GRID BASED PASSWORD AUTHENTICATION SYSTEM

A Mini Project Report

Submitted to the Faculty of Engineering of

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In partial fulfillment of the requirements for the award of the Degree of

BACHELOR OF TECHNOLOGY
In
INFORMATION TECHNOLOGY

By

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CERTIFICATE

This is to certify that the project report entitled "**GRID BASED PASSWORD AUTHENTICATION SYSTEM**" is a bonafide record of work carried out by **N.DURGA PRASAD (19481A1281**), **T.PRAVEEN KUMAR REDDY (19481A12B6), P.GUNA RAJESH (19481A1295),** and **M.ASMATHULLA (19481A1272)** under the guidance and supervision of **Mr. K. Srikanth,** in the partial fulfillment of the requirements for the award of the degree of Bachelor of Technology in Information Technology of **Jawaharlal Nehru Technological University Kakinada, Kakinada** during the academic year 2022-23.

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ABSTRACT

Graphical passwords refer to using pictures (also drawings) as passwords. In theory, graphical passwords are easier to remember, since humans remember pictures better than words . Also, they should be more resistant to brute force attacks, since the search space is practically infinite**.** A recall - based graphical password approach was introduced by Greg Blonder in 1996 . In this approach, a user create a password by clicking on several grids of an image. A user is asked to reproduce something that he created or selected at the registration stage. In our approach a user can click any point grid to create the password. During authentication, the user has to select the grids within the in the correct sequence to login.

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INTRODUCTION

CHAPTER-1

INTRODUCTION

1.1 INTRODUCTION

The world is becoming digital at a high pace with increasing technical advancements and everything is happening online. From paying your bills to ticket bookings to paying the person sitting next to you, you prefer to pay online. Not only payments but all activities, be it, communication through e-mails and messaging apps, keeping your documents in a digital locker etc happen online.

With everything turning online, the risk of cybercrimes and privacy breaches is also increasing. Passwords play a huge role in keeping your data safe online as well as offline platforms. Passwords are the default method of authentication to get access to our accounts. Using images as passwords we can ensure more security than traditional authentication methods.

1.2 PROBLEM STATEMENT

Alphanumeric passwords are the most common but they have some drawbacks. Previous studies have shown that users tend to choose short alphanumeric passwords that are easy to remember (Adams and Sasse 1999) but that password can be easily guessed. On the other hand, if an alphanumeric password is hard to guess, then it is often hard to remember (Suo, Zhu, and Owen 2005). Since users can remember a limited number of alphanumeric passwords, they often write down their passwords or use same password for multiple accounts(Kotadia2005). Alphanumeric password scheme is one of the most common methods for mobile authentication. However, it has some security and usability drawbacks.

1.3 EXISTING SYSTEM

Alphanumeric password scheme is one of the most common methods for mobile authentication. In the current existing system, there are some inconsistencies. It has some security and usability drawbacks such as: a difficult password is hard to remember, and a short password is easy to guess.

1.4 DISADVANTAGES

- High chance of Brute force attack
- Shoulder surfing attack
- Hard to remember

1.5 PROPOSED SYSTEM

To develop a Grid based password authentication system that is easier for a user to remember password and increase the level of security. User is prompted to recreate anything that he or she generated or selected earlier during the registration stage It satisfies both conflicting requirements i.e. easy to remember and security.

1.6 ADVANTAGES

- Easy to remember
- Resistant to brute force attacks, since the search space is practically infinite.
- High level security
- Make password sharing and writing tough.
- Ensure positive user experience

CHAPTER-2
REQUIREMENT ANALYSIS

CHAPTER-2
REQUIREMENT ANALYSIS

2.1 FUNCTIONAL REQUIREMENTS

Functional requirement defines a function of a system or its component, where a function is described as a specification of behaviour between outputs and inputs. Here the input is username (email) & Graphical (Grid) password. The output is allowing the user to access the website if the given credentials are valid. If the credentials are not valid then the system should restrict the access to website.

2.2 NON FUNCTIONAL REQUIREMENTS

In the systems engineering, a non-functional requirements that specifies criteria that can be used to judge the operation of a system, rather than specific behaviours. They are contrasted with functional requirements that defines specific behaviour or functions. The non-functional requirements can be considered as quality attributes of a system performance.

2.2.1Usability

Graphical passwords are an alternative to textual alphanumeric password. It satisfies both conflicting requirements i.e. easy to remember and security

2.2.2Efficiency

In this system authentication is done efficiently by using graphical password.

2.2.3Reliability

The system perform accurately whenever the user enters an input.

2.24Documentation

Everything that is done for designing our system is documented in an understandablemanner.

2.2 SOFTWARE REQUIREMENT SPECIFICATIONS

- MySQL

- Tomcat

- Language: HTML,CSS,JAVA SCRIPT,PHP

- Operating system : Windows 10/11

2.3 HARDWARE REQUIREMENT SPECIFICATIONS

- System with i3 and above configuration.

- Ram : 4gb

- Rom : 500 mb

CHAPTER-3
DESIGN

CHAPTER-3
DESIGN

3.1 SYSTEM ARCHITECTURE

An architecture is the fundamental organization of a system, embodied in its components, their relationships to each other and the environment, and the principles governing its design and evolution. To be more precise, the technologies, methods, and how everything is   arranged to form a complete product is what the architecture of a system refers to.

3.1.1 BLOCK DIAGRAM
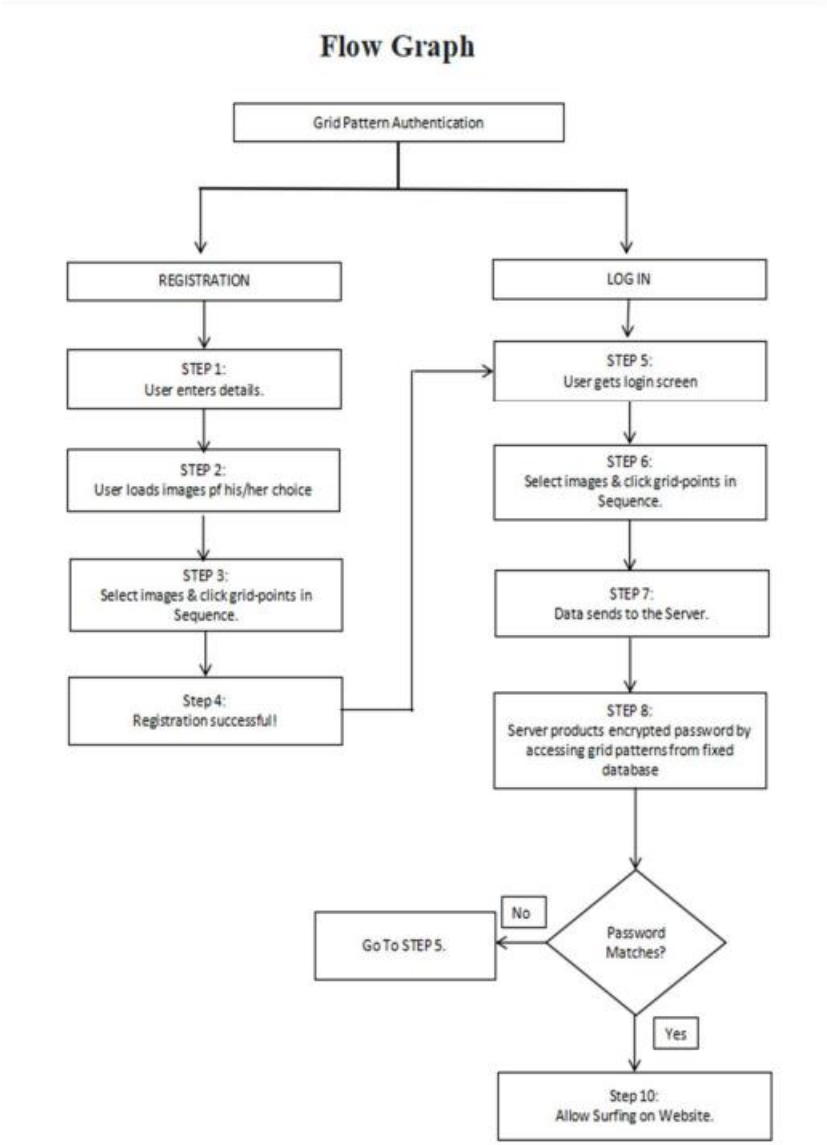
3.1.1 Block Diagram

Fundamental Design Concepts

- **Data Abstraction -**It is an act of representing essential features without including the background details or explanations.

- **Refinement -** It is the process of elaboration. A hierarchy is developed by decomposing a macroscopic statement of function in a stepwise fashion until programming language statements are reached. Abstraction and Refinement are complementary concepts.

- **Modularity -** Software architecture is divided into components called modules.

- **Software Architecture -** It refers to the overall structure of the software and the ways in which that structure provides conceptual integrity for a system.

- **Control Hierarchy -** A program structure that represents the organization of a program component and implies a hierarchy of control.

- **Data Structure -** It is a representation of the logical relationship among individual elements of data.

- **Software Procedure -** It focuses on the processing of each module individually.

- **Information Hiding -** Modules should be specified and designed so that information contained within a module is inaccessible to other modules that have no need for such information.

3.2 UML DIAGRAMS

The UML consists of a number of graphical elements that combine to form diagram. Because it is a language the UML has need for combining these elements. The purpose of the diagram is to present multiple views of a system and this set of multiple views is called a model. The most important diagram of UML is class diagram.

3.2.1 USECASE DIAGRAM

To provide a basis for planning the technical contents of iterations, an architectural view called the use-case view is used. There is only one use-case view of the system, which illustrates the use cases and scenarios that encompass architecturally significant behavior, classes, or technical risks. The use-case view is refined and considered in iteration initially. A use case diagram can identify the different types of users of a system and the different use cases and will often be accompanied by other types of diagrams as well. The use cases are represented by either circles or ellipses. The purpose of the use case diagrams is simply to provide the high level view of the system and convey the requirements in laypeople's terms for the stakeholders. Additional diagrams and documentation can be used to provide a complete functional and technical view of the system.

A use case diagram in the Unified Modelling Language (UML) is a type of behavioural diagram defined by and created from a Use-case analysis. Use case diagrams give a graphic overview of the actors involved in a system, different functions needed by those actors and how these different functions interact. It's a great starting point for any project discussion because you can easily identify the main factors involved and the main processes of the system.

Actor:

Actor is something external to the system and interacts with the system. Actor may be a human being, device or some other software system. For Online projectmanagement system, actors are User, database admin.

Use - Case:

A use-case represents sequence of actions performed by the system that yields an observable result of value for a particular actor. Use-case represents a functional requirement of a system.

Purpose of Use Case Diagram:

Use case diagrams are typically developed in the early stage of development and people often apply use case modelling for the following purposes:

- Specify the context of a system.
- Capture the requirements of a system.
- Validate a systems architecture.
- Drive implementation and generate test cases.
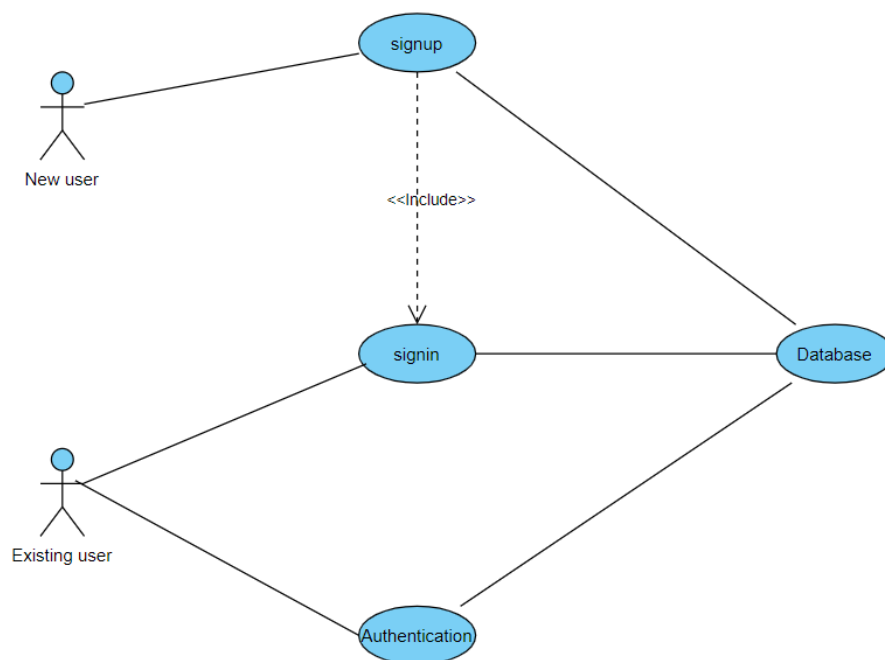- Developed by analysts together with domain experts.

Fig 3.2.1 Use Case Diagram

3.2.2 CLASS DIAGRAM

Class diagrams are the main building block of any Object Oriented solution. It shows the classes in a system, attributes, and operations of each class and the relationship between each class. In most modelling tools, a class has three parts. Name at the top, attributes in the middle and operations or methods at the bottom. In a large system with many related classes, classes are grouped together to create class diagrams. Different relationships between classes are shown by different types of arrows.

A class diagram contains a rectangle for each class. It is divided into three parts.

- The name of the class.

- The names and types of the fields.

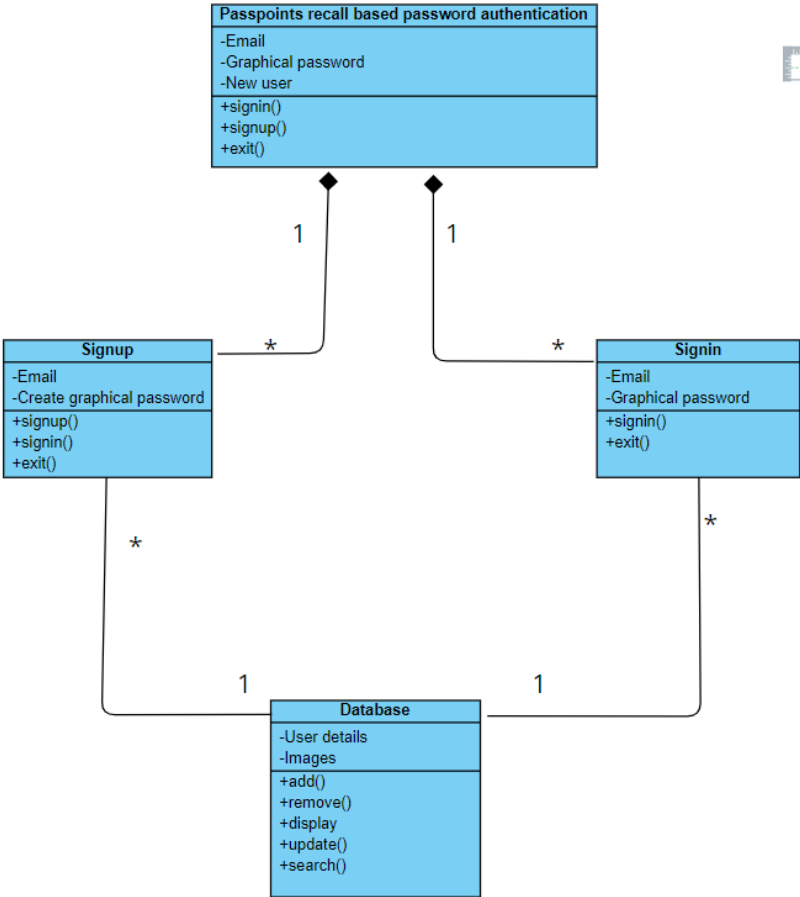- The names, return types, and parameters of the methods.

Fig 3.2.2 Class Diagram

3.2.3 ACTIVITY DIAGRAM

Activity diagram is basically a flowchart to represent the flow from one activity to another activity. The activity can be described as an operation of the system.

The control flow is drawn from one operation to another. This flow can be sequential, branched, or concurrent. Activity diagrams deal with all type of flow control by using different elements such as fork, join, etc.

