# Industrial Internship Report on

# Url Shortener, File Organizer,

# Password Manager & Quiz game

# Prepared by

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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).<br><br>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.<br><br>My project was (Tell about ur Project)<br><br>This internship gave me a very good opportunity to get exposure to Industrial problems and design/implement solution for that. It was an overall great experience to have this internship. |

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# 1 Preface

I was fortunate to be part of the USC/UCT internship program this summer, and for 6 weeks I worked on various projects from a URL shortener to a quiz game. Throughout this period, I addressed and resolved many hurdles, acquired additional skills, and expanded my knowledge of aviation. This internship has been instrumental in determining my career trajectory and molding me a little closer into the individual I want to become, and for that reason alone, it was worth all of the lows.

The internship allowed me to transform my academic experience into a more practical one, improve my technical knowledge, and learn professionalism/work ethics. These collaborative projects with industry professionals have also allowed for growth in my ability to work as a team and communicate with others, which are skills that will prepare me well for the future.

My problem statements were majorly need-based, ranging from a URL shortener that would ease web addresses to a file organizer that may ease the hassle of file management, a password manager for the security of one's password, and a quiz game that merges education with entertainment.

The practical experience was priceless in terms of the internship opportunity that I had taken up with USC/UCT. It allowed me to use the theoretical stuff that I had learned in real-life practical issues as well, which helped increase my problem-solving and decision-making abilities. Furthermore, collaboration between professionals in the industry I got to explore provided me with a fantastic experience and improved my working/team communication skills.

My internship learning experience at USC/UCT was all-rounded and versatile, it integrated theory into practice. The challenges included approaching complex problems and developing innovative solutions both as an individual and as part of a team.
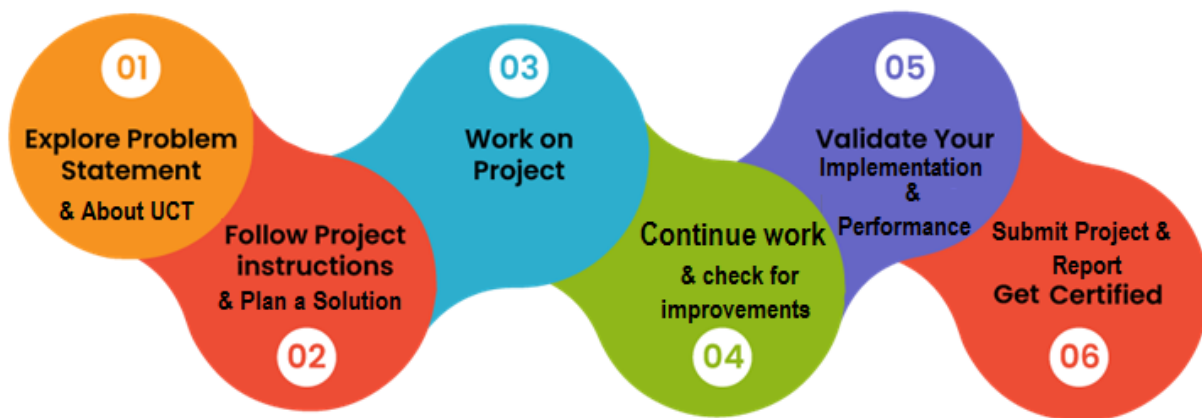
This is an internship that has been a rewarding learning experience, had me better understand the industry, enhanced my technical skills, and built practical problem-solving abilities. In this process, I was exposed to an overall enriching experience that prepared me for the challenges and opportunities beyond. Thank you to all (with names), who have helped you directly or indirectly.

All the juniors and peers, please make sure that you get yourself multiple opportunities to learn!!! An internship is an experience where you learn a lot of things and acquire knowledge about the industry you want to work in. Nothing is going to be a breeze, but take it in stride, learn from the challenges and use EVERY single opportunity you will get. Success = motivation + passion. The start and last of this sentence are similar i,e being determined, The rest of the part says always keep your spirit high you cannot fail in any work. Remember, each step you take is a part of your journey to getting there.

## 2    Introduction

### 2.1    About UniConverge Technologies Pvt Ltd

A company established in 2013 and working in Digital Transformation domain and providing Industrial solutions with prime focus on sustainability and RoI.

