Silinder

date 24.10.2021

solved in time of CTF

category Forensic score 415

Description

BMP Forensic, with additional image trailing, and stride image.

Attached files

solve.java

```java
public static void main(String[] args) throws Exception {
    File f = new File("raw");
    FileInputStream fis = new FileInputStream(f);
    long l = f.length();
    int w = 1280;
    int h = 640;
    int p = (int) (l / 4); // BGRA
    System.out.println("width: " + w);
    System.out.println("height: " + h);
    System.out.println("all: " + w*h);
    System.out.println("p: " + p);

    // SEE DETAILED SOLUTIONS BELOW, THERE ARE MULTIPLE OUTPUT, INPUT THOSE LINES
AFTER THIS

    int[] bands = new int[] { 3, 2, 1, 0 };
    SampleModel sampleModel = new ComponentSampleModel(DataBuffer.TYPE_BYTE, w, h,
bands.length, w * bands.length, bands);
    WritableRaster raster = Raster.createWritableRaster(sampleModel, new
DataBufferByte(pixels, w * h * bands.length), null);
    ColorModel colorModel = new
ComponentColorModel(ColorSpace.getInstance(ColorSpace.CS_sRGB), true, false,
Transparency.TRANSLUCENT, DataBuffer.TYPE_BYTE);
    BufferedImage result = new BufferedImage(colorModel, raster,
colorModel.isAlphaPremultiplied(), null);

    ImageIO.write(result, "PNG", new File("out.png"));
}
```

Summary

Comes with broken bmp file, there were still image data intact. Then after recovered, there were spotted trailing image data, which does not satisfy the expected image size. Further image width and height analysis

from the original file and manual analysis were required.

Flag

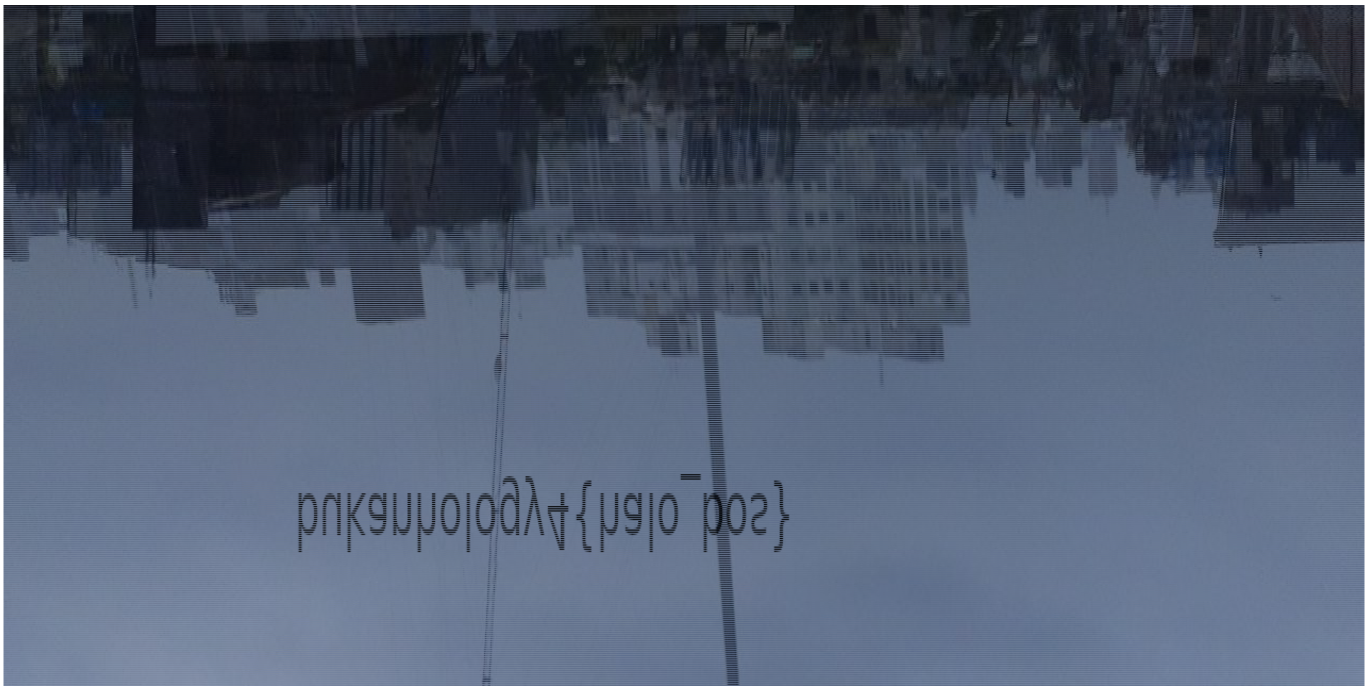
```
hology4{Haloo_bos_bos_q_semuanyaa}
```

