

Decrypting Genesis

These puzzles are part of a four-part series. Puzzles will build on complexity.

Genesis is a steganography puzzle, with simple encoding techniques.

Part 1 – Decoding Binary

On the left side of the puzzle, the user will notice a long binary string.

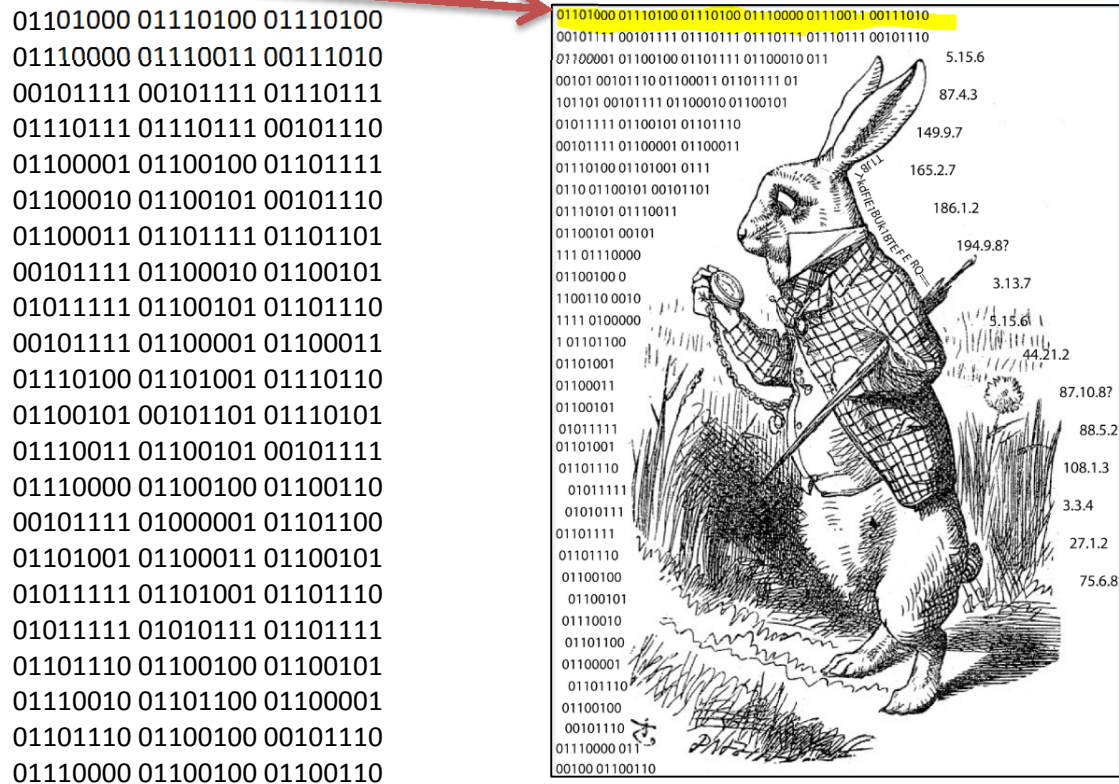


FIGURE 1 – GENESIS – BINARY STRING

Once decoded, this binary string will reveal a URL, which forwards to a PDF download of the book “Alice’s Adventures in Wonderland.”¹

A binary to Ascii converter can be utilized to decode this binary string, as shown in Figure 2.²

