
# Y24 OPEN SOURCE ENGINEERING

**BY**

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# 1.LINUX DISTRIBUTION

A Linux distribution is a ready-made version of the Linux operating system that includes system tools, software, updates, and a desktop environment. Examples include Ubuntu, Fedora, and Kali Linux.

Ubuntu is one of the most popular and beginner-friendly Linux operating systems. It is completely free, open-source, and designed to be simple for everyday users as well as students and developers. Ubuntu provides a clean interface, regular security updates, and a huge library of software that you can install easily from its Software Center. Because it runs smoothly even on older laptops and is free from viruses, many people prefer Ubuntu for learning and daily use.

Ubuntu is widely used for programming, web development, cybersecurity learning, and even running self hosted servers. It supports many programming languages and offers powerful tools that make coding easier. Many companies also use Ubuntu on cloud platforms and servers because it is stable and secure. Whether you want to browse the internet, write documents, learn Linux commands, or develop applications, Ubuntu provides a fast, safe, and reliable environment.

# 2.ENCRYPTION AND GPG

## ENCRYPTION

Encryption is the process of converting normal readable data into a secure, unreadable form so that only the intended person can access it. It protects our files, messages, and digital identity from hackers or unauthorized users. Encryption is widely used today in emails, online banking, WhatsApp chats, and even in storing passwords. It ensures privacy, security, and trust while sharing or storing information on the internet.

## GNU PRIVACY GUARD(GNG)

GPG (GNU Privacy Guard) is a free and open-source tool used to encrypt data and digitally sign documents or emails. It uses a pair of keys: a public key for others to send you encrypted data, and a private key that only you can use to decrypt it. Students and developers use GPG to securely send emails, verify software authenticity, and protect important files. It is one of the most common tools used in Linux systems for privacy and strong encryption.

# 3. SENDING ENCRYPTED EMAIL

Sending an encrypted email means your message is protected so that only the intended person can read it. Even if someone tries to intercept the email during transfer, they cannot understand the content because it is converted into unreadable encrypted text. This ensures privacy and safety when sharing sensitive information such as passwords, personal details, or important documents.

To send an encrypted email using GPG, both you and the receiver exchange your public keys. You use the receiver's public key to encrypt the email before sending it, and they use their private key to decrypt and read it. This method provides end-to-end security, meaning only the correct person can unlock the message. Students, developers, and professionals commonly use this for secure communication in Linux environments.

# 5. PRIVACY TOOLS

## Privacy Tools from Prism-Break

### 1. Tor (Anonymizing Network)

Tor helps protect your identity by routing your internet traffic through multiple volunteer-run servers. This makes it very difficult for anyone to track your IP address or online activity. It is widely used for safe and private web browsing.

### 2. WireGuard (VPN Tool)

WireGuard is a fast and modern VPN protocol that encrypts your internet connection. It keeps your online activity private by hiding your real IP address and protecting your data from attackers. It is lightweight, secure, and easy to configure on Linux systems like Ubuntu.

### 3. KeePassXC (Password Manager)

KeePassXC securely stores all your passwords inside an encrypted vault protected by one master password. You only need to remember one password while the tool handles the rest safely. It helps prevent password theft and encourages stronger, unique passwords.

## 4. Nextcloud (Self-Hosted File Storage)

Nextcloud allows you to store files, photos, and documents on your own personal server instead of third-party cloud services. This gives you full control over your data and keeps it private. It also supports secure file sharing, syncing, and collaboration.

## 5. Thunderbird (Email Client)

Thunderbird is a secure, open-source email application that supports encrypted email using GPG. It helps keep your messages private and protected from unauthorized access. It also includes strong spam filtering and works smoothly on Ubuntu.

# 6. SELF-HOSTED SERVER

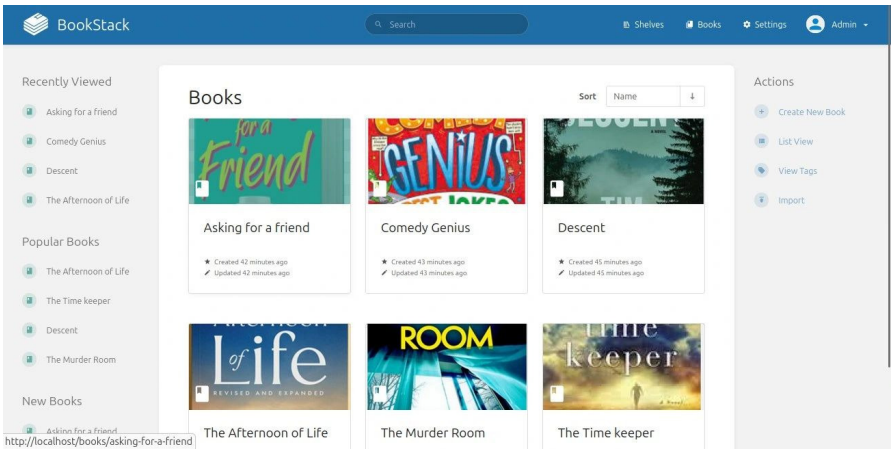
## Self-Hosted Server – About and Installation

### Self-Hosted Server

A self-hosted server means running a service on your own computer instead of depending on companies like Google, Microsoft, or other cloud providers. When you self-host, all your data stays under your control because it is stored on your own system. This increases privacy, security, and data ownership while removing third-party access.

