

1. EXECUTIVE SUMMARY

1.1 PURPOSE

An internship can give unique learning opportunities outside of traditional academic settings. It can introduce you to new tasks and assist you in developing the abilities necessary to do those jobs. You can gain experience with people, technology, and projects that may be relevant to your career aspirations through internships. These practical internships give our students firsthand knowledge of real-world situations and exposure to the working world. They also give them a solid experiential basis for future career decisions and the opportunity to develop important professional networks.

- **Enhance Technical Skills:** The internship aims to build a solid foundation in Python programming by covering fundamental concepts such as data types, control structures, functions, modules, and file handling. This knowledge is crucial for any aspiring computer science professional.
- **Exploration of Advanced Topics:** The internship also provides an opportunity to explore advanced topics in Python, such as web development frameworks (e.g., Django, Flask), data science libraries (e.g., Pandas, NumPy), and machine learning (e.g., TensorFlow, Scikit-Learn). This exploration helps in identifying areas of interest for further specialization.
- **Project Management Experience:** Working on projects during the internship helps in understanding project management principles, such as planning, execution, and documentation. These skills are essential for managing software development projects effectively.
- **Problem-Solving Abilities:** The internship focuses on developing problem-solving skills by encouraging students to tackle various programming challenges. This includes writing efficient algorithms, debugging code, and optimizing solutions.
- **Exposure to Industry Practices:** Through interactions with experienced professionals and exposure to industry-standard tools and methodologies, the internship provides insights into best practices in software development. This experience is invaluable for understanding the dynamics of working in a professional environment.

1.2 SCOPE OF THE INTERNSHIP

An Internship Provides Real life experience and exposure. An internship enables you to gain first-hand exposure to working in the real world. It also allows students to harness the skill, knowledge, and theoretical practice they learnt in university. Python allows you to program in an easy way. Programming in Python makes learning the programming language easier and starts building projects. This internship will help learn new skills and future project development in respected fields. Python can be used to solve real world problems like data analysis and machine learning. Though it is an interpreted language and not the compiled language, program execution is comparatively slower than other object-oriented programming languages.

1.3 OUTCOME OF THE INTERNSHIP

The results of a Python internship can differ depending on the intern's objectives, the internship program's structure, and the particular projects and tasks that are assigned throughout the internship. After finishing an internship in Python, interns could anticipate the following possible results:

- **Enhanced Proficiency in Python:** Interns significantly improve their Python skills through hands-on experience, mastering syntax, data structures, and various libraries.
- **Understanding of Software Development Practices:** Interns gain insights into software development best practices, including version control, code documentation, and testing methodologies.
- **Introduction to Machine Learning:** Interns may be introduced to basic machine learning concepts and algorithms, gaining experience in building and evaluating models.
- **Project Experience:** Interns work on real-world projects, applying Python skills in practical scenarios and collaborating with team members.
- **Professional Networking:** Interns have the opportunity to network with industry professionals, building valuable connections for future career opportunities.
- **Portfolio Development:** By completing projects, interns develop a portfolio showcasing their skills and accomplishments, enhancing their employability.
- **Career Exploration:** Internships provide insights into various career paths and industries, helping interns make informed career decisions.

2. INTRODUCTION AND ORGANIZATION PROFILE

2.1 SCOPE OF WORK IN COMPANY

Software Development:

- Development and maintenance of software applications and systems utilizing the Python programming language.
- Adherence to best practices and coding standards in writing clean, efficient, and maintainable code.
- Collaboration with cross-functional teams, including software engineers, product managers, and designers, to deliver high-quality solutions.

Web Development:

- Creation of dynamic web applications and APIs using Python-based web frameworks like Django or Flask.
- Implementation of server-side logic, database integration, authentication mechanisms, and user interfaces.
- Optimization of web applications for performance, scalability, and security.

Data Analysis and Visualization:

- Analysis of large datasets using Python libraries such as Pandas, NumPy, and SciPy to uncover insights and patterns.
- Visualization of data using tools like Matplotlib, Seaborn, or Plotly to effectively communicate findings.
- Development of data pipelines and automation scripts for data preprocessing, cleansing, and transformation.

Machine Learning and Data Science:

- Building and deploying machine learning models with Python libraries like Scikit-learn, TensorFlow, or PyTorch. Conducting exploratory data analysis, feature engineering, model training, and evaluation.