Activity is a particular operation of the system. Activity diagrams are not only used for visualizing the dynamic nature of a system, but they are also used to construct the executable system by using forward and reverse engineering techniques. Activity diagram is sometimes considered as the flowchart. Although the diagrams look like a flowchart, they are not. It shows different flows such as parallel, branched, concurrent, and single.
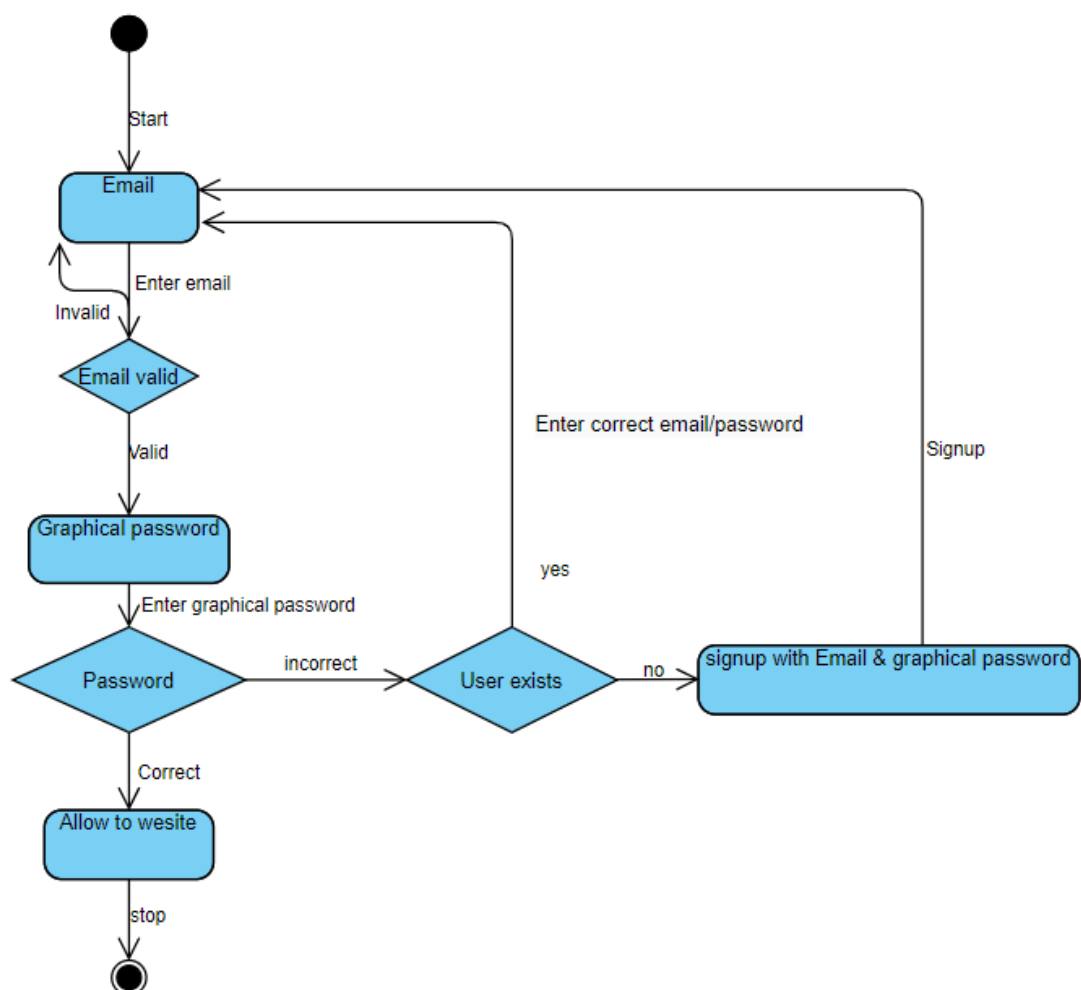

Fig 3.2.3 Activity diagram

3.2.4 SEQUENCE DIAGRAM

A sequence diagram in Unified Modeling Language (UML) is a kind of interaction diagram that shows how processes operate with one another and in what order. It's important to note that they show the interactions for a particular scenario It is a construct of a Message Sequence Chart. The processes are represented vertically and interactions are shown as arrows.
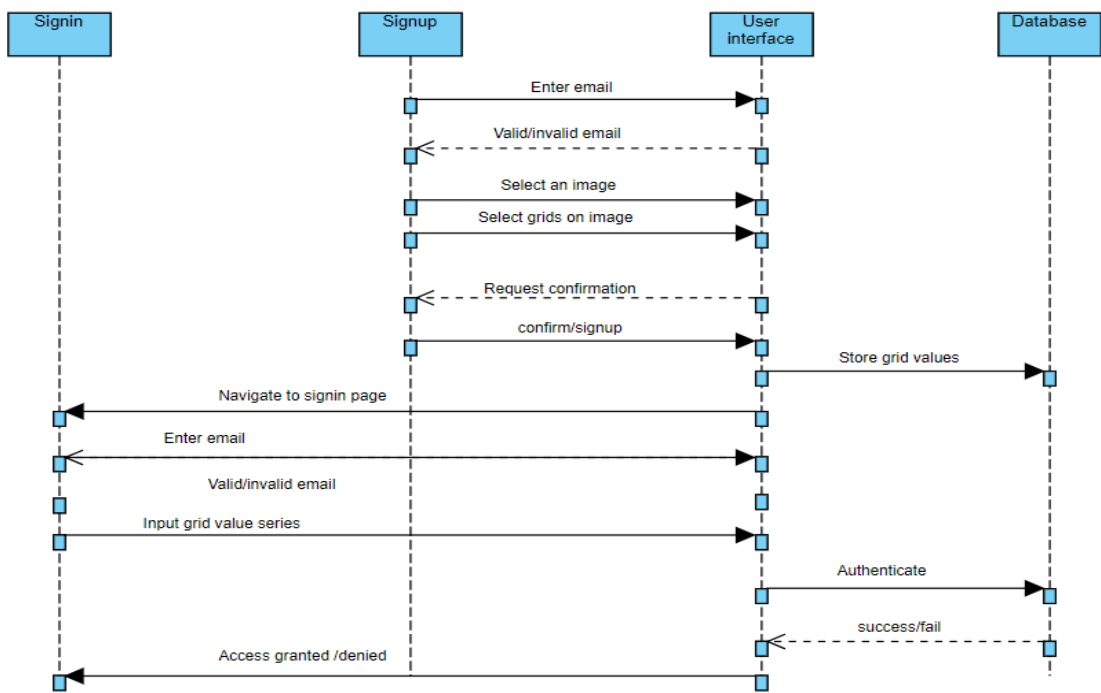

Fig 3.2.4 Sequence diagram

CHAPTER-4
IMPLEMENTATION

CHAPTER-4
IMPLEMENTATION

4.1 TECHNOLOGY DESCRIPTION

INTRODUCTION

Graphical password schemes can be categorized into three groups: recognition based, recall based, and cued recall based (Chiang and Chiasson 2013). In a recognition based scheme, a set of images is given and the user needs to identify correct images that the user had already set in order to authenticate (e.g., Use Your Illusion (UYI)). In UYI scheme, the login screen displays 9 images randomly positioned in a 3×3 grid (Schaub et al. 2013). The user needs to recognize and select a right image amongst trap images. Both of the papers provide creation time, login time, and login success rate as the measurement criteria for usability. Chiang and Chiasson (2013) also described the password length and password strength as security criteria. Recall schemes require recreating drawings without a hint (e.g., Android Pattern Lock). Chiasson et al. (2009) propose a recall based graphical password called the passpoint in which, users must select the same click-points in the same order to login. After comparing the pass-points with the alphanumeric password, they find that participants using pass-points have success rates approximately 99%, whereas participants have approximately 88% success rates for alphanumeric password. Tao and Adams (2008) introduce a recall based password scheme called the pass-go. A user can either draw dots on intersection points or connect intersection points with strokes. Points and lines have to be drawn in the correct order for successful authentication. PassGo is a gridbased scheme, which is an improvement of Draw A Secret (DAS) (Jermyn et al. 1999). Chiasson et al. (2008) introduce a cued recall based password where a sequence of points needs to be selected on a cue like an image. Another new technique, persuasive cued click points (PCCP), is proposed by Chiasson et al. (2012). They describe that graphical password is effective in terms of memorability and provide benefits over alphanumeric passwords because images can be used as cues for different passwords. They also point out graphical passwords are easy to learn but typically require longer login time.

Why choosing Graphical password ?

User authentication is one of the most pressing issues in information security today. When utilizing text-based strong password schemes, there is a lot of security, but remembering those solid passwords is often difficult, so people write them down on a piece of paper or save them in their smart phone. Graphical User Authentication (GUA) or simply image-based Password is an alternative to text-based authentication that is based on the idea that humans remember visuals better than text. This method makes it simple for people to create and remember passwords. However, one of the major problems that GUA is dealing with is a shoulder surfing attack that can record users' mouse clicks and eavesdropping. In this research, we present a new technique that uses the zero-knowledge protocol to solve the eavesdropping and shoulder surfing attacks and improve system security. Users confirm they know the graphical password without sending it via the zero-knowledge protocol. In other words, the user does not divulge the password to others or give it to the verifier. Hackers attempting to eavesdrop the password will be unsuccessful because the password is neither transferred over an insecure channel such as the Internet nor revealed. As a result, it is a secure method of preventing interception by other parties or adversaries. This project will produce a safe authentication method that is also user friendly.

Memory:

This project requires 2MB of flash memory for storing code . It also need 200 MB of memory for MySQL database and 18 MB for Tomcat server.

Programming:

This project is programmed using HTML,CSS,PHP and JavaScript. HTML is used to create the structure of the website. CSS is used to style the website. JavaScript makes the project as dynamic. We do client side scripting using Java Script. PHP is used to connect the webpage to MySQL database.

Webserver : Tomcat

Why Tomcat ?

It is an open-source Java servlet container that implements many Java Enterprise Specs such as the Websites API, Java-Server Pages and last but not least, the Java Servlet. The complete name of Tomcat is "Apache Tomcat" it was developed in an open, participatory environment and released in 1998 for the very first time. It began as the reference implementation for the very first Java-Server Pages and the Java Servlet API. However, it no longer works as the reference implementation for both of these technologies, but it is considered as the first choice among the users even after that. It is still one of the most widely used java-sever due to several capabilities such as good extensibility, proven core engine, and well-test and durable. Here we used the term "servlet" many times, so what is java servlet; it is a kind of software that enables the webserver to handle the dynamic(java-based) content using the Http protocols.

So what exactly is Apache tomcat?

If you are a little familiar with the websites or have some basic knowledge about the websites, you must have heard about the HTTP protocol or may also know what actually are they. If you want to provide any web-services such as you want to provide a simple static content possibly by using HTML (or Hypertext Markup Language), or maybe you just want to send data from a server to point you, so you necessarily need a server and that server is HTTP(HyperText transfer protocol). So, as we all know that if anyone wants to make a simple, static website, he definitely requires an HTTP server, but if he wants to make website dynamic, he has to use servlet. We use the HTTP server if we want to send simple data. If we want to send dynamic data or to make our website dynamic, we need to use the servlet. Hence, we need an HTTP server and what else we need is a container where we will run or servlet, so when we combine the HTTP server and the servlet (or we can say servlet container), they both combine to become a single server know as tomcat server.

In simple words, we can say that The Apache Tomcat is actually a server and a servlet container.

Advantages of Tomcat

It is open-source

It means anyone from anywhere can download, install, and use it free of cost, which makes it the first choice among the new developers and new users.

Incredibly Lightweight

It is actually a very light application, even with the JavaEE's certification. However, it provides all necessary and standard functionalities required to operate a server, which means it gives very fast load and redeploys as compared to its various alternatives. Yes, it is right that it does not offer so many features in case you want a number of features, it might be good for you, but if you want to have an easy and fast means in order to run your application, it is the best option for you.

Highly flexible

Due to its built-in customization options, extensive and lightweight nature, it offers high flexibility, a user can run it in any fashion he wants, and it will still work as fine without any issues. Since it is open-source, anyone who has knowledge can tweak it according to his requirements.

Stability

It is one of the most stable platforms available today to build on and using it to run our applications. It is incredibly stable because it runs independently of our Apache installation. In case if there is a big failure in Tomcat due to which it to stop working, the rest of our server would run just well.

It provides us an extra level of security

As the several organizations usually like to position their Tomcat's installation behind the protection of an extra firewall which can be accessible only from the Apache installation.

It is well documented

It has several excellent documentation available, including a vast range of freely available online tutorials that can be downloaded or viewed directly online by the user, which makes it one of the best choices to fill the requirement of an application server in mostly every java web-application.Whether a user is looking for the installation instructions, startup settings, server configuration notes, all kind of information about the Tomcat is already available on the internet.

It is one of the most widely used application servers

According to an estimation, it holds almost 60 percent of the market share almost all java application server deployments, which makes it one of the most popular application servers used for java web-based applications. However, we cannot say that it implements all of the features required for a JavaEE application server; instead, it enables us to run Java EE application.

Tomcat acts as a "webserver" or "servlet container." However, there is a plethora of terminology for anything.

It's mature

We take a look back in the past; we will find that it has existed for almost 20 years, which is quite a significant time, in which it gets mature over time passage. Since the Tomcat is open-source software, it's updated, and new releases come out nearly on a regular basis, and the open-source community maintains it. The maturity makes it one of the most extremely stable application servers for the development of software, applications, and deploying java applications. Since now, it is extremely a stable option that becomes more powerful with excellent community support.

Database : MySQL

What is Database?

It is very important to understand the database before learning MySQL. A database is an application that stores the organized collection of records. It can be accessed and manage by the user very easily. It allows us to organize data into tables, rows, columns, and indexes to find the relevant information very quickly. Each database contains distinct API for performing database operations such as creating, managing, accessing, and searching the data it stores. Today, many databases available like MySQL, Sybase, Oracle, MongoDB, PostgreSQL, SQL Server, etc.

Why MySQL?

MySQL is currently the most popular database management system software used for managing the relational database. It is open-source database software, which is supported by Oracle Company. It is fast, scalable, and easy to use database management system in comparison with Microsoft SQL Server and Oracle Database. It is commonly used in conjunction with PHP scripts for creating powerful and dynamic server-side or web-based enterprise applications.

It is developed, marketed, and supported by **MySQL AB, a Swedish company**, and written in C programming language and C++ programming language. The official pronunciation of MySQL is not the My Sequel; it is *My Ess Que Ell. However, you can pronounce it in your way.* Many small and big companies use MySQL. MySQL supports many Operating Systems like Windows, Linux, MacOS, etc. with C, C++, and Java languages.

How MySQL Works?

MySQL follows the working of Client-Server Architecture. This model is designed for the end-users called clients to access the resources from a central computer known as a server using network services. Here, the clients make requests through a graphical user interface (GUI), and the server will give the desired output as soon as the instructions are matched. The process of MySQL environment is the same as the client-server model.
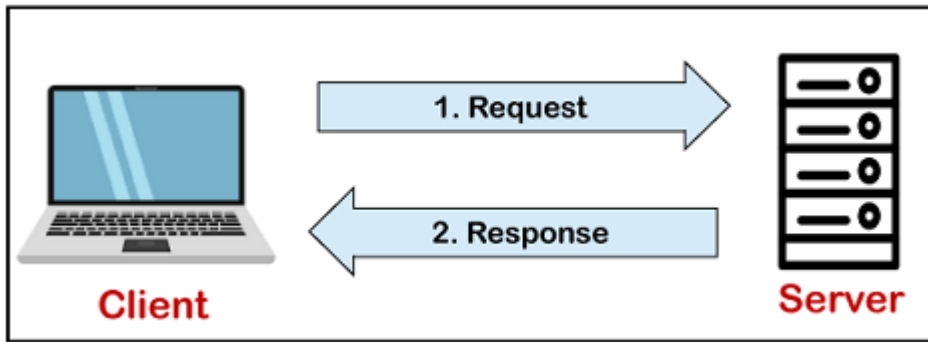
The core of the MySQL database is the MySQL Server. This server is available as a separate program and responsible for handling all the database instructions, statements, or commands. The working of MySQL database with MySQL Server are as follows:

1. MySQL creates a database that allows you to build many tables to store and manipulate data and defining the relationship between each table.
2. Clients make requests through the GUI screen or command prompt by using specific SQL expressions on MySQL.
3. Finally, the server application will respond with the requested expressions and produce the desired result on the client-side.

A client can use any MySQL GUI. But, it is making sure that your GUI should be lighter and user-friendly to make your data management activities faster and easier. Some of the most widely used MySQL GUIs are MySQL Workbench, SequelPro, DBVisualizer, and the Navicat DB Admin Tool. Some GUIs are commercial, while some are free with limited functionality, and some are only compatible with MacOS. Thus, you can choose the GUI according to your needs.

Features of MySQL

Relational Database Management System (RDBMS)

MySQL is a relational database management system. This database language is based on the SQL queries to access and manage the records of the table.

Easy to use

MySQL is easy to use. We have to get only the basic knowledge of SQL. We can build and interact with MySQL by using only a few simple SQL statements.

It is secure

MySQL consists of a solid data security layer that protects sensitive data from intruders. Also, passwords are encrypted in MySQL.

Client/ Server Architecture

MySQL follows the working of a client/server architecture. There is a database server (MySQL) and arbitrarily many clients (application programs), which communicate with the server; that is, they can query data, save changes, etc.

Free to download

MySQL is free to use so that we can download it from MySQL official website without any cost.

