Steganography Tool for Image/File Hiding

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Objective:
To design and implement a Python-based tool that allows hiding and extracting text or files inside images using steganography (Least Significant Bit method). The project includes a simple GUI to make the process user-friendly and supports formats like PNG and BMP.

Tools & Libraries:
• Python 3
• Pillow (PIL) – for image processing
• Stepic – for encoding/decoding hidden data
• Tkinter – for GUI development
• Parrot OS Terminal – for running and testing

Implementation:

The tool works by converting the secret message into binary form and embedding it into the Least Significant Bits (LSB) of image pixels. This modification is invisible to the human eye but allows recovery of the hidden message later.

Sample Code (Encoding/Decoding):

```
from PIL import Image
import stepic

def hide_message(image_path, message, output_path):
    img = Image.open(image_path)
    encoded_img = stepic.encode(img, message.encode())
    encoded_img.save(output_path, 'PNG')

def extract_message(image_path):
    img = Image.open(image_path)
    decoded_msg = stepic.decode(img)
    return decoded_msg.decode()
```

Illustrations:

1. Original Image (before hiding message).

2. Encoded Image (with hidden text inside).

3. Extracted Output (terminal): 'Hello from Parrot OS!'

GUI Preview (Planned):
The Tkinter-based GUI will have the following features:
• Upload Image button
• Text box to enter secret message
• Encode and Decode buttons
• Drag-and-drop support for images

• Output window to display extracted message

Results:
• Successfully embedded hidden text into PNG image.
• Extracted the hidden message without quality loss.
• Backend functions for encoding/decoding are working.

Conclusion:
The project demonstrates the use of steganography for secure message hiding inside images. The backend encoding and decoding functions have been completed and tested. Further development will focus on GUI integration, drag-and-drop functionality, and optional encryption for enhanced security.