KL (DEEMED TO BE UNIVERSITY) | HTE HONORS THROUGH EXPERIENTIAL LEARNING

EXPERIENTIAL LEARNING & GLOBAL ENGAGEMENT

Open Source Engineering Report

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Branch: B.Tech –Electrical And Electronics Engineering (EEE)

Course: Open Source Engineering

Academic Year: 2025–2026

Submitted To:

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1 About Linux Distro Used: Ubuntu

Ubuntu is one of the most popular Linux distributions used by developers, students and beginners. It is based on Debian and is known for its stability, regular updates and a friendly graphical interface. Ubuntu is widely used in software development, cloud computing and open-source learning labs.

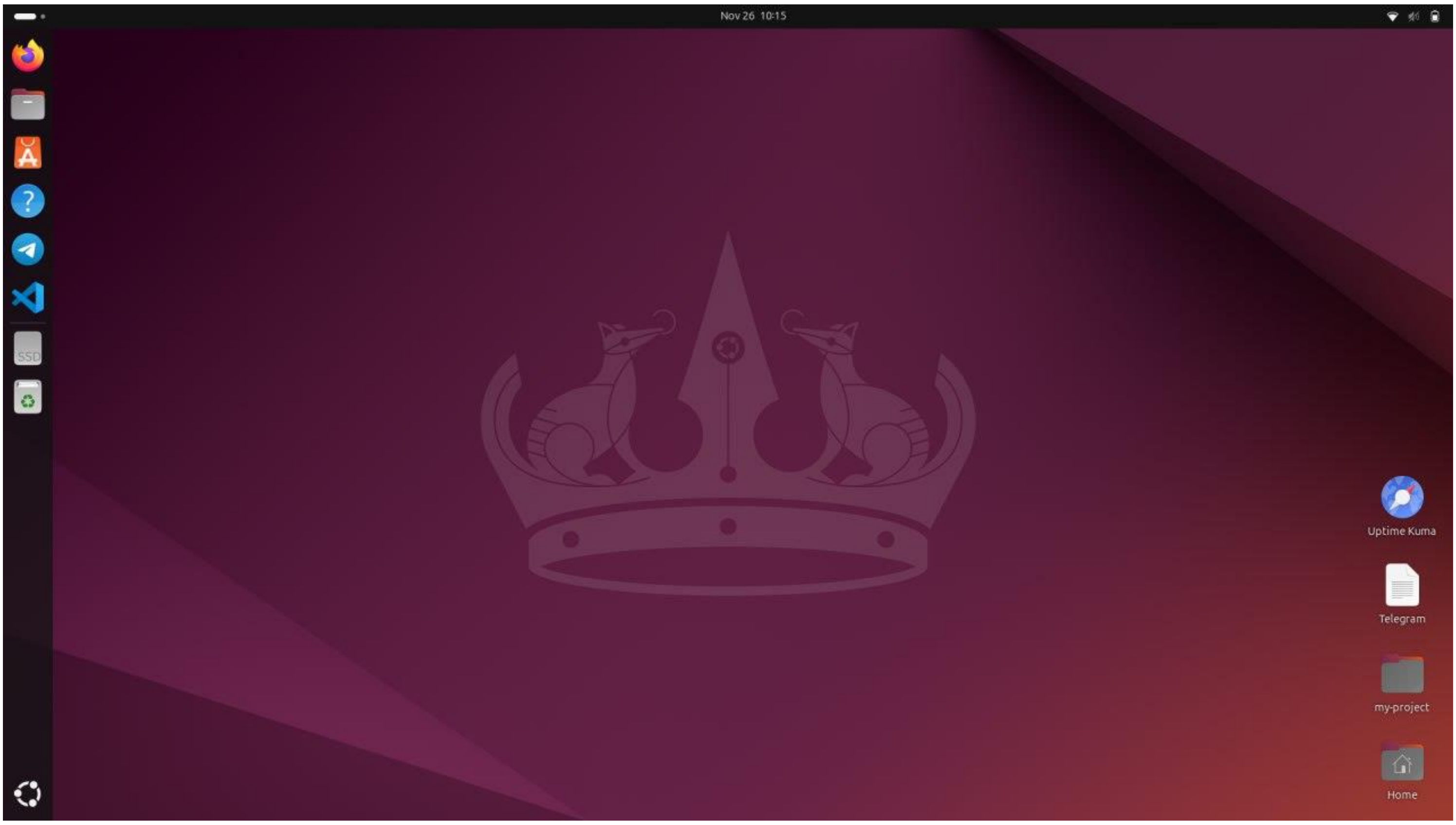
Ubuntu provides thousands of free and open-source packages through the apt package manager. Using simple commands, we can install compilers, editors, servers and security tools. This makes it a very good choice for students who are just starting with Linux.

