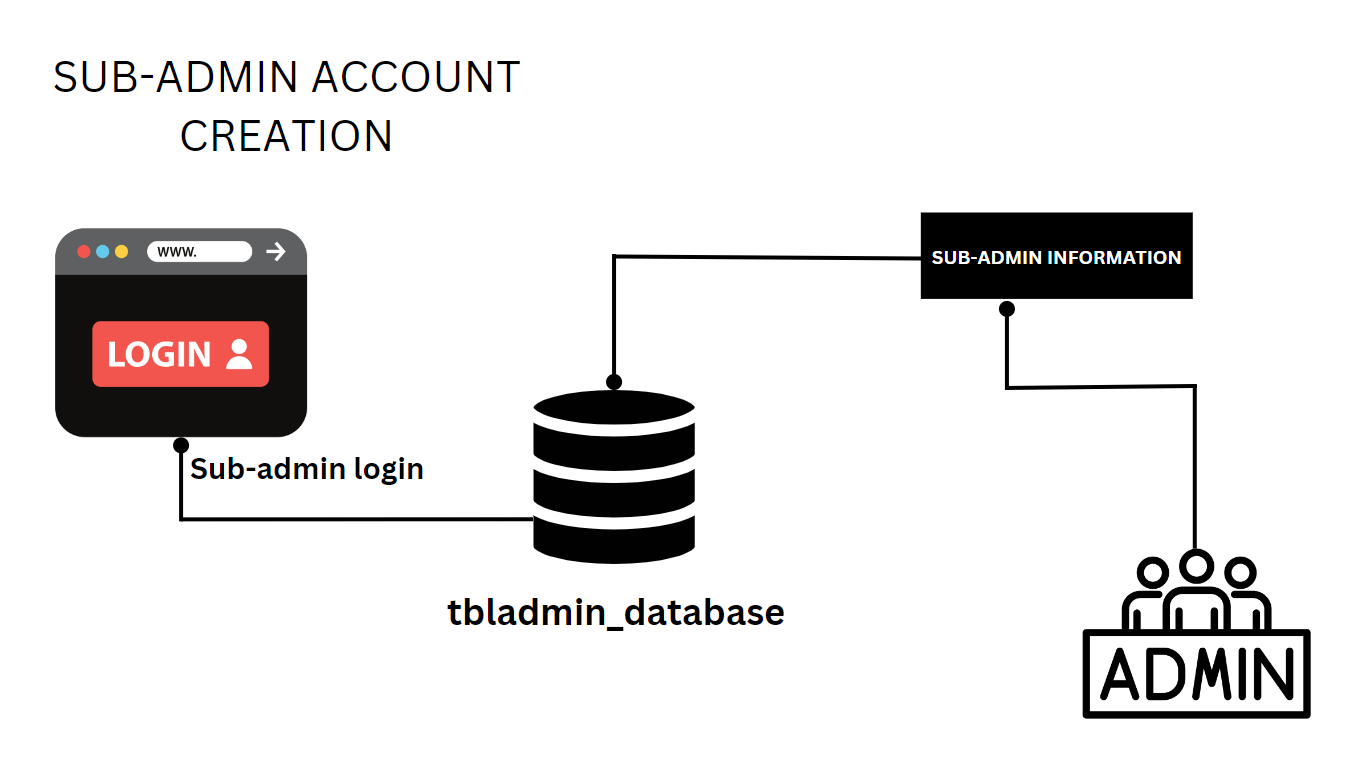
**TECHNICAL REQUIREMENTS**

In the context of software development and systems engineering, are the elements that must exist for a system to deliver a desired function or behavior to a user in order to meet the user's expectations and requirements.

**System Architecture**

***Figure***  *– System Architecture of Design - Sub-admin Account Creation*

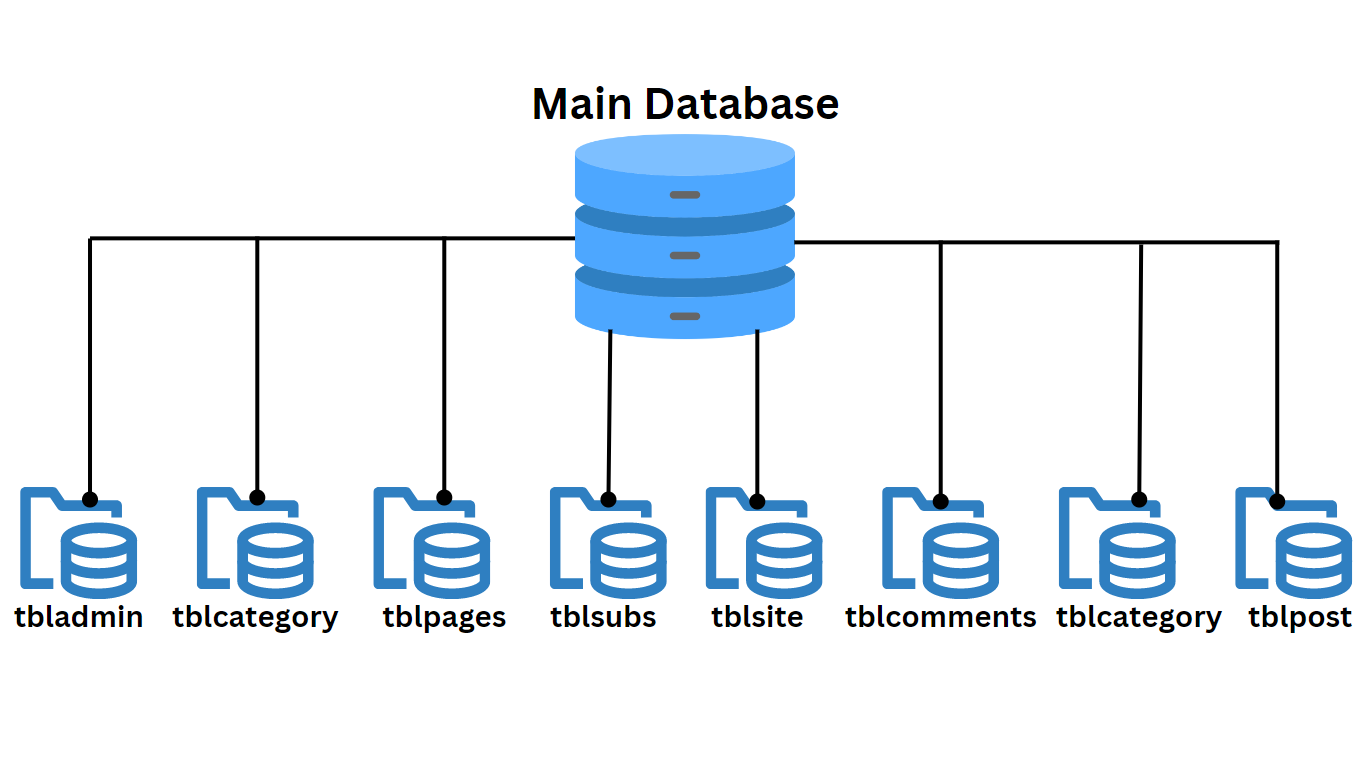
The creation of a sub-admin account will handle the Main Admin of the TCU News Portal, which is the MIS. MIS will be in charge of creating staff accounts. They can also manage their accounts and edit a little minimal data for sub-admin users.