For developing its products and solutions it is leveraging various **Cutting Edge Technologies e.g. Internet of Things (IoT), Cyber Security, Cloud computing (AWS, Azure), Machine Learning, Communication Technologies (4G/5G/LoRaWAN), Java Full Stack, Python, Front end** etc.



## i.    UCT IoT Platform (  )

**UCT Insight** is an IOT platform designed for quick deployment of IOT applications on the same time providing valuable "insight" for your process/business. It has been built in Java for backend and ReactJS for Front end. It has support for MySQL and various NoSql Databases.

- It enables device connectivity via industry standard IoT protocols - MQTT, CoAP, HTTP, Modbus TCP, OPC UA

- It supports both cloud and on-premises deployments.

It has features to
• Build Your own dashboard
• Analytics and Reporting
• Alert and Notification
• Integration with third party application(Power BI, SAP, ERP)
• Rule Engine
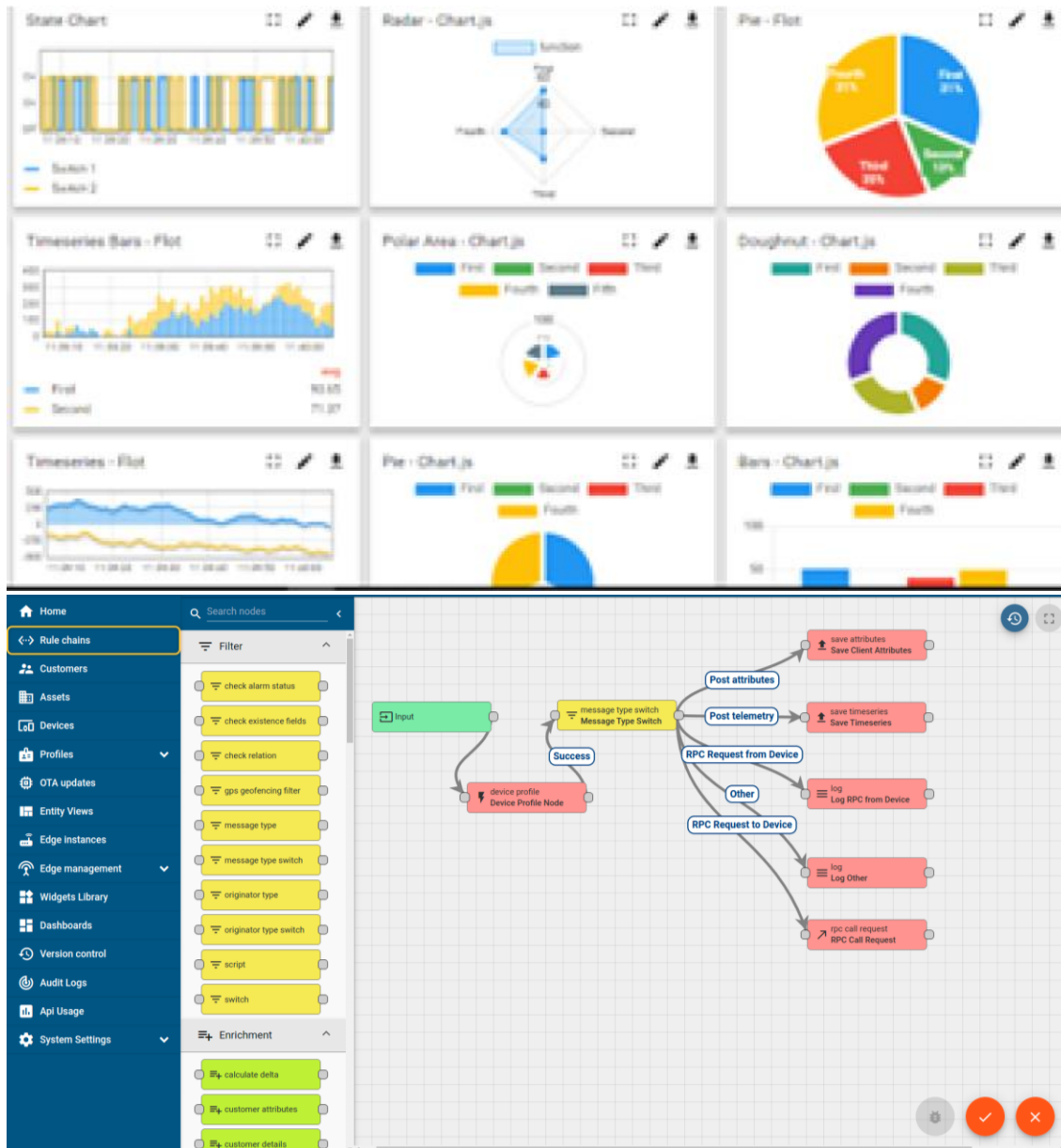
## ii.  Smart Factory Platform ( **FACTORY WATCH** )

Factory watch is a platform for smart factory needs.