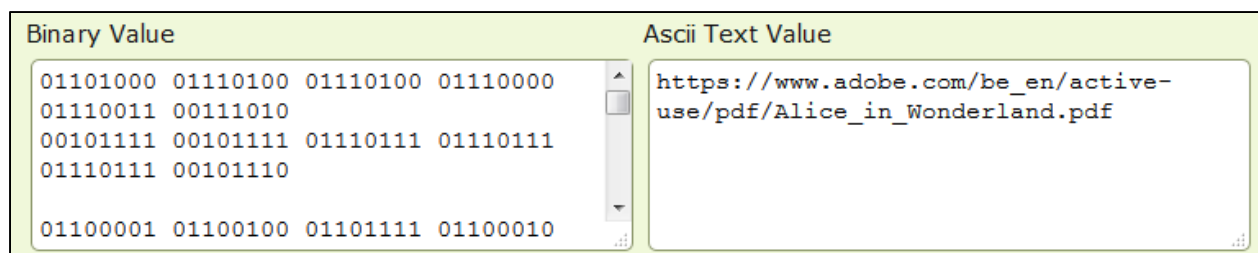


FIGURE 2 – BINARY TO ASCII CONVERSION

¹ https://www.adobe.com/be_en/active-use/pdf/Alice_in_Wonderland.pdf

² <http://www.binaryhexconverter.com/binary-to-ascii-text-converter>

Part 2 – Decrypting the Arnold Cipher

The decoding of the binary string is significant, because the puzzle on the right side of the picture utilizes an Arnold Cipher, and directly relates to the decoded URL/PDF. The user will utilize the “Alice’s Adventures in Wonderland” PDF to decrypt the Arnold Cipher. This cipher consists of a series of three numbers separated by periods, which represent:

- A page number of the agreed book, [which is gleaned by the binary string that downloads the specific version of the book]
- A line number on that page, and
- A word number in that line.

The user will decode the cipher by looking up the page number, line number, and word number until all sets of numbers have been deciphered.

Cipher Line	Answer
5.15.6	<p style="text-align: center;">RABBIT-HOLE. 6</p> <p>1 her, still it was good practice to say it over)</p> <p>2 “—yes, that’s about the right distance—but</p> <p>3 then I wonder what Latitude or Longitude</p> <p>4 I’ve got to?” (Alice had not the slightest</p> <p>5 idea what Latitude was, or Longitude either, but</p> <p>6 she thought they were nice grand words to say.)</p> <p>7 Presently she began again. “I wonder if</p> <p>8 I shall fall right <i>through</i> the earth! How funny</p> <p>9 it’ll seem to come out among the people that</p> <p>10 walk with their heads downwards! The Anti-</p> <p>11 pathies, I think—” (she was rather glad there</p> <p>12 <i>was</i> no one listening, this time, as it didn’t</p> <p>13 sound at all the right word) “—but I shall</p> <p>14 have to ask them what the name of the country</p> <p>15 is, you know. Please, Ma’am, is this New</p>
87.4.3	<p style="text-align: center;">PIG AND PEPPER. 87</p> <p>1 or two: wouldn’t it be murder to leave it</p> <p>2 behind?” She said the last words out loud, and</p> <p>3 the little thing grunted in reply (it had left off</p> <p>4 sneezing by this time). “Don’t grunt,” said</p>