Scripting and Automation:

- Writing scripts and automation tools to streamline repetitive tasks and workflows.
- Automation of system administration tasks, deployment processes, and infrastructure management using tools like Ansible or Fabric.
- Development of custom scripts and utilities to enhance productivity and efficiency across teams.

Testing and Quality Assurance:

- Implementation of unit tests, integration tests, and end-to-end tests to ensure software reliability and robustness.
- Setting up continuous integration and continuous deployment (CI/CD) pipelines for automated testing and deployment processes.
- Collaboration with QA engineers to identify and rectify software bugs.

Research and Development:

- Conducting research and experimentation to explore new technologies and tools.
- Prototyping and proof-of-concept development for innovative ideas and features.
- Contribution to open-source projects and active participation in developer communities to stay updated with the latest trends and advancements in Python programming.

Overall, Python programming roles within the company present diverse opportunities to engage in exciting projects, tackle complex problems, and contribute meaningfully to organizational success. Whether it involves developing web applications, analyzing data, building machine learning models, or automating tasks, Python programmers play a pivotal role in driving innovation and delivering value to customers.

2.2 DOMAIN DESCRIPTION

Overview:

The internship in Python programming and machine learning provides students with an opportunity to apply theoretical knowledge in practical settings. Interns will gain hands-on experience in utilizing Python, a versatile programming language, for data manipulation, analysis, and the implementation of various machine learning algorithms. Through engaging in real-world projects and receiving mentorship, interns will develop essential skills in data preprocessing, model development, evaluation, and deployment.

Key Responsibilities:

- **Python Programming:**
 - Develop proficiency in Python programming language, covering syntax, data structures, and object-oriented concepts.
 - Utilize Python libraries such as NumPy, Pandas, and Matplotlib for data manipulation, analysis, and visualization.
 - Write efficient and maintainable code following best practices and coding standards.
- **Machine Learning Fundamentals:**
 - Learn effective data preprocessing techniques, including handling missing values, feature scaling, and encoding categorical variables.
 - Gain understanding of fundamental machine learning concepts such as supervised and unsupervised learning, regression, classification, and clustering.
- **Algorithm Implementation:**
 - Implement various machine learning algorithms using Python libraries like Scikit-learn and TensorFlow.
 - Experiment with different models, hyperparameters, and evaluation metrics for optimization.

- **Data Analysis and Visualization:**

- Analyse datasets using Python to derive meaningful insights and patterns.
- Visualize data using libraries like Matplotlib and Seaborn to effectively communicate findings.

- **Project Development:**

- Work on real-world projects involving the application of machine learning techniques to solve practical problems.
- Collaborate with mentors and team members to define project requirements, develop solutions, and iterate on feedback.

Benefits:

- Hands-on experience in Python programming and machine learning.
- Mentorship from experienced professionals in the field.
- Exposure to real-world projects and challenges.
- Opportunity to build a professional network.
- Certificate of completion and potential for future employment opportunities.

The internship program focusing on Python programming and machine learning presents an exceptional opportunity for students keen on exploring the dynamic interface between programming and data science. Throughout the duration of this internship, participants will immerse themselves in the development of practical skills that are essential in today's data-driven world. They will be actively engaged in working on real-world projects, which will provide hands-on experience and a deeper understanding of the complexities and nuances of actual industry scenarios.

Additionally, interns will have the chance to learn and implement industry best practices, ensuring they are well-versed in the standards and methodologies that lead to efficient and effective problem-solving in the professional realm. This comprehensive learning experience is designed to thoroughly prepare students for a prosperous career in fields where data plays a pivotal role, equipping them with the knowledge and expertise needed to excel in various data-centric roles. By the end of the internship, participants will not only have enhanced their technical capabilities but also gained valuable insights into the practical applications of machine learning.

2.3 ORGANIZATIONAL PROFILE



SkillVertex is an edtech organization dedicated to providing upskilling and training solutions tailored to the needs and future aspirations of students and working professionals. With a focus on emerging industrial requirements and technologies, SkillVertex offers a comprehensive range of programs aimed at fostering career development, providing additional counselling guidance, and offering mentorship in various domains.

SkillVertex operates as a platform offering online courses and resources designed to help individuals enhance their skills across diverse fields such as technology, business, design, and more. These courses, led by industry experts and professionals, cover a wide range of topics, including management, making SkillVertex an ideal resource for those seeking to upskill or advance their careers.

SkillVertex stands as an innovative online learning platform, empowering individuals with the knowledge and skills necessary to thrive in today's rapidly evolving job market. With a diverse array of courses spanning multiple disciplines, SkillVertex provides a dynamic learning experience tailored to meet the needs of learners at every stage of their professional journey.

