

VISHNU COMMUNICATION SYSTEM

*A Mini Project-2 Report submitted
in partial fulfilment of the requirements
for the award of the degree of*

BACHELOR OF TECHNOLOGY

In

COMPUTER SCIENCE & ENGINEERING

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SHRI VISHNU ENGINEERING COLLEGE FOR WOMEN(A)
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BHIMAVARAM – 534 202
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CERTIFICATE

*This is to certify that the Mini Project-1 entitled “**VISHNU COMMUNICATION SYSTEM**”, is being submitted by **S.TEJA SRI** bearing the **Regd. No. 18B01A0584**, **N.PAVANI** bearing the **Regd. No. 18B01A0579**, **P.VEEKSHITA** bearing the **Regd. No. 18B01A0580**, **G.BALA VYSHNAVI** bearing the **Regd. No. 18B01A0569**, in partial fulfillment of the requirements for the award of the degree of “**Bachelor of Technology in Computer Science & Engineering**” is a record of bonafide work carried out by her under my guidance and supervision during the academic year 2020–2021 and it has been found worthy of acceptance according to the requirements of the university.*

Internal Guide

Head of the Department

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ABSTRACT

This system facilitates mailing among users of an Intranet. Now-a-days organizations are growing fast and are increasing in size also. So, these organizations are divided into departments. In the fast-growing world the information is needed as fast as possible. This can be accomplished by passing the information quickly.

Quick passing of mails is not possible in manual systems. This is because the information is passed through persons of one department to another department. This leads to the inconsistency and delay in delivering information. So, we need a system which is both quick and accurate. This can be achieved by developing an Intranet Mailing System.

Our project "Vishnu Communication System" consists of intranet mailing system which is restricted to SVECW organization and displays mail id's of SVECW management for a faster communication.

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1. INTRODUCTION

Generally it is difficult to send a mail without using internet on the websites like gmail, yahoo, rediff mail etc and so to overcome such type of problem Intranet Mailing System is used.

It helps in reducing the complexity and is the easiest way of communication between the sender and the receiver. The main purpose of this application is it can be used without using internet connection

"Vishnu Communication System" is implemented as a website. A new user can register to the website with a username and password while a registered user logs in to the website with his credentials. Once logged in the user lands to a home page. Other pages present in the website are "Classroom", "Contact Us".

Classroom Page comprises of the locations of various classrooms in the institute. It's implemented as a static HTML page in a website which allows the user to check the name of the block and room number in our college. Contact Us page helps the user know the domain mail ids of the faculty and office members of our college which we have created in the Mailing module. There is an option to the user to navigate to the Thunderbird software from the same page.

2.SYSTEM ANALYSIS

System Analysis is an important activity that takes place when we are changing the existing one. Analysis helps to understand the existing system and the requirements necessary for building the new system. If there is no existing system then analysis defines only the requirements.

One of the most important factors in the system analysis is to understand the system and its problems. A good understanding to the system enables designer to identify and correct problems.

Based on the existing system the new system is being planned.so the definition problem is of the given problem has been analysed.

2.1 EXISTING SYSTEM

Existing System is manually providing services to employees of departments of an organization. Employees have to go departments to know some particular information. Sometimes information is passed by manually between departments.

This manual system will take time to pass the information and sometimes it causes loss of information also. Thereby causing loss of employee time also. Thus, the present system stated is time taking, insecure and costly.

2.2 PROPOSED SYSTEM

As organization grows in size in terms of departments and functionalities, it requires a quick and efficient system to achieve instant communication between employees of same department or between departments. The proposed system "Vishnu Communication System" serves organization's needs in a consistent and transparent manner.

It should cater the needs of information sharing. It allows the users to exchange their views through mails and send electronic files through attachments. It should have all traditional things such as sent items, inbox, drafts etc. The users are allowed to send mails to multiple users using to, cc and bcc too. Thus, the system caters spontaneous needs of the organization. This Intranet Mailing System is extended with other modules of "Find Your Class" and "Reach Out Early"

Modules enclosed in a website entitled "Vishnu Communication System".

2.3 FEASIBILITY STUDY

- Reduce the scope of internet
- promotes professional environment
- improves internal communication
- encourages knowledge sharing

- provides more security
- Time saving
- Cost efficiency
- avoids unnecessary threats of internet
- easy communication

3.SYSTEM REQUIREMENTS SPECIFICATION

A system requirements specification (SRS) is a description of a software system to be developed. It lays out functional and non-functional requirements, and may include a set of use cases that describe user interactions that the software must provide.

3.1 Software requirements:

- **Web Presentation:** HTML,CSS ,PHP
- **Database Connectivity :** MySQL
- **Softwares :** hMailServer, Mozilla Thunderbird, xampp
- **Operating System:** Windows 10

3.2 Hardware requirements

To develop any project we not only need the software requirements but we also need little bit of the hardware. The hardware the suits our project is

- Pentium processor ----- 233 MHZ or above
- RAM Capacity ----- 128MB
- Hard Disk ----- 20GB
- Floppy disk ----- 1.44 MB
- CD-ROM Drive ----- 32 HZ
- KEYBOARD ----- 108 Standard

4. SYSTEM DESIGN

4.1 INTRODUCTION

Software Design is a process to transform user requirements into some suitable form, which helps the programmer in software coding and implementation.

For accessing user requirements ,an SRS (Software Requirement Specification) document is created whereas for coding and implementation ,there is a need of more specific and detailed requirements in software terms .The output of this process can directly be used into implementation in programming languages.

Software design is the first step in SDLC (Software Design Life Cycle),which moves the concentration from problem domain to solution domain. It tries to specify how to fulfil the requirements mentioned in SRS.

Software analysis and design includes all activities, which help the transformation of requirement specification into implementation. Requirements specifications specify all functional and non-functional expectations from the software. These requirement specifications come in the shape of human readable and understandable documents, to which a computer has nothing to do.

Software analysis and design is the intermediate stage, which helps human-readable requirements to be transformed into actual code.

SOFTWARE DESIGN LEVELS:

Software design yields three levels of results:

Architectural Design:

The architectural design is the highest abstract version of the system. It identifies the software as a system with many components interacting with each other. At this level, the designers get the idea of proposed solution domain.

High-level Design:

The high-level design breaks the 'single entity-multiple component' concept of architectural design into less-abstracted view of sub-systems and modules and depicts their interaction with each other.High-level design focusses on how the system along with all of its components can be implemented in forms of modules. It recognises modular structure of each sub-system and their relation and interaction among each other.

Detailed Design:

Detailed design deals with the implementation part of what is seen as a system and its sub-systems in the previous two designs. It is more detailed towards modules and their implementations. It defines logical structure of each module and their interfaces to

communicate with each other modules.

MODULARIZATION:

Modularization is a technique to divide a software system into multiple discrete and independent modules, which are expected to be capable of carrying out tasks independently. These modules may work as basic constructs for the entire software. Designers tend to design modules such that they can be executed and compiled separately and independently.

Modular design unintentionally follows the rules of 'divide and conquer' problem-solving strategy this is because there are many other benefits attached with the modular design of a software.

Advantages of Modularization:

- 1) Smaller components are easier to maintain.
- 2) Program can be divided based on functional aspects.
- 3) Desired level of abstraction can be brought in the program.
- 4) Components with high cohesion can be re-used.
- 5) Concurrent execution can be made possible.
- 6) Desired from security aspect.

4.2 UML DIAGRAMS

UML diagrams are the diagrams based on the UML (Unified Modelling language) with the purpose of visually representing a system along with its main actors, roles, actions, artifacts or classes, in order to better understand, alter, maintain, or document information about the system.

What is UML?