### My Self-Hosted Server: BookStack

BookStack is an open-source platform used to create, organize, and share documentation or notes. It allows you to build your own wiki-style knowledge base that can be accessed from any device. BookStack is similar to tools like Confluence or Notion, but fully controlled and hosted on your own server.



## Installation Steps for BookStack on Ubuntu 24.04

1. Download the official BookStack Ubuntu installation script:

   ```
   wget https://codeberg.org/bookstack/devops/raw/branch/main/scripts/installa
   ```

2. Make the script executable:

   ```
   chmod a+x installation-ubuntu-24.04.sh
   ```

3. Run the script with administrator permissions:

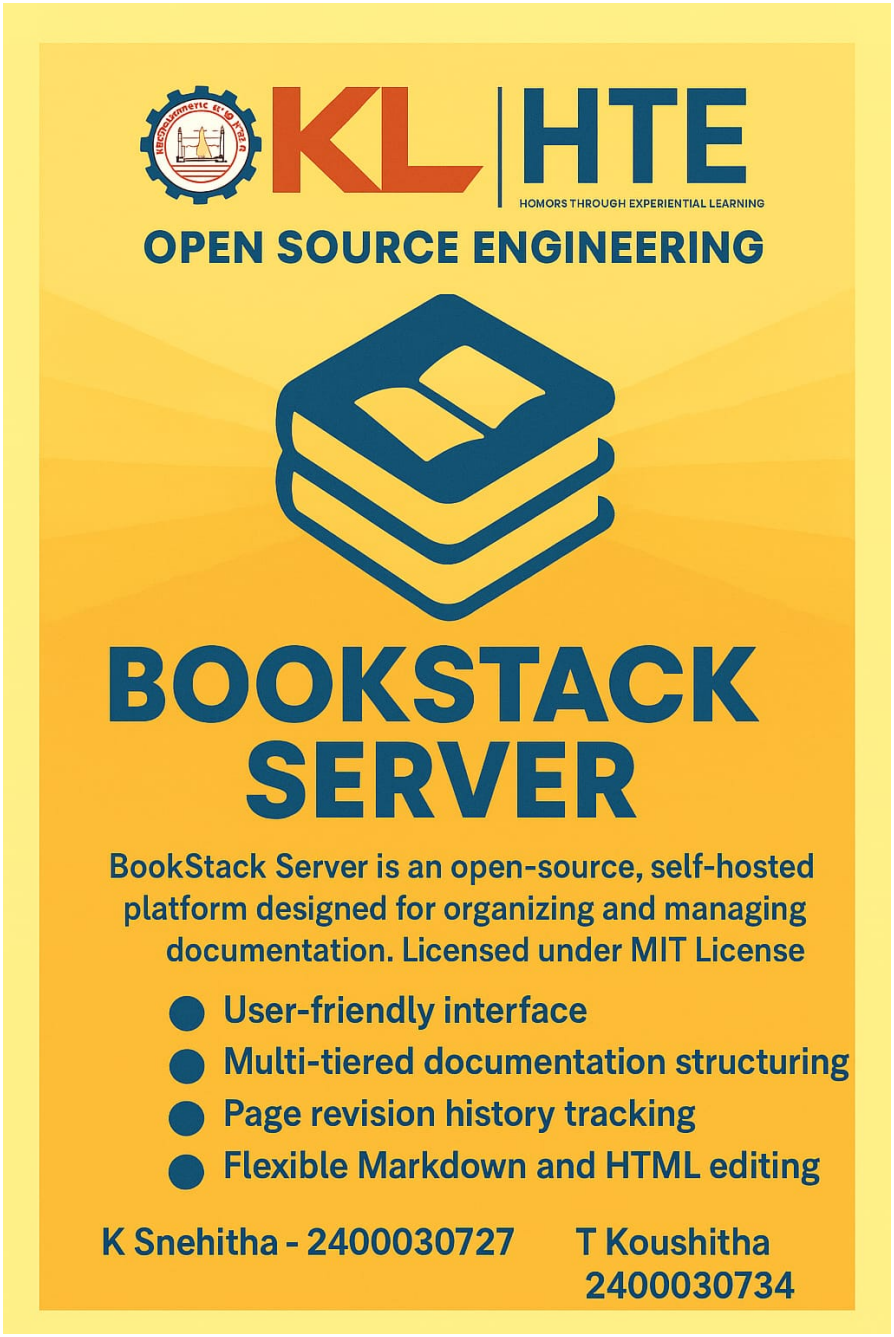
   ```
   sudo ./installation-ubuntu-24.04.sh
   ```

4. After installation, open BookStack in the browser using your server's IP (for example: http://localhost or http://your-server-ip) and complete the setup.