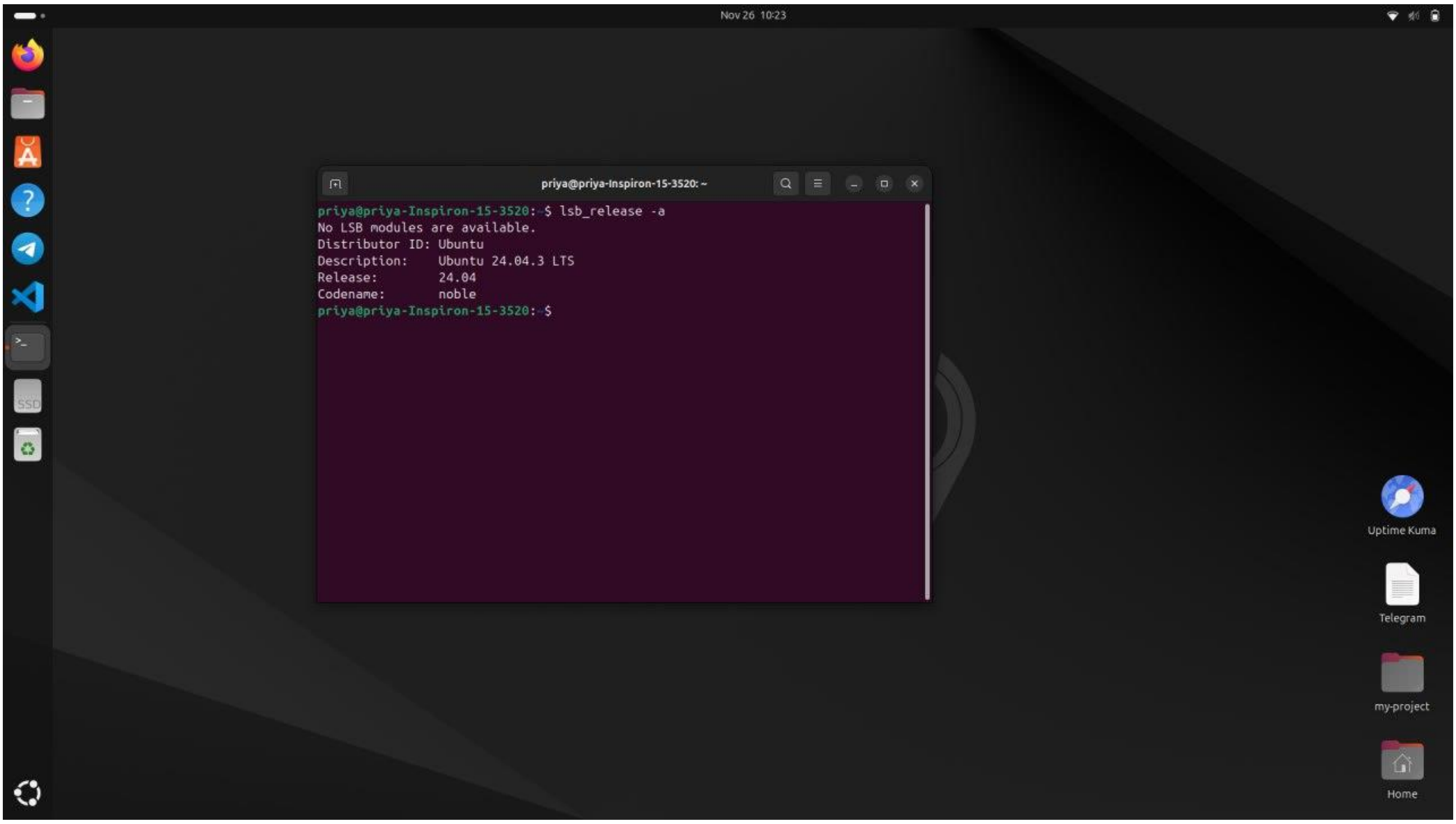
A key advantage of Ubuntu is its Long-Term Support (LTS) releases. LTS versions receive security and bug fix updates for five years, so they are trusted by companies and universities. Most major cloud platforms like AWS, Azure and Google Cloud support Ubuntu images by default.