It is scalable

MySQL supports multi-threading that makes it easily scalable. It can handle almost any amount of data, up to as much as 50 million rows or more. The default file size limit is about 4 GB. However, we can increase this number to a theoretical limit of 8 TB of data.

Speed

MySQL is considered one of the very fast database languages, backed by a large number of the benchmark test.

High Flexibility

MySQL supports a large number of embedded applications, which makes MySQL very flexible.

Compatible on many operating systems

MySQL is compatible to run on many operating systems, like Novell NetWare, Windows* Linux*, many varieties of UNIX* (such as Sun* Solaris*, AIX, and DEC* UNIX), OS/2, FreeBSD*, and others. MySQL also provides a facility that the clients can run on the same computer as the server or on another computer (communication via a local network or the Internet).

Allows roll-back

MySQL allows transactions to be rolled back, commit, and crash recovery.

Memory efficiency

Its efficiency is high because it has a very low memory leakage problem.

High Performance

MySQL is faster, more reliable, and cheaper because of its unique storage engine architecture. It provides very high-performance results in comparison to other databases without losing an essential functionality of the software. It has fast loading utilities because of the different cache memory.

High Productivity

MySQL uses Triggers, Stored procedures, and views that allow the developer to give higher productivity.

Platform Independent

It can download, install, and execute on most of the available operating systems.

Partitioning

This feature improves the performance and provides fast management of the large database.

GUI Support

MySQL provides a unified visual database graphical user interface tool named "**MySQL Workbench**" to work with database architects, developers, and Database Administrators. MySQL Workbench provides SQL development, data modeling, data migration, and comprehensive administration tools for server configuration, user administration, backup, and many more. MySQL has a fully GUI supports from MySQL Server version 5.6 and higher.

Dual Password Support

MySQL version 8.0 provides support for dual passwords: one is the current password, and another is a secondary password, which allows us to transition to the new password.

Advantages of MySQL

o MySQL is an open-source database, so you don't have to pay a single penny to use it.

o MySQL is a very powerful program that can handle a large set of functionality of the most expensive and powerful database packages.

o MySQL is customizable because it is an open-source database, and the open-source GPL license facilitates programmers to modify the SQL software according to their own specific environment.

o MySQL is quicker than other databases, so it can work well even with the large data set.

o MySQL supports many operating systems with many languages like PHP, PERL, C, C++, JAVA, etc.

o MySQL uses a standard form of the well-known SQL data language.

o MySQL is very friendly with PHP, the most popular language for web development.

o MySQL supports large databases, up to 50 million rows or more in a table. The default file size limit for a table is 4GB, but you can increase this (if your operating system can handle it) to a theoretical limit of 8 million terabytes (TB).

4.2   INSTALLATION STEPS

Tomcat software installation

There are many versions of the Tomcat available with different features on its website. You can choose the version according to your requirements, but we suggest you download the latest stable version.

Installation steps

Step   1: Open the Google Chrome or any of your web browser and type "download Tomcat for windows" in the search box. You can also go directly on Tomcat's website by clicking on this https://tomcat.apache.org/download-90.cgi#9.0.38

Now download any version of Tomcat you want:
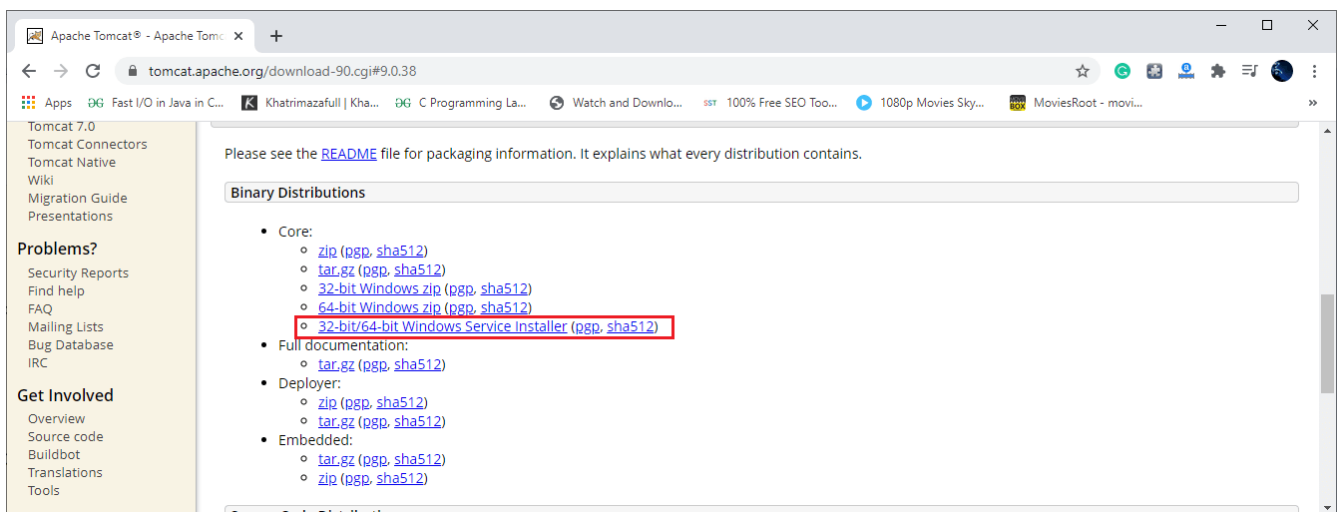
Step 2. Go to Download and click on the downloaded file and wait for little until the installation process starts.

Step 3. Once the installation process gets started, click on the **"Next"** button, as shown below:
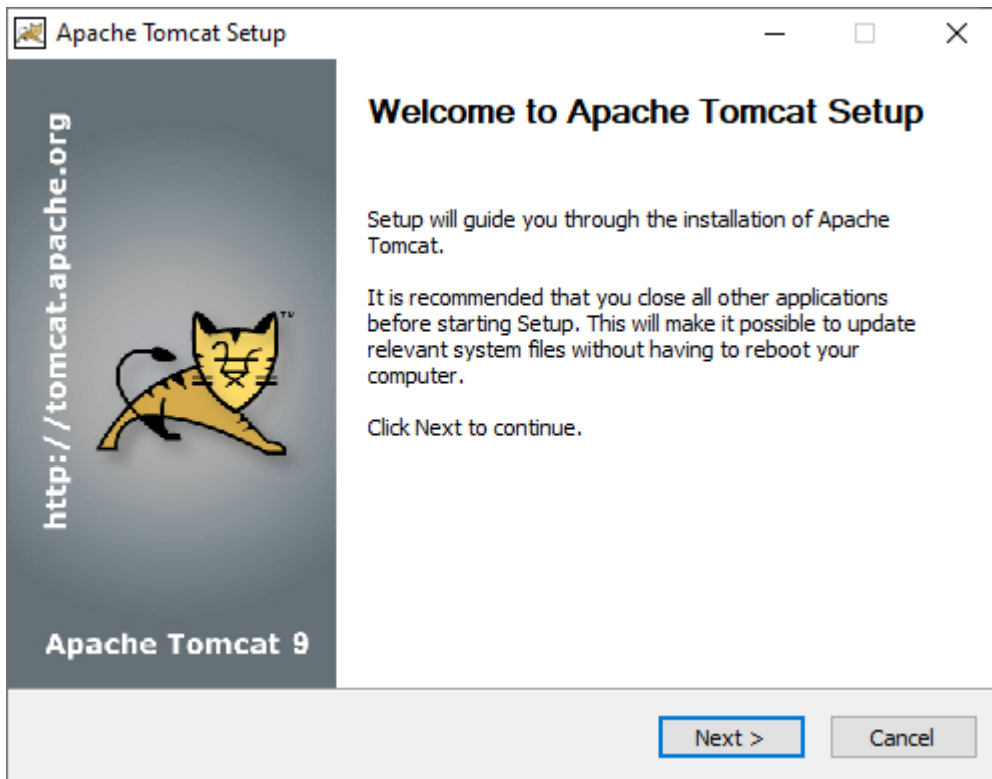
Step 4. Click on the button labeled as **"I Agree."**
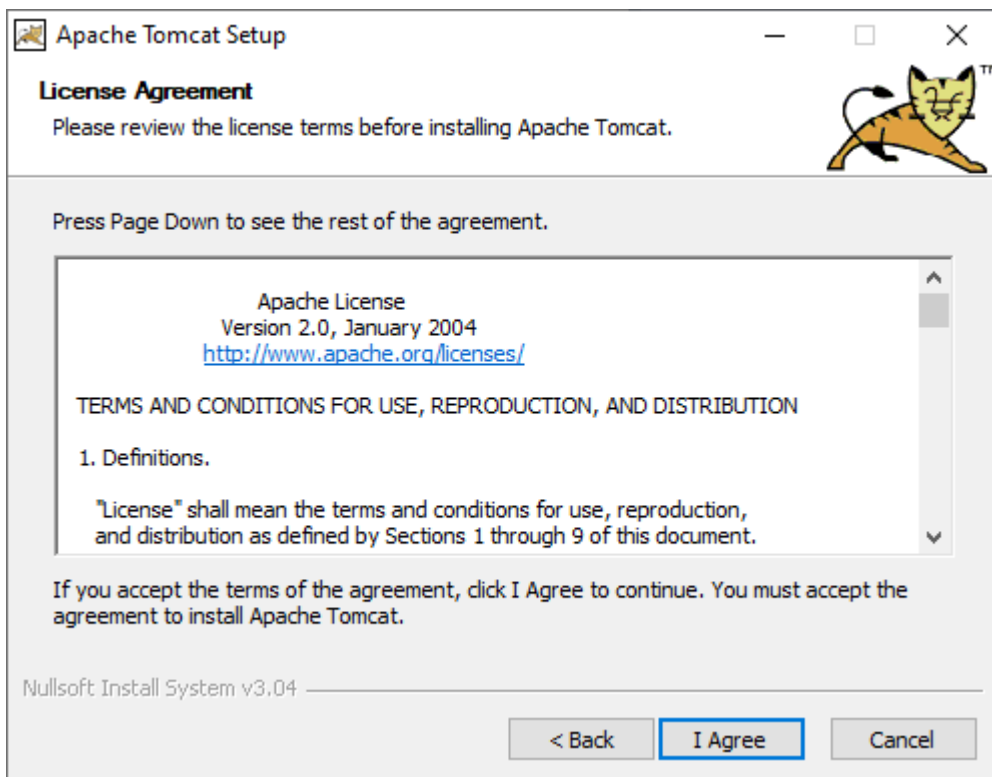
Step 5. Click on the **"Next"** button.
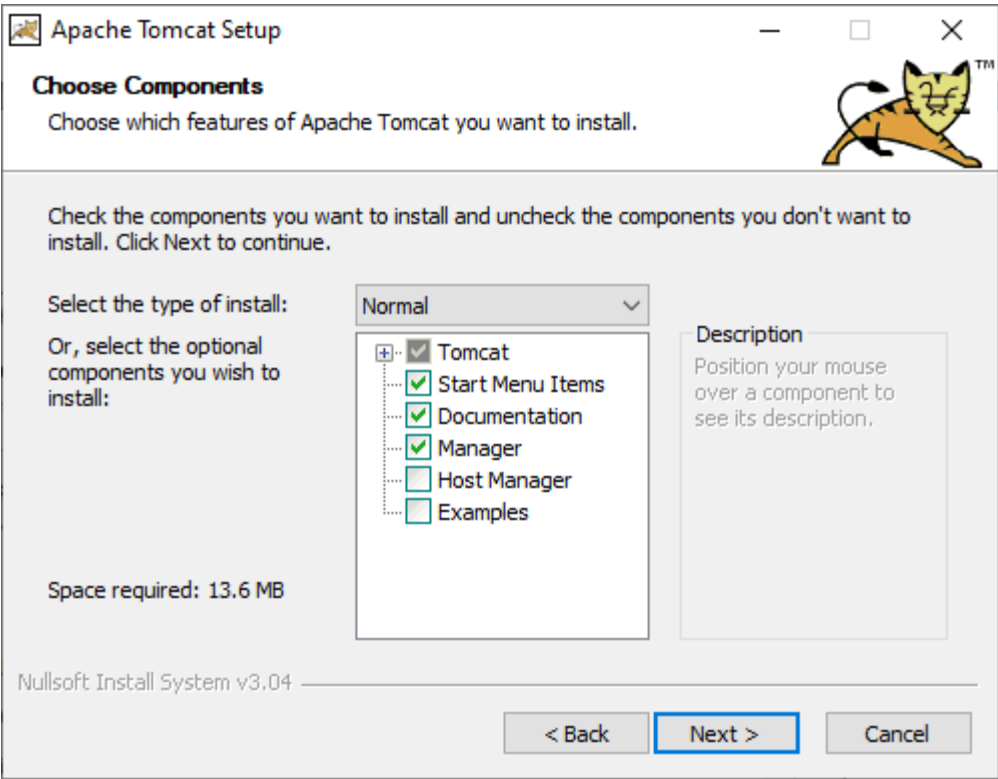
Step 6. Enter the user name and password and click on the **" Next"** button, as shown below:
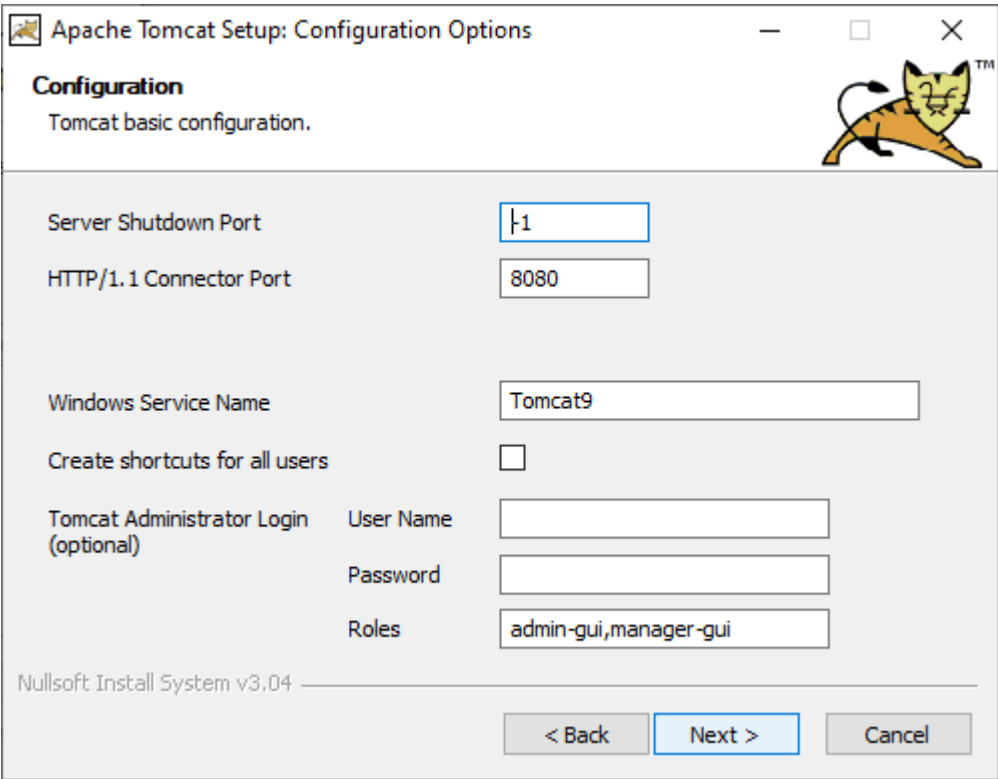
Step 7. Then click on the "Next" button again
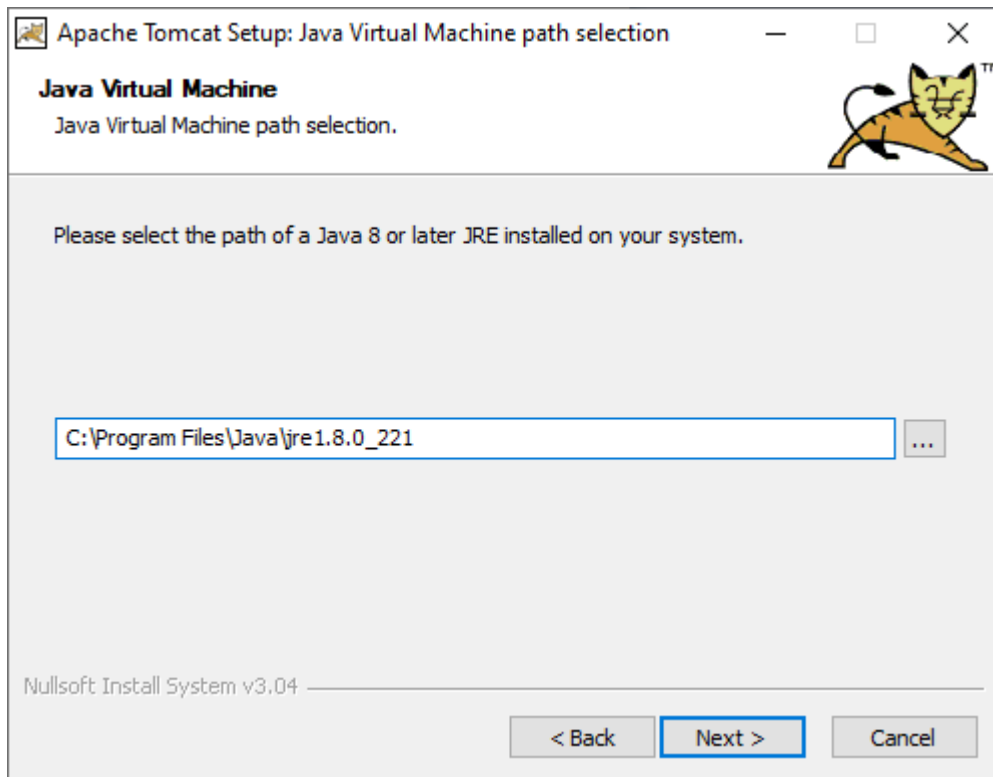
Step 8. Now click on the **"Install"** button.
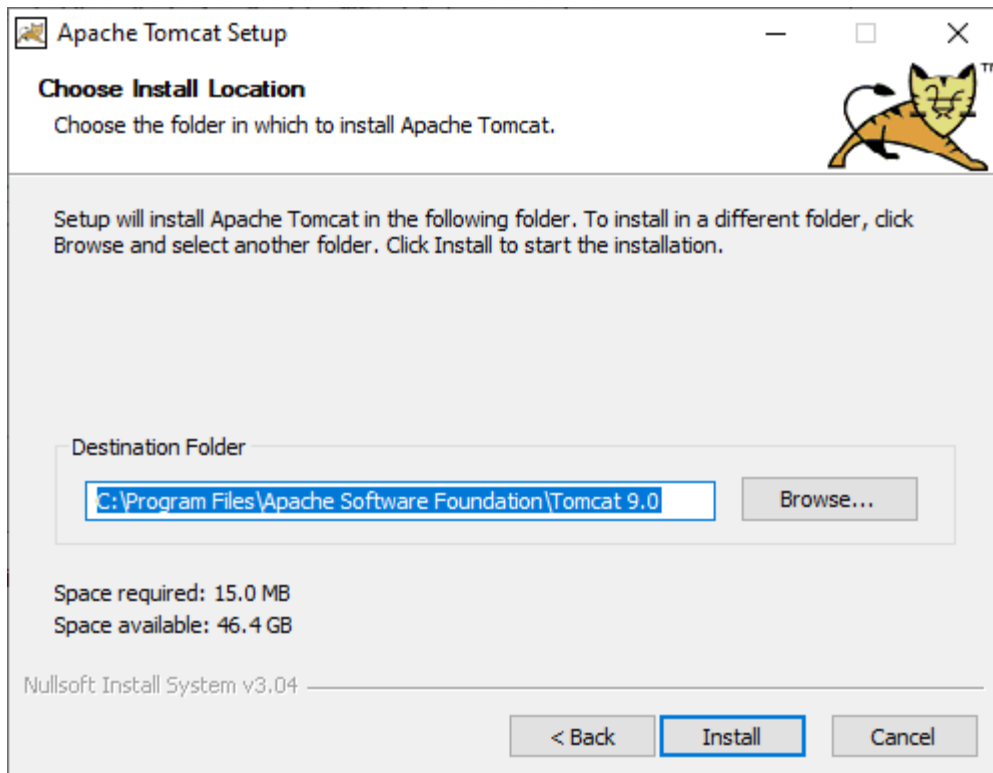
Wait for some time until the Tomcat gets installed.
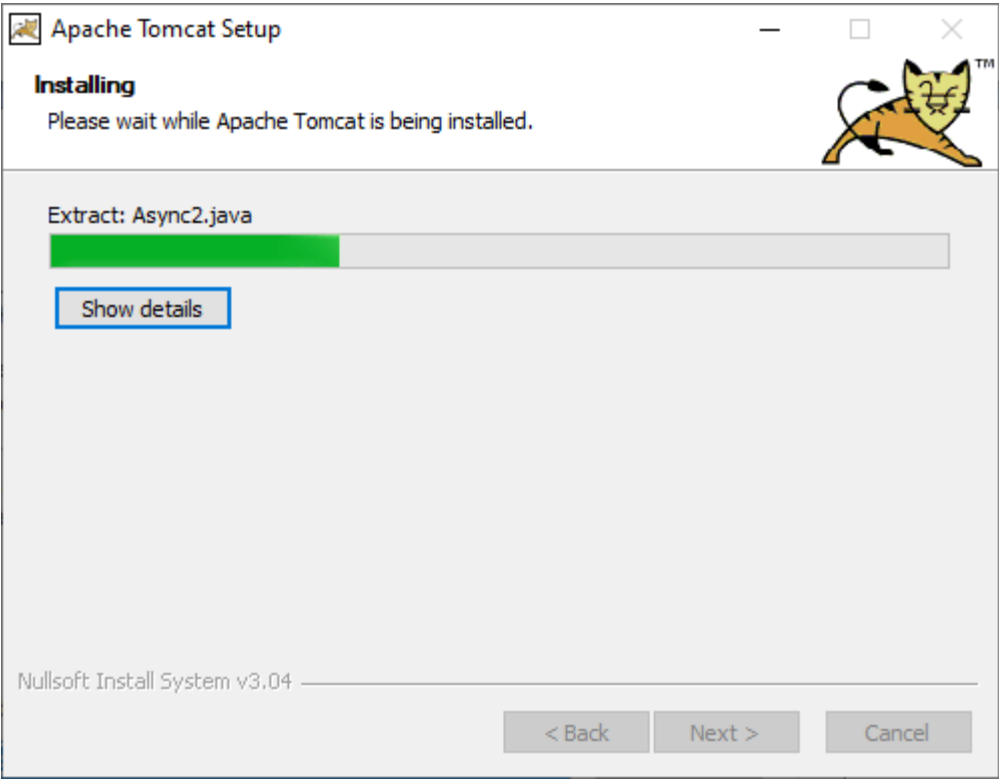
Step 9. Now click on the **"Finish"** button, here the installation of Tomcat is completed. It may ask you to restart your system, so restart your system.