The admin will be in charge of entering the sub-data; once the sub-admin user has accessed his account, he can change his password as well as other information about him. The sub-admin cannot create an account without the permission of the main admin, who is the MIS Administrator of Taguig City University.

**Technicality of the Project**

Finding a certain announcement, topics, and events of TCU using a web based platform will be made easier as a result of this study. That is the primary purpose of this research project. In addition, to guard the accounts used for users, we employ a cryptography method based on the Bcrypt algorithm. Users that are connected to the same network are able to access the web application thanks to the system that is built into the web application itself.

**Database Network**

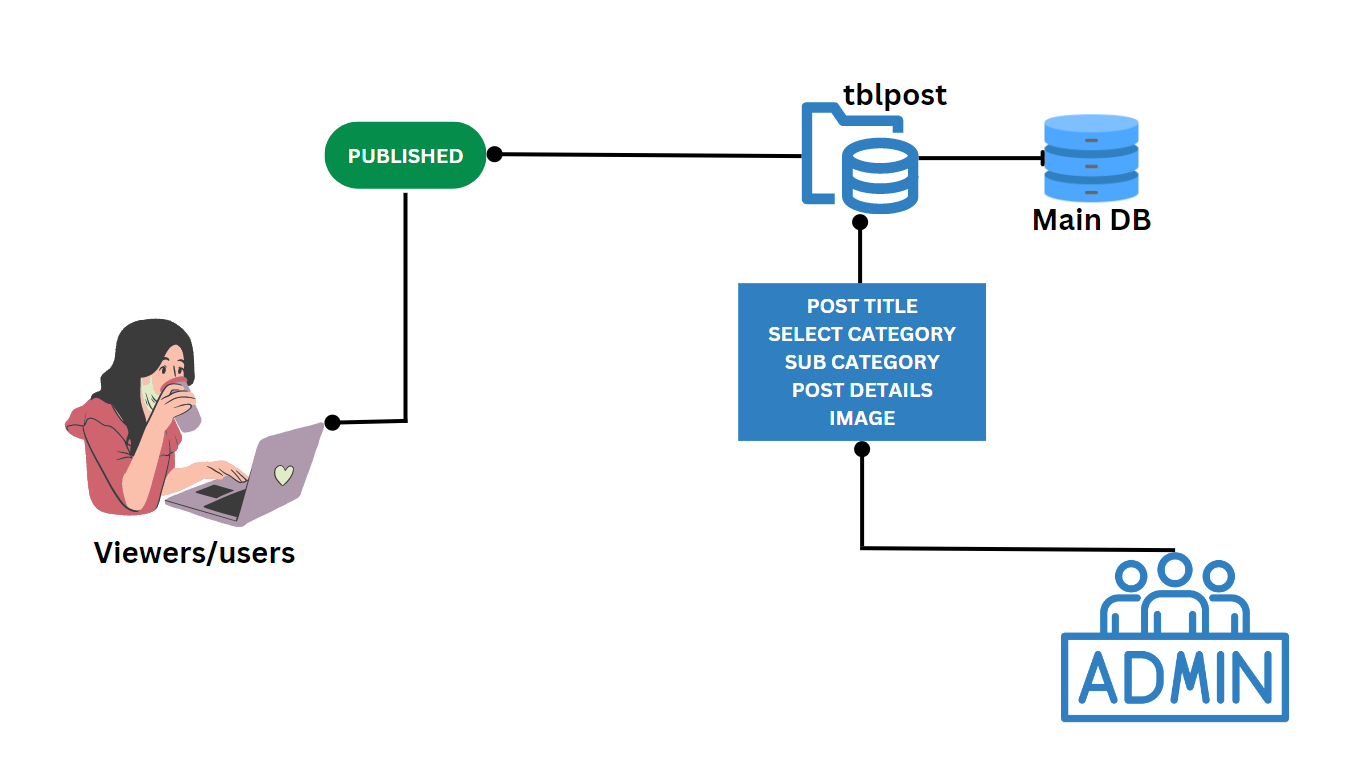
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***Figure*** *– Database Network*

Figure depicts how databases are linked together. Each Account Database has a primary backup in the Main database of TCU News Portal. Both MIS Admin and Sub-admin information will store tbladmin (DB). While the other tables such as; tblcategory, tblapages, tblsite, tblcomments, tblpost, and tblsubs, have their own databases for individual information.