In this course, Ubuntu helped me learn:

- Basic terminal commands for navigation and file handling
- Installing and updating software using apt
- Managing users, permissions and executable files
- Using Git and GitHub directly from the terminal
- Running and testingself-hosted services such as HedgeDoc

Overall, Ubuntu gave me a strong foundation in using Linux as a development environment for open source engine



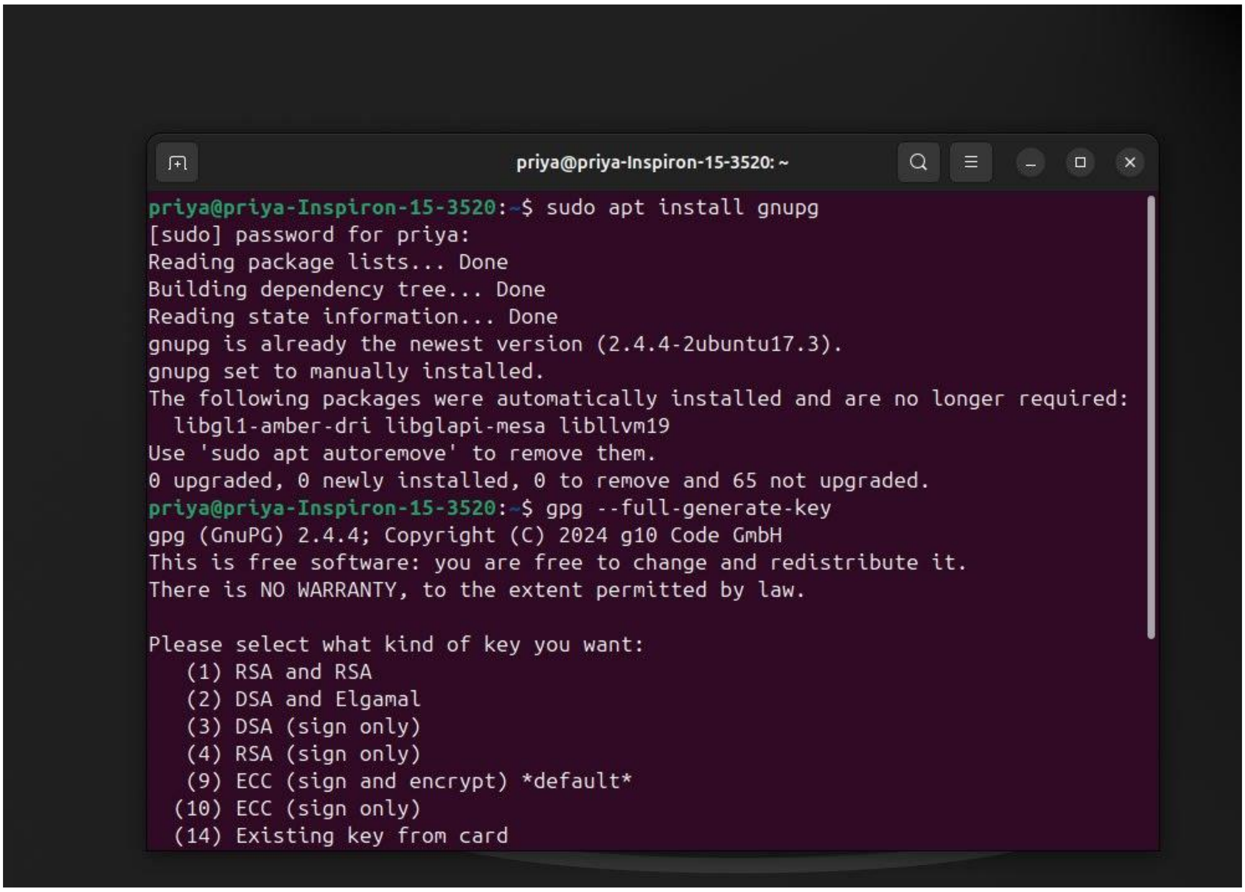


```
priya@priya-Inspiron-15-3520:~$ lsb_release -a
No LSB modules are available.
Distributor ID: Ubuntu
Description:    Ubuntu 24.04.3 LTS
Release:        24.04
Codename:       noble
priya@priya-Inspiron-15-3520:~$
```

