7 BIT FLOW

Description:

Computers see images much differently than we do. Can you see the bigger picture?

Bit_flow.jpg

1. Initial Review

For this challenge, I tried everything, including checking the metadata, using steghide, and running binwalk, but I couldn't figure out what to do. Then I reread the question, which mentioned `'7-bit'` Taking a chance, I created the script to process RGB values using 7-bit, and it worked.

2. Script crafted

This script extracts and decodes a hidden message embedded in the most significant bit (MSB) of the red channel of an image (*bit_flow.jpg*). It uses the PIL library to load the image in *RGB format* and numpy to convert it into an array for manipulation. This script isolates the *red channel* and shifts its values by *7 bits*, retaining only the MSB, resulting in a binary matrix. Each row of this matrix is converted into a binary string, divided into chunks of *8 bits*, and translated into **ASCII** characters to reconstruct the hidden message. Finally, the decoded text is printed line and will print out the flag.

Script (PY)

```
from PIL import Image
import numpy as np

img = Image.open("bit_flow.jpg").convert("RGB")
width, height = img.size

pixels = np.array(img)

ch_channel = pixels[:, :, 0]

# Extract bit 7 (MSB)
bit_plane_7 = (ch_channel >> 7) & 1
```
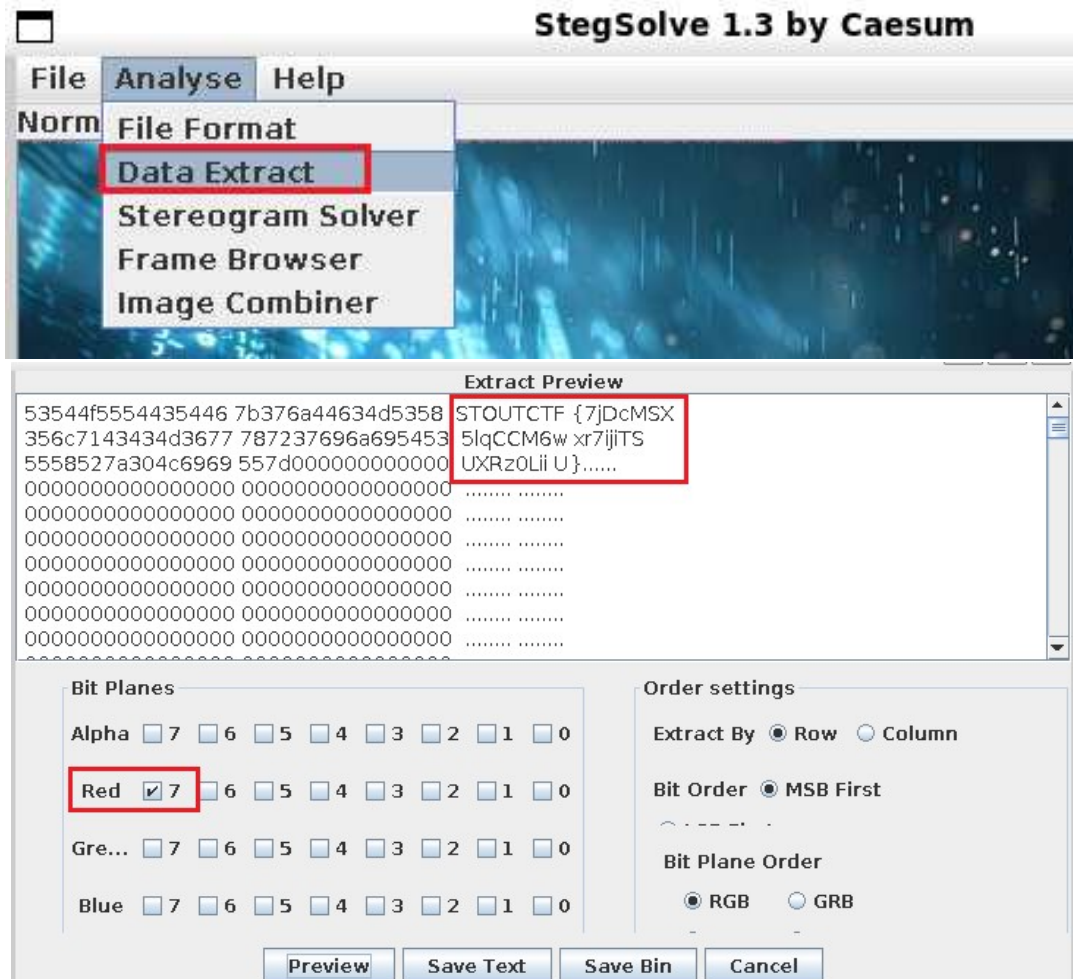
```
text_output = []
for row in bit_plane_7:
    bits = "".join(map(str, row))
    chars = [chr(int(bits[i:i + 8], 2)) for i in range(0, len(bits), 8)]
    text_output.append("".join(chars))

for line in text_output:
    print(line)
```



```
┌──(osiris☯ALICE)-[~/Downloads/CTF/STOUTCTF/7_bit_flow]
└─$ python try.py | head -n 1
STOUTCTF{7jDcMSX5lqCCM6wxr7ijiTSUXRz0LiiU}
```

3. Alternative way:

Use Stegsolve and data extraction tools to filter the 7-bit red color channel, focusing on the MSB. Since the encryption uses LSB (Least Significant Bit), it is necessary to reverse the process from the lower bits to the most significant bits to retrieve the hidden data. To install Stegsolve, you can refer to this guide: Stegsolve - bi0s wiki

Flag	STOUTCTF{7jDcMSX5lqCCM6wxr7ijiTSUXRz0LiiU}