This database can be backup primarily using the platform based on PHP MySQL. However, for convenient access, researchers and developers provide an easy-managed backup system for administrators to backup the entire database manually without accessing the PHP MySQL web page platform.

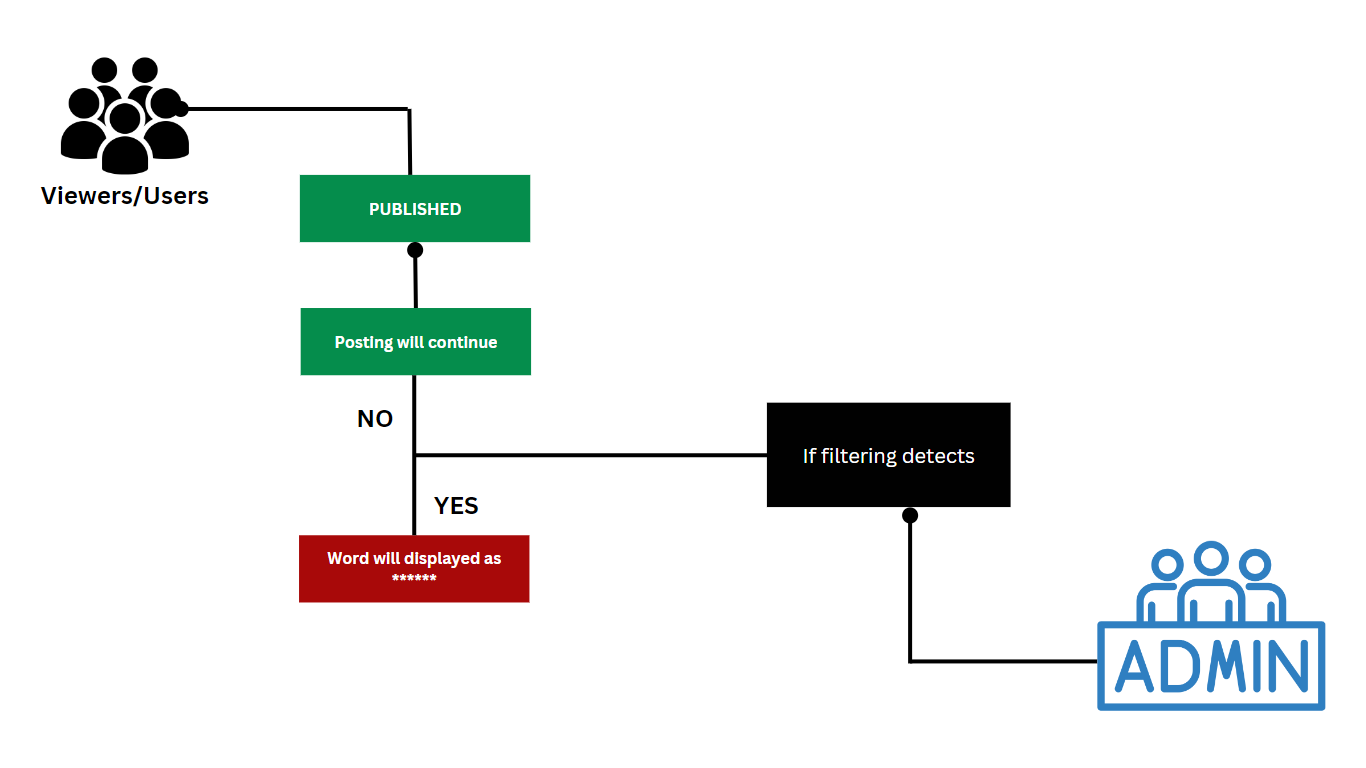
**Data Flow Diagram**



***Figure***  *– Data Flow Diagram - Adding Post*

Figure shows how posting a content is being submitted from the tblpost database. The sub-admin will be responsible for posting content based on a certain topic given by the administrator which is the MIS. Posting a content has 5 layers, of course the title post, category, sub category, post details, and image file. Sub-admin can manage posts such as; edit a specific field from the post, and delete the post.