2 Encryption and GPG

GNU Privacy Guard (GPG) is a free and open-source implementation of the OpenPGP standard. It is used for encrypting files, signing data and verifying signatures. The main idea is public-key cryptography: each user has a **public key** (can be shared) and a **private key** (kept secret).

When someone wants to send us a secret message, they encrypt it with our public key. Only our private key can decrypt that message. In the same way, if we sign a file with our private key, others can verify the signature with our public key and confirm that it really came from us and has not been modified.



```
priya@priya-Inspiron-15-3520:~$ sudo apt install gnupg
[sudo] password for priya:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
gnupg is already the newest version (2.4.4-2ubuntu17.3).
gnupg set to manually installed.
The following packages were automatically installed and are no longer required:
  libgl1-amber-dri libglapi-mesa libllvm19
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 65 not upgraded.
priya@priya-Inspiron-15-3520:~$ gpg --full-generate-key
gpg (GnuPG) 2.4.4; Copyright (C) 2024 g10 Code GmbH
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.

Please select what kind of key you want:
   (1) RSA and RSA
   (2) DSA and Elgamal
   (3) DSA (sign only)
   (4) RSA (sign only)
   (9) ECC (sign and encrypt) *default*
  (10) ECC (sign only)
  (14) Existing key from card
```

Common GPG Commands

- gpg --full-generate-key – Generate a new key pair (public + private)
- gpg --list-keys – Show the public keys stored in our keyring
- gpg --export --armor > publickey.asc – Export our public key so that we can share it
- gpg --encrypt --recipient <email> file.txt – Encrypt file.txt for a sp cific user

- gpg –decrypt file.txt.gpg – Decrypt an encrypted file using our private key

In the lab we practised generating keys, exporting the public key and encrypting and decrypting sample files. This helped me understand how many open-source projects sign their releases and how users can verify authenticity.

3 Sending Encrypted Email

Normal email is like sending a postcard: anyone on the path can read the content. To protect privacy, we can combine email with GPG encryption. For this we can use tools such as Thunderbird with built-in OpenPGP support or browser plugins like Mailvelope.

Steps for Encrypted Email

- Both sender and receiver generate their own GPG key pairs.
- Each person shares their **public key** with the other, usually as a .asc file or via a key server.
- In the email client, we import the other person's public key and mark it as trusted.
- While composing a mail, we select the option "Encrypt" (and optionally "Sign").
- The email body is encrypted with the recipient's public key and sent over the internet.
- The recipient opens the mail, enters their passphrase and decrypts the message using their private key.

This activity showed me how encryption is used in real life for secure communication and how public-key infrastructure works beyond theory.

4 Privacy Tools (PRISM-BREAK)

PRISM-BREAK is a community-driven website that lists privacy-respecting alternatives to many popular services. Its goal is to help users avoid mass surveillance and tracking by using open-source and decentralised software.

Some tools we explored are:

- **Brave Browser** – A privacy-focused web browser that blocks ads and trackers by default, supports Tor integration, and rewards users with cryptocurrency for opting into privacy-respecting ads.
- **ProtonMail** – An end-to-end encrypted email service based in Switzerland, offering zero-access encryption where even the service provider cannot read user emails.
- **Bitwarden** – An open-source password manager that stores credentials in an encrypted vault, supports self-hosting, and offers cross-platform synchronization.

- **Nextcloud** – A self-hosted cloud storage and collaboration platform that provides file sync, calendar, contacts, and document editing as alternatives to Google Drive and Dropbox.

- **Element (Matrix)** – A decentralized, end-to-end encrypted messaging platform based on the Matrix protocol, allowing users to communicate across different servers.

These examples helped me see that privacy is not only a theory topic. There are real open-source tools available for almost every daily use-case.