UML is an acronym that stands for Unified Modelling Language. Simply put, UML is a modern approach to modelling and documenting software. In fact, it's one of the most popular business process modelling techniques. It is based on diagrammatic representations of software components. As an old proverb says: "a picture is worth a thousand words". By using visual representations, we are able to better understand possible flaws or errors in software or business processes.

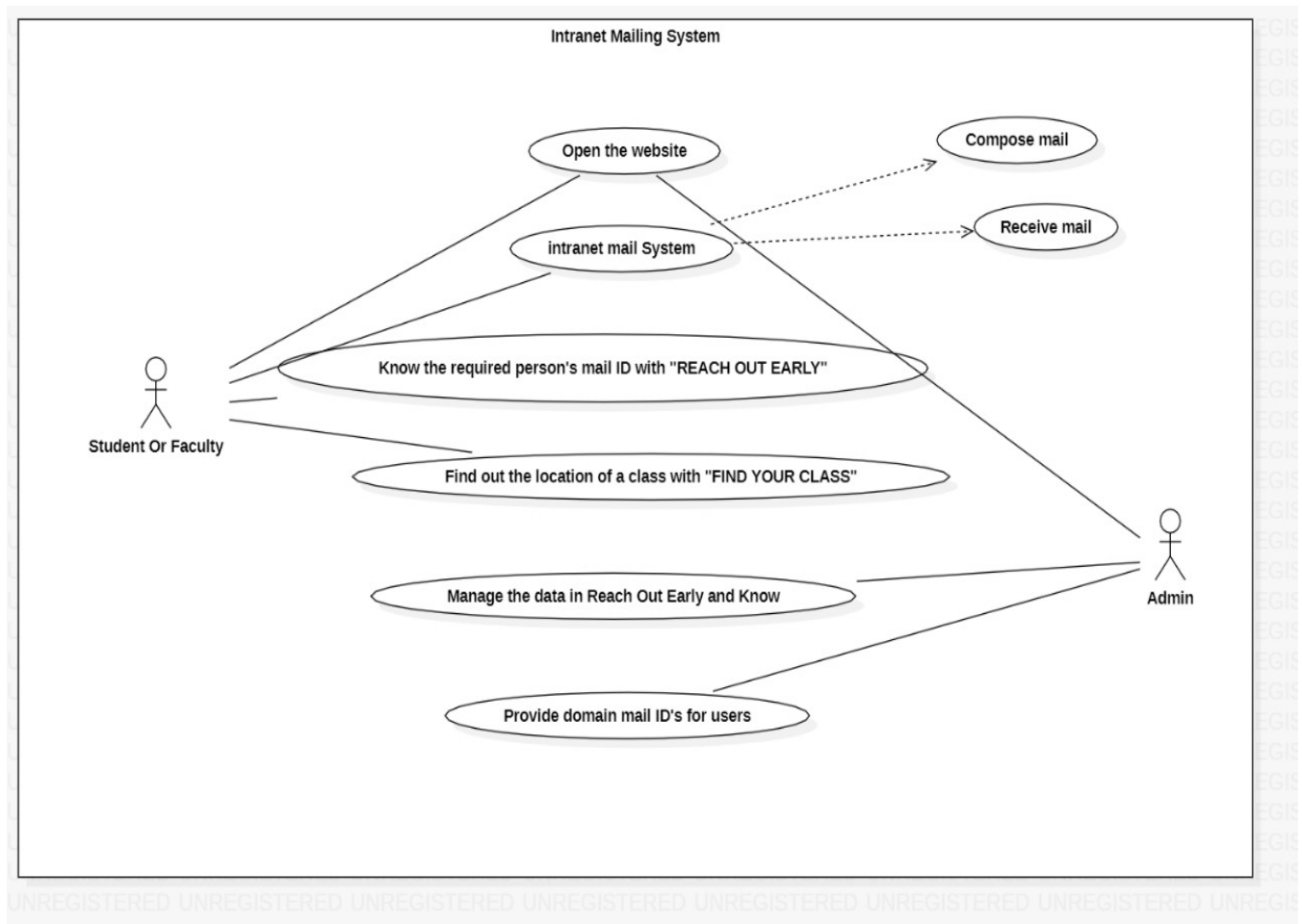
USECASE DIAGRAM:

A cornerstone part of the system is the functional requirements that the system fulfils. Use Case diagrams are used to analyse the system's high-level requirements. These requirements are expressed through different use cases. The components are Functional requirements, Actors, Relationships between actors and use cases.

ACTORS FOR THE GAME:

Actor1: **student or faculty** who wants to send and receive mails

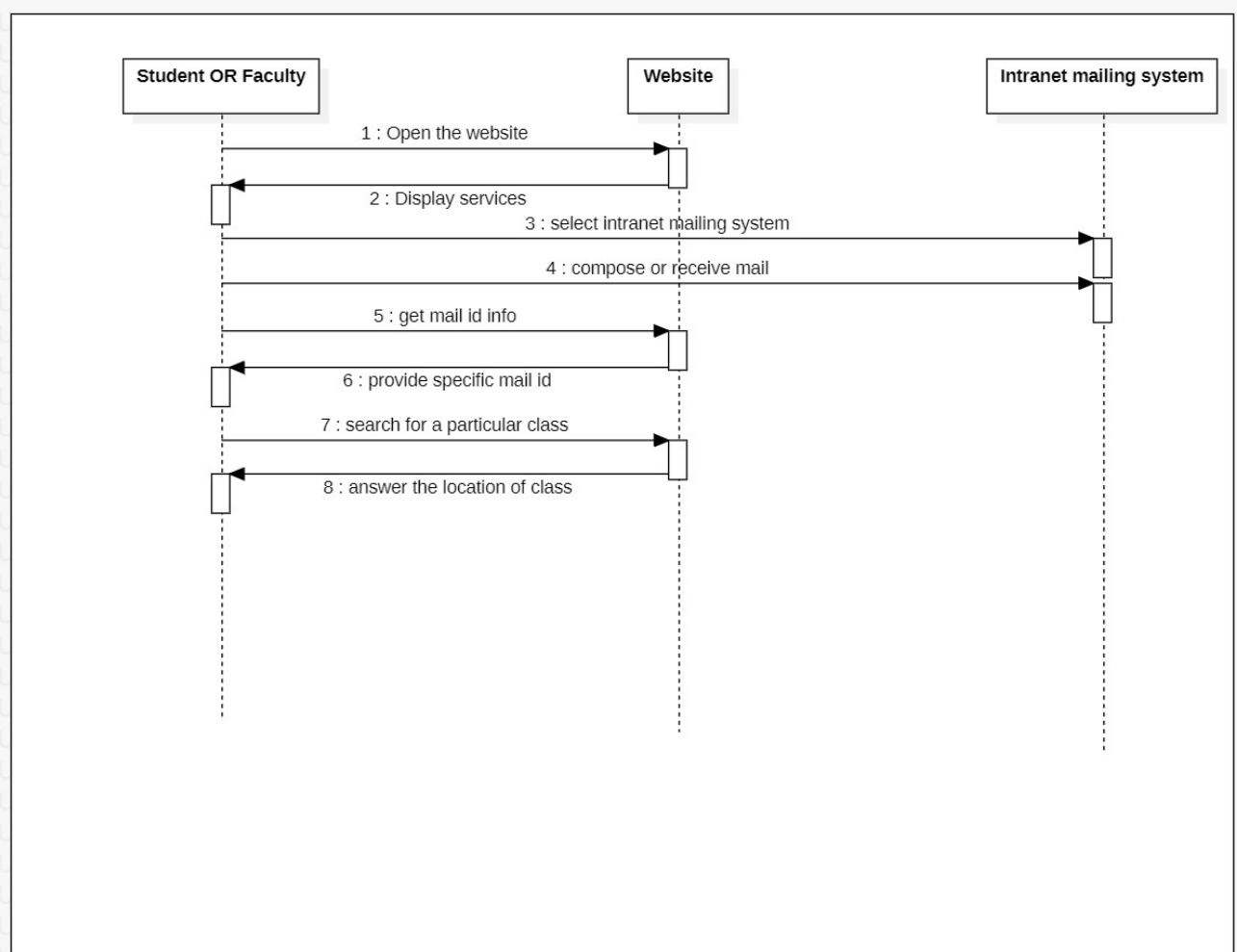
Actor2: **Admin** who maintains the data of the intranet mailing system



SEQUENCE DIAGRAM:

A sequence diagram represents the sequence and interactions of a given USE-CASE or scenario. Sequence diagrams can capture most of the information about the system.