Detailed solution

1. Analysis the header of BMP, some info may be useful later. (image width, image height, bit masks)
2. Later discovered, it was taking too long to recover the header. Then, decided to extract the raw data instead, since the header is just a standard header.
3. Export multiple version of images

- The exported `rawimage.png`

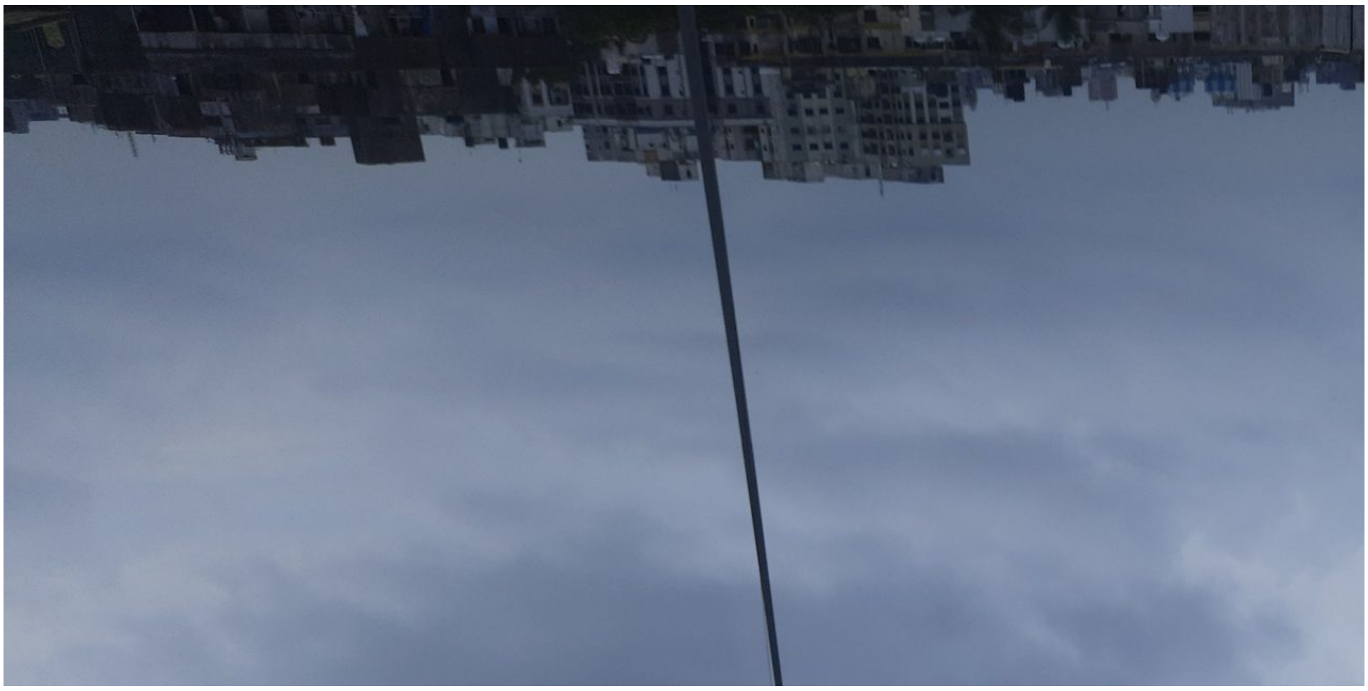
```
byte[] pixels = new byte[w*h*4];
for(int i = 0; i < h; i++) {
    fis.read(pixels, i * w * 4, w * 4);
}
```



From the resulted image, I could conclude that what I was seeing was two images, but merged into one with alternating scanline, (I call this stride for now).