SkillVertex is committed to revolutionizing skill development in the digital age. With a keen understanding of the evolving educational landscape,

From personalized learning paths to industry-aligned certifications, SkillVertex leads the charge in shaping the future of education and career advancement.

Nature of business: Ed-tech startup

Company Founder: Nimish Keshri

Registered address: 5th main road, 14th B cross road, Sector 6, HSR Layout, Bengaluru, Karnataka, 560102

Legal status of the firm: Private company

Founded year: 2021

VISION OF THE COMPANY

SkillVertex envisions itself as an innovative organization dedicated to providing aspiring learners with rigorous training and exposure for a promising future. With a vision of a world brimming with opportunities and possibilities, SkillVertex aims to empower the youth to become industry-ready and build strong foundations and skills for a bright future ahead. SkillVertex endeavours to reach every individual in the education sector, assisting them in realizing their dreams and emphasizing the importance of education being accessible anytime, anywhere. At SkillVertex, the goal is to connect like-minded individuals with the ideal platforms where they can collectively "Bring a change."

MISSION OF THE COMPANY

SkillVertex is committed to empowering individuals and businesses through innovative skill development solutions. Our mission is to offer accessible, high-quality training and resources that foster personal and professional growth, cultivating a community of lifelong learners and industry leaders. SkillVertex aims to bridge the gap between education and real-world application by providing cutting-edge courses, workshops, and resources tailored to the evolving needs of various industries. Our goal is to equip individuals with the skills and knowledge needed to succeed in today's dynamic job market while fostering a culture of continuous improvement and adaptability. Ultimately, our mission is to empower individuals to unlock their full potential and achieve their aspirations, driving positive impact both personally and professionally.

2.3.1 PRODUCTS AND CLIENTS

SkillVertex offers a diverse range of products and services focused on skills development and training. These offerings include online courses, workshops, seminars, and consulting services aimed at enhancing skills in various domains such as technology, business, leadership, and personal development. Additionally, SkillVertex provides customized training solutions for businesses and organizations seeking to upskill their workforce.

SkillVertex may also offer educational materials, books, software tools, and online platforms designed to facilitate learning and skill-building. Certification programs, assessments, and mentoring services are also available to help individuals and organizations achieve their learning objectives effectively. The company caters to both professionals seeking career advancement and businesses aiming to improve their workforce's capabilities.

IT Courses:

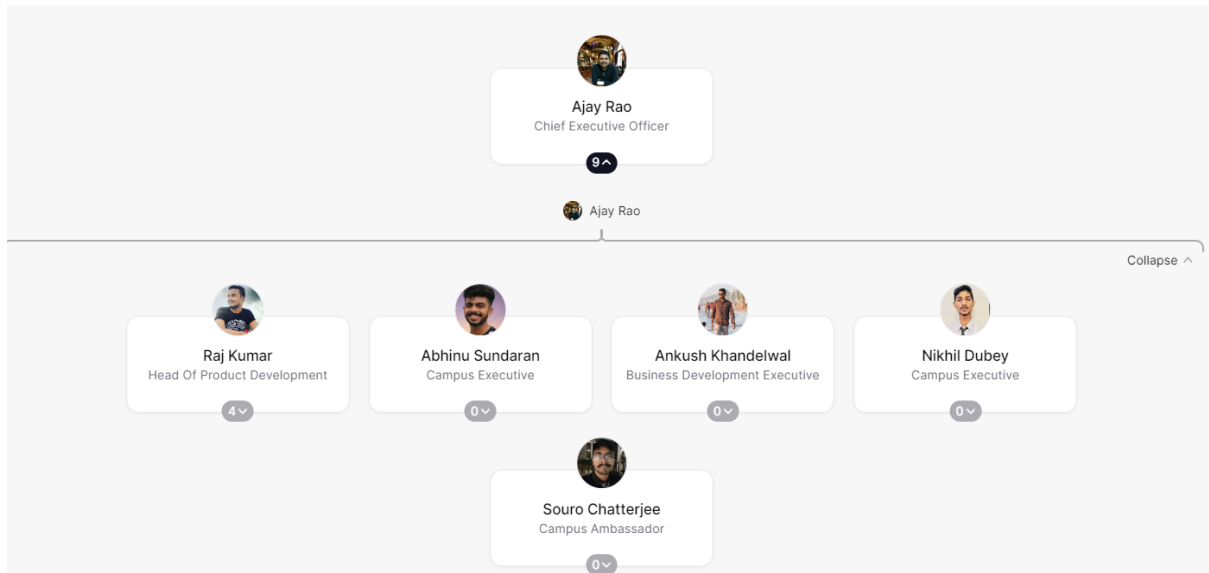
- Programming Courses: Python, Java, C++, JavaScript, algorithms, and data structures.
- Web Development Courses: HTML, CSS, JavaScript, React, Angular.
- Database Management Courses: SQL, NoSQL databases.
- Cybersecurity Courses: Network security, cryptography, ethical hacking.
- Networking Courses: Routing, switching, network protocols.
- Cloud Computing Courses: AWS, Azure, Google Cloud.
- Data Science and Analytics Courses: Statistical analysis, machine learning, big data technologies.