It provides Users/ Factory

- with a scalable solution for their Production and asset monitoring

- OEE and predictive maintenance solution scaling up to digital twin for your assets.

- to unleased the true potential of the data that their machines are generating and helps to identify the KPIs and also improve them.

- A modular architecture that allows users to choose the service that they what to start and then can scale to more complex solutions as per their demands.

Its unique SaaS model helps users to save time, cost and money.

| Machine | Operator | Work Order ID | Job ID | Job Performance | Job Progress | | Output | | Rejection | Time (mins) | | | | Job Status | End Customer |
|---------|----------|---------------|--------|-----------------|------------|----------|---------|--------|-----------|-------|------|----------|------|------------|--------------|
| | | | | | Start Time | End Time | Planned | Actual | | Setup | Pred | Downtime | Idle | | |
| CNC_S7_81 | Operator 1 | WO0405200001 | 4168 | 58% | 10:30 AM | | 55 | 41 | 0 | 80 | 215 | 0 | 45 | In Progress | i |
| CNC_S7_81 | Operator 1 | WO0405200001 | 4168 | 58% | 10:30 AM | | 55 | 41 | 0 | 80 | 215 | 0 | 45 | In Progress | i |

### iii. **LoRaWAN** based Solution

UCT is one of the early adopters of LoRAWAN teschnology and providing solution in Agritech, Smart cities, Industrial Monitoring, Smart Street Light, Smart Water/ Gas/ Electricity metering solutions etc.

### iv. Predictive Maintenance

UCT is providing Industrial Machine health monitoring and Predictive maintenance solution leveraging Embedded system, Industrial IoT and Machine Learning Technologies by finding Remaining useful life time of various Machines used in production process.