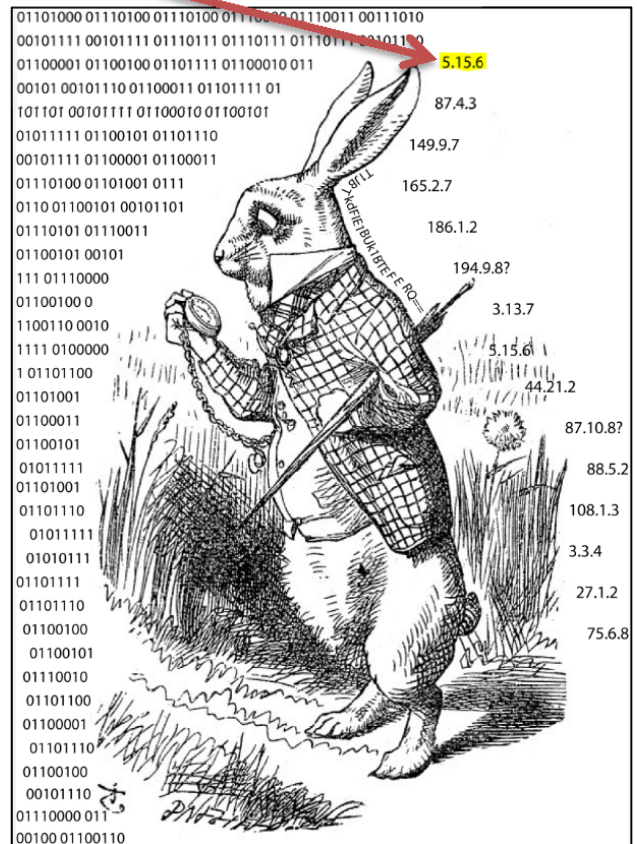


FIGURE 3 – GENESIS – ARNOLD CIPHER

149.9.7	<p>QUADRILLE. 149</p> <p>1 "The lobsters!" shouted the Gryphon, with 2 a bound into the air. 3 "—as far out to sea as you can—" 4 "Swim after them!" screamed the Gryphon. 5 "Turn a somersault in the sea!" cried the 6 Mock Turtle, capering wildly about. 7 "Change lobsters again!" yelled the Gryphon 8 at the top of its voice. → 9 "Back to land again, and—that's all the first</p>
165.2.7	<p>THE TARTS? 165</p> <p>1 writing down "stupid things!" on their slates, → 2 and she could even make out that one of them</p>
186.1.2	<p>186 ALICE'S EVIDENCE</p> <p>→ 1 Why, there they</p>
194.9.8?	<p>194 COLOPHON</p> <p>1 This first true typographically accurate replica of the 2 original Macmillan edition was produced in Chicago by 3 the staff of VolumeOne. Type was set exclusively in 4 Monotype Modern with only slight adjustments to the set. 5 Monotype Modern, known in metal as Modern Extended, 6 was originally adapted from 19th century types designed 7 by British foundry Miller & Richard. It represents not 8 only the nearest known PostScript match to the original → 9 type used for this book, but also is probably the only</p>
3.13.7	<p>RABBIT-HOLE. 3</p> <p>1 burning with curiosity, she ran across the field 2 after it, and was just in time to see it pop 3 down a large rabbit-hole under the hedge. 4 In another moment down went Alice after 5 it, never once considering how in the world 6 she was to get out again. 7 The rabbit-hole went straight on like a 8 tunnel for some way, and then dipped suddenly 9 down, so suddenly that Alice had not a moment 10 to think about stopping herself before she found 11 herself falling down what seemed to be a very 12 deep well. → 13 Either the well was very deep, or she fell</p>

