

# CSAW - LLM

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## forensics/1black0white

### Observation:

The challenge provides us with a set of numbers that we have to process to generate the QR Code.

### Approach:

1. Convert the numbers in the txt file to binary.
2. Ensure all the binaries generated are of equal length.
3. Create a 2D matrix consisting of pixel data contained in the binaries (0,1 for black,white).
4. Create and store a grayscale image generated from the matrix. Upscale the image for better visibility.
5. Read and decode the QR image to print the flag.

### Solution:

1. Prompted ChatGPT to give a python code for steps 1-4 in the Approach.

```
import numpy as np
from PIL import Image

# Step 1: Read integers from qr_code.txt and store them in an array
with open("qr_code.txt", "r") as file:
    integers = [int(line.strip()) for line in file]

# Step 2: Convert integers to binary and ensure equal bit length
max_bit_length = len(format(max(integers), 'b'))
binary_strings = [format(num, f'0{max_bit_length}b') for num in integers]

# Step 3: Split binary strings into elements and create a 2D matrix
matrix = np.array([list(binary_str) for binary_str in binary_strings],
dtype=int)

# Step 4: Create an image using Pillow
# 0 means black, 1 means white, so we invert the colors for visualization
image_data = 255 * (1 - matrix) # 0 is black, 255 is white

# Add a white border
border_size = 10
```

```

border_color = 255 # White

# Create a larger image with the border
height, width = image_data.shape
larger_image_data = np.full((height + 2 * border_size, width + 2 *
border_size), border_color, dtype=int)

# Copy the image data into the center of the larger image
larger_image_data[border_size:border_size + height, border_size:border_size
+ width] = image_data

# Create a Pillow image from the NumPy array
image = Image.fromarray(larger_image_data.astype(np.uint8), 'L')

# Step 5: Save the image in high resolution
image_resolution = (300, 300)
image = image.resize(image_resolution)
image.save("qr_code.png")

# Step 6: Show the image (optional)
image.show()

```

2. Prompted ChatGPT again for Step 5.

```

import cv2
from pyzbar.pyzbar import decode

# Load the image using OpenCV
image = cv2.imread("qr_code.png")

# Decode the QR code
decoded_objects = decode(image)

if decoded_objects:
    for obj in decoded_objects:
        # Extract the data (decoded content) from the QR code
        data = obj.data.decode('utf-8')
        print(f"QR Code Data: {data}")
else:
    print("No QR code found in the image.")

```

**Flag:** `csawctf{1_d1dnt_kn0w_th1s_w0uld_w0rk}`

**Chat:** [CSAW LLM - QR Code \(Latest\) \(openai.com\)](#)