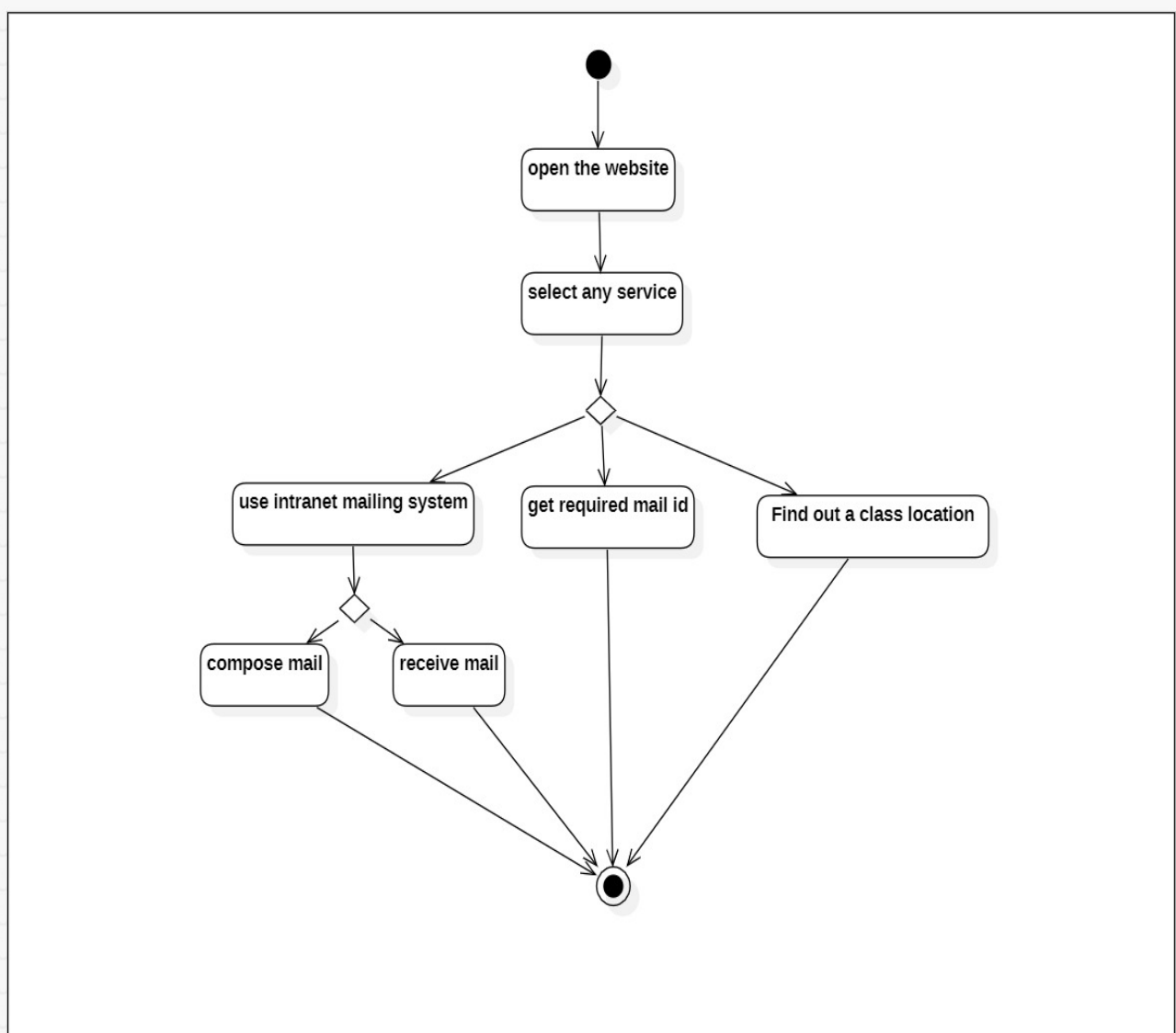
Most object-to-object interactions and operations are considered events and events include signals, inputs, decisions, interrupts, transitions and actions to or from users or external devices. An event also is considered to be any action by an object that sends information. The event line represents a message sent from one object to another in which the "from" object is requesting an operation be performed by the "to" object. The "to" object performs the operation using a method that the class contains.



ACTIVITY DIAGRAM:

Activity Diagrams describe how activities are coordinated to provide a service which can be at different levels of abstraction. Typically, an event needs to be achieved by some operations, particularly where the operation is intended to achieve a number of different things that require coordination, or how the events in a single use case relate to one another.

1. Identify candidate use cases, through the examination of business workflows
2. Identify pre- and post-conditions (the context) for use cases
3. Model workflows between/within use cases
4. Model complex workflows in operations on objects
5. Model in detail complex activities in a high level activity Diagram.



CLASS DIAGRAM:

A UML class diagram is made up of:

- 1.A set of classes and
- 2.A set of relationships between classes

What is a Class?

A description of a group of objects all with similar roles in the system, which consists of:

Structural features (attributes) define what objects of the class "know"

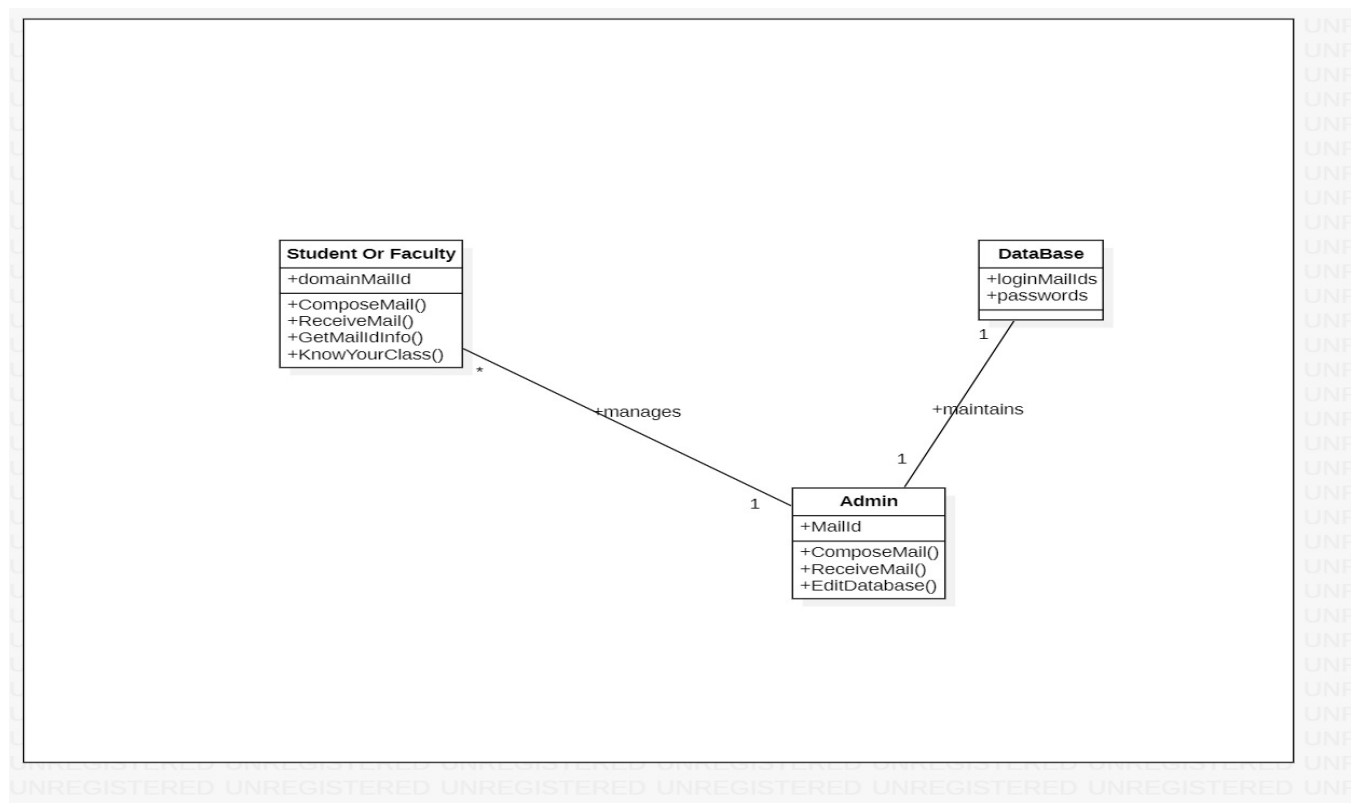
Behavioural features (operations) define what objects of the class "can do"

