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Lab System Monitoring

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Abstract: *Lab System Monitoring is a project designed to enhance the management and monitoring of computer labs in educational institutions. It is divided into two main domains: the administrative and the user. The administrative domain manages lab resources, monitors user activities, and ensures security by providing details such as login time, system number, and system IP address. The user domain allows users to access lab resources, reserve systems, and manage their activities efficiently.*

Index Terms: *Systems, IP, Admin, User, Login, Logout*

I. INTRODUCTION

Currently, the systems in the labs are connected via LAN, but there is no administrative oversight or user connectivity in each lab. As a result, students can complete their tasks but also engage in unrelated activities without supervision. This lack of oversight prevents lecturers from monitoring student activities effectively. The Lab System Monitoring project is designed to enhance the management and monitoring of computer labs in educational institutions. This project focuses on creating a system that provides efficient monitoring tools for both administrators and a secure lab environment. Therefore, Enhanced Lab System Monitoring represents a significant advancement in laboratory security. By implementing credential-based access control and real-time monitoring capabilities, our system ensures that desktop access remains restricted to authorized personnel.

- 1) *Admin Domain:* The admin domain manages lab resources, monitors student activities, generates reports, and ensures the security and efficiency of the lab environment.
- 2) *User Domain:* The user domain allows users to access lab resources, view lab rules, and manage their activities within specified guidelines.

II. LITERATURE REVIEWS

During the project review, it was found that login and logout times recorded in the logbook may be inconsistent. These discrepancies may stem from human errors like inaccurate time recording or mixing up entries [2]. To address the drawbacks associated with logging login and logout times directly into an Excel sheet, a lab system monitoring setup, implementing credential-based login and logout times, stores this data in an admin database. This enhances accountability and security [3]. Firstly, web applications can be designed with built-in redundancy and failover mechanisms to minimize the impact of technical issues such as software glitches or system crashes. Additionally, a web-based monitoring system can provide greater scalability and flexibility, accommodating large volumes of data more effectively than Excel sheets [4]. Integrating IP address tracking into a lab system monitoring web application enhances security measures by linking user activities to their respective IP addresses. This association provides administrators with a detailed view of user interactions with the system, as login and logout times are automatically accompanied by IP addresses.

III. EXISTING SYSTEM

In the current system, inconsistencies in the recorded login and logout times in the logbook have been observed. These discrepancies are often due to human error, such as inaccurate recording or mixing up entries.

A. Disadvantages

- 1) *Complexity of Implementation:* Transitioning from a simple Excel sheet to a lab system monitoring setup with credential-based login and logout times can be complex.
- 2) *Potential for Technical Issues:* While web applications can include redundancy and failover mechanisms to mitigate technical issues, they are not immune to problems such as software glitches, system crashes, or network failures.
- 3) *Dependency on Internet Connectivity:* A web-based monitoring system relies heavily on stable internet connectivity.

IV. PROPOSED SYSTEM

This system is developed to address existing challenges. It separates Admin and User domains. The proposed lab monitoring system introduces a comprehensive solution with distinct domains for user administrators.

On the administrative side, the system provides a dashboard that offers real-time data on computer usage, including which computers are in use, how long they have been used, and by whom.

A. Advantages

- 1) *Real-Time Monitoring:* Administrators have access to a dashboard providing real-time data on computer usage. This includes details on which computers are currently in use, the duration of use, and the identity of the users.
- 2) *Enhanced Accuracy:* By automating the tracking of login and logout times, the system reduces human errors and ensures accurate record-keeping.
- 3) *Improved Efficiency:* The automated system streamlines monitoring processes, saving time and effort for administrators, and allowing them to focus on more critical tasks.

B. Technical Feasibility

The proposed lab monitoring system employs a robust combination of front-end and back-end technologies, ensuring seamless functionality. Accessible through a web browser on the Windows operating system, the system requires a dedicated server to handle user requests.