Now you can start the Tomcat by clicking on its icon, and you can start and stop the server.
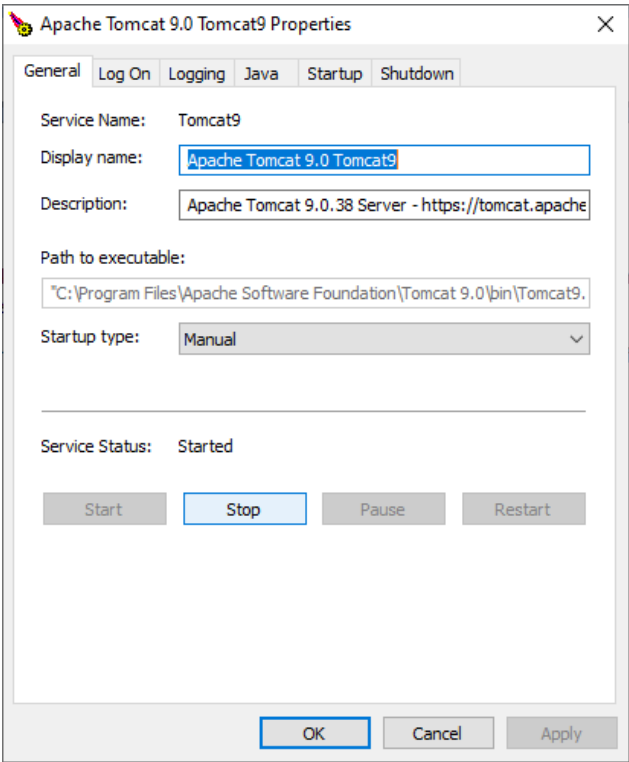
MySQL software installation

Installation Steps

Step 1: Go to the official website of MySQL and download the community server edition software. Here, you will see the option to choose the Operating System, such as Windows.

Step 2: Next, there are two options available to download the setup. Choose the version number for the MySQL community server, which you want. If you have good internet connectivity, then choose the mysql-installer-web-community. Otherwise, choose the other one.
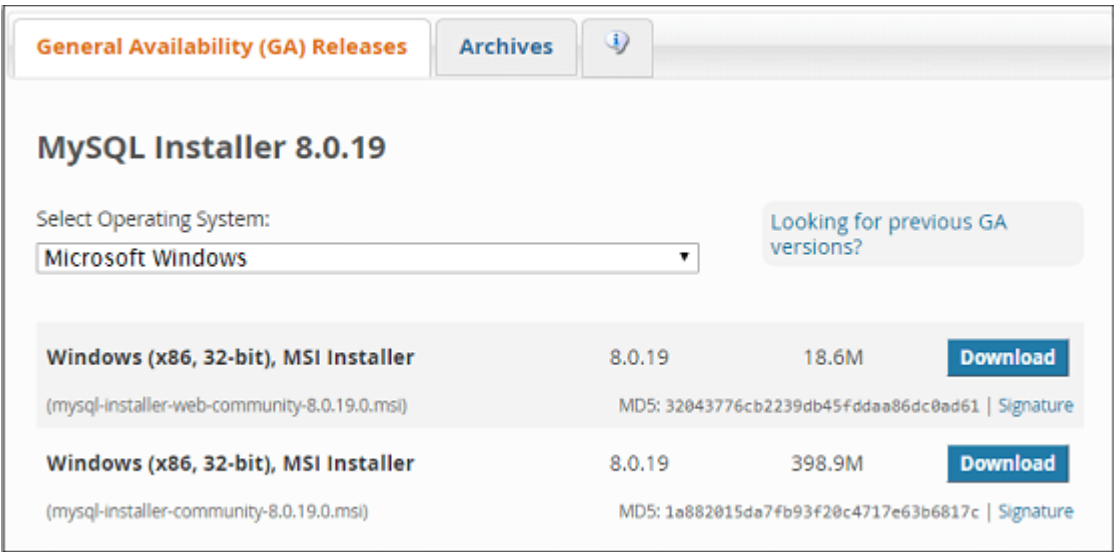
Step 1: After downloading the setup, unzip it anywhere and double click the MSI **installer .exe file.** It will give the following screen:
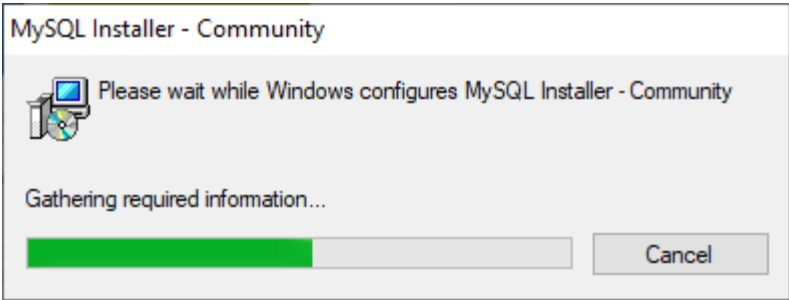
Step 2: In the next wizard, choose the **Setup Type**. There are several types available, and you need to choose the appropriate option to install MySQL product and features. Here, we are going to select the **Full** option and click on the Next button.
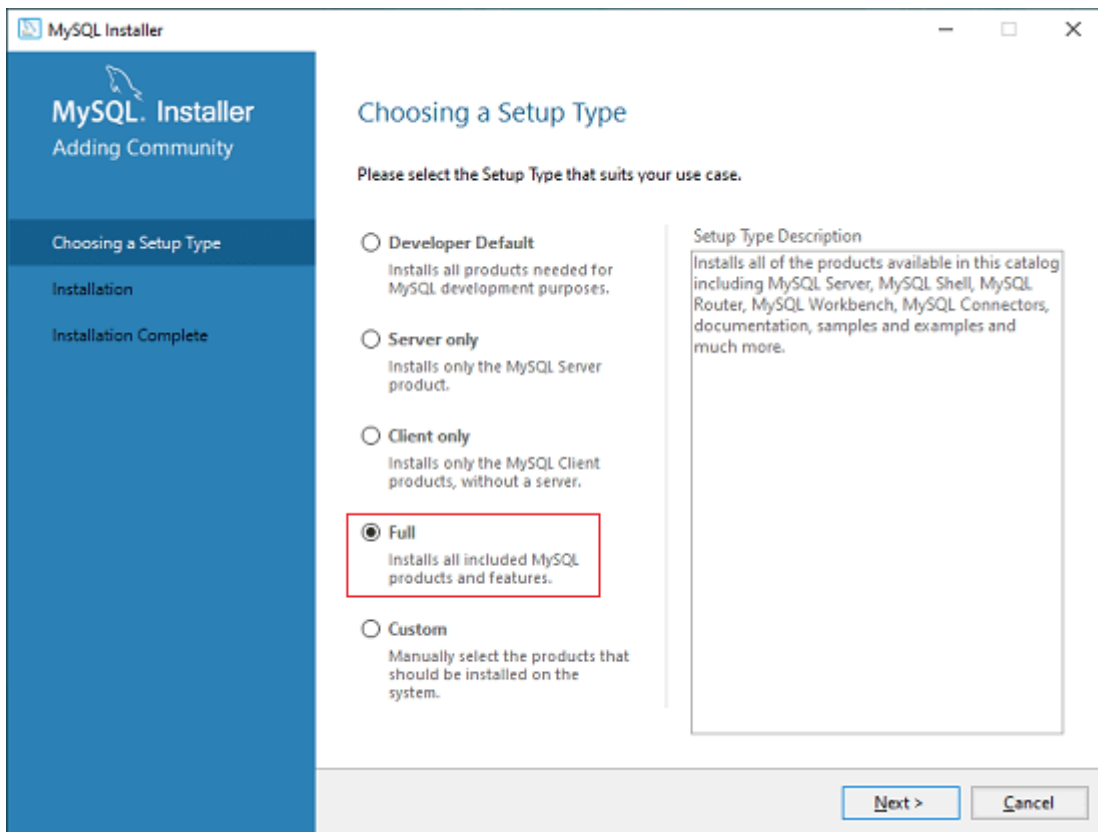
This option will install the following things: MySQL Server, MySQL Shell, MySQL Router, MySQL Workbench, MySQL Connectors, documentation, samples and examples, and many more.