5 Open Source License Used – MIT LICENSE

The **MIT License** is a highly permissive open-source license widely used in modern software projects. It prioritizes freedom, flexibility, and ease of reuse, making it extremely popular among developers and organizations.

- **Allows anyone to freely use, copy, modify, merge, publish, distribute, and sublicense the software**
- **Permits integration into both open-source and closed-source/proprietary systems**
- **Requires only a simple copyright notice and license text to be included in copies**
- **Imposes no copyleft requirements — modifications do not need to be open-sourced**
- **Encourages rapid innovation, commercial use, and wide adoption**

The MIT License is commonly chosen for libraries, frameworks, and tools where maximum flexibility and minimal restrictions are desired.

6 Self Hosted Server –Uptime Kuma

Uptime Kuma is an open-source, self-hosted monitoring tool used to track the uptime and performance of websites, APIs, servers, and network services. It provides easy-to-read status dashboards and instant notifications, making it popular for personal and team infrastructure monitoring.

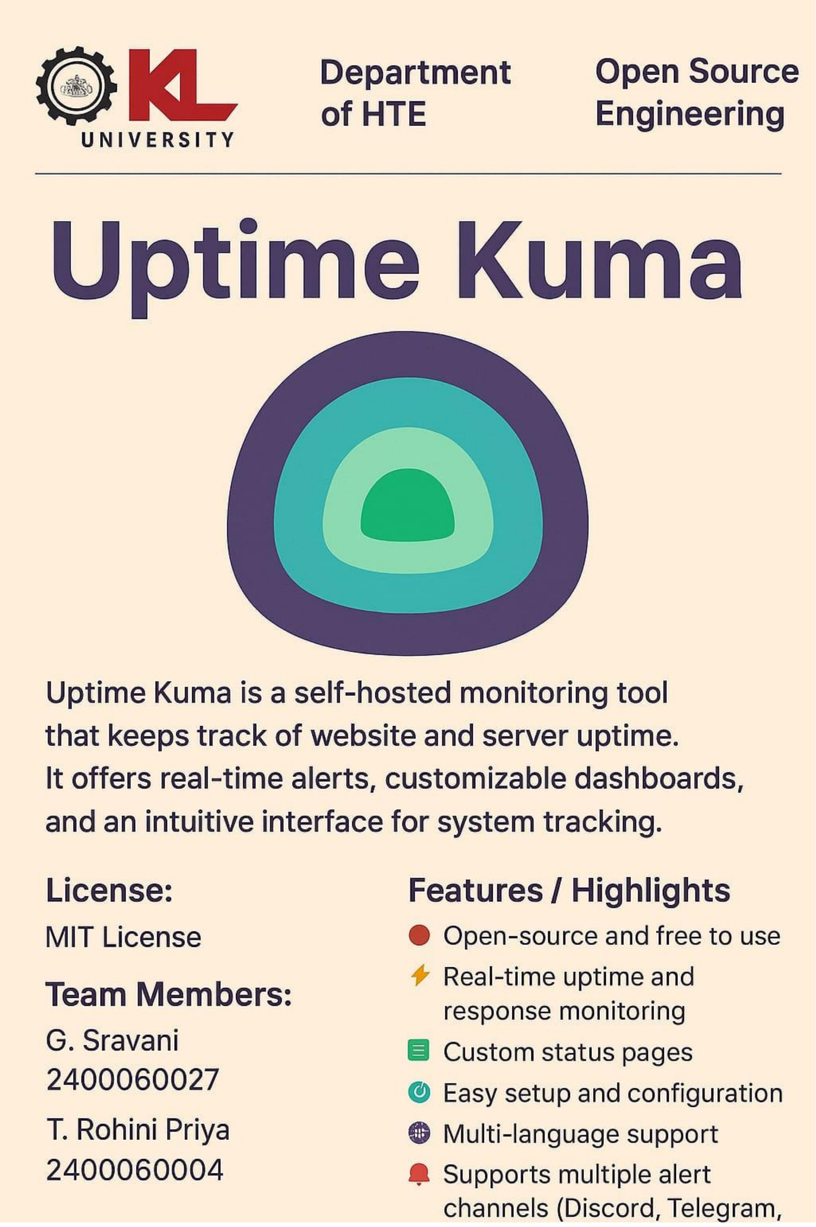
Features

- Simple, user-friendly dashboard for monitoring uptime
- Supports HTTP(s), TCP, Ping, DNS, Docker containers, and more
- Customizable status pages for public or private use
- Multiple notification integrations (Telegram, Discord, Email, Slack, etc.)
- Real-time alerts when a service goes down or recovers
- Easy to deploy on Docker, Linux servers, or local machines
- Regular health checks with detailed history and logs