- 1) *Real-Time Monitoring:* Provides instant data on computer usage.
- 2) *Login/Logout Tracking:* Accurately records user sessions.
- 3) *Resource Management:* Efficiently manages lab resources.

C. Operational Feasibility

- 1) *Time Efficiency:* The system significantly reduces the time required for users to complete tasks, leading to increased productivity and satisfaction. This time-saving aspect is a substantial benefit for users who need to manage their work efficiently.
- 2) *Negligible Costs:* The cost associated with implementing and maintaining the proposed system is minimal compared to the substantial benefits it offers. This cost-effectiveness makes the system an attractive option for organizations looking to optimize operations without incurring significant expenses.
- 3) *Customizable Layouts:* Allow users to customize the interface layout according to their preferences, improving usability and comfort.
- 4) *Accessibility Options:* Implement features such as screen readers, high-contrast modes, and keyboard shortcuts to accommodate users with disabilities.

D. Economical Feasibility

- 1) *Affordable Hardware and Software:* The required hardware and software components are readily available in the market at cost-effective prices. This affordability reduces the initial investment burden on the organization.
- 2) *Minimal Ongoing Costs:* Once the initial setup is complete, there are minimal ongoing costs, as the system is designed to function efficiently without the need for frequent enhancements or upgrades.
- 3) *Comprehensive Feasibility:* The system is feasible not only economically but also operationally and technically. This comprehensive feasibility underscores its viability as an optimal solution for the organization.

V. IMPLEMENTATION

- 1) *Step 1:* Visit the MySQL website to download the MySQL installer compatible with your operating system.
- 2) *Step 2:* Double-click the downloaded installer to start the installation process.
- 3) *Step 3:* Select the installation type (typical, full, custom) and choose the components you want to install (server, client, utilities). Configure the MySQL server, including setting the root password and port number.
- 4) *Step 4:* Set the server configuration options, such as port number, data directory, and root password.
- 5) *Step 5:* Verify the installation by connecting to the MySQL server using the command line or a graphical interface correct the mistakes and give correct steps

MySQL Server: The MySQL Server is the core component of MySQL, responsible for storing, managing, and retrieving data.

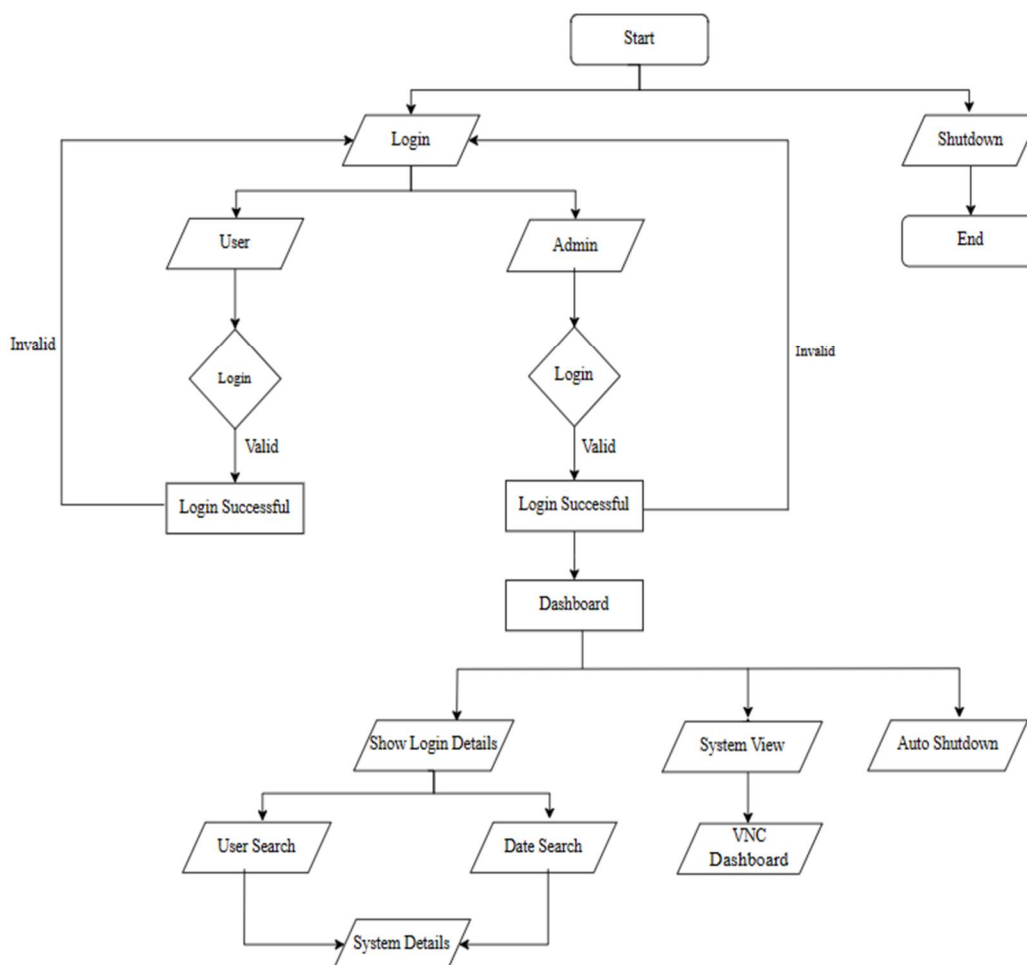
MySQL Client: The MySQL Client is a program or interface that allows users to interact with the MySQL Server.