Class Notation

A class notation consists of three parts.

Classes:

The classes in the project are identified as
STUDENT OR FACULTY, DATABASE, ADMIN



5. SYSTEM IMPLEMENTATION

5.1 INTRODUCTION

"Vishnu Communication System" is implemented as a website. A new user can register to the website with a username and password while a registered user logs in to the website with his credentials. Once logged in the user lands to a home page. Other pages present in the website are "Classroom", "Contact Us".

Classroom Page comprises of the locations of various classrooms in the institute. It's implemented as a static HTML page in a website which allows the user to check the name of the block and room number in our college. Contact Us page helps the user know the domain mail ids of the faculty and office members of our college which we have created in the Mailing module. There is an option to the user to navigate to the Thunderbird software from the same page.

5.2 PROJECT MODULES

The project "Vishnu Communication System" consists of 3 modules.

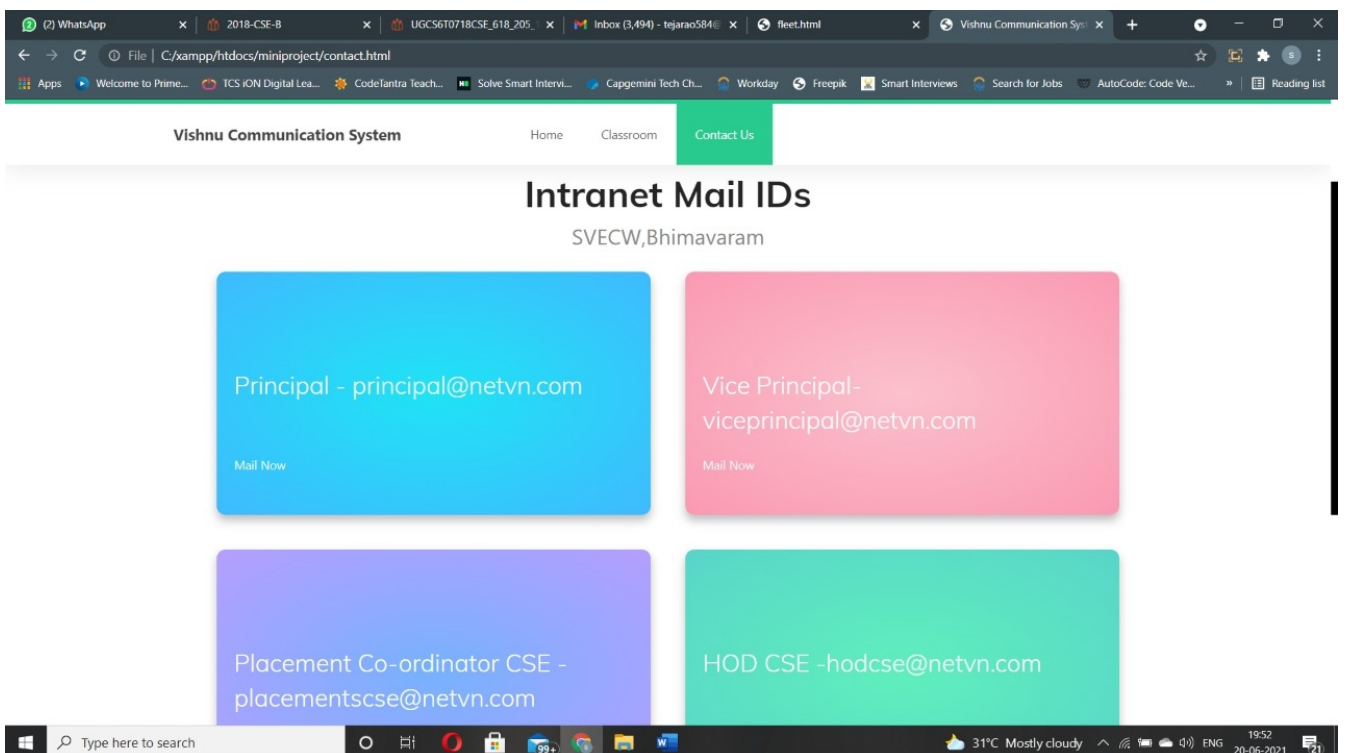
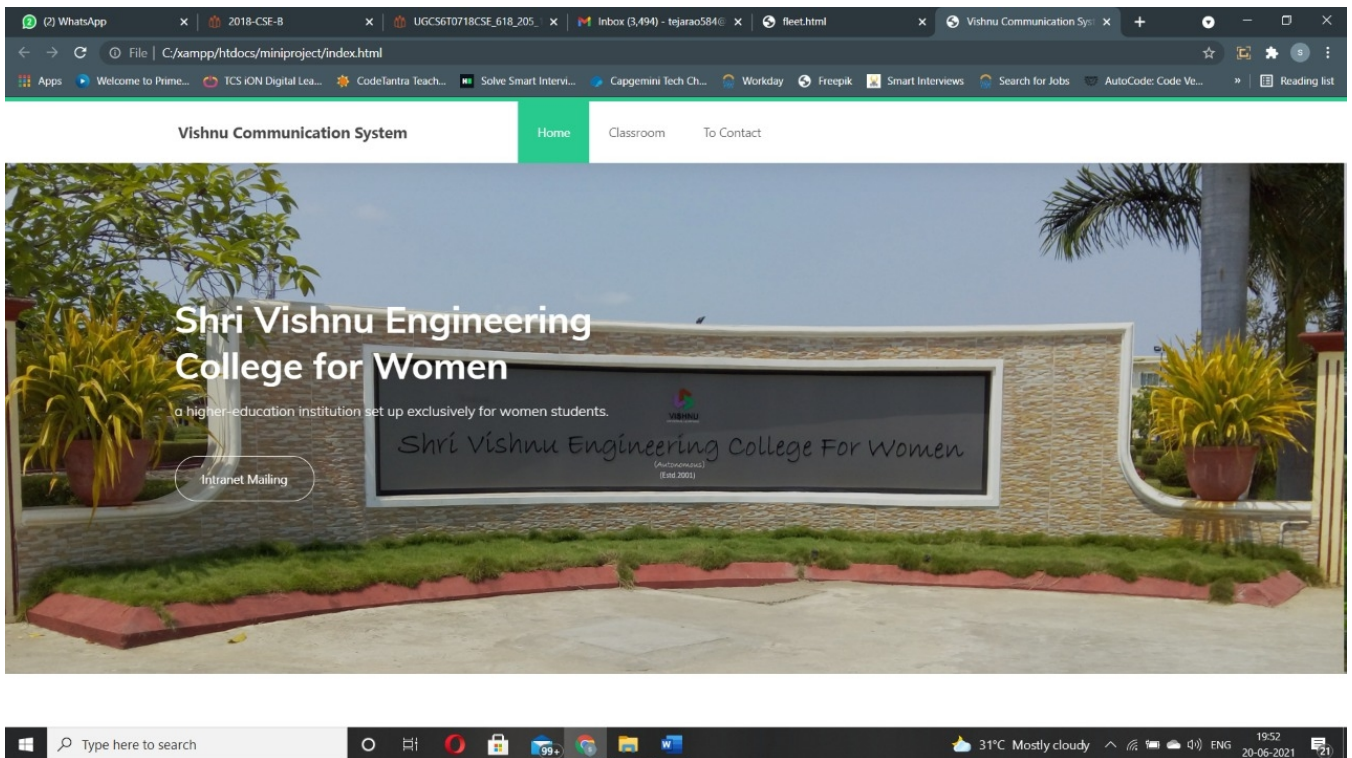
1. Mailing
2. Find Your Class
3. Reach Out Early