## 2.2 About upskill Campus (USC)

upskill Campus along with The IoT Academy and in association with Uniconverge technologies has facilitated the smooth execution of the complete internship process.
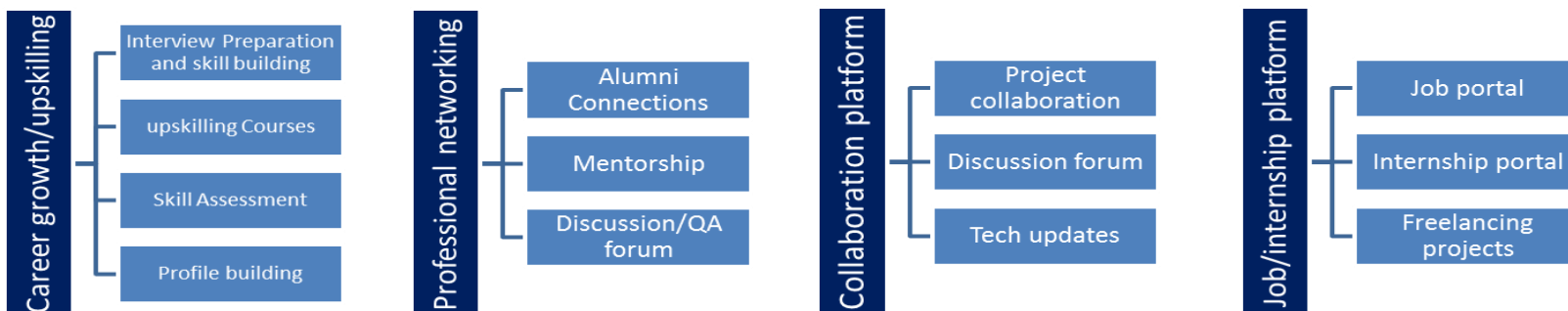
USC is a career development platform that delivers **personalized executive coaching** in a more affordable, scalable and measurable way.
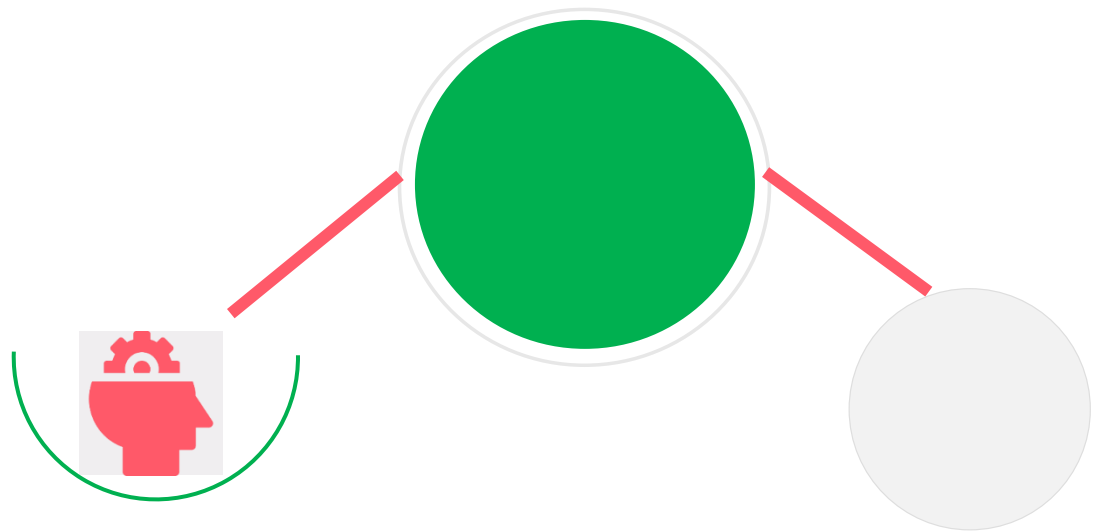
Seeing need of upskilling in self paced manner along-with additional support services e.g. Internship, projects, interaction with Industry experts, Career growth Services

upSkill Campus aiming to upskill 1 million learners in next 5 year

https://www.upskillcampus.com/

**Career growth/upskilling**
- Interview Preparation and skill building
- upskilling Courses
- Skill Assessment
- Profile building

**Professional networking**
- Alumni Connections
- Mentorship
- Discussion/QA forum

**Collaboration platform**
- Project collaboration
- Discussion forum
- Tech updates

**Job/internship platform**
- Job portal
- Internship portal
- Freelancing projects

## 2.3   The IoT Academy

The IoT academy is EdTech Division of UCT that is running long executive certification programs in collaboration with EICT Academy, IITK, IITR and IITG in multiple domains.

## 2.4   Objectives of this Internship program

The objective of this internship program was to

☛ get practical experience working in the industry.

☛ to solve real-world problems.

☛ to have improved job prospects.

☛ to have an Improved understanding of our field and its applications.

☛ to have Personal growth like better communication and problem-solving.

## 2.5   Reference

[1]      Mentors and supervisors at USC/UCT

[2]      Introduction to Programming in Python, Pyperclip module in Python

[3]      tkinter— Python interface to Tcl/Tk

## 2.6   Glossary

| Terms | Acronym |
|---|---|
| HTML | Hypertext Markup Language |
| CSS | Cascading Style Sheets |
| JSON | JavaScript Object Notation |
| OS | Operating System |

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# 3  Problem Statement

In the assigned problem statement

- To develop a URL Shortener (You may have seen this before, but the problem is to make long and complex web addresses shorter than they are). Remembering and exchanging URLs with long strings of characters is not easy, that's why users might make mistake in typing and get annoying. So I wanted to create a simple tool which can reduce this address and make it easy for people to share the content online.

- To write a program for File Organizer will take some files as input and sort those files without using high-level built-in or library functions. Many popular methods for file organization, such as creating folders and moving files around manually can be slow and inefficient. What I wanted to do was automate the process of organizing them so that users could effectively sort and find files in a logical manner.

- To securely save and manage so many passwords for several online accounts. As the list of websites and applications that require member sign-ins grows, so too do our password requirements; however, remembering more passwords is difficult enough let alone a dozen others. or writing them down on notes (which are terribly insecure for this sensitive information), you might consider one easy-to-guess pattern across multiple accounts. That is where the Password Manager project came in, which aimed to provide a secure as well as convenient way for storing and managing passwords.