Non-IT Courses:

- Business Administration Courses: Management principles, organizational behavior, marketing, finance.
- Human Resource Management Courses: Recruitment, training, employee relations.
- Finance and Accounting Courses: Financial management, accounting principles.
- Marketing Courses: Market research, branding, digital marketing.
- Management Courses: Leadership styles, project management, supply chain management.

3. WORK DESCRIPTION

3.1 ORGANIZATIONAL CHART



LEVEL OF HIERARCHY

- **Chief Executive Officer:** Ajay Rao
- **Head of Product Development:** Raj Kumar
- **Campus Executive:** Abhinu Sundaran
- **Business Development Executive:** Ankush Khandelwal
- **Campus Executive:** Nikhil Dubey
- **Campus Ambassador:** Souro Chatterjee

3.2 INTERN JOB ROLE DESCRIPTION

Job Role: Python Programming Intern

Key Responsibilities:

Learning and Skill Development:

- Participate in training sessions and workshops to learn the fundamentals of Python programming language.
- Familiarize yourself with Python syntax, data structures, control flow, and basic programming concepts.
- Explore Python libraries and frameworks commonly used for software development, data analysis, and web development.

Code Review and Documentation:

- Review and analyze existing Python codebase to understand implementation details and coding standards.
- Document code changes, comments, and documentation updates following established guidelines.
- Learn best practices for writing clean, readable, and maintainable code and apply them to your own projects.

Project Support and Collaboration:

- Assist senior developers and team members in developing and maintaining Python-based software applications.
- Collaborate with cross-functional teams, including software engineers, QA testers, and product managers, to deliver project milestones on time.
- Contribute ideas, feedback, and solutions to technical challenges and brainstorming sessions.

Testing and Debugging:

- Write and execute unit tests, integration tests, and regression tests to ensure the reliability and correctness of Python code.
- Debug and troubleshoot software issues reported by users or identified during testing phases.

Continuous Learning and Improvement:

- Stay updated with the latest trends, tools, and technologies in Python programming and software development.
- Seek feedback from mentors and peers to identify areas for improvement and set personal development goals.
- Take initiative to explore new projects, experiment with different Python libraries, and expand your skill set.

Qualifications:

- Currently pursuing a degree in computer science, information technology, etc.
- Basic understanding of programming concepts and familiarity with at least one programming language (e.g., Python, Java, C++).
- Enthusiasm for learning and curiosity to explore new technologies and methodologies.
- Strong problem-solving skills, attention to detail, and eagerness to take on challenges.
- Excellent communication and interpersonal skills, with the ability to collaborate effectively in a team environment.

Benefits:

- Hands-on experience in Python programming and software development.
- Mentorship from experienced developers and industry professionals.
- Exposure to real-world projects and challenges in a supportive learning environment.
- Opportunity to build a professional network and gain insights into career paths in technology.
- Certificate of completion and potential for future employment opportunities within the organization.

3.3 PROGRAMMING LANGUAGES/TECHNOLOGY

- **PYTHON:** Python is a high-level, general-purpose programming language known for its readability and versatility. It supports multiple programming paradigms, including procedural, object-oriented, and functional programming. Python is widely used for software development, data analysis, web development, and machine learning.
- **DJANGO:** Django is a Python-based web framework that follows the model-template-view (MTV) architectural pattern. It aims to simplify the development of complex, database-driven websites by emphasizing reusability and rapid development.
- **VISUAL STUDIO CODE (VS CODE):** Visual Studio Code is a popular source-code editor developed by Microsoft, offering features like debugging, syntax highlighting, code completion, and version control integration. It supports multiple programming languages, including Python, Java, JavaScript, and C++.
- **MYSQL:** MySQL is an open-source relational database management system (RDBMS) commonly used for storing and querying structured data. It supports SQL for database management and works with various programming languages, including Python, Java, and PHP.
- **GOOGLE COLAB:** Google Colab, formerly known as Colaboratory, is a free notebook environment that runs entirely in the cloud. It provides support for many popular machine learning libraries and allows users to collaborate on Python notebooks in real-time. Google Colab offers GPU acceleration for machine learning tasks.