How I Self-Hosted Uptime Kuma

- Installed **Docker** and **Docker Compose** on my Ubuntu system.
- Created a `docker-compose.yml` file and configured the required settings such as:
  – **PORT** to specify the web UI port
  – **DATA directory** to persist monitoring data
- Started the Uptime Kuma service using `docker-compose up -d`.
- Accessed the dashboard through the browser at http://localhost**:<port>** to begin adding monitor

POSTER



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Open Source Engineering

Uptime Kuma

Uptime Kuma is a self-hosted monitoring tool that keeps track of website and server uptime. It offers real-time alerts, customizable dashboards, and an intuitive interface for system tracking.

License:

MIT License

Team Members:

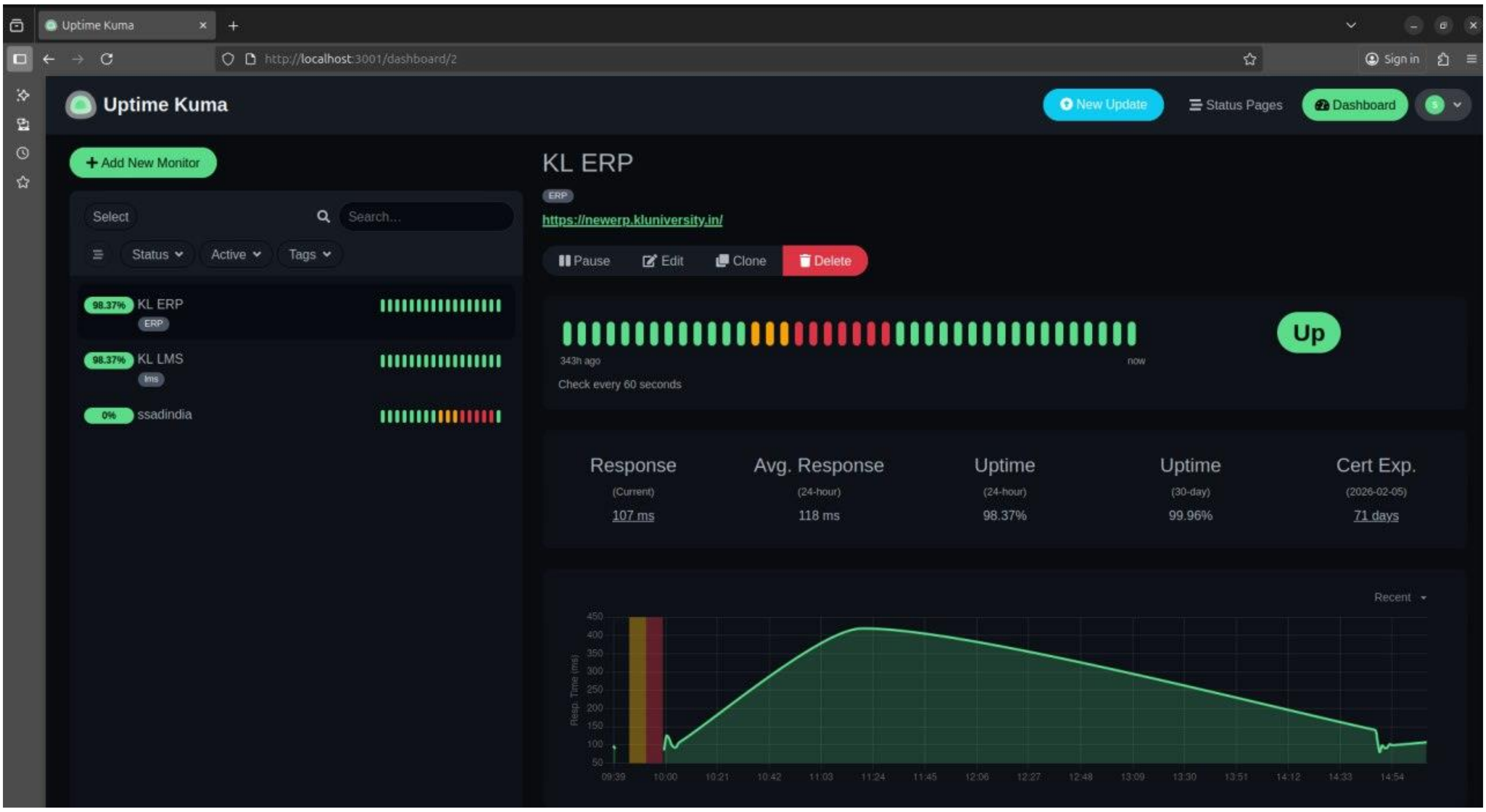
G. Sravani
2400060027

T. Rohini Priya
2400060004

Features / Highlights

- ● Open-source and free to use
- ⚡ Real-time uptime and response monitoring
- 🟩 Custom status pages
- ● Easy setup and configuration
- ● Multi-language support
- 🔔 Supports multiple alert channels (Discord, Telegram,

Server Screenshot



Check every 60 seconds

Response	Avg. Response	Uptime	Uptime	Cert Exp.
(Current)	(24-hour)	(24-hour)	(30-day)	(2026-02-05)