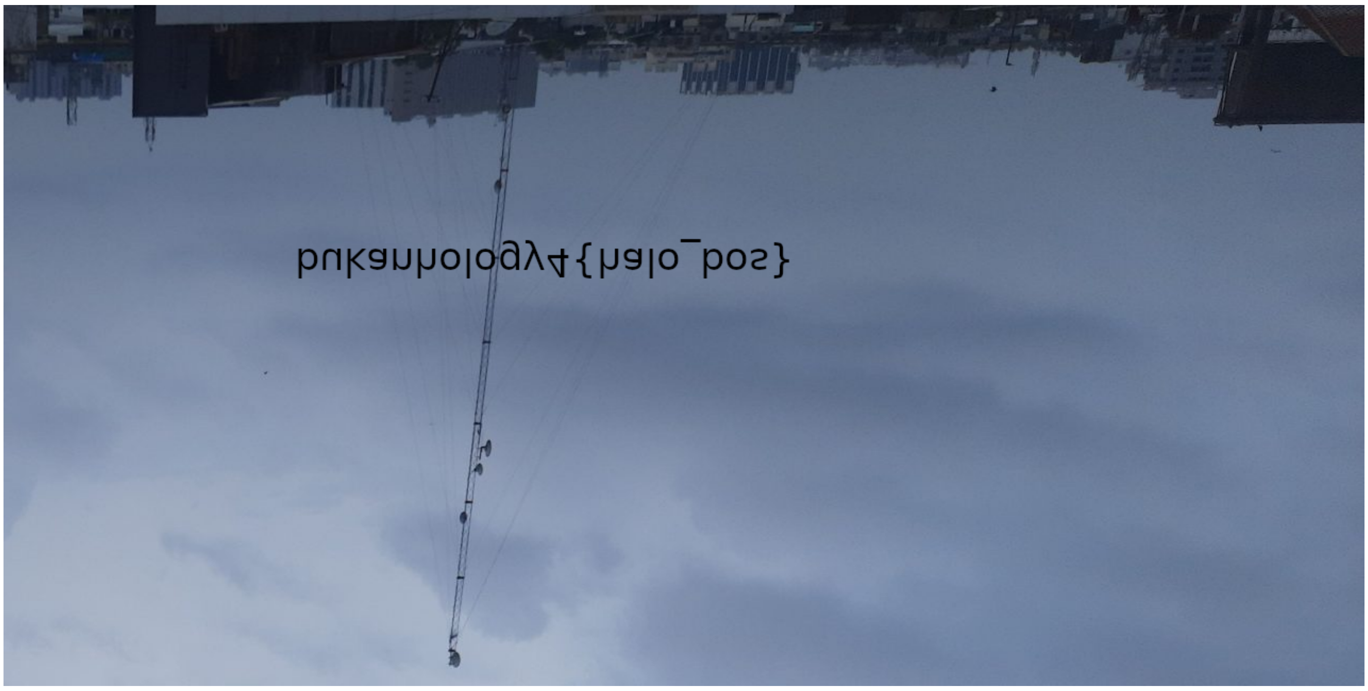
- The exported `rawimagestride0.png`

```
byte[] pixels = new byte[w*h*4];
for(int i = 0; i < h; i++) {
    fis.read(pixels, i * w * 4, w * 4);
    fis.skip(w * 4);
}
```



