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Industrial Internship Report

on Python Development

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Executive Summary

This report provides details of the Industrial Internship provided by upskill Campus and The IoT Academy in collaboration with Industrial Partner UniConverge Technologies Pvt Ltd (UCT).

This internship was focused on a project/problem statement provided by UCT. We had to finish the project including the report in 6 weeks' time.

where I developed multiple projects, including File Specifications and Allocation(MPS),Password Manager, Quiz Game, and URL Shortener.

This internship gave me a very good opportunity to get exposure to Industrial problems and design/implement solution for that. I gained hands-on experience in Python scripting, automation, data handling, and problem-sloving.

It was an overall great experience to have this internship.

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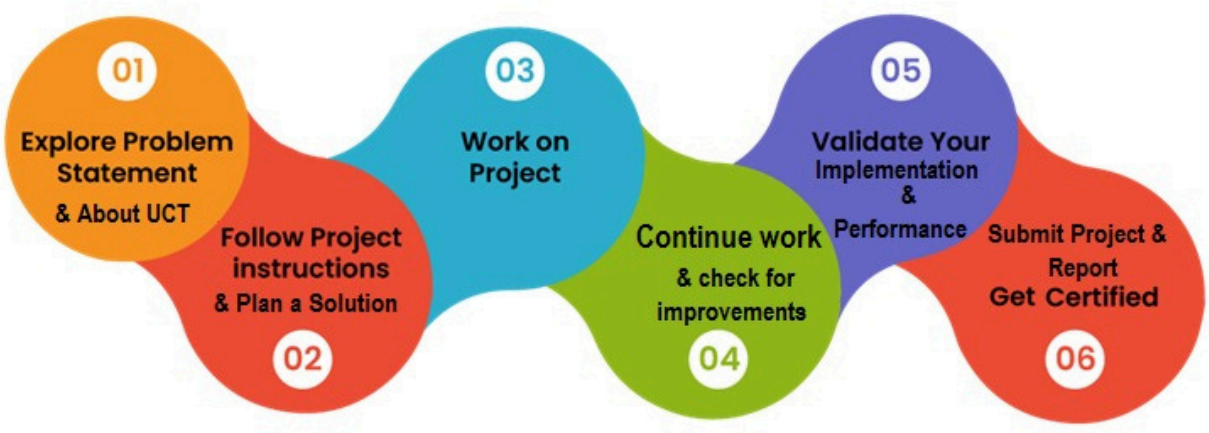
1 Preface

Summary of the whole 6 weeks' work.

This internship was a great learning experience, providing a strong foundation in Python programming and project development. The projects I worked on helped me understand file handling, encryption, API integration, and data management.

Opportunity given by USC/UCT.

How Program was planned



I would like to sincerely thank my mentors and colleagues for their continuous support and guidance throughout this internship. Special thanks to mentors and trainers for their insightful feedback, and to my peers who provided valuable collaboration and discussions that enhanced my learning experience.

Message to Juniors and peers

To all aspiring developers, I encourage you to focus on hands-on practice, work on real-world projects, and embrace debugging as a learning opportunity. Python is a powerful language. Stay curious, keep learning and don't hesitate to seek guidance from mentors and peers.

2 Introduction

2.1 About the Internship Program

The internship focused on real-world python development, covering:

- Python scripting and automation
- File system operations and management
- Data encryption and password security
- API integration and URL shortening
- Problem-solving through algorithmic coding

2.2 Objectives of the Internship

- Develop practical Python applications
- Learn and implement key programming concepts
- Improve debugging and troubleshooting skills
- work on automation and data security projects

3 Weekly Progress

3.1 Week 1: Python Development

Worked on four key projects:

- File Specifications and Allocation(MPS) - Implemented file allocation strategies and management techniques.
- Password Manager - Built a secure password storage system with encryption.
- Quiz Game - Created an interactive multiple-choice quiz game.
- URL Shortener - Developed a system to generate short URLs efficiently.

Challenges: Debugging encryption issues, optimizing file handling operations.

3.2 Week 2: Python Fundamentals

- Learned Python basics and wrote scripts for automation.
- Worked on mini-projects like a calculator, web scrapper, and automation tools.
- Faced challenges in debugging, optimizing loops, and understanding OOP concepts.
- Used resources like W3Schools, GeeksforGeeks, Udemy and Python documentation.

3.3 Week 3: Data Handling (Numpy & Pandas)

- Explored Numpy (arrays, indexing, mathematical operations).
- Practiced data filtering, sorting, and aggregation in pandas.
- Faced challenges in handling missing data, vectorized operations, and dataset conversations.
- Improved skills in data manipulation and scientific computing.

3.4 Week 4: Problem-Solving & Algorithmic coding

- Focused on algorithmic problem-solving and manual python coding.
- Solved quizzes and challenges on GeeksforGeeks, W3Schools and UpSkill.
- Improved debugging, syntax correction and logical reasoning.

4 Existing and Proposed solution

Existing Solutions and their Limitations

Currently, file organization, password management, quiz games, and URL shorteners are implemented using various software tools and frameworks. However, these solutions have some limitations.

- **File Organization Tools:** Many existing tools require manual setup or predefined rules, making them less adaptable.
- **Password Manager:** Some password managers are paid or required cloud storage, raising security concerns.
- **Quiz Games:** Many existing solutions are either too simple or require heavy frameworks, making them less customizable.
- **URL Shorteners:** Public URL shorteners often lack customization and security features.

Proposed Solutions

To address these limitations, I have developed Python-based projects that provide efficient user-friendly, and customizable solutions:

- **File Specification & Allocation System:** Automation file organization with an intelligent allocation mechanism.
- **Password Manager:** Encrypts and securely stores passwords locally, reducing reliance on third-party services.
- **Quiz Games:** A customizable quiz system with a user interface, question storage, and scoring algorithm.
- **URL Shorteners:** A lightweight URL shortener with a database for storing and retrieving shortened URLs.

5 Performance Testing

- Debugging and optimized Python scripts.
- Implemented encryption algorithms in the Password Manager.
- Improved file processing speed in the File Specifications and Allocation project.
- Optimized randomization and user interaction in the quiz game.

6 Learnings & Achievements

- Gained expertise in Python scripting and file system management.
- Worked with Numpy and Pandas for data manipulation.
- Built secure applications using encryption and API integration.
- Strengthened problem-solving skills through coding challenges.

7 Challenges Faced

- Debugging encryption and data security issues.
- Handling missing values and dataset conversion in pandas.
- Optimizing large-scale file operations efficiently.
- Improving time management for quizzes and project deadlines.

8 Future Work Scope

- Develop GUI applications for the Password Manager and Quiz Game.
- Implementation data visualization using Matplotlib and seaborn.
- Explore advanced automation using Python scripting.
- Work on full-stack Python projects integrating APIs and databases.

9 Report submission (GitHub link) - Click Here

10 Code submission (GitHub link):

1. Password manager - **Click Here**
2. File Manager - **Click Here**
3. Quiz Game - **Click Here**

11 Reference

[1. Python Official Documentation - **https://docs.python.org/3/**]

[2. Flask Documentation - **https://flask.palletsprojects.com/**]

[3. Postman API Documentation - **https://learning.postman.com/**]

12 Glossary

Acronym	Term
API	Application Programing Interface
CI/CD	Continuous Integration/ Continuous Deployment
FAT	File Allocation Table
HTML	Hyper Text Markup Language
SHA	Secure Hash Algorithm