# Localized (Translated) Document – Telugu

```
+ # Self Hosted Project - [BOOKSTACK]
+
+ ## Description
+ BookStack is an open-source, self-hosted platform for storing and organizing information like documentation, wikis, or notes.
+ It’s built with PHP and Laravel and offers a clean, user-friendly interface for creating pages, organizing them into chapters and books, and
+ BookStack is ideal for knowledge bases, internal documentation, or collaborative writing.
+
+ ## Installation (in your local language)
+ ఈ స్క్రిప్ట్ కొత్త Ubuntu 22.04 సిస్టమ్‌లో మాత్రమే ఉపయోగించాలి. ఇప్పటికే వెబ్‌సైట్‌లు లేదా డేటాబేస్‌లు ఉన్న కంప్యూటర్‌లో ఇది అమలు చేస్తే అవి దెబ్బతినే అవకాశం ఉంటుంది.
+
+ స్క్రిప్ట్‌ని డౌన్‌లోడ్ చేయండి:
+ wget https://codeberg.org/bookstack/devops/raw/branch/main/scripts/installation-ubuntu-22.04.sh -O installation-ubuntu-22.04.sh
+
+ స్క్రిప్ట్‌లో ఏముంది చూడండి:
+ less installation-ubuntu-22.04.sh
+ (ఇది ఏ ఫైళ్ళను ఇన్‌స్టాల్ చేస్తుందో, ఏ సెట్టింగ్స్ మార్చుతుందో ముందుగా చూసుకోవాలి.)
+
+ స్క్రిప్ట్‌ను అమలు చేయగలిగేలా మార్చండి:
+ chmod a+x installation-ubuntu-22.04.sh
+
+ స్క్రిప్ట్‌ను అడ్మిన్ హక్కులతో నడపండి:
+ sudo ./installation-ubuntu-22.04.sh
+ (ఇది Apache, MySQL, PHP, BookStack లను ఆటోమేటిక్‌గా ఇన్‌స్టాల్ చేస్తుంది.)
+
+ ప్రాసెస్ పూర్తయిన తర్వాత, ఎర్రర్లు ఉన్నాయా లేదో చెక్ చేయండి.
+ ఫైల్ లాగ్‌ను చూడటానికి: tail -f installation-log.txt
+
+ Apache మరియు MySQL సర్వీసులు సరిగ్గా నడుస్తున్నాయా చూడండి:
+ sudo systemctl status apache2
+ sudo systemctl status mysql
+
+ BookStack ఫోల్డర్ /var/www/bookstack లో సరిగ్గా ఉందో చూసి, అవసరమైతే ఫైల్ యజమానిని మార్చండి:
+ sudo chown -R www-data:www-data /var/www/bookstack
+
+ BookStack సైట్ ఓపెన్ చేసి లాగిన్ అవ్వండి – మొదటిసారి ఓపెన్ చేసినప్పుడు సర్వర్ యూఆర్ఎల్ సరిగ్గా ఉందో .env ఫైల్లో చెక్ చేయండి.
+
+ అన్ని సరిగ్గా పని చేస్తే, చివరగా బ్యాకప్ తీసుకోవడం మరియు సెక్యూరిటీ సెట్టింగ్స్ పెట్టడం మర్చిపోవద్దు
+
+ ## Video Demonstration
+ https://drive.google.com/file/d/1ZxbmRDJZV0aHPVGaGZYpJ4FW2azUL2IV/view?usp=drive_link
+
+ ## LinkedIn Post
+ https://www.linkedin.com/posts/koushitha-tadiboina-787427350_opensource-kluniversity-foss-activity-7383768629764403200-HqWH?
```