3.4 SOFTWARE & HARDWARE USED

SOFTWARE:

- **Python Programming Language:** Primary language for development in Python programming and machine learning. It provides a wide range of libraries and frameworks tailored for various tasks.
- **Integrated Development Environments (IDEs):**
 - **PyCharm:** PyCharm is a popular IDE for Python development, offering features like code completion, debugging, and version control integration.
 - **Jupyter Notebooks:** Jupyter Notebooks provide an interactive environment for writing and executing Python code, making them ideal for prototyping.

- **Visual Studio Code (VS Code):** VS Code is a lightweight and versatile code editor with extensive support for Python development through extensions and integrations.
- **Python Libraries and Frameworks:**
 - **NumPy:** NumPy is a fundamental library for numerical computing in Python, providing support for multi-dimensional arrays, linear algebra, and mathematical functions.
 - **Pandas:** Pandas is a powerful library for data manipulation and analysis, offering data structures like DataFrame and tools for handling missing data, reshaping, and merging datasets.
 - **Matplotlib, Seaborn, Plotly:** These libraries are used for data visualization, allowing developers to create various types of plots and charts to explore and communicate data insights effectively.
 - **Scikit-learn:** Scikit-learn is a comprehensive library for machine learning in Python, offering a wide range of algorithms for classification, regression, clustering, and dimensionality reduction.
 - **TensorFlow, Keras:** TensorFlow is an open-source machine learning framework developed by Google, while Keras is a high-level neural networks API that runs on top of TensorFlow. They are commonly used for building and training deep learning models.
 - **PyTorch:** PyTorch is another popular deep learning framework known for its dynamic computational graph and ease of use, especially for research-oriented projects.
- **Database Systems:**
 - **SQLite, MySQL, PostgreSQL:** These are popular relational database management systems (RDBMS) commonly used for storing and querying structured data in Python applications.
 - **MongoDB:** MongoDB is a NoSQL database that is often used for storing unstructured or semi-structured data, such as JSON data, in Python applications.

- **Version Control Systems:**

Git: Git is a distributed version control system widely used for tracking changes in source code during software development. Platforms like GitHub, GitLab, and Bitbucket provide hosting services for Git repositories and collaboration tools.

HARDWARE:

- **Central Processing Unit (CPU):** Intel Core i3, AMD Ryzen 3, equivalent or above for the Python Projects.
- **Graphics Processing Unit (GPU):** Recommended for machine learning tasks, not strictly required for most Python projects.
- **Memory (RAM):** At least 2GB, recommended 4GB or more.
- **Storage:** An adequate storage of 10GB free in the disk space.
- **Network Connectivity:** Internet connection for package installation, accessing online resources, and collaboration.

4. LEARNING OUTCOME

4.1 ABSTRACT OF WORK EXPERIENCE

During my internship as a Python Programming Intern, I underwent a transformative learning journey, gaining proficiency in Python programming and software development. Highlights of my experience include:

- **Learning Journey:** I began my internship by immersing myself in the basics of the Python programming language through an immersive learning experience. I became proficient in Python grammar, data structures, and control flow through workshops, structured training sessions, and independent study. By using mentorship and internet resources, I investigated Python libraries and frameworks and added more software development tools to my toolkit.
- **Problem Solving and Innovation:** I faced a variety of challenges throughout my internship that put my ability to solve problems to the test and spurred creative thinking. Whether it was optimizing code efficiency, creating effective algorithms, or troubleshooting intricate problems, I approached every challenge with curiosity and tenacity. I experimented with several solutions, iterated on feedback, and kept refining my problem-solving techniques by utilizing Python's adaptability.
- **Practical Projects:** Throughout the internship, I moved from studying to application by working on practical projects that gave my Python skills a real-world perspective. I worked in cross-functional teams and with senior engineers to develop and maintain software applications that were Python-based. Each project provided priceless learning opportunities and insights into the software development lifecycle, from writing clear, understandable code to adding new features and fixing issues.
- Emphasis on continuous learning and professional growth through mentorship and feedback.
- Reflection on the internship experience and readiness for future career opportunities.