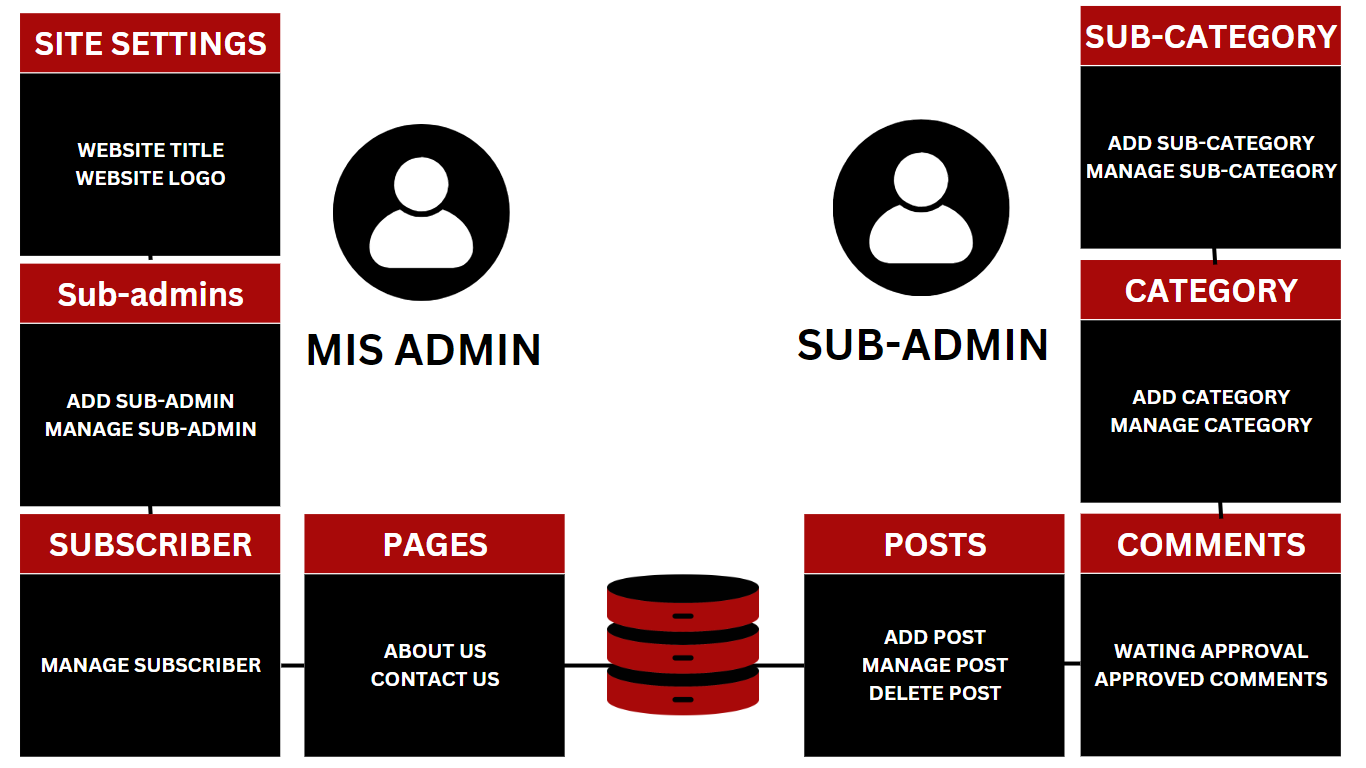
The figure doesn’t show the process from managing the post for editing it’s content, however, the same principle for posting is what sub-admin will do from editing the content. Sub-admin will be responsible for posting and deleting the content given by the administrator of MIS. However, to ensure the safety of post and readers, researchers provide a solution to prevent those scenarios. By applying a word filter from the system of TCU News Portal.



***Figure***  *– Data Flow Diagram of Filtering Word*

The figure shows the process of filtering an inappropriate word in the post. When the admin tries to post an inappropriate context, the filter will activate itself and will filter out those words that have been flagged as inappropriate. The process of finding a filter word is based on the array only and it is built inside the code based on the source code. If the context has been detected, the filtering system will replace them from Asterisk symbol to hide the filtered word.

**UML Use-Case Diagram**

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***Figure***  *– UML Use-Case Diagram*

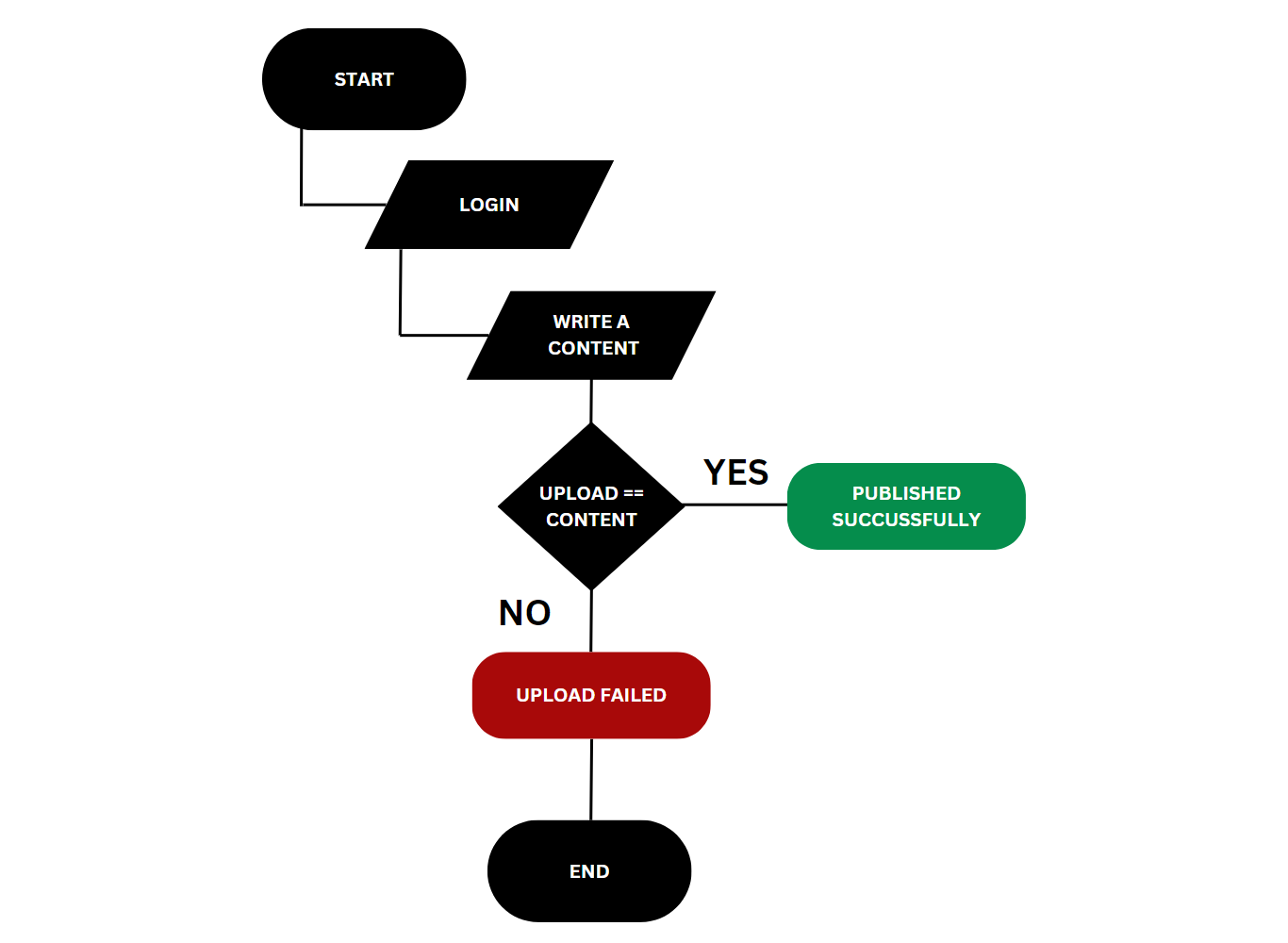
The illustration depicts a use-case illustration of the TCU News Portal. In this scenario, the MIS Admin and Sub-admin each have their own unique scope and limitations on website access.