- As part of the aforementioned problem statement definition, I focused on a demand for educational aids that would spark learning interest as well as matches from video games. Educational methods still rooted in tradition are typically dry and uninspiring, causing students to lose interest domains of the subject. The goal of the Quiz Game project was to solve this problem by making a game-like learning environment that would attract users and get them involved in studying.

# 4  Existing and Proposed solution

**URL shortener:**

An old solution is a Tkinter-based UI that allows you to shorten URLs easily and use it. The user can put a URL in the anchor field and click on submit, generating some random short code that is saved via JSON along with what original URL it was. Unfortunately, the current behavior of this system does not provide a simple way to manage existing shortened URLs.

To solve this issue and a few more, we introduced another part for maintaining the current shortened URLs in the system. It shows the users a list of previously shortened URLs which have been created and saved in a JSON file. It also has links to edit and delete the newly created short URLs in order to keep control of your shortened URLs without running into a usability issue.

**File Organizer:**

It's a simple system where users can organize files into folders either in their computer or in cloud storage; however, it still lacks giving the user the ability to organize files with tags or to automatically sort the files by file types or other attributes.

File Organizer is an all in one solution compiles everything and manages our files on the bases of customization. As well as archives, you can sort files by tags. Users can create their own tags, for example, you might tag a file as "Work" or other kind of similar descriptive name), now these files will automatically appear in your work folder.

**Password Manager:**

The current password manager is implemented in a simple, text-file-based solution that allows users to quickly avail it with no extra work but security without proper hashing and could be susceptible to attackers. This should ring some alarm bells as by default the passwords are stored in plain text, so if anyone gets access to the password file they can easily view them.

The proposed solution will handle the security problems of the old solution by making use of the AES algorithm for password encryption before storing them in the text file. This will make it a little secure from falling into unauthorized people's hands.

**Quiz Game:**

The existing quiz game is merely a simple application in Tkinter that presents the questions and allows one to choose one answer out of several. In this game, no tracking of user scores is maintained, nor is there a high-score list or leaderboard against which to compare.

The scoring system within the proposed solution entails a leaderboard with scores calculated based on the total number of correct answers. The result is then displayed on the screen.

## 4.1 Code submission (Github link)

[GitHub](#)

## 4.2 Report submission (Github link)

[Report File](#)

# 5   Proposed Design/ Model

**URL Shortener:** The Architecture for a URL Shortener system is similar to what we proposed above with a Tkinter-based user interface, where the users will enter a URL which they want to be shorted. Here is my approach, the system professionals a random short code and stores it in JSON with the original URL. The user can even see a list of shortened URLs that currently exist. A Flask-based web server is used to support the redirection from a shortened URL that will send the user back into his personal crawling grounds.

**File Organizer:** The File Organizer system is a command line application intended for various types of functionalities in the arena of file management, such as creating new files, viewing all the files in a directory, deleting files, reading the content of a file, editing a file, and organizing the files into folders based on their extensions.

The main() function handles the user input and executes the appropriate function depending on the user's choice. The BASE_FOLDER constant stores the base path for all operations, and try/except blocks are used for error handling in each function.

**Password Manager:** It is a GUI app for people with two main functions.

It generates strong and unique passwords by clicking on the new "Generate password" UI Button. It generates a password for letters, numbers and symbols, etc. to get high-level security.

The password can also be managed by this app, the user fills in the website name and email & password. The data entered, it can be saved in the text file to help review when necessary and saves a manual capture of records.

**Quiz Game:** The Quiz Game app is a fun and attractive educational game for all users who want to test their skills while learning new information. The application has a very basic design, but nevertheless effective and easy for users to navigate through.

The main idea of the app was about serving many quiz questions to be able play and learn in interactive way, we made it great! By using a random selection of questions for the game, no two sessions will ever be same which keeps Players excited and challenge them to come back.

