Broken File Writeup

The image won't open normally, so let's look at the hex:

```
$ xxd broken-file.png | head
00000000: 0000 0000 0000 0000 0000 000d 4948 4452  ............IHDR
00000010: 0000 0190 0000 0064 0806 0000 00a8 cb66  .......d.......f
00000020: 7700 0018 d549 4441 5478 daed dd79 5494  w....IDATx...yT.
00000030: d7f9 07f0 2f51 83c6 621b db92 b460 34a8  ..../Q..b....`4.
00000040: 4431 1104 4944 81a0 44a8 7139 d154 93a3  D1..ID..D.q9.T..
00000050: 18b7 6881 2241 89a0 9c48 54b4 4069 9554  ..h."A...HT.@i.T
00000060: 141b 44c0 2648 415c 42c4 050e 8b2c 21c6  ..D.&HA\B....,!.
00000070: b00a 0841 023a 1c59 1454 4004 64ee ef0f  ...A.:.Y.T@.d...
00000080: 7f73 cf3b 32ef 6c0c 8be9 f339 67ce 1998  .s.;2.l....9g...
00000090: fbae 73df 79ee f6de 578f 31c6 4008 2184  ..s.y...W.1.@.!.
```

The block of `0`s at the start is where the file header should be. The file name suggests it's a PNG, so that part should be (in hex) "`89 50 4e 47 0d 0a 1a 0a`"[1]. Replacing the block of `0`s with that hex should look like:

```
$ xxd broken-file-solved.png | head
00000000: 8950 4e47 0d0a 1a0a 0000 000d 4948 4452  .PNG........IHDR
00000010: 0000 0190 0000 0064 0806 0000 00a8 cb66  .......d.......f
00000020: 7700 0018 d549 4441 5478 daed dd79 5494  w....IDATx...yT.
00000030: d7f9 07f0 2f51 83c6 621b db92 b460 34a8  ..../Q..b....`4.
00000040: 4431 1104 4944 81a0 44a8 7139 d154 93a3  D1..ID..D.q9.T..
00000050: 18b7 6881 2241 89a0 9c48 54b4 4069 9554  ..h."A...HT.@i.T
00000060: 141b 44c0 2648 415c 42c4 050e 8b2c 21c6  ..D.&HA\B....,!.
00000070: b00a 0841 023a 1c59 1454 4004 64ee ef0f  ...A.:.Y.T@.d...
00000080: 7f73 cf3b 32ef 6c0c 8be9 f339 67ce 1998  .s.;2.l....9g...
00000090: fbae 73df 79ee f6de 578f 31c6 4008 2184  ..s.y...W.1.@.!.
```

Then opening the PNG shows an image of the flag:

`Intake24{So-N0-H34D?}`

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[1] http://www.libpng.org/pub/png/spec/1.2/PNG-Rationale.html#R.PNG-file-signature