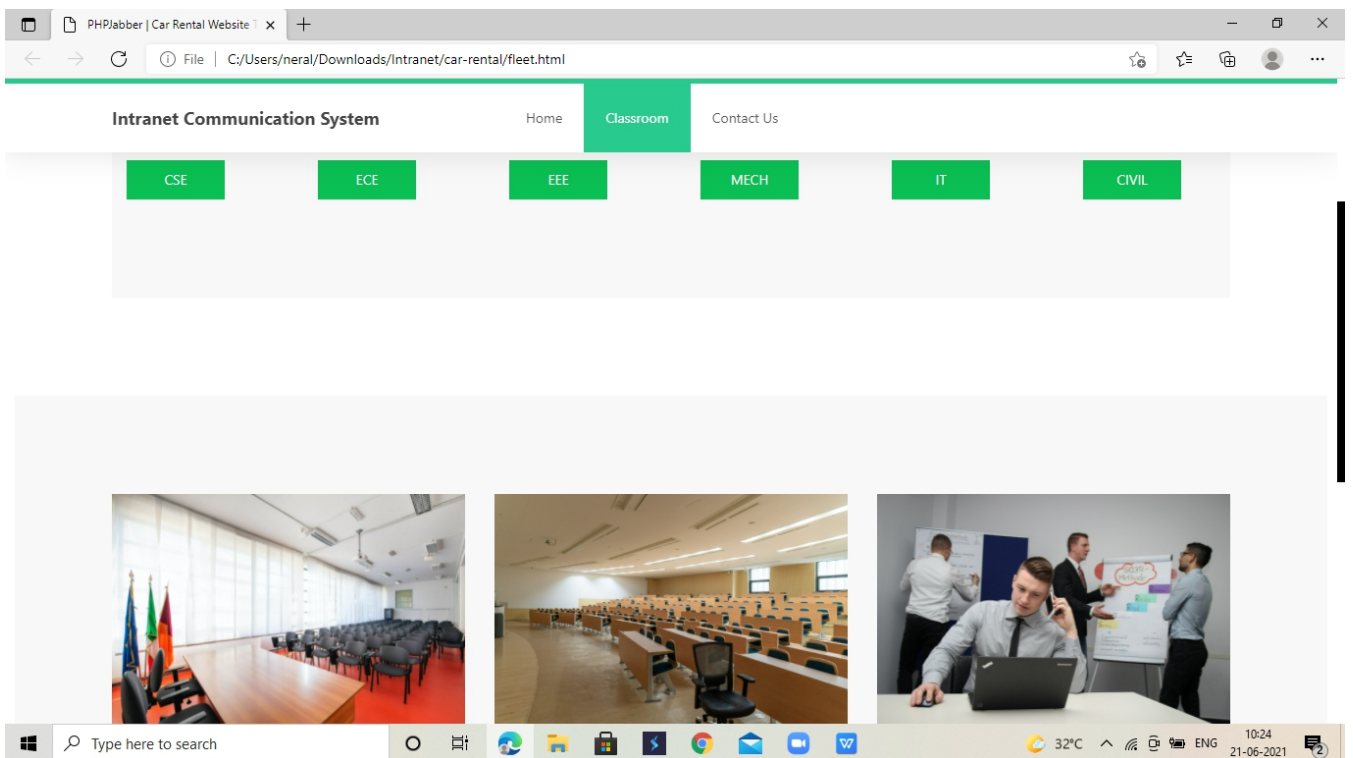
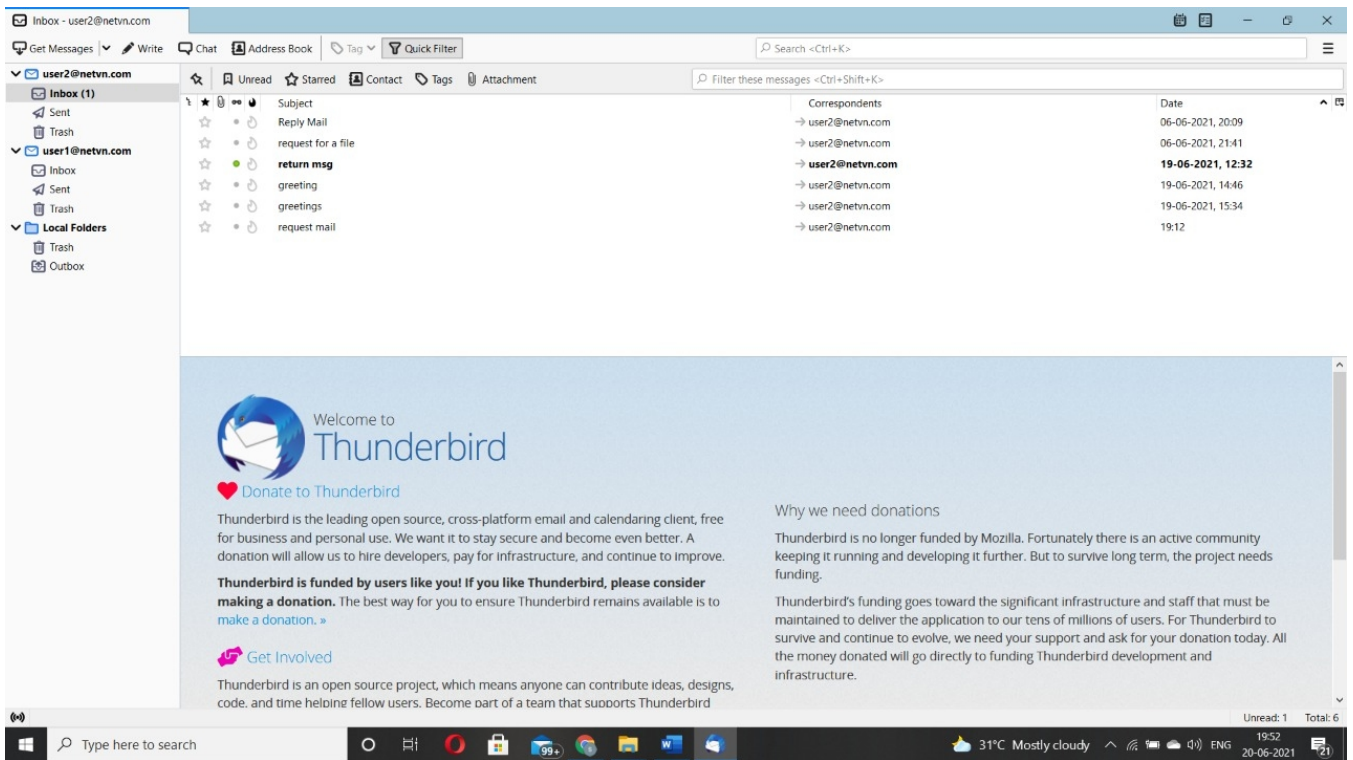
Mailing This module facilitates conventional mail options like Inbox, Compose, Send Messages, Draft etc. Compose option allows us to compose new mails that can be sent to one or more users of the organization. Inbox option shows all messages received. This option allows viewing and deleting such messages. Send Messages option allows us to view and delete messages that have been sent. The Draft option allows us to view messages saved incompletely. These messages can be completed and sent at a later stage. It is implemented using hmailServer and Mozilla Thunderbird .hmailServer is used to create a mail domain for our institute while Mozilla Thunderbird provided the interface for the mailing.