The Sub-admin will be in charge of managing and posting content for the TCU News Portal, while the MIS admin will be in charge of the overall performance of the website, including code-based scenarios, website maintenance, database structure, and hosting server. The Sub-admin has the ability to change the TCU News Portal's category and subcategory content.

The MIS Administrator will handle code-to-code scenarios and ensure that the website functions properly. Furthermore, because MIS will be in charge of the entire database, manual backups are their responsibility. However, to be sure, the researcher will include those categories that will allow MIS to manage the post, category, and subcategory of the TCU News Portal.

The website will allow you to comment on and subscribe to specific TCU News Portal posts. Signing up for an account is not required, but a comment section will require certain information such as name, email, and, of course, the comment. This will ensure the prevention of malicious comments and inappropriate remarks.

**Flowchart**

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***Figure*** *– Flowchart - Uploading Content*

The figure to the right depicts the workflow for uploading an article from TCU News Portal. After the sub-admin has published the content, the data will send a message to the database structure from tblposts, requesting that they examine the document that the sub-admin has uploaded.

The sub-admin is expected to stick to the required minimum number of characters when posting an article. In this format, the title must be at least 30 characters long, and the description must be at least 1000 characters long. This is for the normal News Portal publishing that every sub-admin author was required to do.

**Software Requirements**

In order to develop the system. It meets the required number of system specifications.

1. Chrome 107.0.5304.107 version 10.7.0.5304.107 / Mozilla 102.4.0 version / Microsoft Edge installed version in your device.
2. Git Version
3. Xampp 8.8 version (MySQL for database is included).
4. Visual Studio Code Editor - IDE version 8
5. PHP 5.8 version.
6. GIT Terminal
7. Php intellisense library

**Hardware Requirements**

The minimum processor speed, memory, and disk space required for Windows installation are all listed here.

1. Windows 7, 8, 10, and 11 any version.
2. Core i3 4th gen or above.
3. Above 1.5GHz 32-bit(x64) processor or 64-bit(x86) processor.
4. Minimum 4GB ram and 8gb is recommended.
5. Peripherals such as; keyboards, mouse, external hard drives, and monitor.
6. 10GB disk space or more.

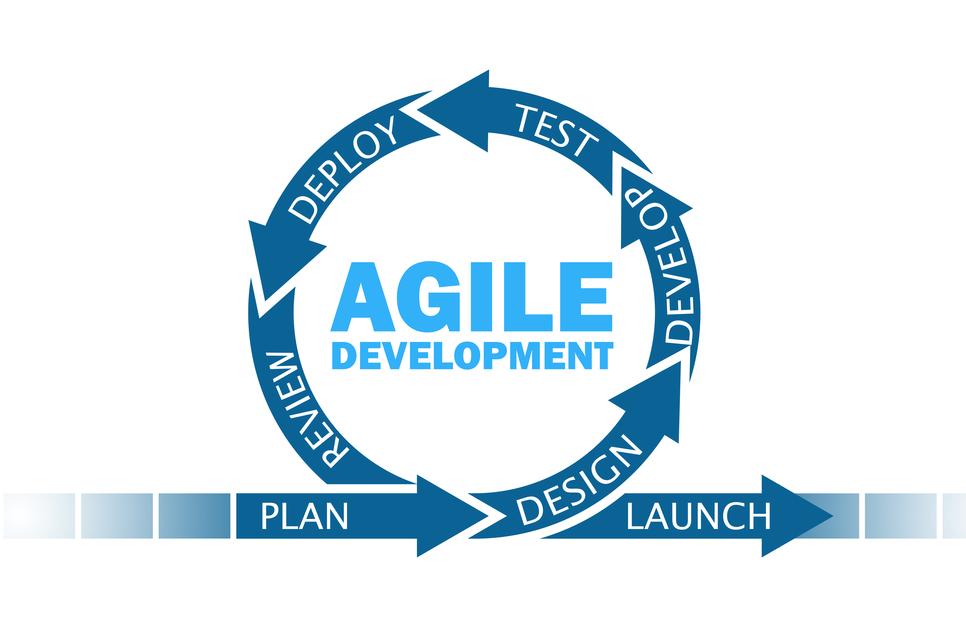
**Network Requirements**

The basic minimum, which may include, but is not limited to, software and/or hardware, an internet connection, latency, and other requirements.

**Analysis of requirements, application, device, and network requirements:**

1. Hosts(PCs, Laptops, Handhelds)
2. Protocols(IP router & TCP)
3. Routers(IP router, Ethernet switches)
4. Links(Wired & Wireless)
5. Network Services
6. Network: Interconnected system
7. Wifi Repeater (if necessary)

**System Development**



***Figure*** *– System Development Agile Methodology*

The figure depicts the project development strategy that will be used when building the TCU News Portal. The agile model depicts the software development process as a sequential and linear process. This means that a new phase of the development process cannot begin until the previous one is completed. The stages of this waterfall model have no overlap.