107 ms	118 ms	98.37%	99.96%	71 days

Open Source Contributions

GitHub Username: **thatithuripriya**

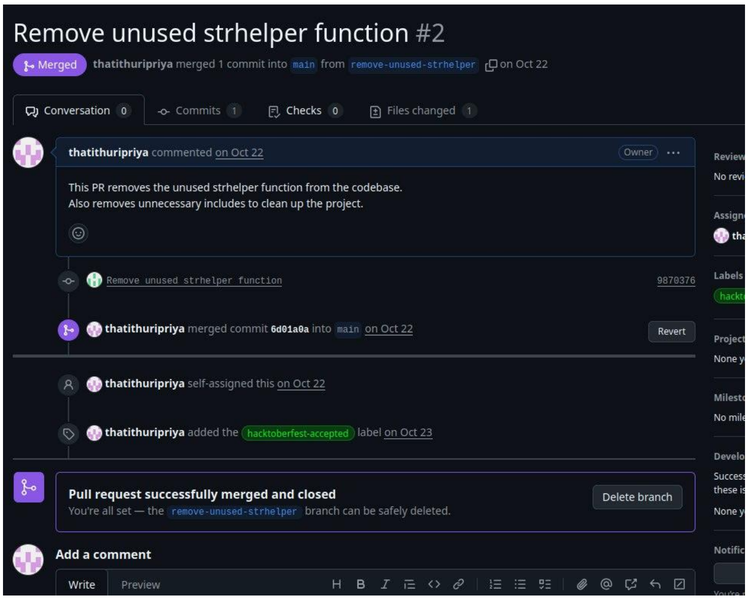
In this course we were asked to contribute to real open-source projects. The following is a list of my successfully merged pull requests:

List of Pull Requests

- **PR1: firstcontributions / first-contributions** – Remove unused strhelper function

This pull request removes the unused `strHelper` function from the project. After reviewing the codebase, it was confirmed that this function is not referenced by any existing modules or features. Keeping unused functions can create confusion, increase maintenance effort, and make the codebase harder to navigate for new contributors.

By removing `strHelper`, the code becomes cleaner, more efficient, and easier to maintain. This update also aligns with good coding practices by eliminating dead code and reducing potential sources of technical debt.



Remove unused strhelper function #2

Merged thatithuripriya merged 1 commit into `main` from `remove-unused-strhelper` on Oct 22

thatithuripriya commented on Oct 22 Owner

This PR removes the unused strhelper function from the codebase.
Also removes unnecessary includes to clean up the project.