MySQL Database: A MySQL Database is a collection of tables that are related to each other in some way.

Testing MySQL Installation.

To install Tkinter for Python, you typically don't need to install it separately because it comes pre-installed with the standard Python distribution. However, depending on your operating system and Python installation, you might need to ensure that it is available and properly installed.

VI. FLOW CHART



VII. MODULES

User Login Page

User Login Successful

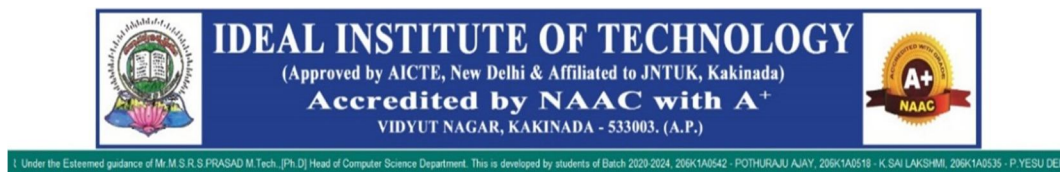
Admin Login page

Admin Login Successful

Login Details

System View

User Desktop View



Username

Password

02:54:05



Fig 1: User Login Page

The user login page on the user side features the login and shutdown buttons. Upon entering the correct username and password, the user is shown the desktop view. Otherwise, an error message indicating the incorrect username and password is displayed.

A. User Login Successful

Upon successful login, user log-in and logout times are updated on the admin server. Admin can monitor user login and logout activities.



Username

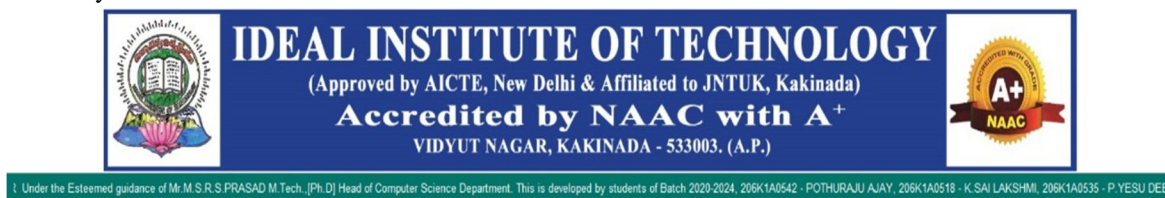
Password

02:54:05

Fig 2: User Login Successful

B. Admin Login Page

The admin login page allows administrators to enter their username and password. Upon correct credentials, administrators access the user desktop view; otherwise, an error message is displayed. Additionally, administrators have access to two modules: Show Login Details and System View.