Find Your Class This module allows us to find out the location of a particular class in the institute. It's implemented as a static HTML page in a website which allows the user to check the name of the block and room number in our college.

Reach Out Early This module helps the user know the domain mail ids of the faculty and office members of our college which we have created in the Mailing module. It is implemented as "Contact Us" page in the website. There is an option to the user to navigate to the Thunderbird software from the same page.

5.3 SCREENS





6. SYSTEM TESTING

6.1 INTRODUCTION

System testing is defined as testing of a complete and fully integrated software product. This testing falls in black-box testing wherein knowledge of the inner design of the code is not a prerequisite and is done by the testing team.

System testing is performed in the context of a System Requirement Specification (SRS) and/or a Functional Requirement Specifications (FRS). It is the final test to verify that the product to be delivered meets the specifications mentioned in the requirement document. It should investigate both functional and non-functional requirements.

There are various types of system testing and the team should choose which ones they would need before application deployment.

Some of the types of system testing techniques are

1. Usability Testing - To test if an application or product has good user experience or not.
2. Regression Testing - To confirm that a code change or addition has not adversely affected existing features.
3. Load Testing - It is a type of non-functional testing which helps understand the behaviour of the application under a specific expected load.
4. Functional Testing - It is a type of testing to verify that a product performs and functions correctly according to user specifications.
5. Migration Testing - Testing of programs used to migrate /convert data from one application to another replacement application.
6. Compatibility Testing - It performed to validate that software performs same behaviour with different environment.
7. Boundary Value Testing - It is designed to include representatives of boundary values.

8. Fuzz Testing - It is used to provide invalid, unexpected, or random data to the inputs of a program.

6.2 TESTING METHODS:

There are two types of testing methods:

1)Manual Testing.

2)Automation Testing.

Manual Testing:

Manual testing is a software testing process in which test cases are executed manually without using any automated tool. Test case reports are also generated manually.

Manual Testing is one of the most fundamental testing processes as it can find both visible and hidden defects of the software. The difference between expected output and output, given by the software is defined as a defect. The developer fixed the defects and handed it to the tester for retesting.

Manual testing is mandatory for every newly developed software before automated testing.

Manual testing is essential because one of the software testing fundamentals is "100% automation is not possible."

There are various methods used for manual testing. Each method is used according to its testing criteria. Types of manual testing are given below:

Types of Manual Testing:

1. Black Box Testing.
2. White Box Testing.
3. Unit Testing.
4. System Testing.
5. Integration Testing.
6. Acceptance Testing.

Black box testing:

Black box testing is a technique of software testing which examines the functionality of software without peering into its internal structure or coding. The primary source of black box testing is a specification of requirements that is stated by the customer.

In this method, tester selects a function and gives input value to examine its functionality, and checks whether the function is giving expected output or not. If the function produces correct output, then it is passed in testing, otherwise failed. The test team reports the result to the development team and then tests the next function. After completing testing of all functions if there are severe problems, then it is given back to the development team for correction.



Generic steps of black box testing

- The black box test is based on the specification of requirements, so it is examined in the beginning.
- In the second step, the tester creates a positive test scenario and an adverse test scenario by selecting valid and invalid input values to check that the software is processing them correctly or incorrectly.
- In the third step, the tester develops various test cases such as decision table, all pairs test, equivalent division, error estimation, cause-effect graph, etc.
- The fourth phase includes the execution of all test cases.
- In the fifth step, the tester compares the expected output against the actual output.
- In the sixth and final step, if there is any flaw in the software, then it is cured and tested again.

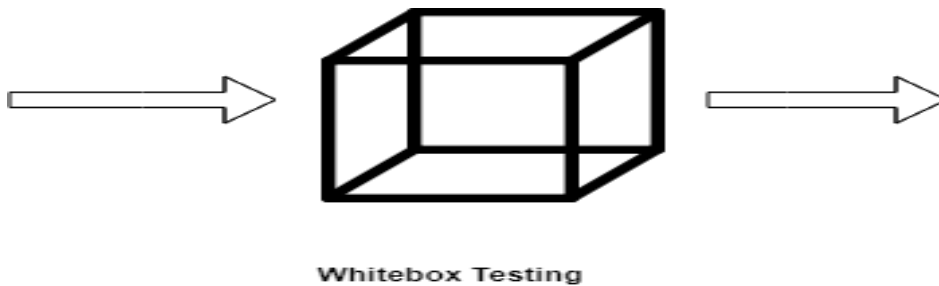
White Box Testing:

The box testing approach of software testing consists of black box testing and white box testing. We are discussing here white box testing which also known as glass box is testing, structural testing, clear box testing, open box testing and transparent box testing. It tests internal coding and infrastructure of a software focus on checking of predefined inputs against expected and desired outputs. It is based on inner workings of an application and revolves around internal structure testing. In this type of testing programming skills are required to design test cases. The primary goal of white box testing is to focus on the flow of inputs and outputs through the software and strengthening the security of the software.

The term 'white box' is used because of the internal perspective of the system. The clear box or

white box or transparent box name denote the ability to see through the software's outer shell into its inner workings.

Test cases for white box testing are derived from the design phase of the software development lifecycle. Data flow testing, control flow testing, path testing, branch testing, statement and decision coverage all these techniques used by white box testing as a guideline to create an error-free software.



White box testing follows some working steps to make testing manageable and easy to understand what the next task to do. There are some basic steps to perform white box testing.

Generic steps of white box testing

- Design all test scenarios, test cases and prioritize them according to high priority number.
- This step involves the study of code at runtime to examine the resource utilization, not accessed areas of the code, time taken by various methods and operations and so on.
- In this step testing of internal subroutines takes place. Internal subroutines such as nonpublic methods, interfaces are able to handle all types of data appropriately or not.
- This step focuses on testing of control statements like loops and conditional statements to check the efficiency and accuracy for different data inputs.
- In the last step white box testing includes security testing to check all possible security loopholes by looking at how the code handles security.

Unit Testing:

Unit testing involves the testing of each unit or individual component of the software application. It is the first level of software testing. The aim behind unit testing is to validate unit component with its performance.

A unit is a single testable part of a software system and tested during the development phase of the application software.