This abstract encapsulates the key learnings and accomplishments from my internship, shaping me into a confident and skilled professional ready to tackle new challenges in Python programming and beyond.

Conclusion:

In summary, my experience as a Python programming intern has been enlightening and life-changing, molding me into a more self-assured, capable, and flexible professional. With a strong background in Python programming and a strong desire to learn new things every day, I'm ready to start a fulfilling career that will be full of growth prospects and limitless possibilities.

4.2 APPLICATION DEVELOPMENT**Library Management System Using Python****Background/ Problem Statement:**

A library is a place where a huge collection of books and resources are available which can be accessible by the users. In traditional libraries, the students have to search for books which is a hassle process and there is no proper maintenance of the database about issues and fines. The overall progress of work is slow and it is impossible to generate a fast report. The librarians have to work allotted for arranging, and sorting books in the book sales. At the same time, they have to check and monitor the lent and borrowed book details with fine.

To tackle this problem, we have designed a Library Management System using Python. Library management means efficient and effective management of material (information sources), machinery, men (human resources), technology and money to meet the objectives of the library. Our system can help librarians to work easily. This computerization of the library helps in many instances of its maintenance. It reduces the workload of management as most of the manual work done is reduced.

Working of the Project:

Our Python-based project consists of two modules: Admin and User. The admin can log in using their credentials. The admin can add, update, view and delete any book and can also update the inventory. They can also view orders by filtering the date, whether the books are returned or not, and expired orders. The user would need to register first to log in. They can manage their profile and change their password. They can search for any book by entering the book or author's name. If they find the book they want, they can issue it here.

They can view the list of orders. They can also return books. If any particular book is not returned within the given period, the fine will be shown.

In this project, the front end involves Html, CSS and JavaScript and the back end involves Python. The database: used is MySQL Database and Django is used for the framework.

Advantages:

- The system is easy to maintain.
- It is user-friendly.
- It saves human efforts and resources
- The system excludes the use of paperwork by managing all the records electronically.
- Administrator doesn't have to keep a manual track of the users.

System Description:

The system comprises 2 major modules with their sub-modules as follows:

- **Admin**
- **User**

➤ **Admin Login: The admin can log in using their credentials.**

- **Manage Books:** They can add, update, delete and view any book in the system. They can also update the inventory.

- **View Orders:** The admin can view the orders by –

- **filter by date**
- **filter by expired**
- **filter by returned/not returned**

➤ **User:**

- **Register:** The user would need to register to log in.
- **Login:** The user can log in using their credentials.
- **Profile:** They can manage and view their profile.

- **Change Password:** The user can change their password if they want.
- **Search Book:** The user can search for books by their name or author's name. If they find the book they want, they can issue it.
- **View Orders:** The user can view the list of the book ordered; they can return the book. If a book is not returned within the period, a fine will be shown.

Project Life Cycle:

The waterfall model is a classical model used in the system development life cycle to create a system with a linear and sequential approach. It is termed a waterfall because the model develops systematically from one phase to another in a downward fashion. The waterfall approach does not define the process to go back to the previous phase to handle changes in requirements. The waterfall approach is the earliest approach that was used for software development.

System Requirements:

- **Hardware Requirement:**
 - Laptop or PC
 - Windows 7 or higher
 - I3 processor system or higher
 - 4 GB RAM or higher
 - 100 GB ROM or higher
- **Software Requirement:**
 - Python
 - XAMPP Server
 - Sublime Text Editor.

Limitations/Disadvantages:

- The information stored can be susceptible to cyber hacks.
- Users cannot view the book in person.

Application: This system can be used in public libraries to ease the work of librarians and keep track of all the records.

Conclusion & Future Scope:

This website provides a computerized version of the library management system which will benefit the students as well as the staff of the library. It makes the entire process online where students can search books, staff can generate reports and perform book transactions. It also includes a facility for student login where students can see the status of books issued, request books, or provide suggestions. Moreover, it offers a teacher's login where educators can add lecture notes, provide necessary suggestions to the library, and share information about workshops or events happening in our college or nearby colleges through the online notice board.

There is a future scope for this facility wherein many more features can be added, such as online lecture video tutorials by teachers, online assignment submission facility, and a group chat feature where students can discuss various engineering issues. By incorporating these enhancements, the project can become more interactive, user-friendly, and capable of fulfilling each user's needs in the best possible way.

5. BIBLIOGRAPHY

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