Username

Password

02:54:05



Fig 3: Admin Login Page

C. Admin Login Successful

The admin interface includes two modules. Show Login Details and System View

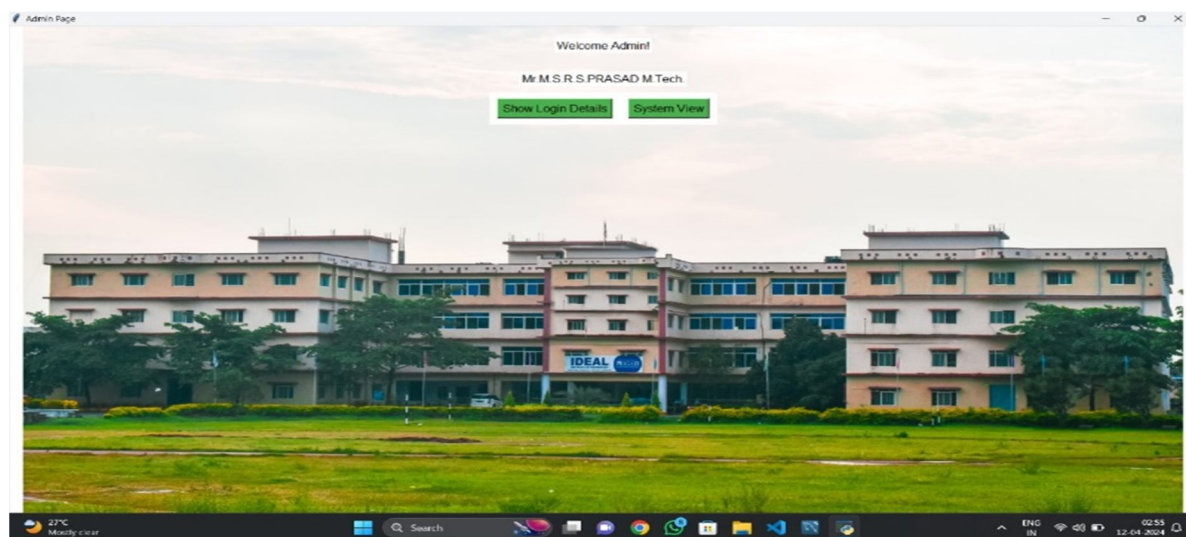


Fig 4: Admin Login Successful

D. Login Details

After admin login, clicking on 'Show Login Details', displays user login details, including Login Time, Logout Time, Username, System ID, and System Number.