Step 3: Once we click on the Next button, it may give information about some features that may fail to install on your system due to a lack of requirements. We can resolve them by clicking on the **Execute** button that will install all requirements automatically or can skip them. Now, click on the Next button.
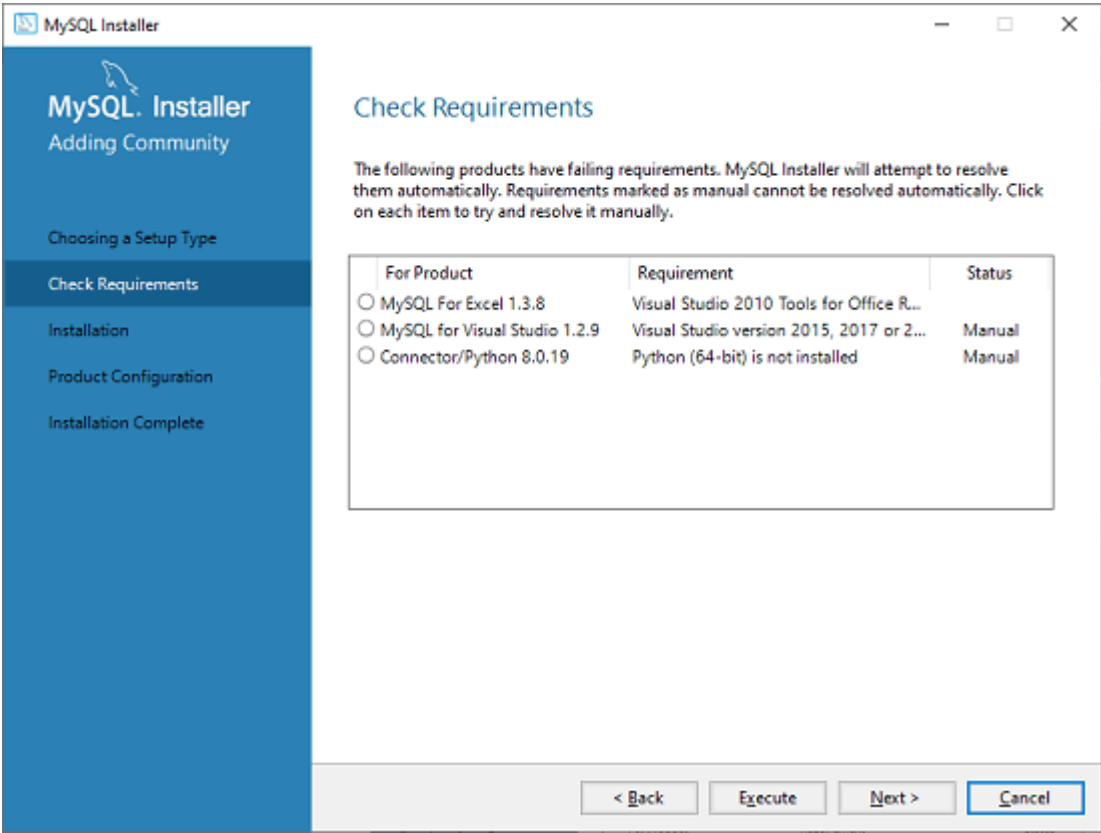
Step 4: In the next wizard, we will see a dialog box that asks for our confirmation of a few products not getting installed. Here, we have to click on the **Yes** button.
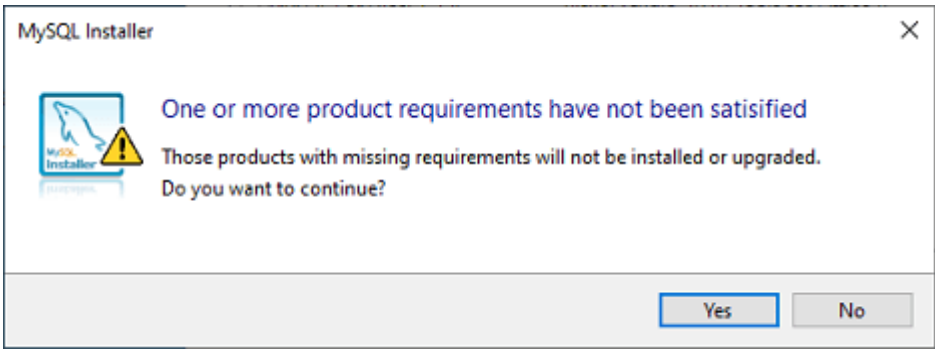

After clicking on the Yes button, we will see the list of the products which are going to be installed. So, if we need all products, click on the Execute button.
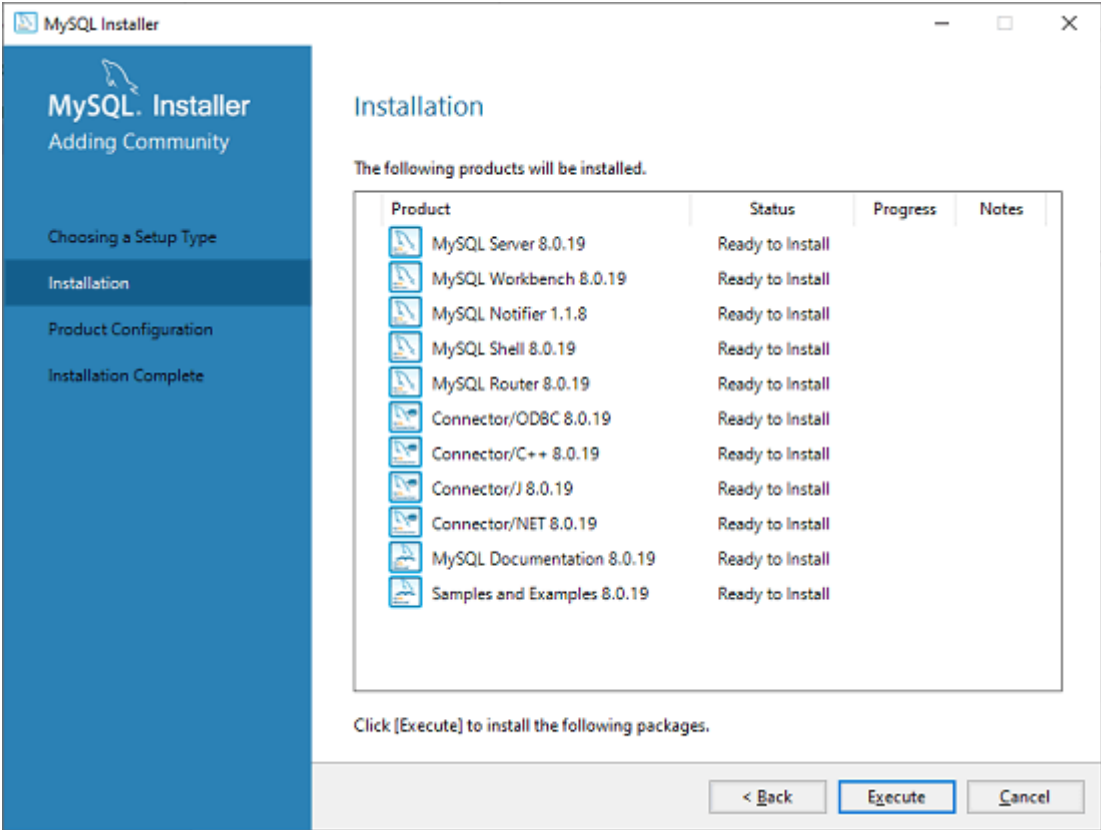
Step 6: In the next wizard, we need to configure the MySQL Server and Router. Here, I am not going to configure the Router because there is no need to use it with MySQL. We are going to show you how to configure the server only. Now, click on the Next button.
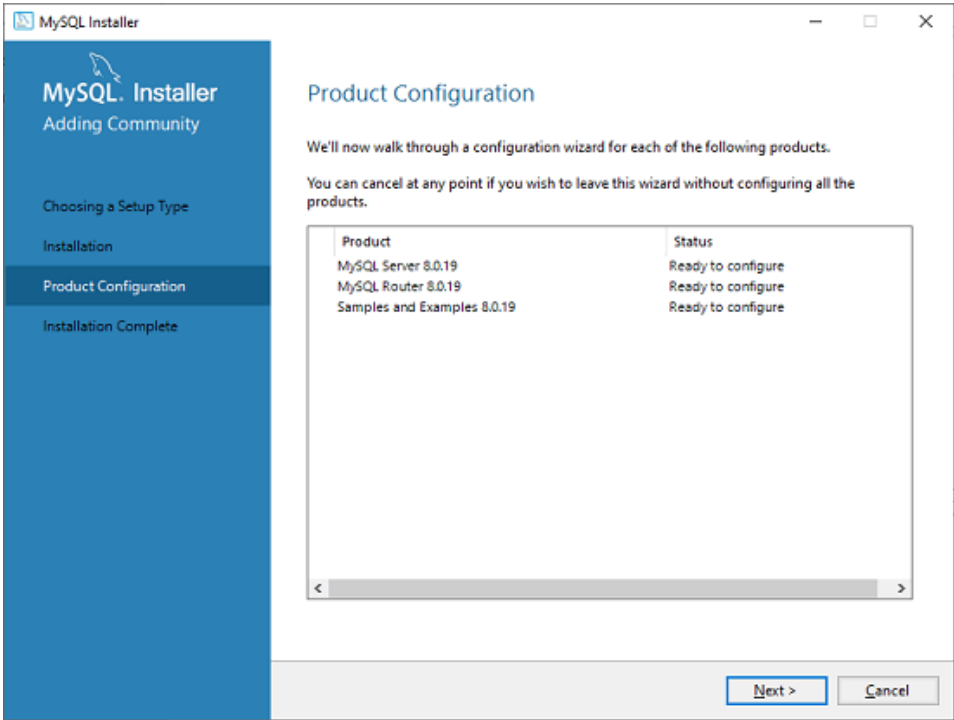
Step 7: As soon as you will click on the Next button, you can see the screen below. Here, we have to configure the MySQL Server. Now, choose the Standalone MySQL Server/Classic MySQL Replication option and click on Next. Here, you can also choose the Inno DB Cluster based on your needs.
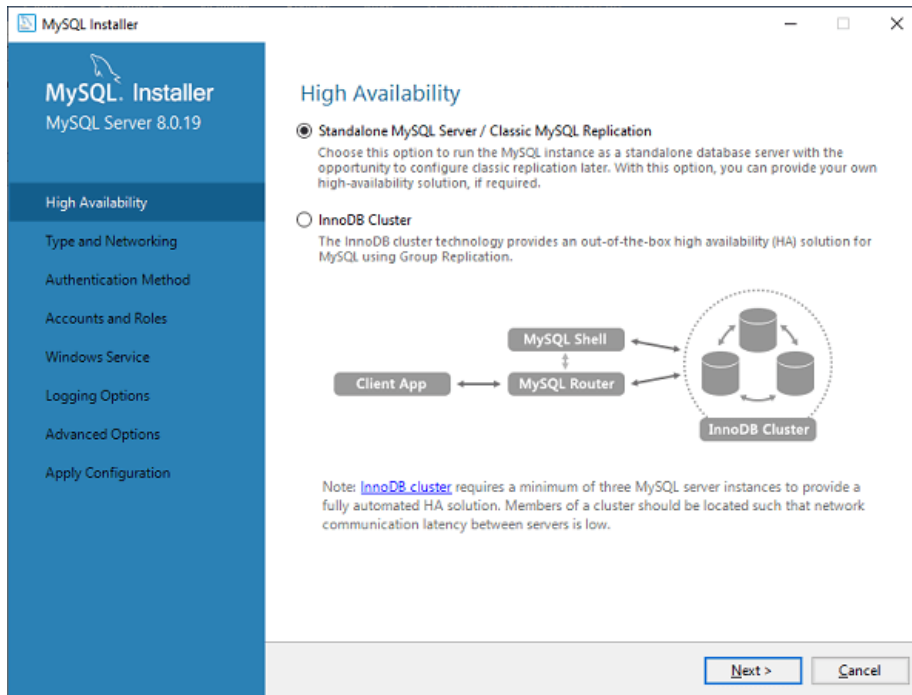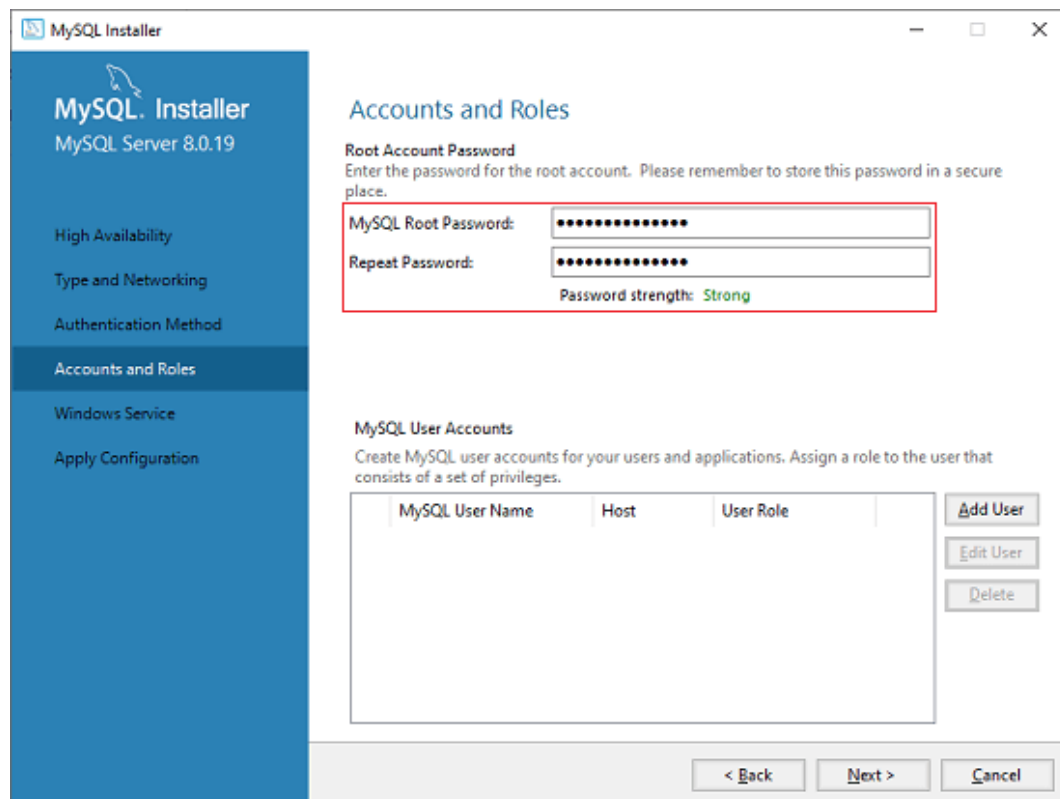
Step 8: In the next screen, the system will ask you to choose the Config Type and other connectivity options. Here, we are going to select the **Config Type** as 'Development Machine' and Connectivity as **TCP/IP,** and **Port Number** is 3306, then click on Next.
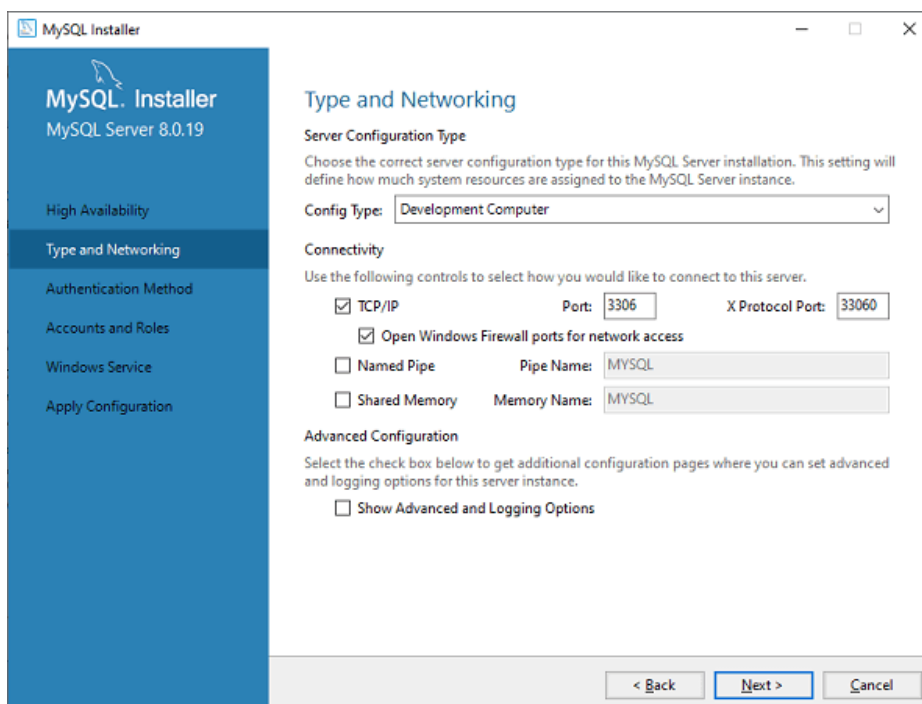
**Step 9:** Now, select the Authentication Method and click on Next. Here, I am going to select the first option.
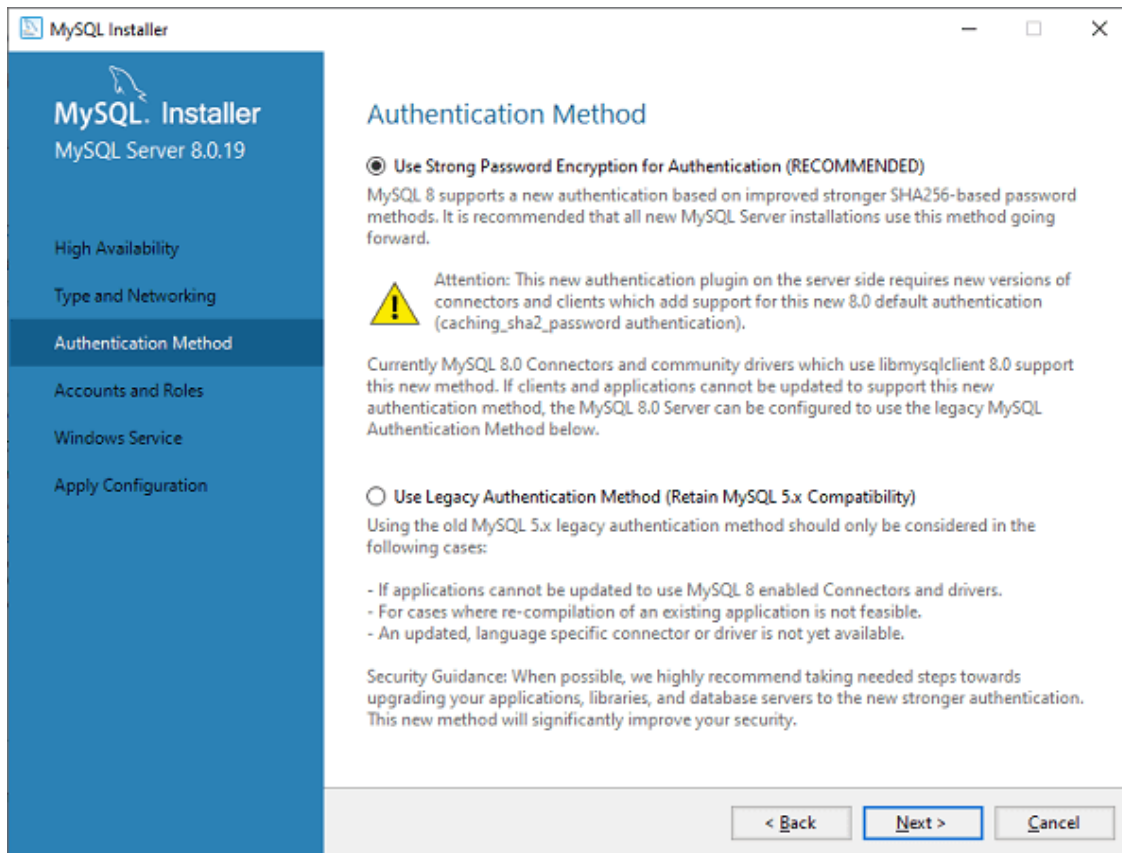
Step 10: The next screen will ask you to mention the MySQL Root Password. After filling the password details, click on the Next button.