## Self-Hosted Poster



## 0.1 Top 7 Merged Pull Requests

### 0.1.1 1. Binary Tree with Diagonal Sum (C) - #3547

**Problem:** Missing implementation for diagonal sum calculation in binary trees.

**Solution:** Implemented C program to efficiently compute diagonal sums using tree traversal algorithms.

### 0.1.2 2. Breadth First Search Algorithm (C) - #3542

**Problem:** No BFS implementation available in the repository for graph traversal.

**Solution:** Added complete BFS algorithm using adjacency matrix and queue operations in C.

### 0.1.3 3. Infix to Postfix Converter (C) - #3541

**Problem:** Lack of infix to postfix conversion utility for expression parsing.

**Solution:** Developed stack-based converter handling operator precedence and parentheses in C.

### 0.1.4 4. To-Do List Application (Python) - #458

**Problem:** Request for a simple Python project demonstrating basic programming concepts.

**Solution:** Built command-line todo app with add, view, delete tasks functionality.

### 0.1.5 5. Morris Inorder Traversal (C) - #467

**Problem:** Need for efficient inorder traversal without recursion or stack memory.

**Solution:** Implemented Morris traversal algorithm achieving O(1) space complexity.

### 0.1.6 6. Linear Search Algorithm (C) - #1

**Problem:** Basic search algorithm implementation missing from the repository.

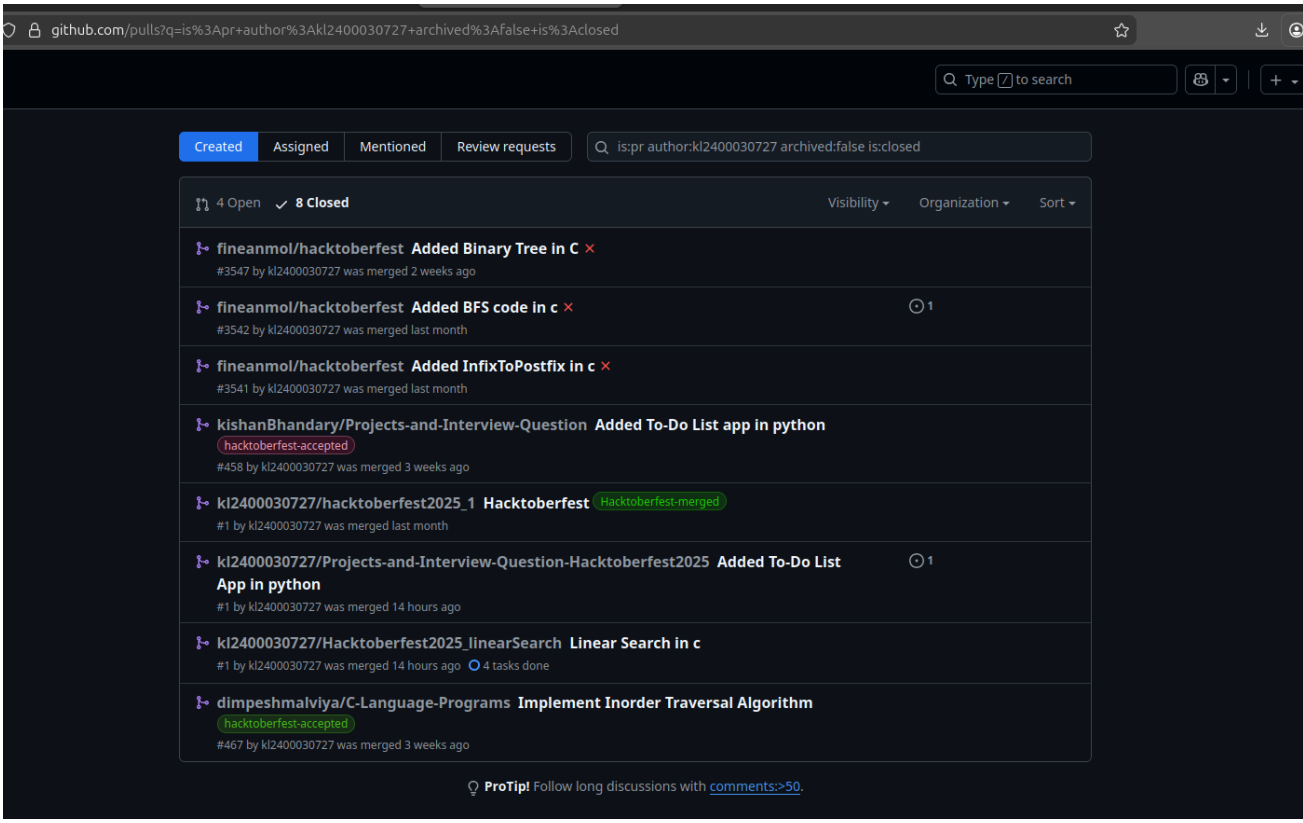
**Solution:** Added linear search implementation with user input handling in C.

### 0.1.7 7. Hacktoberfest Project Setup - #1

**Problem:** Initial project setup and Hacktoberfest participation preparation.

**Solution:** Created repository structure and contributed initial codebase setup.

## My Merged PR's



# 8. LinkedIn Posts

### 0.1.8 Self Hosted Server – BookStack

**Click here to view the LinkedIn Post**

### 0.1.9 PRs Merged

**Click here to view the LinkedIn Post**

### 0.1.10 Blog Post

**Click here to view the LinkedIn Post**