accounts that can be created in cPanel. The available accounts are infinite.

g. *Mailing Lists*

Mailing Lists are group emails that can be created via cPanel to make it easier to send the same email to several people at once. Mailing Lists available are infinite.

h. *Autorespodens*

Autorespondens is a feature in cPanel that can answer emails automatically. The available autoresponders are infinite.

i. *Forwarders*

Forwarders are a way of forwarding received emails to other emails. The available forwarders are infinite.

j. *Email Filters*

Email filters function to filter incoming emails based on certain categories, so that it will make it easier to manage emails, especially if the emails are in the hundreds. Email Filters available are infinite.

k. *FTP Accounts*

FTP Accounts are used to upload and manage files on the website. The FTP Accounts available are unlimited.

l. *MySQLDatabases*

MySQLDatabases used when going to create a PHP-based applications on the website. The available MySQLDatabases are infinite.

m. *PostgreSQL Databases*

PostgreSQL Databases are a type of database that has many advantages over other databases such as open source, data integrity, user-level ease and high performance in processing large data. The available PostgreSQL Databases are infinite.

n. *CPU Usage*

CPU Usage is a feature of cPanel that will inform the details of CPU usage for hosting. CPU Usage available is 100.

o. *Entry Processes*

Entry Processes is an LVE (Lightweight Virtualized Environments) limitation that limits the entire webservice process to the user. The available entry processes are 15.

## Conclusion

Based on the results obtained from the correspondence application, FMIPA Unimed obtained mail management, namely adding, updating, deleting, uploading, downloading and searching for letters and printing web-based reports that were carried out online so that employees could access them anywhere. The domain name in this web application is kholilizaa.my.id/skripsi with a capacity of 2 GB and a period of 1 month. In the application letter correspondence Unimed's Faculty students had to apply for a letter of research and active college letters online simply by filling the data themselves and complete the required files can be directly downloaded to the students had finished the letter by an employee in the process.

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