**The agile model phases include:**

**Planning Analysis**

During this phase, a comprehensive list of potential system requirements for the TCU News Portal is compiled and recorded in a document known as a requirement specification. Agile requirements, which can include functions, services, and features, are critical components of a successful product. Teams can create agile requirements for themselves in the form of business rules, functions, or constraints to help them navigate the production process.

**Design**

Insinuates that the designers are constantly collaborating with the rest of the team (developers, layout specialists, etc.). As a result, both a sense of TCU News Portal pride in the project as a whole and trust among team members are strengthened.

**Development**

A process or series of processes used in software development of the website. This term is quite broad, but it includes things like a design phase and a development phase. It is a way of thinking about things like waterfall being a non-iterative process. It usually takes the form of distinct phases.

**Testing**

TCU News Portal testing is only one component of the overall software development lifecycle in agile software development. It occurs concurrently with the development process and is a collaborative effort that includes not only testers and developers, but also product owners and even end users.

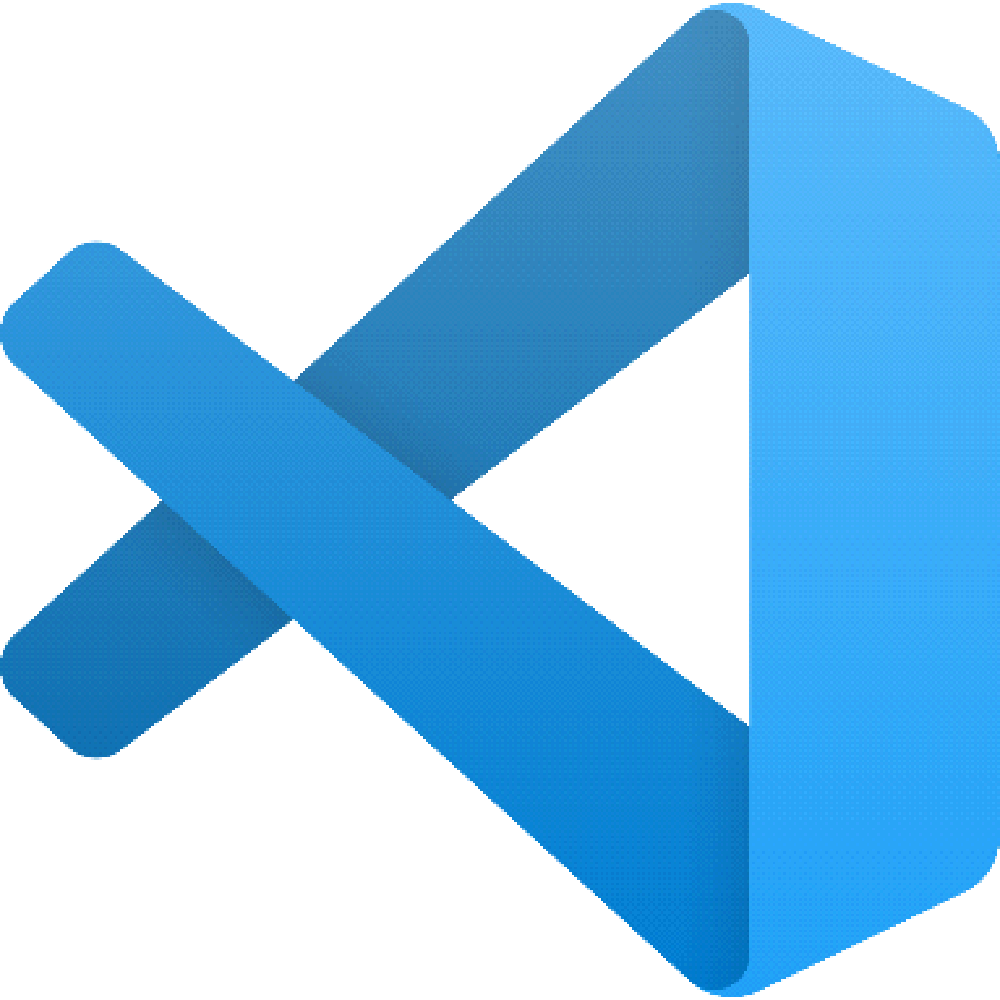
**Deployment**

The mechanism through which developers deliver applications, modules, updates, and patches to users The methods used by developers to create, test, and deploy new code influence how quickly a product can respond to changes in customer preferences or requirements, as well as the quality of each change.

**Review**

The Scrum team will gather for an unstructured meeting called a "sprint review" at the end of each iteration of TCU News Portal to report on the progress made during the preceding period.

**Details of technology to be Used**



**Visual Studio Code**

Microsoft Visual Studio Code is a code editor that is available for Windows, Linux, and macOS. Among the features are debugging, syntax highlighting, intelligent code completion, snippets, code refactoring, and embedded Git. Free. The code is open source. Runs all over the place. By using VS Code, you agree to the license and privacy statement.



PHP is a server-side scripting language that supports HTML. It's used to manage dynamic content, databases, session tracking, and even to build whole e-commerce websites. Many popular databases, including MySQL, PostgreSQL, Oracle, Sybase, Informix, and Microsoft SQL Server, are supported. This is simple to accomplish by including the router file. As you can see, the PHP built-in web server is a straightforward web server with no complicated settings. It's great for development and testing.



Bootstrap is a free and open-source CSS framework for responsive and mobile-first front-end web development. It includes HTML, CSS, and JavaScript design templates for typography, forms, buttons, navigation, and other interface components.