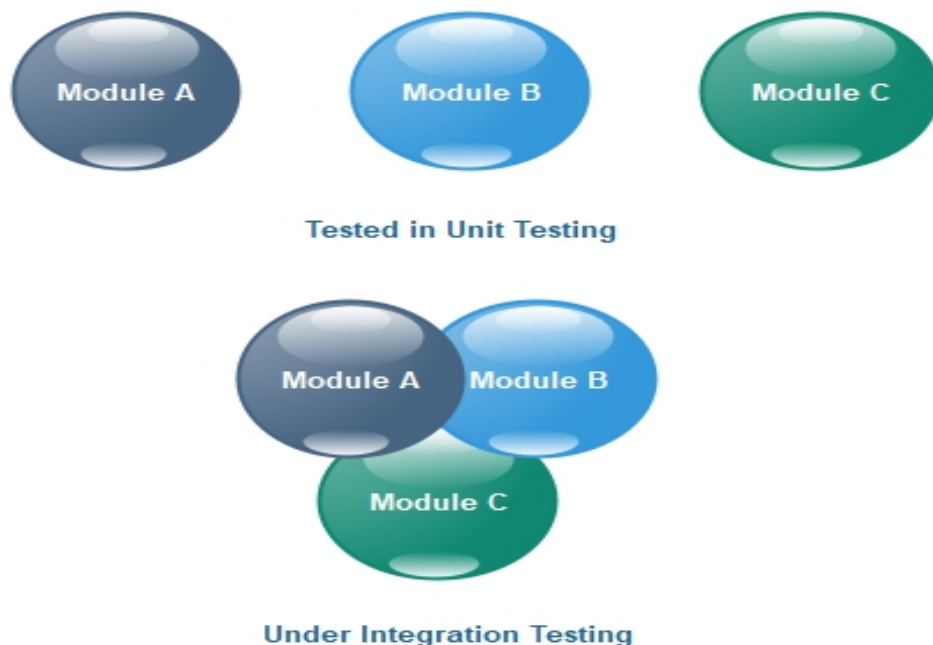
This testing aims to test the correctness of isolated code. A unit component is an individual function or code of the application. White box testing approach used for unit testing and usually done by the developers.

In a testing level hierarchy, unit testing is the first level of testing done before integration and other remaining levels of the testing. It uses modules for the testing process which reduces the dependency of waiting for Unit testing frameworks, stubs, drivers and mock objects are used for assistance in unit testing.

Integration testing:

Integration testing is the second level of the software testing process comes after unit testing. In this testing, units or individual components of the software are tested in a group. The focus of the integration testing level is to expose defects at the time of interaction between integrated components or units.

Unit testing uses modules for testing purpose, and these modules are combined and tested in integration testing. The Software is developed with a number of software modules that are coded by different coders or programmers. The goal of integration testing is to check the correctness of communication among all the modules.



System Testing:

System Testing includes testing of a fully integrated software system. Generally, a computer system is made with the integration of software (any software is only a single element of a computer system). The software is developed in units and then interfaced with other software and hardware to create a complete computer system. In other words, a computer system consists of a group of software to perform the various tasks, but only software cannot perform the task; for that software must be interfaced with compatible hardware. System testing is a series of different type of tests with the purpose to exercise and examine the full working of an integrated software computer system against requirements.

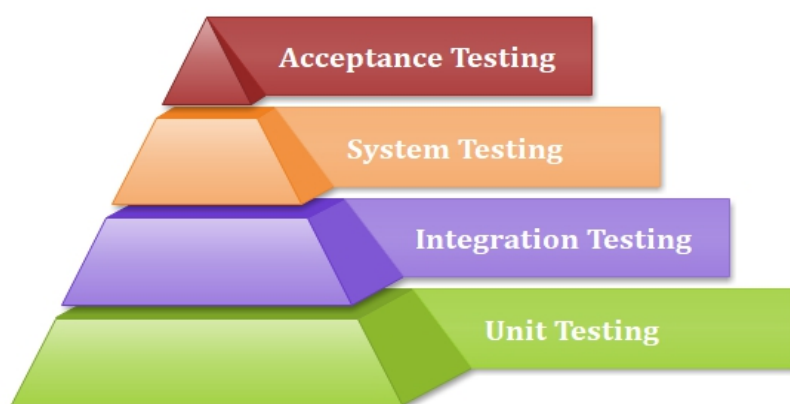
Acceptance testing:

Acceptance testing is formal testing based on user requirements and function processing. It determines whether the software is conforming specified requirements and user requirements or not. It is conducted as a kind of Black Box testing where the number of required users involved to test the acceptance level of the system. It is the fourth and last level of software testing.

However, the software has passed through three testing levels (Unit Testing, Integration Testing, System Testing) But still there are some minor errors which can be identified when the system is used by the end user in the actual scenario.

Acceptance testing is the squeezing of all the testing processes that have done previously.

Hierarchy of Testing Levels:



7. CONCLUSION

The project discussed here has many advantages and it benefits an organization to a great extent. Through this system, a consistent approach to the systems is followed. The success rate of projects increases thereby it saves costs. It also raises the skill of project managers in the organization.

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9. APPENDIX

9.1 CSS

CSS handles the look and feel part of a web page. Using CSS, you can control the colour of the text, the style of fonts, the spacing between paragraphs, how columns are sized and laid out, what background images or colours are used, layout designs, variations in display for different devices and screen sizes as well as a variety of other effects.

CSS is easy to learn and understand but it provides powerful control over the presentation of an HTML document. Most commonly, CSS is combined with the mark up languages HTML or XHTML.

Advantages of CSS:

- **CSS saves time** – You can write CSS once and then reuse same sheet in multiple HTML pages. You can define a style for each HTML element and apply it to as many Web pages as you want.
- **Pages load faster** – If you are using CSS, you do not need to write HTML tag attributes every time. Just write one CSS rule of a tag and apply it to all the occurrences of that tag. So less code means faster download times.
- **Easy maintenance** – To make a global change, simply change the style, and all elements in all the web pages will be updated automatically.

- **Superior styles to HTML** – CSS has a much wider array of attributes than HTML, so you can give a far better look to your HTML page in comparison to HTML attributes.
- **Multiple Device Compatibility** – Style sheets allow content to be optimized for more than one type of device. By using the same HTML document, different versions of a website can be presented for handheld devices such as PDAs and cell phones or for printing.
- **Global web standards** – Now HTML attributes are being deprecated and it is being recommended to use CSS. So its a good idea to start using CSS in all the HTML pages to make them compatible to future browsers.

Who Creates and Maintains CSS?

CSS is created and maintained through a group of people within the W3C called the CSS Working Group. The CSS Working Group creates documents called specifications. When a specification has been discussed and officially ratified by the W3C members, it becomes a recommendation.

These ratified specifications are called recommendations because the W3C has no control over the actual implementation of the language. Independent companies and organizations create that software.

CSS Versions:

Cascading Style Sheets level 1 (CSS1) came out of W3C as a recommendation in December 1996. This version describes the CSS language as well as a simple visual formatting model for all the HTML tags.

CSS2 became a W3C recommendation in May 1998 and builds on CSS1. This version adds support for media-specific style sheets e.g. printers and aural devices, downloadable fonts, element positioning and tables.

Why Use CSS?

CSS is used to define styles for your web pages, including the design, layout and variations in display for different devices and screen sizes.

What is HTML?

HTML is the standard markup language for creating Web pages.

- HTML stands for Hyper Text Markup Language
- HTML describes the structure of a Web page
- HTML consists of a series of elements
- HTML elements tell the browser how to display the content
- HTML elements are represented by tags
- HTML tags label pieces of content such as "heading", "paragraph", "table", and so on
- Browsers do not display the HTML tags, but use them to render the content of the page

9.2 PHP

PHP is an open-source, interpreted, and object-oriented scripting language that can be executed at the server-side. PHP is well suited for web development. Therefore, it is used to develop web applications (an application that executes on the server and generates the dynamic page.).