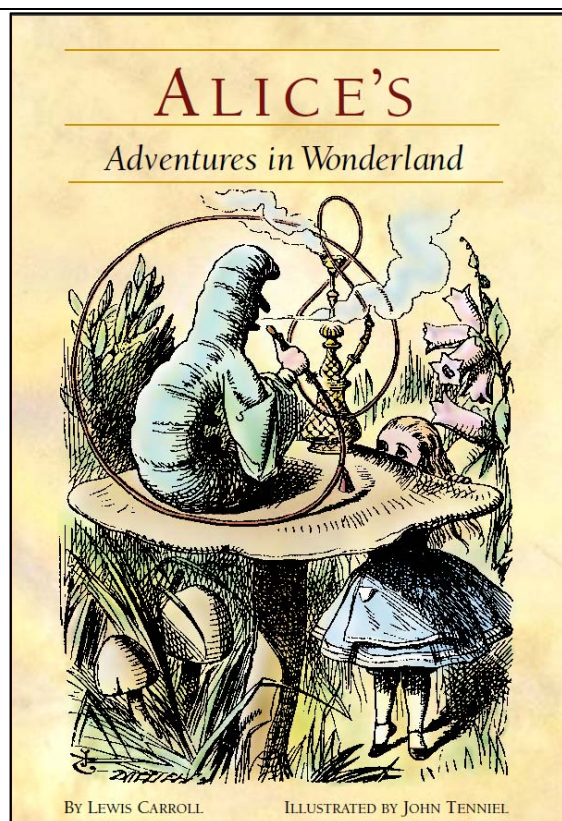


FIGURE 4 –ALICE'S ADVENTURES IN WONDERLAND

5.15.6	<p style="text-align: center;">RABBIT-HOLE. 5</p> <p>1 her, still it was good practice to say it over) 2 “—yes, that’s about the right distance—but 3 then I wonder what Latitude or Longitude 4 I’ve got to?” (Alice had not the slightest 5 idea what Latitude was, or Longitude either, but 6 she thought they were nice grand words to say.) 7 Presently she began again. “I wonder if 8 I shall fall right <i>through</i> the earth! How funny 9 it’ll seem to come out among the people that 10 walk with their heads downwards! The Anti- 11 pathies, I think—” (she was rather glad there 12 <i>was</i> no one listening, this time, as it didn’t 13 sound at all the right word) “—but I shall 14 have to ask them what the name of the country 15 is, you know. Please, Ma’am, <i>is</i> this New</p>
44.21.2	<p style="text-align: center;">44 THE RABBIT SENDS</p> <p>1 words “DRINK ME,” but nevertheless she un- 2 corked it and put it to her lips. “I know 3 <i>something</i> interesting is sure to happen,” she 4 said to herself, “whenever I eat or drink any- 5 thing; so I’ll just see what this bottle does. 6 I do hope it’ll make me grow large again, for 7 really I’m quite tired of being such a tiny 8 little thing!” 9 It did so indeed, and much sooner than she 10 had expected: before she had drunk half the 11 bottle, she found her head pressing against the 12 ceiling, and had to stoop to save her neck from 13 being broken. She hastily put down the bottle, 14 saying to herself, “That’s quite enough—I hope 15 I shan’t grow any more—As it is, I can’t get 16 out at the door—I do wish I hadn’t drunk 17 quite so much!” 18 Alas! It was too late to wish that! She 19 went on growing and growing, and very soon 20 had to kneel down on the floor: in another 21 minute <i>there</i> was not even room for this, and</p>
87.10.8?	<p style="text-align: center;">FIG AND PEPPER. 87</p> <p>1 or two: wouldn’t it be murder to leave it 2 behind?” She said the last words out loud, and 3 the little thing grunted in reply (it had left off 4 sneezing by this time). “Don’t grunt,” said 5 Alice: “that’s not at all a proper way of 6 expressing yourself.” 7 The baby grunted again, and Alice looked 8 very anxiously into its face to see what was the 9 matter with it. There could be no doubt that 10 it had a <i>very</i> turn-up nose, much <i>more</i> like a</p>

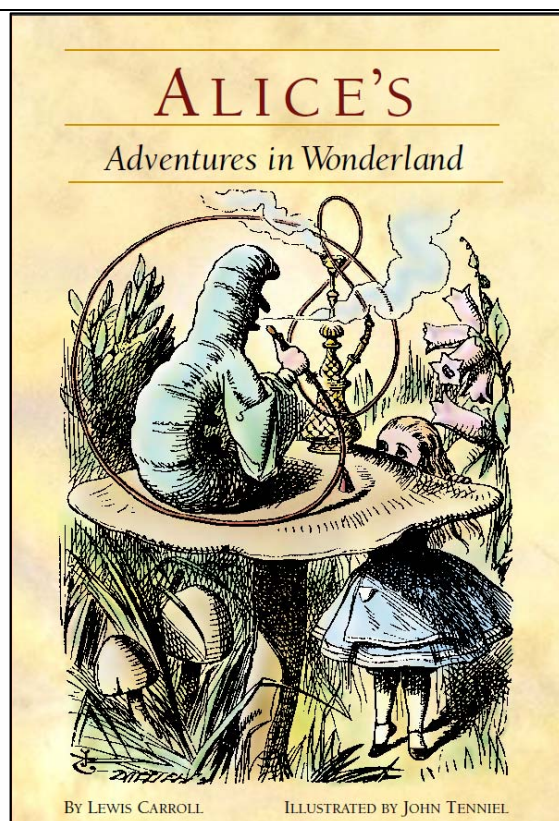
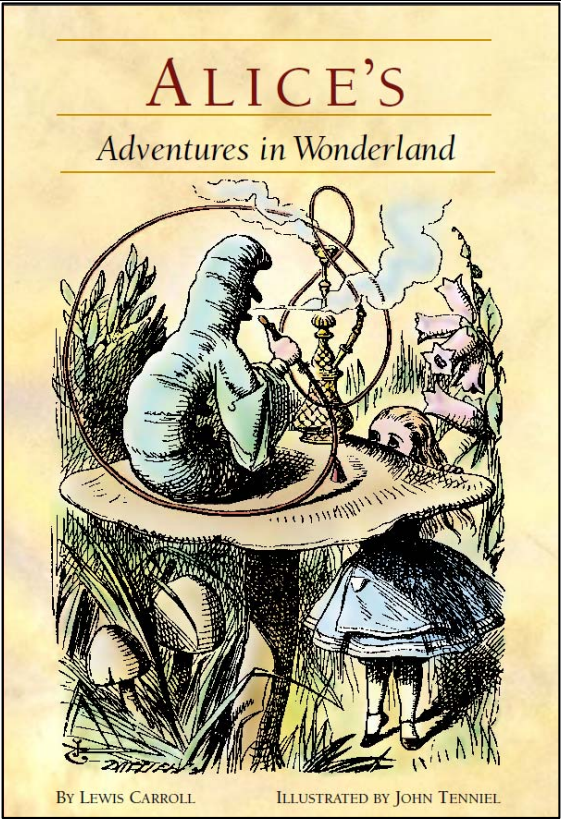