Git is a version control system that is free and open source that tracks changes in any set of files. It is commonly used to coordinate work among programmers who are developing source code collaboratively during software development.

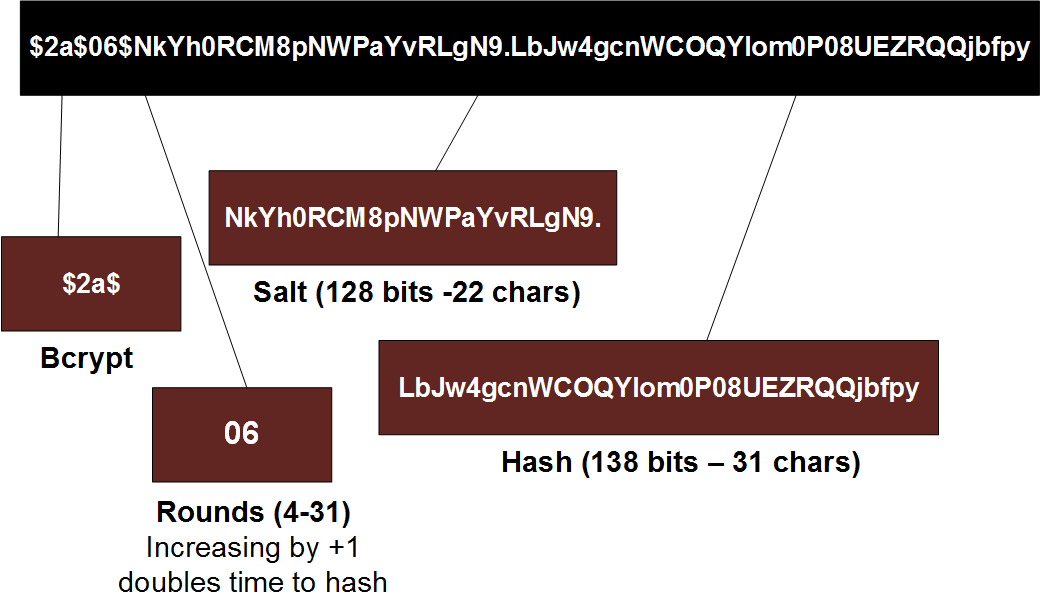


MySQL is a database management tool, so while it is not a database, it is widely used in relation to managing and organizing data in databases. MySQL is a database, not a programming language. It's a database management system, more specifically an RDBMS. It manages data inside the database using SQL (Structured Query Language), which is a query language. MySQL, an open-source Oracle-backed Relational Database Management System, was created in 1995.



XAMPP is an acronym that stands for cross-platform, Apache, MySQL, PHP, and Perl, and it allows you to build a WordPress site on your computer's local web server. This straightforward and lightweight solution is cross-platform, which means it can be used on Windows, Linux, and Mac.

**Algorithm Discussion**

***Figure 10*** *– Algorithm Discussion.*

Bcrypt is a more influential cryptographic hash generator that employs salt to generate a non-recurrent hash. It is based on the Blowfish cipher and was created by Niels Provos and David Mazières. It is the default password hashing method for BSD and other operating systems.

As a whole, it utilizes a 128-bit salt value, which necessitates the use of 22 Radix-64 characters. It can employ a number of iterations, which will slow down any brute-force brittle failure of the hashed value.

**For example, “Hello” with a salt value of “$2a$06$NkYh0RCM8pNWPaYvRLgN9.”**

As shown below, the first part is "$2a$" (or "$2b$"), followed by the number of iterations used (in this case, six) (where each additional iternation doubles the hash time). Following that are 128-bit (22 character) salt values, followed by a 184-bit hash code (which is 31 characters).

**hashcat benchmarking:**

**Hash type: MD5 Speed/sec: 380.02M words**

**Hash type: SHA1 Speed/sec: 218.86M words**

**Hash type: SHA256 Speed/sec: 110.37M words**

**Hash type: bcrypt, Blowfish(OpenBSD) Speed/sec: 25.86k words**

**Hash type: NTLM. Speed/sec: 370.22M words**

Blowfish is nearly four times slower than MD5 (380,000,000 words/sec to only 25,860 words/sec). Along with Jack the Ripper:

**md5crypt [MD5 32/64 X2] 318237 c/s real, 8881 c/s virtual**

**bcrypt ("$2a$05", 32 iterations) 25488 c/s real, 708 c/s virtual**

**LM [DES 128/128 SSE2-16] 88090K c/s real, 2462K c/s virtual**

The BCrypt Methodology is utilized to securely hash and salt passwords. BCrypt allows the creation of a password security stage that can advance nearby hardware innovation to guard against dangers or threats in the long run, such as attackers having the computing power to guess passwords twice as rapidly.

The technology in the Bcrypt algorithm and procedure limits attacks and makes it more difficult for attackers to compromise passwords. Bcrypt was not intended to encrypt large amounts of data. It is best used for passwords, but SHA-256 is better for large amounts of data because it is less expensive and faster.

**Table 1. Difference between BCrypt and MD5**

| MD5 Algorithm | BCrypt Algorithm |
| --- | --- |
| MD5 stands for Message Digest. | Moreover, bcrypt is resistant to brute force attacks, both now and in the future. |
| MD5 message digests can be up to 128 bits long. | Bcrypt is more secure against preimage attacks thanks to the salt and key stretching functions. |
| Compared to the speed of MD5, it is slow. | The cost can be increased to slow down the hashing process. |
| MD5 is simpler than BCrypt. | The eksblowfish function is heavily used in the bcrypt hashing process. |

The eksblowfish function is crucial to the bcrypt hashing process. When a user enters their password for the first time, the site uses "EksBlowfishSetup" to set two important parameters. First, it adds the "salt" to the password. A salt is a string of random characters used by the site to make passwords more complex.