Step 11: The next screen will ask you to configure the Windows Service to start the server. Keep the default setup and click on the Next button.
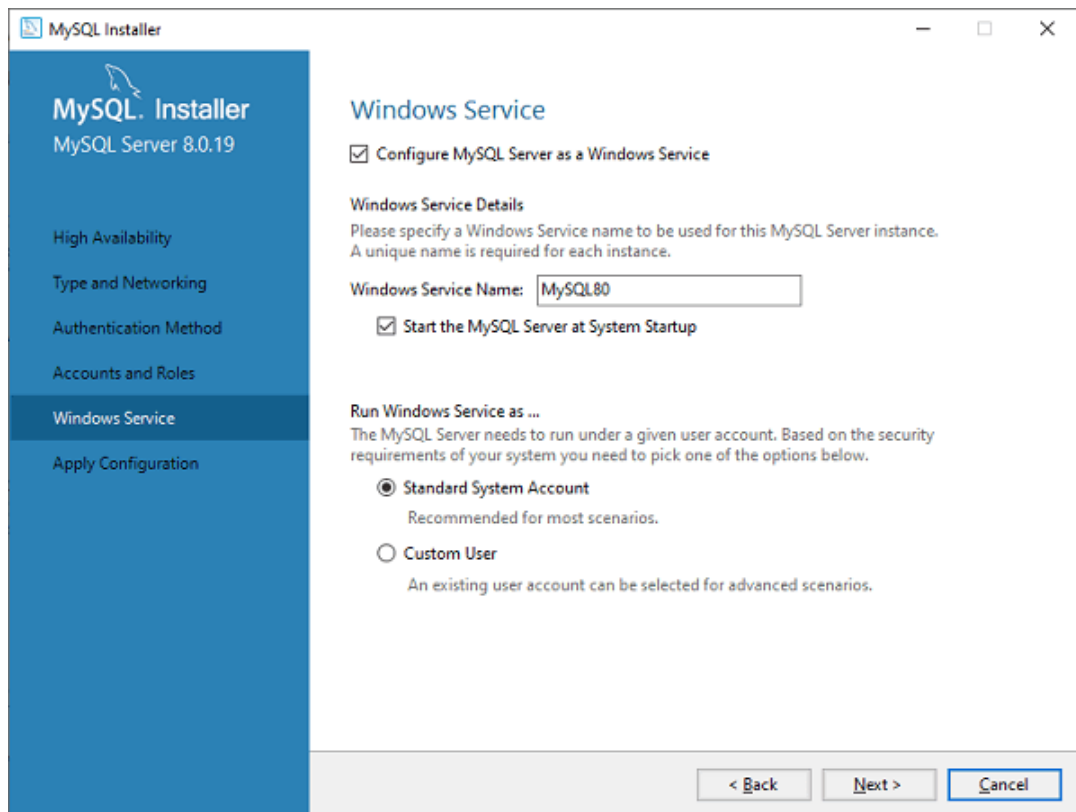

Step 12: In the next wizard, the system will ask you to apply the Server Configuration. If you agree with this configuration, click on the Execute button.
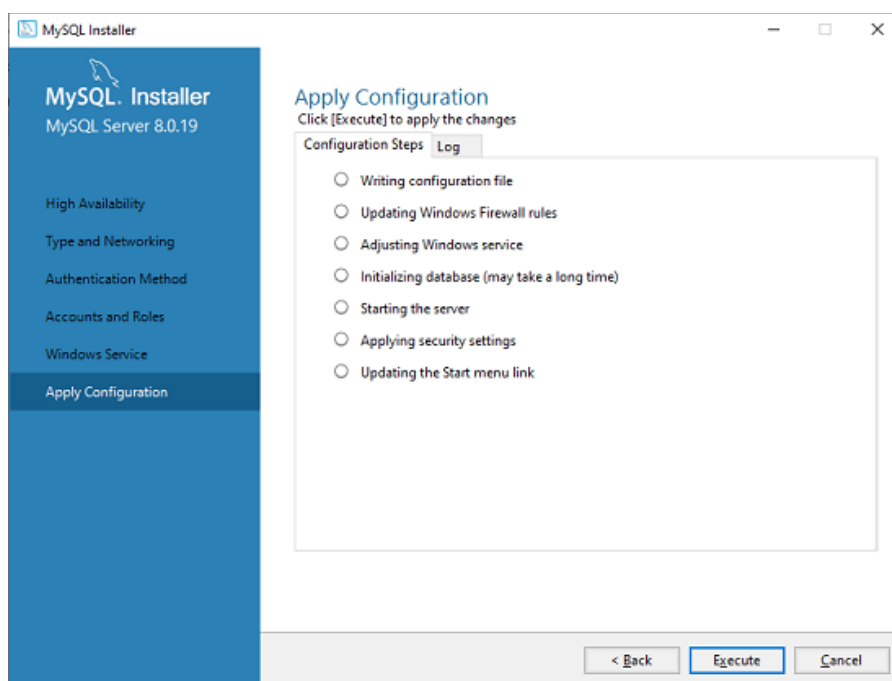
Step 13: Once the configuration has completed, you will get the screen below. Now, click on the **Finish** button to continue.
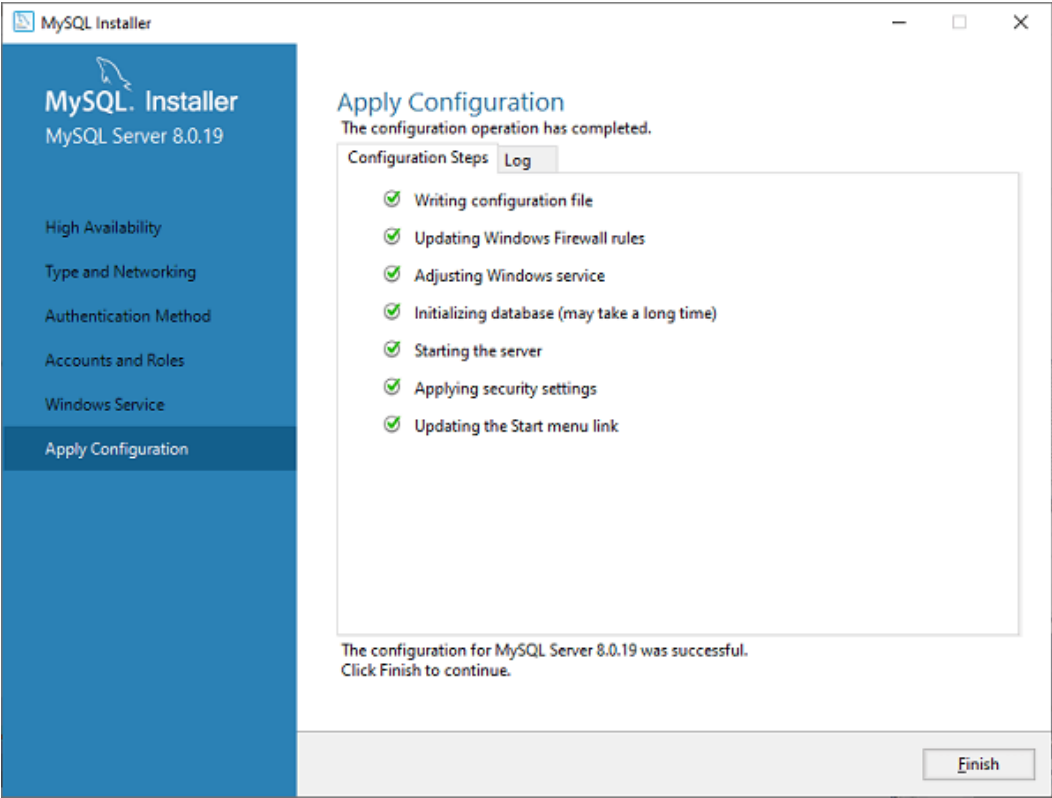

Step 14: In the next screen, you can see that the Product Configuration is completed. Keep the default setting and click on the Next-> Finish button to complete the MySQL package installation.
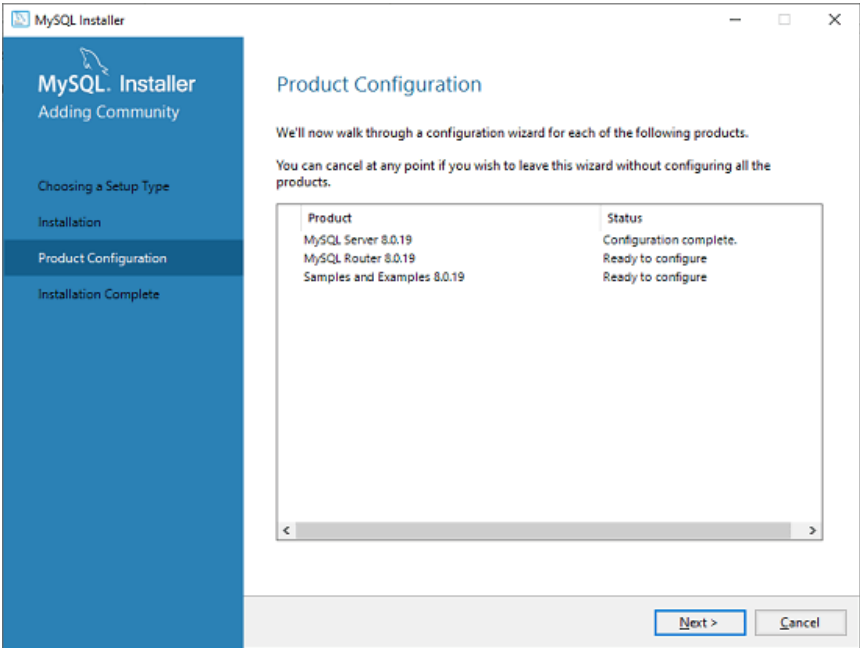
Step 15: In the next wizard, we can choose to configure the Router. So click on Next->Finish and then click the Next button.
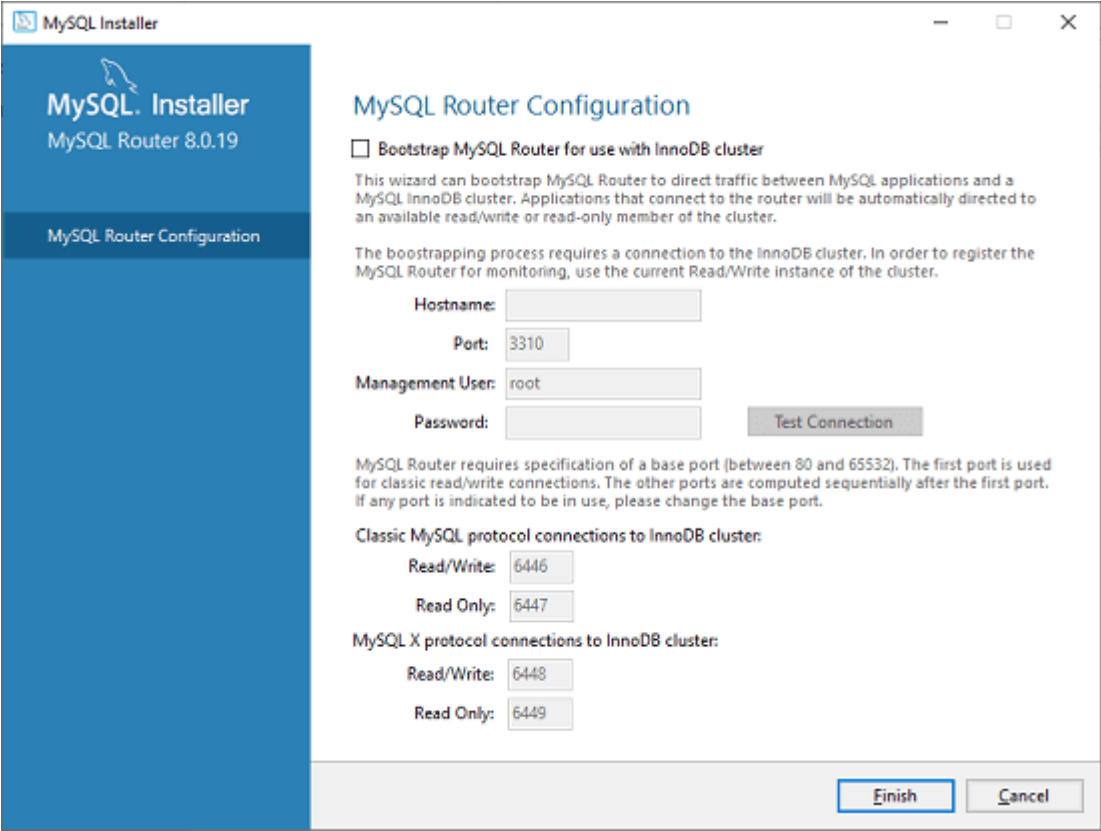