ID	Username	Login Time	IP Address	Logout Time	System ID
25	system	2024-04-06 20:53:46	192.168.0.9	None	3
26	206k1a0542	2024-04-06 20:58:11	192.168.0.9	None	3
27	206k1a0541	2024-04-06 21:01:13	127.0.0.1	None	3
28	206k1a0502	2024-04-06 21:03:43	192.168.64.103	None	3
29	206k1a0542	2024-04-06 21:39:31	192.168.141.103	None	3
30	admin	2024-04-06 21:40:03	192.168.141.103	None	3
31	ADMIN	2024-04-06 21:40:19	192.168.141.103	None	3
32	admin	2024-04-06 21:43:58	192.168.141.103	None	3
33	ADMIN	2024-04-06 21:44:13	192.168.141.103	None	3
34	admin	2024-04-06 21:48:15	127.0.0.1	2024-04-06 21:48:15	None
35	admin	2024-04-06 21:48:20	127.0.0.1	2024-04-06 21:48:20	None
36	admin	2024-04-06 21:55:43	192.168.141.103	None	3
37	admin	2024-04-06 22:00:51	192.168.141.103	None	3
38	admin	2024-04-06 22:02:35	192.168.141.103	None	3
39	admin	2024-04-07 06:15:18	127.0.0.1	2024-04-07 06:15:18	None
40	206k1a0519	2024-04-07 06:16:28	127.0.0.1	2024-04-07 06:16:28	None
41	206k1a0542	2024-04-07 06:26:50	127.0.0.1	2024-04-07 06:26:50	None
42	206k1a0542	2024-04-07 06:30:51	127.0.0.1	2024-04-07 06:30:51	3
43	206k1a0519	2024-04-07 06:36:59	192.168.141.103	None	3
44	206k1a0542	2024-04-08 01:08:56	192.168.94.103	None	3
45	admin	2024-04-08 01:11:37	192.168.94.103	None	3
46	206k1a0544	2024-04-08 01:19:04	192.168.94.103	None	3
47	admin	2024-04-08 01:21:18	192.168.94.103	None	3
48	206k1a0542	2024-04-08 01:25:06	192.168.94.103	None	3
49	admin	2024-04-08 13:58:31	192.168.4.150	None	3
50	admin	2024-04-08 14:00:39	192.168.4.150	None	3
51	206k1a0542	2024-04-08 14:01:26	192.168.4.150	None	3
52	admin	2024-04-08 15:11:43	192.168.4.150	None	3
53	admin	2024-04-08 15:15:53	192.168.4.150	None	3
54	admin	2024-04-08 15:17:26	192.168.4.150	None	3
55	admin	2024-04-08 15:17:56	192.168.4.150	None	3
56	admin	2024-04-08 15:20:06	192.168.4.150	None	3
57	admin	2024-04-08 15:25:15	192.168.4.150	None	3
58	206k1a0550	2024-04-08 16:04:53	192.168.4.150	None	3
59	admin	2024-04-08 16:05:13	192.168.4.150	None	3
60	admin	2024-04-08 16:21:33	192.168.94.103	None	3
61	admin	2024-04-08 16:23:48	192.168.4.150	None	3
62	admin	2024-04-08 16:30:51	192.168.4.150	None	3

Fig 5: Login Details

E. System View

Once the admin logs in and checks user activities, they can click the System View button and enter the system IP address to connect to the users' desktop.