**BCrypt in PHP Laravel Structure Example:**

$password = Hash::make(‘Hello’);

$password = bcrypt(‘Hello’);

**Verifying A Password Against A Hash**

if (Hash::check('secret', $hashedPassword))

{

// The passwords match...

}

**Checking If A Password Needs To Be Rehashed**

if (Hash::needsRehash($hashed))

{

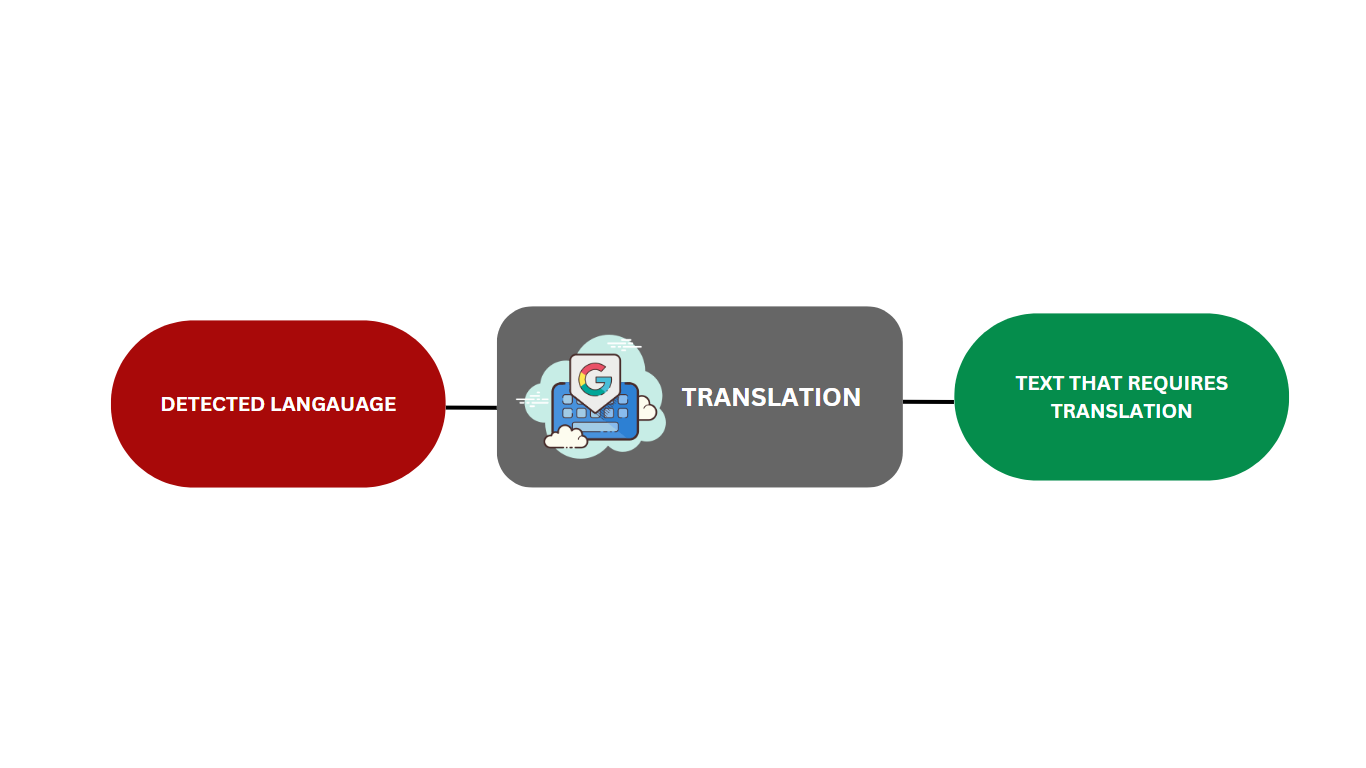
$hashed = Hash::make(‘Hello’);

}

The Laravel Hash facade provides secure Bcrypt hashing for storing user passwords. If you use the AuthController controller that comes with your Laravel application, it will verify the Bcrypt password against the un-hashed version provided by the user.

Because its "work factor" is adjustable, Bcrypt is an excellent choice for hashing passwords. This means that the time it takes to generate a hash can be increased as hardware power increases. Slow is good when hashing passwords. The longer it takes an algorithm to hash a password, the longer it takes malicious users to generate "rainbow tables" of all possible string hash values for brute force attacks against applications.

**API Specification**

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***Figure*** *– API Specification - Google Translate*

The Google Translate API key allows you to connect to the same machine learning that Google employs in its search query and Google sites when it encounters material in a language other than yours.

Make your website legible in multiple languages if you use the Web to obtain out to global consumers, the foreign student on the next-door college campus, or anyone else who needs to access your material. Making your site available in multiple languages improves the user experience for foreign visitors.

In many cases, students can improve their language understanding as well as their pronunciation. Furthermore, because it can translate entire documents and websites, Google Translate provides teachers with a quick and easy tool for communicating not only with students, but also with parents and the larger school community.

Google Translate can translate text, handwriting, speech, and websites into multiple languages. your college. However, Google Translate can assist you in navigating online materials and communicating with people who do not speak your language.

The NMT system in Google Translate employs a large artificial neural network capable of deep learning. GNMT improves the quality of the translation by using millions of examples and determining the most relevant translation based on a broader context. The output is then rearranged and modified to resemble grammatically based human language.

An API, or Application Programming Interface, is a set of functions and procedures that allow systems to integrate so that their functionalities can be reused by other apps or programs. An API is used to exchange data between different types of software in order to automate procedures and develop new features.