Step 16: In the next wizard, we will see the Connect to Server option. Here, we have to mention the root password, which we had set in the previous steps.
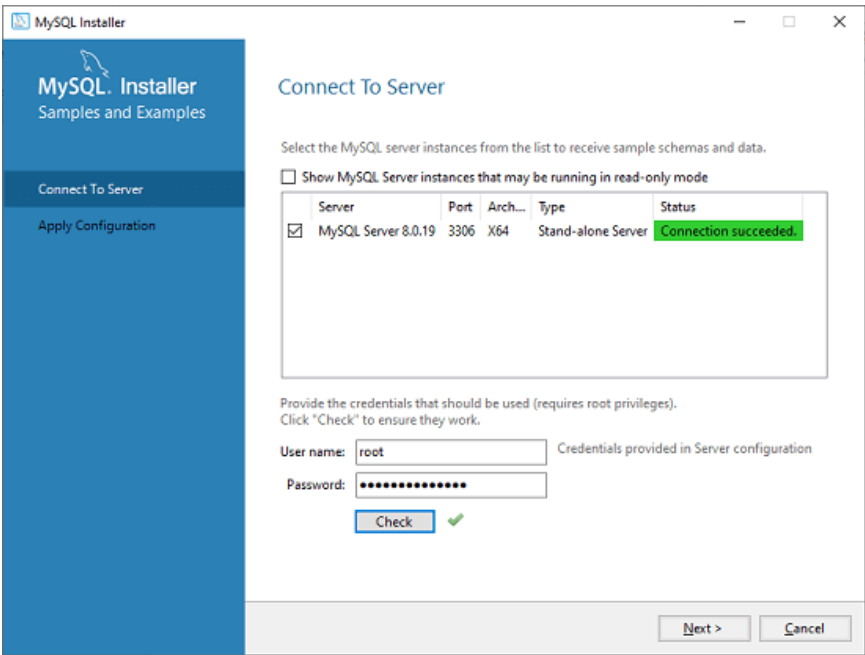
In this screen, it is also required to check about the connection is successful or not by clicking on the Check button. If the connection is successful, click on the Execute button. Now, the configuration is complete, click on Next.
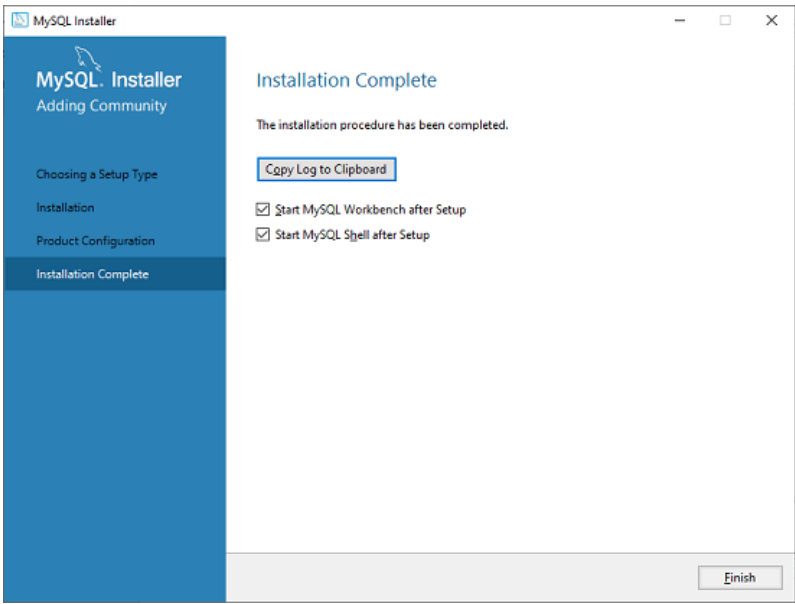
Step 17: In the next wizard, select the applied configurations and click on the Execute button.
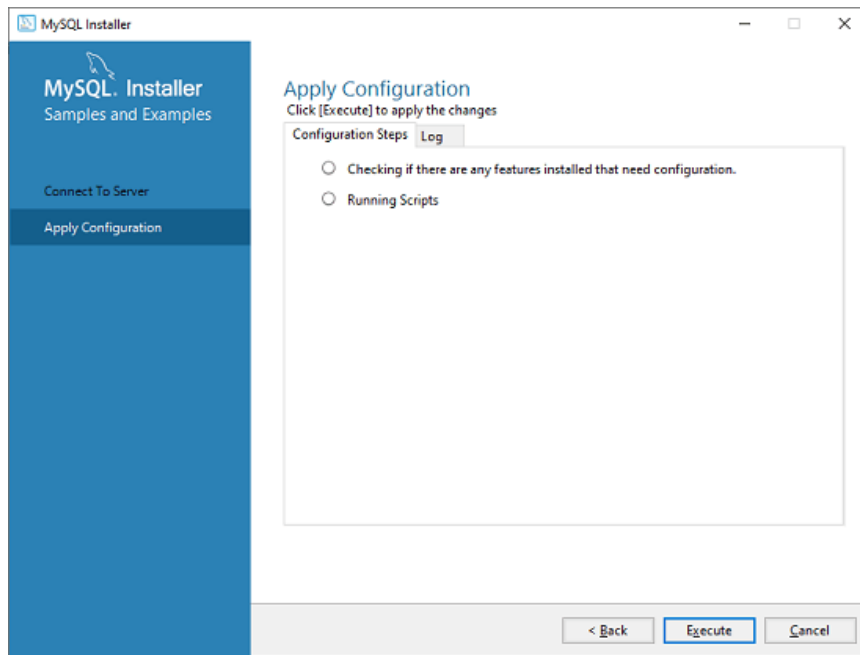
Step 18: After completing the above step, we will get the following screen. Here, click on the Finish button.
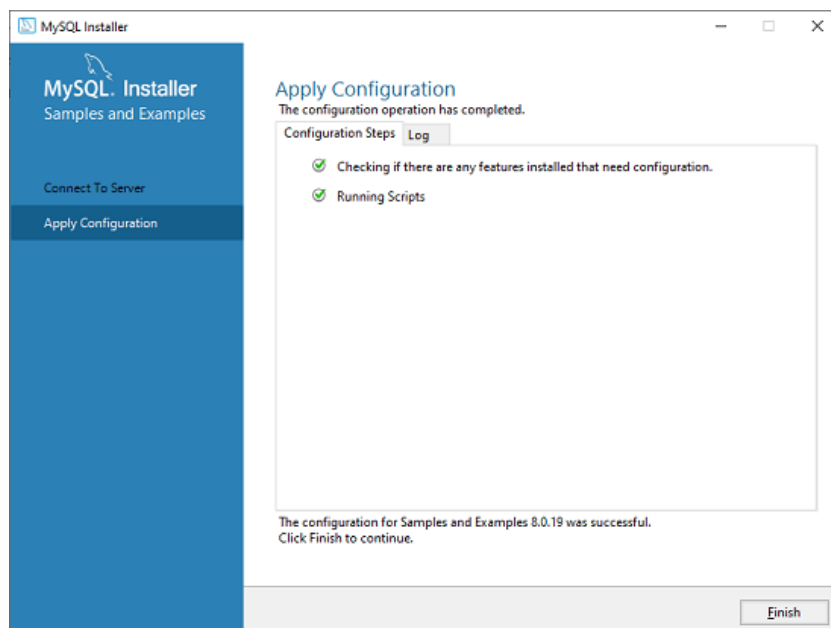
Step 19: Now, the MySQL installation is complete. Click on the Finish button.

Verify MySQL installation

Once MySQL has been successfully installed, the base tables have been initialized, and the server has been started, you can verify its working via some simple tests.

Open your MySQL **Command Line Client**; it should have appeared with a **mysql> prompt**. If you have set any password, write your password here. Now, you are connected to the MySQL server, and you can execute all the SQL command at mysql> prompt as follows:

For example: Check the already created databases with show databases command:
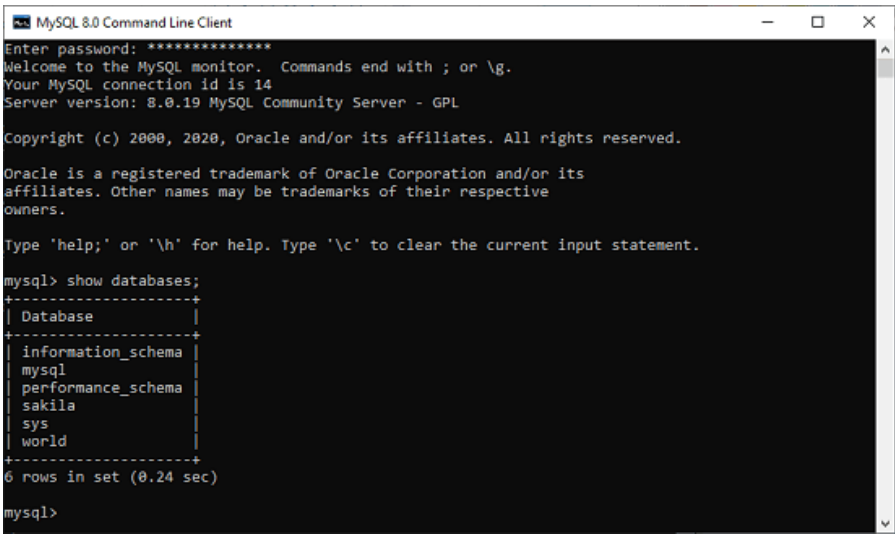
Procedure for Execution :

The user clicks on the HTML document. The HTML page with the login screen will be displayed on the screen. A user is asked to reproduce something that he/she created or selected at the registration stage. During authentication, the user has to choose the grids within the tolerance in the correct sequence to login.

A new user has to signup with his/her name and email and has to create a graphical password by choosing an image of his/her choice. The selected image is then divided into 3X5 grids. The user has to click the grids in a series for creating the password. The name is asked for easy identification of users for the author to resolve any login problems.

CHAPTER 5
TESTING

CHAPTER-5
TESTING

INTRODUCTION

The purpose of testing is to discover errors. Testing is the process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionality of components, sub-assemblies, assemblies and/or a finished product. It is the process of exercising software with the intent of ensuring that the software system meets its requirements and user expectations and does not fail in an unacceptable manner.

5.1 BLACK BOX TESTING

Black box testing is a testing technique that ignores the internal mechanism of the system and focuses on the output generated against any input and execution of the system. It is also called functional testing.

Black-box testing is a method of software testing that examines the functionality of an application based on the specifications. It is also known as Specifications based testing. Independent Testing Team usually performs this type of testing during the software testing life cycle. The testing is done without the internal knowledge of the products.

Black box testing can be done in following ways:

1. **Syntax Driven Testing :** This type of testing is applied to systems that can be syntactically represented by some language.

2. **Equivalence partitioning :** It is often seen that many types of inputs work similarly so instead of giving all of them separately we can group them together and test only one input of each group. The idea is to partition the input domain of the system into a number of equivalence classes such that each member of class works in a similar way, i.e., if a test case in one class results in some error, other members of class would also result into same error.

The technique involves two steps:

• Identification of equivalence class: Partition any input domain into minimum two sets: valid values and invalid values.

• Generating test cases:

    o   To each valid and invalid class of input assign unique identification number.

    o   Write test case covering all valid and invalid test case considering that no two invalid inputs mask each other.

3. **Boundary value analysis :** Boundaries are very good places for errors to occur. Hence if test cases are designed for boundary values of input domain, then the efficiency of testing improves and probability of finding errors also increase.

4. **Cause effect Graphing :** This technique establishes relationship between logical input called causes with corresponding actions called effect. The causes and effects are represented using Boolean graphs. The following steps are followed:

- Identify inputs (causes) and outputs (effect).
- Develop cause effect graph.
- Transform the graph into decision table.
- Convert decision table rules to test cases.

5. **Requirement based testing :** It includes validating the requirements given in SRS of software system.

6. **Compatibility testing :** The test case results not only depend on product but also infrastructure for delivering functionality. When the infrastructure parameters are changed it is still expected to work properly. Some parameters that generally affect compatibility of software are:

- Processor i5 & above.
- Architecture and characteristic of machine (32 bit or 64 bit).
- Back-end components such as database servers.
- Operating System (Windows, Linux, etc.)

5.1.1 TEST CASES

The test cases in black-box testing can be referred to as outer or external software test ofthe software. It is functional test of the software. Test cases are derived to ensure that all statements in the program have been executed at least once during testing and that all logical conditions have been executed.

Black box testing is done in the following manner:

- Requirement and specifications will be examined.
- Valid inputs, as well as invalid inputs, will be given to the system to verify it.
- Outputs for the tests will be defined earlier.
- Test case will be executed.
- Actual outputs and expected outputs will be compared.
- Fixed issue will be retested.
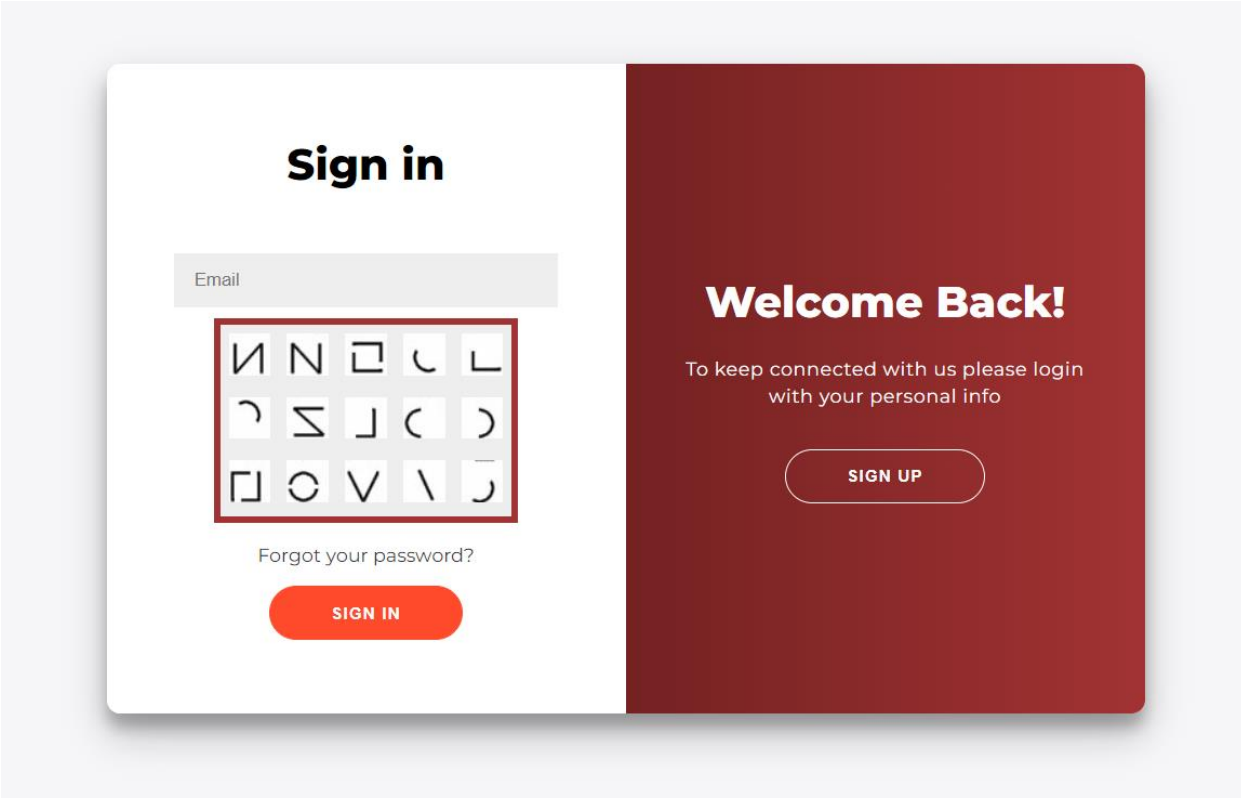
CHAPTER 6
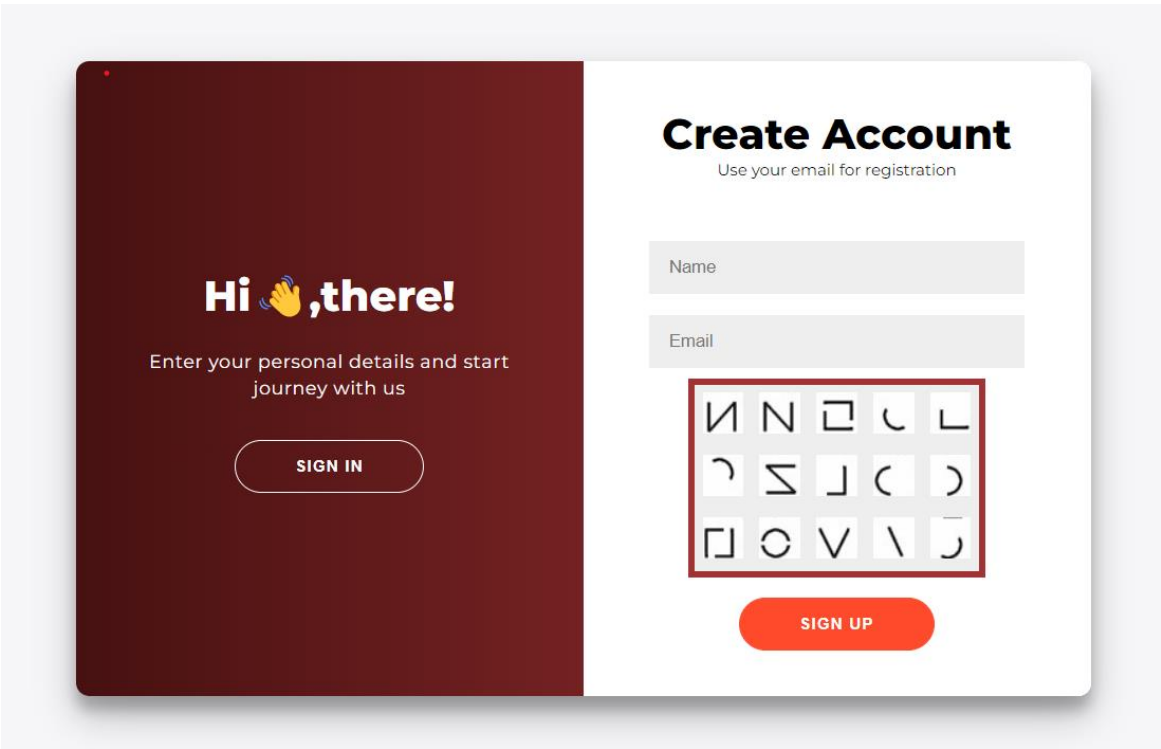# SCREENSHOTS