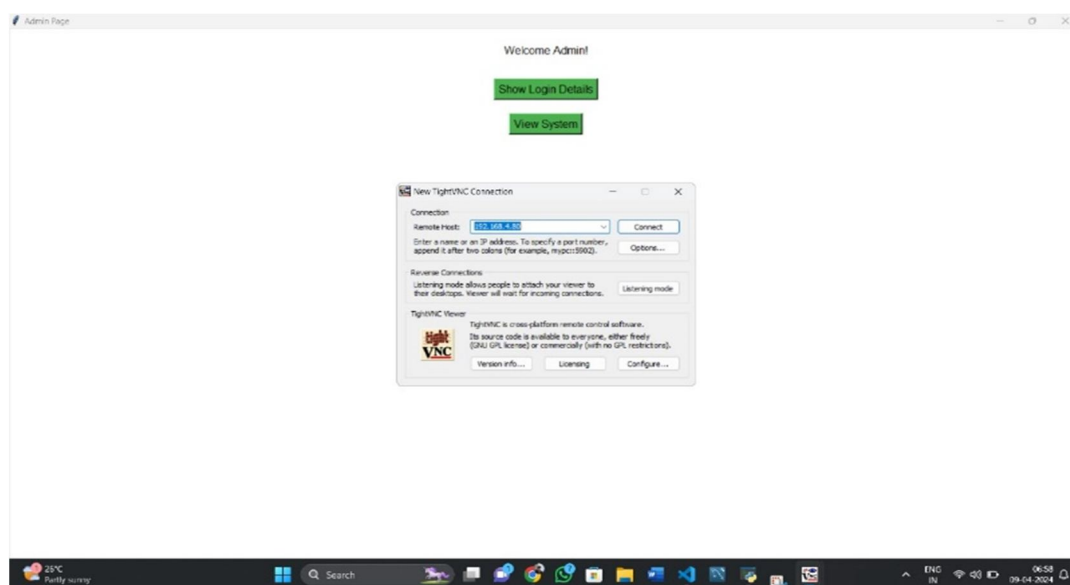


Fig 6: System view

F. Desktop View

After connecting to the user, the admin will have all the details saved on their system. The admin can also operate the user's desktop.

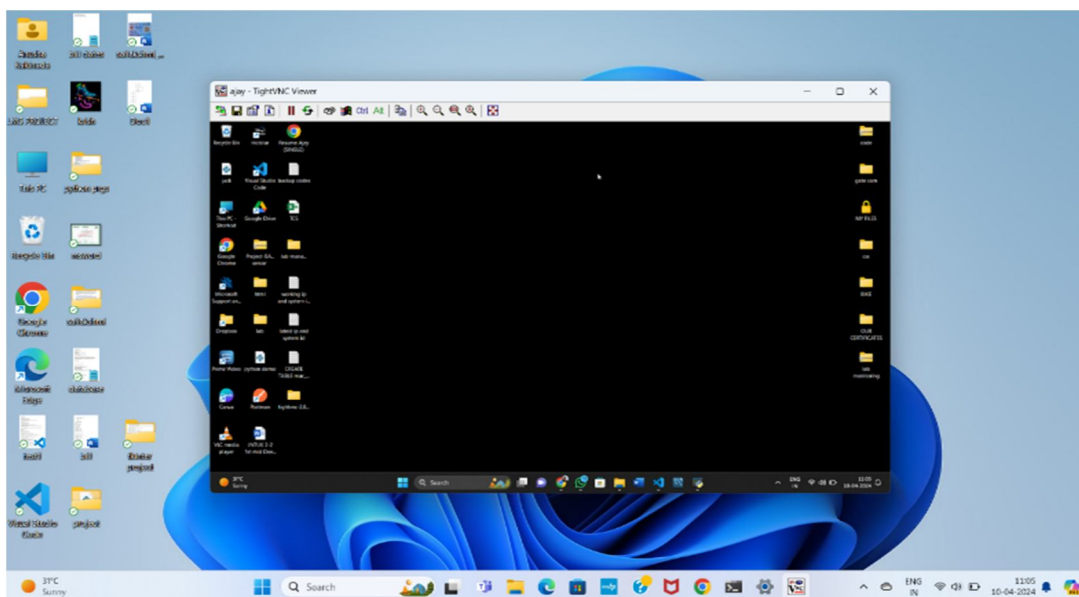


Fig 8: Desktop View

VIII. CONCLUSION

The lab system monitoring solution significantly advances the management and optimization of computer lab resources. A user-friendly GUI, implemented with Tkinter, ensures accessibility and ease of use for all levels of technical expertise.

IX. FUTURE SCOPE

- 1) *Activity History*: Implement a feature to save a history of student activities in the admin database, giving administrators a comprehensive overview of student behavior and identifying usage patterns or trends.
- 2) *Pop-Up Notifications*: Introduce pop-up notifications for students attempting to open unauthorized applications, reminding them of lab policies and encouraging responsible use of resources.

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- [2] Python Programming Language by Guido van Rossum.

E – REFERENCE

- [1] <https://www.w3schools.com/MySQL/default.asp>
- [2] <https://github.com/saif86/UML-class-diagram---Computer-Lab-Management-System>
- [3] <https://www.slideshare.net/NisarArain/monitoring-equipment-248300936>



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