**CyberBlitz 2024 Challenges (Anurag)**

**a. Challenge Name**

Operation Beethoven

**b. Challenge Description**

“In the midst of the symphonic brilliance of Ludwig van Beethoven, lies a hidden secret encoded by a modern-day maestro. The genius of Beethoven's symphonies has been used to conceal a secret split into two. Look within the music.”

**c. Hints, if any**

Two audio files are given. Name or metadata of the audio files contain hints to solve the challenge.

**d. Steps documenting the techniques, procedures, and thought processes to solve your challenge.**

1. The name of mp3 file is fur\_elise.
   1. Use exiftool to view the metadata

A screenshot of a computer

Description automatically generated

Analysing the metadata, the ‘Comment’ field has encoded string ‘KZUXG5LBNRZSAY3BNYQGEZJAMRSWGZLJOZUW4ZY=’.

Use Cyberchef online to identify the encoding. The decoded text is “Visuals can be deceiving”. Spectrogram can be used to visualize the frequency spectrum of audio.

A screenshot of a computer

Description automatically generated

* 1. Use any audacity or similar spectrogram tool to display the frequency spectrum of audio signal over time. Hidden text reveals 1st half of the flag

Note: In spectrogram view, zoom out if needed to view the text properly

A screenshot of a computer

Description automatically generated

1. The name of wav file is symphony\_no9\_danielcardeenas. The Daniel Cardenas is creator of audio steganography tool called AudioStego which can be found in his GitHub repo.
   1. Download AudioStego from Github. Follow instructions in readme.md and build the tool
   2. In the tool repo, use **./hideme** to extract the hidden text (2nd half of flag) as a TXT file.

A screen shot of a computer

Description automatically generated

The flag can be identified as

CyberBlitz{YOu\_h4V3\_c0mP13t3d\_St3gO}