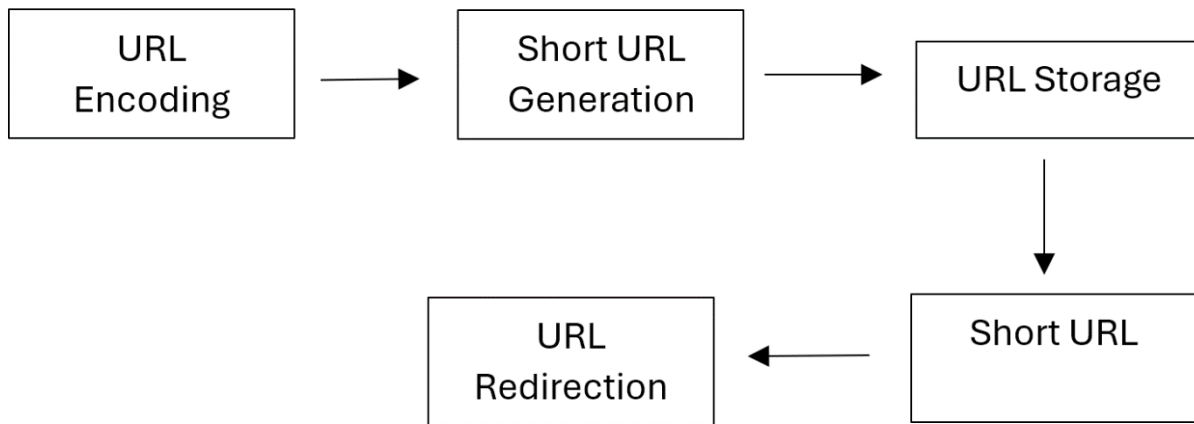## 5.1 High-Level Diagram (if applicable)



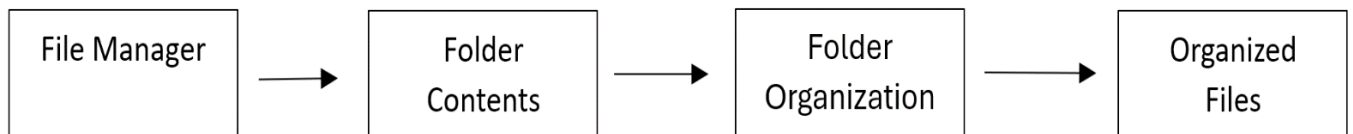**Figure 1: HIGH-LEVEL DIAGRAM OF URL Shortener**



**Figure 2: HIGH-LEVEL DIAGRAM OF File Organizer**



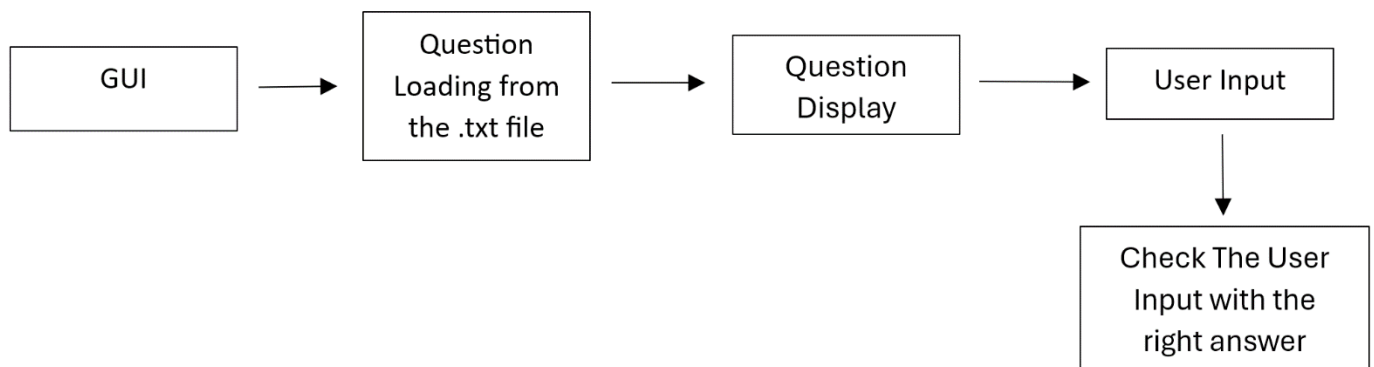**Figure 3: HIGH-LEVEL DIAGRAM OF Password Manager**



**Figure 4: HIGH-LEVEL DIAGRAM OF Quiz Game**

## 5.2 Interfaces (if applicable)

URL Shortener:

- The application supports various types of URL encoding schemes such as Base64 and hexadecimal encoding.