`Remove unused strhelper function` 9870376

thatithuripriya merged commit **6d01a0a** into `main` on Oct 22 Revert

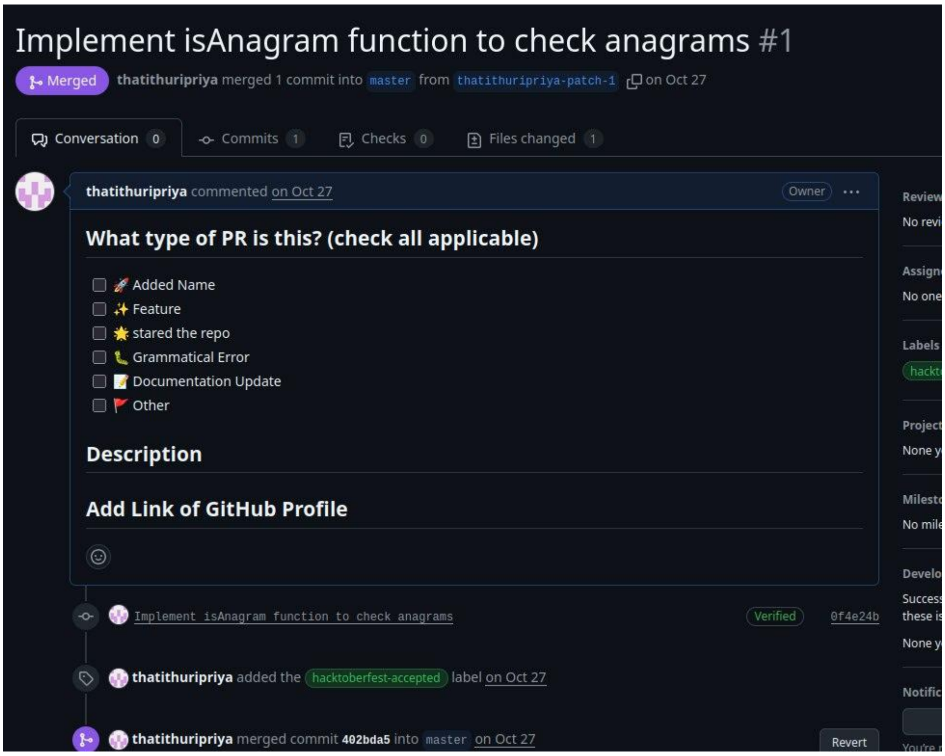
thatithuripriya self-assigned this on Oct 22

thatithuripriya added the hacktoberfest-accepted label on Oct 23

Pull request successfully merged and closed
You're all set — the `remove-unused-strhelper` branch can be safely deleted.

PR:2 Implement is Anagram function to check anagrams

In this pull request, I created the **isAnagram** function to check if two strings are anagrams. I added short Telugu documentation explaining the logic in an easy way and included a small demo video with Telugu voiceover to show how the function works with example inputs. This helps Telugu-speaking students understand and use the function quickly.



Implement isAnagram function to check anagrams #1

Merged thatithuripriya merged 1 commit into `master` from `thatithuripriya-patch-1` on Oct 27

thatithuripriya commented on Oct 27 Owner

What type of PR is this? (check all applicable)

- □ 🚀 Added Name
- □ ✨ Feature
- □ 🌟 stared the repo
- □ 🐛 Grammatical Error
- □ 📝 Documentation Update
- □ 🚩 Other

Description

Add Link of GitHub Profile

`Implement isAnagram function to check anagrams` Verified 0f4e24b

thatithuripriya added the hacktoberfest-accepted label on Oct 27

thatithuripriya merged commit **402bda5** into `master` on Oct 27 Revert

LINKDIN POST LINKS:

PR MERGE LINK:https://www.linkedin.com/posts/rohini-priya-thatithuri-848360366_opensource-selfhosting-uptimekuma-activity-7399341941307363328-Fg5n?utm_source=share&utm_medium=member_desktop&rcm=ACoAAFrSLrgBuecUaJj-w4FLDYxpKuu_TWgh-ysSELF HOSTING SERVER:https://www.linkedin.com/posts/rohini-priya-thatithuri-848360366_here-are-some-of-my-recent-open-source-contributions-activity-7399343450594369536-0rsI?utm_source=share&utm_medium=member_desktop&rcm=ACoAAFrSLrgBuecUaJj-w4FLDYxpKuu_TWgh-ysBLOG POST LINK:https://www.linkedin.com/posts/rohini-priya-thatithuri-848360366_opensource-selfhosting-uptimekuma-activity-7399341941307363328-Fg5n?utm_source=share&utm_medium=member_desktop&rcm=ACoAAFrSLrgBuecUaJj-w4FLDYxpKuu_TWgh-ys