Cryptographic Analysis

Project Overview: The "Cryptographic Analysis" project focuses on decoding and converting encrypted data using various cryptographic methods. The key task is to decode hex strings into ASCII and then into an unknown format. This project uses Python for processing and decoding data with a user-friendly interface to handle user input and display results. The goal is to analyze the structure of the unknown data format, understand its transformation, and reverse engineer the encoding methods.

Objective:

1. To decode a given hex string into ASCII format.
2. To further decode the ASCII into a structured or unknown format.
3. To provide a user-friendly interface for running the conversions and displaying results.
4. To ensure that when the user requests new data, the output from previous inputs is cleared, and new results are shown in an organized manner.

Tools and Technologies Used:

- **Python**: Programming language used for implementing the cryptographic methods and user interface.
- **Tkinter**: GUI library for creating the interface where users can input hex data, perform conversions, and view results.
- **Base64**: For handling the encoding/decoding process related to the unknown format.

Functionality:

1. **Hex to ASCII Conversion**: The input hex value is converted into ASCII format by decoding the hex string into bytes and then interpreting the bytes as UTF-8 text.
2. **Hex to Unknown Format**: The hex string is converted into a Base64-encoded string. This process involves encoding the decoded hex bytes into Base64 to produce the unknown format.
3. **Base64 to Hex (Reverse)**: The Base64 string can be decoded back into the original hex format by reversing the encoding process.

Working:

- The user is presented with an input field where they can paste or type a hex string.

- Upon pressing the "Convert" button, the program will decode the hex into ASCII and show it on the screen.
- Additionally, the program will also encode the hex into the unknown format (Base64) and display it.
- The "Clear" button is used to erase the current output and prepare the interface for a new hex string input.
- Each conversion process is displayed clearly and structured for easy understanding.

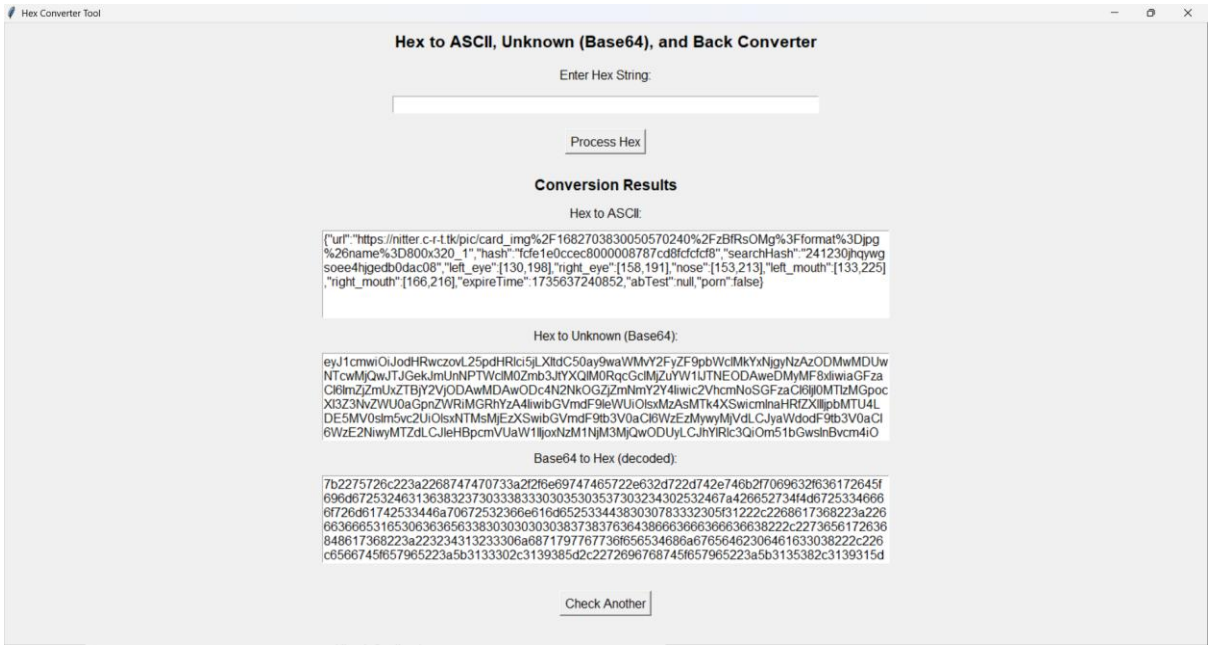
User Interface:

- **Input Field**: A text box where users can input a hex string for conversion.
- **Convert Button**: Triggers the conversion processes (Hex to ASCII and Hex to Unknown).
- **Clear Button**: Clears previous outputs and prepares the UI for new input and results.
- **Output Section**: Displays the results of both conversions (Hex to ASCII and Hex to Unknown).

Output: The output is structured as follows:

- **Hex to ASCII Conversion**: Shows the decoded ASCII string.
- **Hex to Unknown Format (Base64)**: Shows the encoded Base64 string.

Sample Output:



Conclusion: This project highlights how cryptographic techniques like Base64 encoding and hex-to-ASCII conversion work in real-world applications. It demonstrates the decoding and encoding process step-by-step, allowing users to better understand the transformation of data formats. The addition of a user interface makes it more accessible and interactive.