PHP was created by **Rasmus Lerdorf in 1994** but appeared in the market in 1995. **PHP 7.4.0** is the latest version of PHP, which was released on **28 November**. Some important points need to be noticed about PHP are as followed:

- PHP stands for Hypertext Preprocessor.
- PHP is an interpreted language, i.e., there is no need for compilation.
- PHP is faster than other scripting languages, for example, ASP and JSP.
- PHP is a server-side scripting language, which is used to manage the dynamic content of the website.
- PHP can be embedded into HTML.
- PHP is an object-oriented language.
- PHP is an open-source scripting language.
- PHP is simple and easy to learn language.

PHP Features

PHP is very popular language because of its simplicity and open source. There are some important features of PHP given below:

Performance:

PHP script is executed much faster than those scripts which are written in other languages such as JSP and ASP. PHP uses its own memory, so the server workload and loading time is automatically reduced, which results in faster processing speed and better performance.

Open Source:

PHP source code and software are freely available on the web. You can develop all the versions of PHP according to your requirement without paying any cost. All its components are free to download and use.

Familiarity with syntax:

PHP has easily understandable syntax. Programmers are comfortable coding with it.

Embedded:

PHP code can be easily embedded within HTML tags and script.

Platform Independent:

PHP is available for WINDOWS, MAC, LINUX & UNIX operating system. A PHP application developed in one OS can be easily executed in other OS also.

Database Support:

PHP supports all the leading databases such as MySQL, SQLite, ODBC, etc.

Error Reporting -

PHP has predefined error reporting constants to generate an error notice or warning at runtime. E.g., E_ERROR, E_WARNING, E_STRICT, E_PARSE.

Loosely Typed Language:

PHP allows us to use a variable without declaring its datatype. It will be taken automatically at the time of execution based on the type of data it contains on its value.

Web servers Support:

PHP is compatible with almost all local servers used today like Apache, Netscape, Microsoft IIS, etc.

Security:

PHP is a secure language to develop the website. It consists of multiple layers of security to prevent threats and malicious attacks.

Control:

Different programming languages require long script or code, whereas PHP can do the same work in a few lines of code. It has maximum control over the websites like you can make changes easily whenever you want.

A Helpful PHP Community:

It has a large community of developers who regularly updates documentation, tutorials, online help, and FAQs. Learning PHP from the communities is one of the significant benefits.

9.2 MySQL

What is MySQL?

- MySQL is a database system used for developing web-based software applications.
- MySQL used for both small and large applications.
- MySQL is a relational database management system (RDBMS).
- MySQL is fast, reliable, and flexible and easy to use.
- MySQL supports standard SQL (Structured Query Language).
- MySQL is free to download and use.
- MySQL was developed by Michael Widenius and David Axmark in 1994.
- MySQL is presently developed, distributed, and supported by Oracle Corporation.
- MySQL Written in C, C++.

Main Features of MySQL

- MySQL server design is multi-layered with independent modules.
- MySQL is fully multithreaded by using kernel threads. It can handle multiple CPUs if they are available.
- MySQL provides transactional and non-transactional storage engines.
- MySQL has a high-speed thread-based memory allocation system.
- MySQL supports in-memory heap table.
MySQL Handles large databases.
- MySQL Server works in client/server or embedded systems.
- MySQL Works on many different platforms..
- MySQL Server works in client/server or embedded systems.
- MySQL Works on many different platforms.

9.3 THUNDERBIRD

Thunderbird is a computer program and is produced in versions for Windows, Mac os and Linux. This, for me, is one of its attractions as I can use the same program at work on Windows and at home on Linux.

Tablets and phones don't, in general, offer full Windows. So on your mobile devices you'll need to set up their own email clients. Android is Google biased and will nag you to get a Gmail address, and offers a built-in Gmail client. For other email services you'll probably need to find the alternative general purpose Android email client. It's called "email" .

9.3 hMailServer

hMailServer is a free, open source, e-mail server for Microsoft Windows. It's used by Internet service providers, companies, governments, schools and enthusiasts in all parts of the world.

It supports the common e-mail protocols (IMAP, SMTP and POP3) and can easily be integrated with many existing web mail systems. It has flexible score-based spam protection and can attach to your virus scanner to scan all incoming and outgoing email.

9.4 XAMPP

XAMPP is an abbreviation where ***X stands for Cross-Platform, A stands for Apache, M stands for MYSQL, and the Ps stand for PHP and Perl***, respectively. It is an open-source package of web solutions that includes Apache distribution for many servers and command-line executables along with modules such as Apache server, MariaDB, PHP, and Perl.

XAMPP helps a local host or server to test its website and clients via computers and laptops before releasing it to the main server. It is a platform that furnishes a suitable environment to test and verify the working of projects based on Apache, Perl, MySQL database, and PHP through the system of the host itself. Among these technologies, Perl is a programming language used for web development, PHP is a backend scripting language, and MariaDB is the most vividly used database developed by MySQL. The detailed description of these components is given below.

Components of XAMPP

As defined earlier, XAMPP is used to symbolize the classification of solutions for different technologies. It provides a base for testing of projects based on different technologies through a personal server. XAMPP is an abbreviated form of each alphabet representing each of its major components. This collection of software contains a web server named **Apache**, a database management system named **MariaDB** and scripting/ programming languages such as **PHP** and **Perl**. X denotes Cross-platform, which means that it can work on different platforms such as Windows, Linux, and macOS.

Many other components are also part of this collection of software and are explained below.

1. **Cross-Platform:** Different local systems have different configurations of operating systems installed in it. The component of cross-platform has been included to increase the utility and audience for this package of Apache distributions. It supports various platforms such as packages of Windows, Linus, and MAC OS.
2. **Apache:** It is an HTTP a cross-platform web server. It is used worldwide for delivering web content. The server application has made free for installation and used for the community

of developers under the aegis of Apache Software Foundation. The remote server of Apache delivers the requested files, images, and other documents to the user.

3. **MariaDB:** Originally, MySQL DBMS was a part of XAMPP, but now it has been replaced by MariaDB. It is one of the most widely used relational DBMS, developed by MySQL. It offers online services of data storage, manipulation, retrieval, arrangement, and deletion.
4. **PHP:** It is the backend scripting language primarily used for web development. PHP allows users to create dynamic websites and applications. It can be installed on every platform and supports a variety of database management systems. It was implemented using C language. PHP stands for **Hypertext Processor**. It is said to be derived from Personal Home Page tools, which explains its simplicity and functionality.
5. **Perl:** It is a combination of two high-level dynamic languages, namely Perl 5 and Perl 6. Perl can be applied for finding solutions for problems based on system administration, web development, and networking. Perl allows its users to program dynamic web applications. It is very flexible and robust.
6. **phpMyAdmin:** It is a tool used for dealing with MariaDB. Its version 4.0.4 is currently being used in XAMPP. Administration of DBMS is its main role.
7. **OpenSSL:** It is the open-source implementation of the Secure Socket Layer Protocol and Transport Layer Protocol. Presently version 0.9.8 is a part of XAMPP.
8. **XAMPP Control Panel:** It is a panel that helps to operate and regulate upon other components of the XAMPP. Version 3.2.1 is the most recent update. A detailed description of the control panel will be done in the next section of the tutorial.
9. **Webalizer:** It is a Web Analytics software solution used for User logs and provide details about the usage.
10. **Mercury:** It is a mail transport system, and its latest version is 4.62. It is a mail server, which helps to manage the mails across the web.
11. **Tomcat:** Version 7.0.42 is currently being used in XAMPP. It is a servlet based on JAVA to provide JAVA functionalities.
12. **Filezilla:** It is a File Transfer Protocol Server, which supports and eases the transfer operations performed on files. Its recently updated version is 0.9.41.