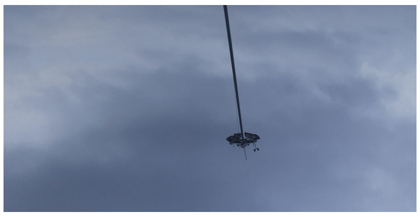
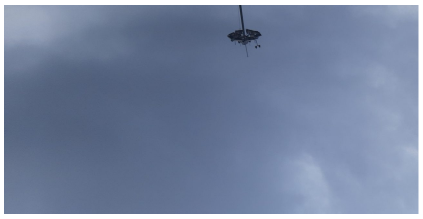
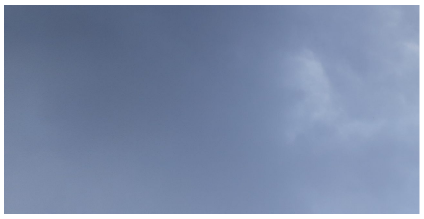
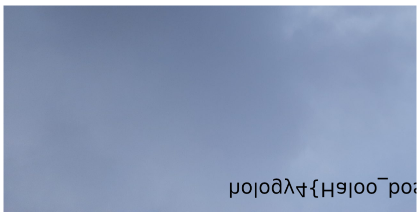
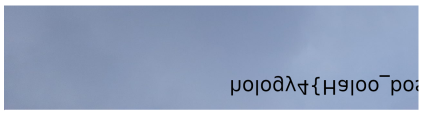
- The exported `rawimagestride1.png`, contains fake flag

```
byte[] pixels = new byte[w*h*4];
for(int i = 0; i < h; i++) {
    fis.skip(w * 4);
    fis.read(pixels, i * w * 4, w * 4);
}
```



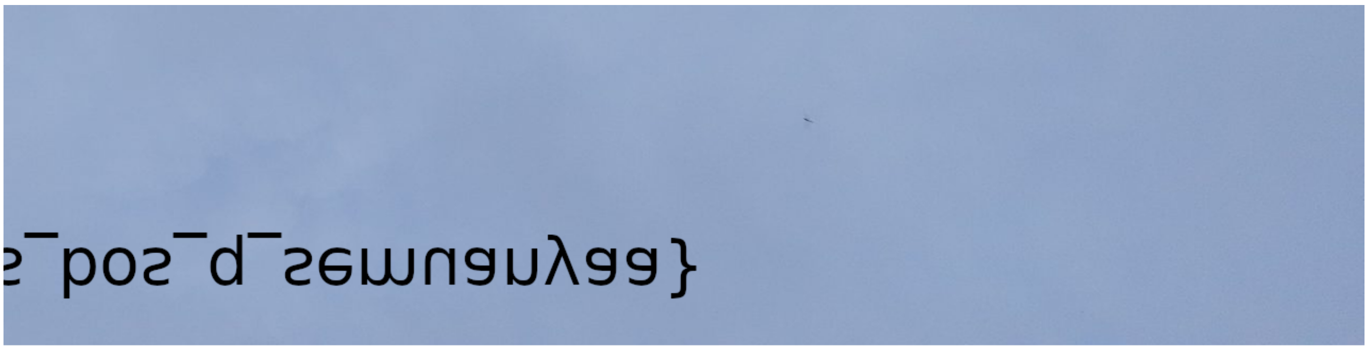
- The exported `skip{n}.png`, uncomment each line

```
byte[] pixels = new byte[w*h*4];
fis.skip(pixels.length); // skip1.png
// fis.skip(pixels.length); // skip2.png
// fis.skip(pixels.length); // skip3.png
// fis.skip(pixels.length); // skip4.png
// fis.skip(pixels.length); // skip5.png
for(int i = 0; i < h; i++) {
    fis.read(pixels, i * w * 4, w * 4);
    fis.skip(w * 4);
}
```

- The exported `skip5stride1.png`, note that the file actually contains two strides.

```
byte[] pixels = new byte[w*h*4];
fis.skip(pixels.length);
fis.skip(pixels.length);
fis.skip(pixels.length);
fis.skip(pixels.length);
fis.skip(pixels.length);
for(int i = 0; i < h; i++) {
    fis.skip(w * 4);
    fis.read(pixels, i * w * 4, w * 4);
}
```



4. Flag was found on the `skip4.png` and `skip5stride1.png`

Another solutions

I haven't thought about other solutions, but I do think that manual file repairing is possible, it'll just take ages though. Yet my solution wasn't perfect either, there were still gaps between `skip4.png` and `skip5stride1.png`, and I had to take a guess the letters between them.