CHAPTER-6

SCREENSHOTS
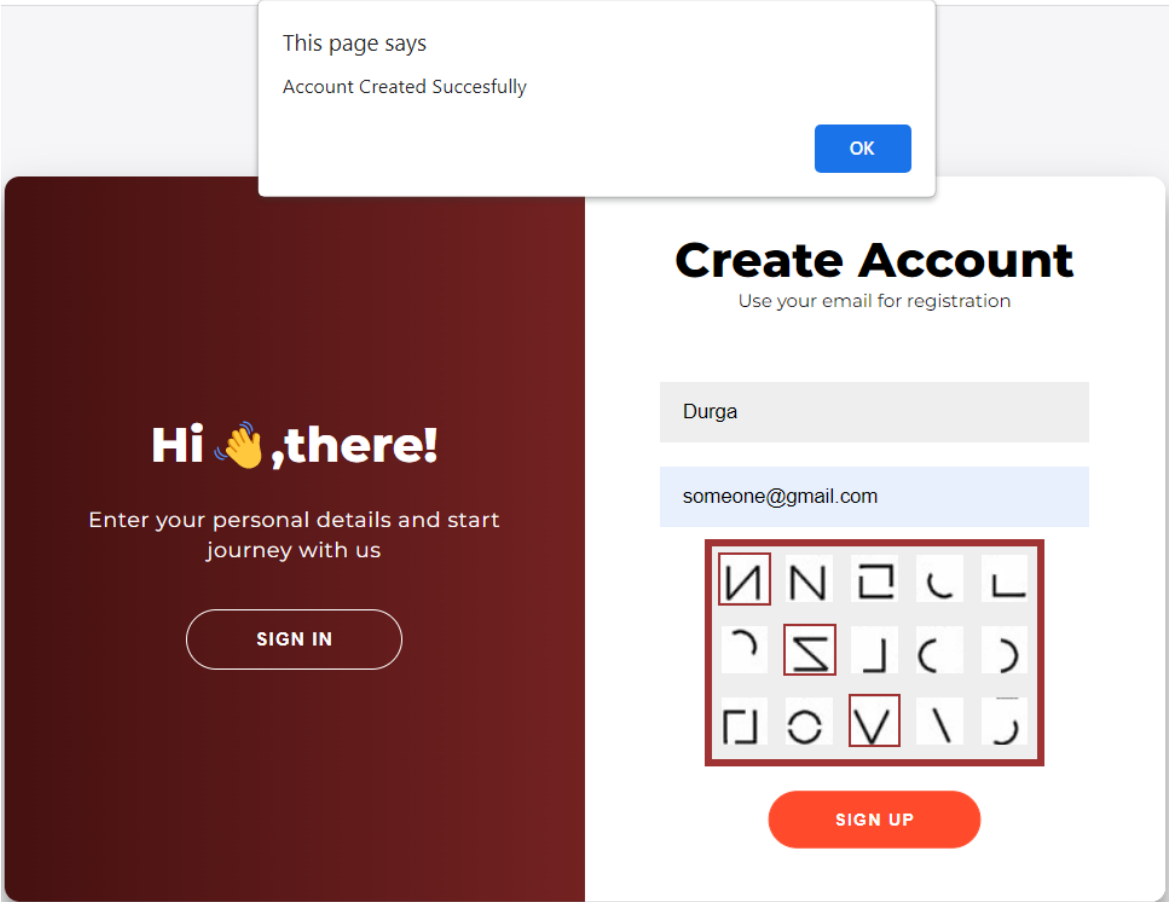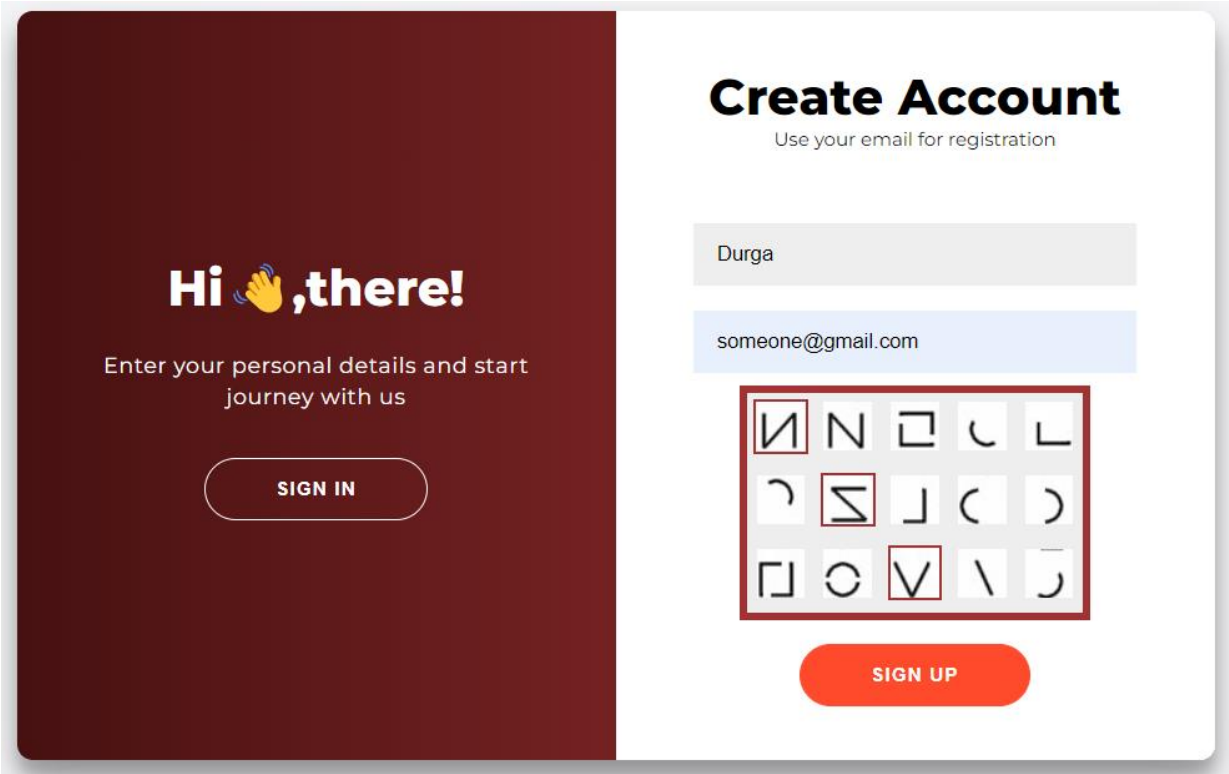

Fig 6.1 : sign in page

Fig 6.2 : Sign up page

Fig 6.3 : Sign up process
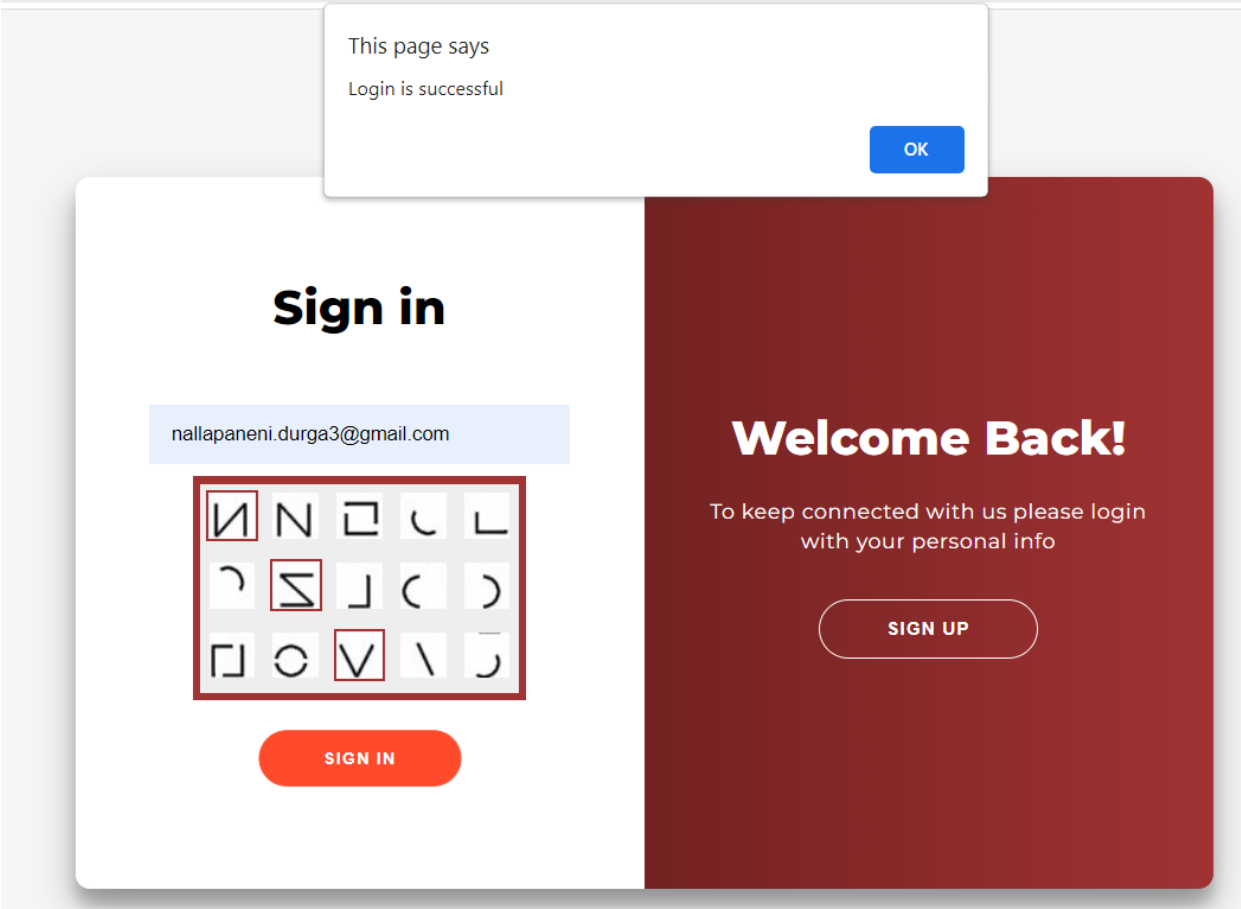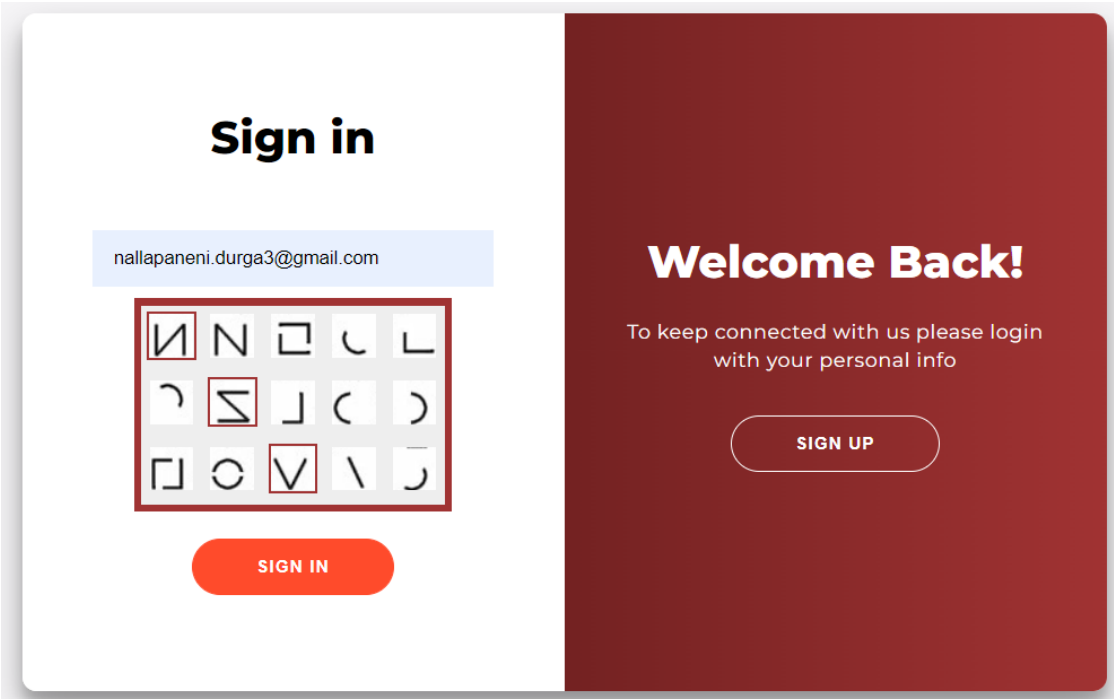
Fig 6.4 : Sign in process
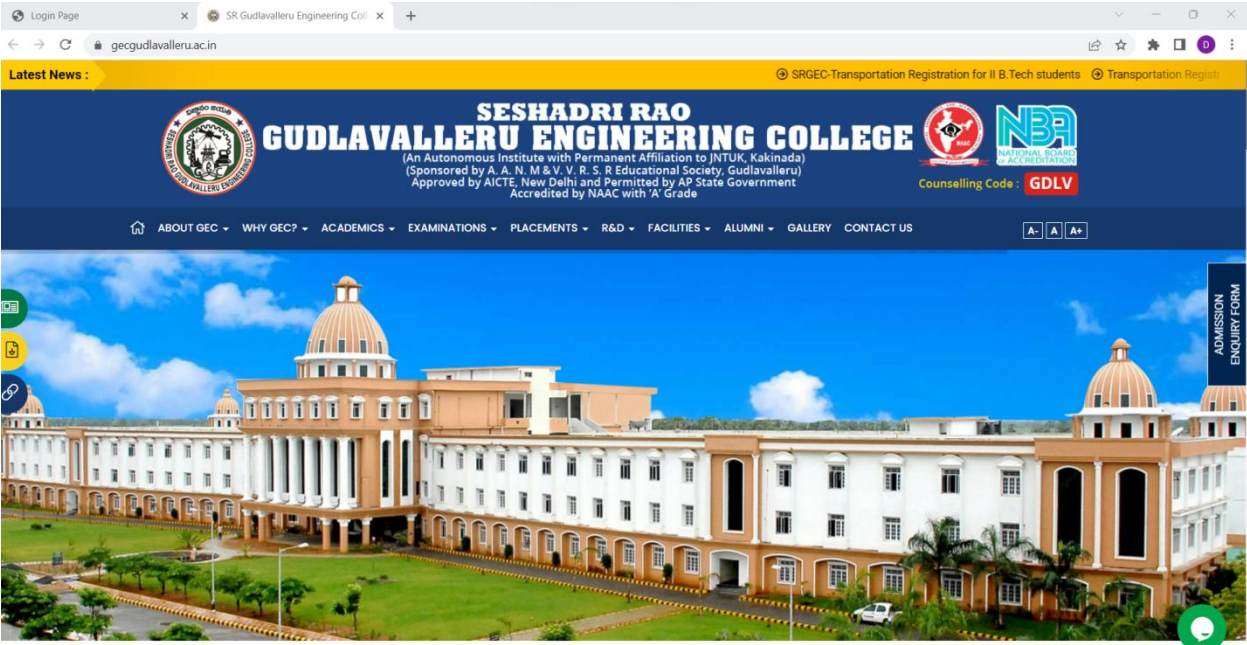
Fig 6.5 : Upon successful login program allows user to access the website

CONCLUSION AND FUTURE SCOPE

CONCLUSION

Graphical passwords are an alternative to textual alphanumeric password. It satisfies both conflicting requirements i.e. easy to remember and security.

FUTURE SCOPE

The future scope of this system depends on the security required by websites/applications. Additional features could easily be adopted into it, thereforemaking the project open to further development. Otherwise, this system also functions as a stand-alone system. When used on websites, the overall safety will be further enhanced.

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Program Outcomes (POs)

Engineering Graduates will be able to:

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2.Problem analysis: Identify, formulate, review research literature, and analyzecomplex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3.Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4.Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation ofdata, and synthesis of the information to provide valid conclusions, component, or software to meet the desired needs.

5.Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

6.The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8.Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9.Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10.Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11.Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12.Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs)

PSO1: Design, develop, test and maintain reliable software systems and intelligent systems.

PSO2: Design and develop web sites, web apps and mobile apps.

PROJECT PROFORMANCE

	Application	**Product**	**Research**	**Review**
Classification of Project	✓			

Note: Tick Appropriate category.

Project Outcomes	
Course Outcome (CO1)	Identify and analyse the problem statement using prior technical knowledge in the domain of interest.
Course Outcome (CO2)	Design and develop engineering solutions to complex problems by employing systematic approach.
Course Outcome (CO3)	Examine ethical, environmental, legal and security issues during project implementation.
Course Outcome (CO4)	Prepare and present technical reports by utilizing different visualization tools and evaluation metrics.

Mapping table

IT2522 : MINI PROJECT															
Course Outcomes	Program Outcomes and Program Specific Outcomes														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12		PSO 1	PSO 2
CO1	3	3	1					2	2	2				1	1
CO2	3	3	3	3	3			2	2	2		1		3	3
CO3	2	2	3	2	2	3	3	3	2	2	2			3	
CO4	2		1		3				3	3	2	2		2	2

Note: Map each project outcomes with POs and PSOs with either 1 Or 2 or3 based on level of mapping as follows:

1- Slightly (Low) mapped

2- Moderately (Medium) mapped

3- Substantially (High) mapped