- The application uses an HTTP 301 redirect to redirect the user to the original URL.

- The application stores the short URLs and their corresponding original URLs in a database using a key-value pair approach

File Organizer:

- The application can support various file types such as documents, images, and videos.

- The application allows for advanced sorting options such as alphabetical, numerical, and chronological sorting.

- The application allows for bulk organization of files, making it easier for users to manage large numbers of files at once.

Password Manager:

- The application supports various encryption algorithms such as AES and SHA to encrypt the stored passwords.

- The application can be integrated with a browser extension to allow for automatic password generation and storage.

- The application stores the passwords in a secure, encrypted file that is only accessible by the user.

Quiz Game:

- The application supports multiple choice, true or false, and fill-in-the-blank question types.

- The application tracks the user's performance over time and generates personalized quiz sets based on their strengths and weaknesses.

- The application can connect to a remote server to download new quiz questions or share quiz results with other users.

# 6   Performance Test

**URL Shortener:**

The app should be able to handle enormous numbers of short URLs, without consuming lots of memory or slowing down greatly.

The application can be load-tested. This allows the application to be measured for its capability to handle a large number of incoming requests.

**File Organizer:**

The "url_encode" function uses the "base64" encoding scheme, which requires quite a lot of memory to convert an original URL to its short format. It is worth noting, however, that the "url_storage" module saves the encoded URLs efficiently enough.

**Password Manager:**

The "encrypt_password" function uses the AES encryption algorithm, which can be quite slow for long passwords or when one needs to encrypt a large amount of passwords. However, there is a certain optimization at play because the "cache_passwords" module keeps in memory a recently used passwords count; this accelerates the encryption process.

The password file, encrypted, would be stored in a "password.txt" file that can become huge if a big amount of passwords are used. However, the application zips this file to reduce its size as much as possible.

**Quiz Game:**

The "quiz_questions" module stores a large number of quiz questions and answers in a "questions.txt" file, which can become large. However, the "question_cache" module caches recently used questions in memory, reducing the need to read from the file and minimizing memory usage.

The "generate_quiz" function uses a random number generator to select questions for the quiz, which can be slow for large numbers of questions.

## 6.1 Test Plan/ Test Cases, Test Procedure and Performance Outcome

**Shorten URL:**

Test Plan/Test Cases: This set of test cases will ensure that the encoding of the URL is correct and that the shortening of the URLs works as expected.

Test Procedure: Testing applications with different URLs like longer and shorter URLs, special character URLs, and other language URLs.

**File Organizer:**

Test Plan/ Test Cases: Test cases should be designed to verify that the file organization for a variety of different file types is done correctly and that the file contents are not altered during the organization process.

Test Procedure: Text, images, and videos. Use different kinds of organization rules: by name, size, and date modified.

**Password Manager:**

Test Plan/Test Cases: The test cases have to be designed to verify whether the password encryption and decryption are proper or not and whether the encryption and decryption techniques are causing the loss of passwords or corruption of the password information.

Test Procedure:  The testing of the application has to be done with a wide variety of passwords, including long and short, with special characters included in them, and in various languages.

**Quiz Game:**

Test Plan/ Test Cases: In essence, prepare the test cases for random selection of questions in quizzes and for correct evaluation of users' answers.

Test Procedure: Perform the test for the above with large and small sets of quiz questions. Also, test different types of questions: multiple choices, true or false, fill-in-the-blank.

# 7 My learnings

In the course of working on these projects, I acquired hands-on experience with many concepts that would be applicable in real software development and management. For example, from the URL Shortener project, I learned the "base64" encoding scheme and how it can be applied to shorten URLs. In the File Organizer, I learned how to sort different types of files according to specific criteria in an organized manner. In the Password Manager, I got to know about encryption algorithms and techniques by which passwords can be stored in a secure manner.

## 8   Future work scope

Of course, there can be several ways of further development and enhancement of all these projects. For the URL Shortener, one would add analytics and click tracking, and investigate support for more encoding schemes. With integration into cloud storage services, the File Organizer can allow file management between devices. The Password Manager would be extended with functionalities like automatic password reset and secure sharing of passwords. More question types and customized quiz sets in the Quiz Game would further enhance user experience and interaction.