FIGURE 4 –ALICE’S ADVENTURES IN WONDERLAND

88.5.2	<p>88 FIG AND PEPPER.</p> <p>1 Alice was just beginning to think to herself,</p> <p>2 "Now, what am I to do with this creature</p> <p>3 when I get it home?" when it grunted again,</p> <p>4 so violently, that she</p> <p>→ 5 looked down into its</p>	 <p>BY LEWIS CARROLL ILLUSTRATED BY JOHN TENNIEL</p> <p>FIGURE 4 –ALICE’S ADVENTURES IN WONDERLAND</p>
108.1.3	<p>108 A MAD TEA-PARTY.</p> <p>→ 1 "Treacle," said the Dormouse, without consider-</p>	
3.3.4	<p>RABBIT-HOLE. 3</p> <p>1 burning with curiosity, she ran across the field</p> <p>2 after it, and was just in time to see it pop</p> <p>→ 3 down a large rabbit-hole under the hedge.</p>	
27.1.2	<p>OF TEARS. 27</p> <p>→ 1 offended. "We won't talk about her any more</p>	
75.6.8	<p>CATERPILLAR. 75</p> <p>1 an open place, with a little house in it about</p> <p>2 four feet high. "Whoever lives there," thought</p> <p>3 Alice, "it'll never do to come upon them <i>this</i></p> <p>4 size: why, I should frighten them out of their</p> <p>5 wits!" So she began nibbling at the right-hand</p> <p>→ 6 bit again, and did not venture to go near the</p>	

The decrypted cipher outputs:

“Is this all there is? Or is there more?

Down the rabbit-hole we go”

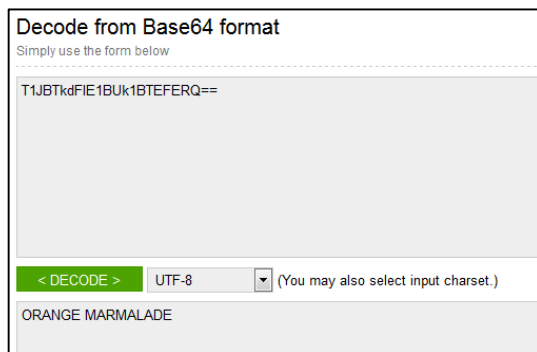
This will hopefully lead the user to thinking about how the puzzle may have more than one layer.

Part 3 – Decoding Base64

Upon further investigation, the user will also notice a third string of text:

T1JBTKdFIE1BUk1BTEFERQ==

This string is encoded with base64. In order to decode this, the user can just type the string into a base64 decoder, as shown below:



The screenshot shows a web form titled "Decode from Base64 format" with the instruction "Simply use the form below". A text input field contains the string "T1JBTKdFIE1BUk1BTEFERQ==". Below the input field is a green button labeled "< DECODE >". To the right of the button is a dropdown menu set to "UTF-8" with a note "(You may also select input charset.)". The output field at the bottom displays the decoded text "ORANGE MARMALADE".

FIGURE 4 – DECODING BASE64³

This string decodes to:

ORANGE MARMALADE

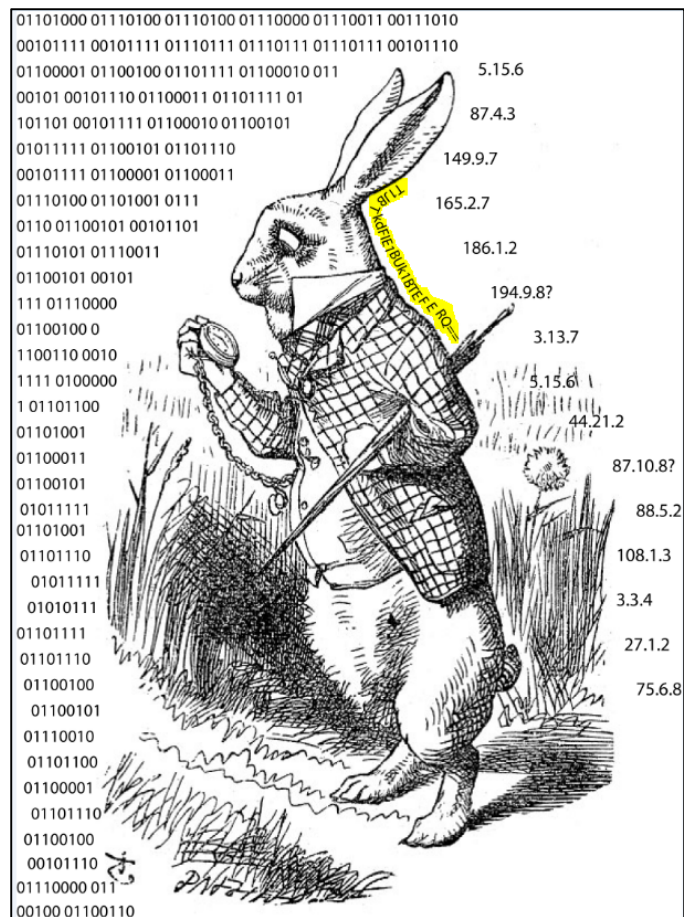


FIGURE 5 – GENESIS – BASE64

³ <https://www.base64decode.org/>

Part 4 – Steganalysis and Decryption

Using the context clues from the book cipher and the decoded base64 key of “ORANGE MARMALADE,” the user can deduce that there is more to this image that utilizes the key. Using steganalysis techniques such as histogram analysis or steganography tools such as StegSecret, Digital Invisible Ink Toolkit, or Virtual Steganographic Laboratory (VSL), will illuminate the usage of steganography in the puzzle.

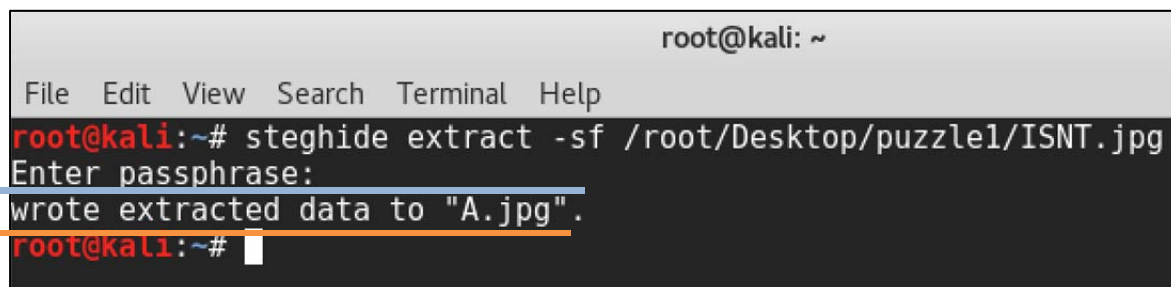
The user will have to figure out which software was used to complete the steganography or use an online cracker that cycles through all known steganography tools to decrypt the steganography. To get the file hidden in this picture, the user will have to download a program called steghide.

To install steghide, the user will need to install the dependencies, including libmcrypt, libmhash, and libjpeg62, and compile the program or install it from a package in order to use the software in Linux.

Once the user successfully downloads and configures steghide correctly, they will have to run it from the terminal and figure out what commands to type in, in order to extract the text file.

The command to extract the text file is as follows:

```
steghide extract -sf /"picture location goes here"/ISNT.jpg
```



```
root@kali: ~
File Edit View Search Terminal Help
root@kali:~# steghide extract -sf /root/Desktop/puzzle1/ISNT.jpg
Enter passphrase:
wrote extracted data to "A.jpg".
root@kali:~#
```

FIGURE 6 – DECRYPTING GENESIS

→ This is where the user will enter in the passphrase “ORANGE MARMALADE”

→ The extracted data will then be written to their pre-designated location, and the user will be able to open the A.jpg file.

Part 5 – Pieces of Four

Upon opening the A.jpg file, the user will notice that there is only part of an image available for viewing. This is part of a larger puzzle that will be revealed later.

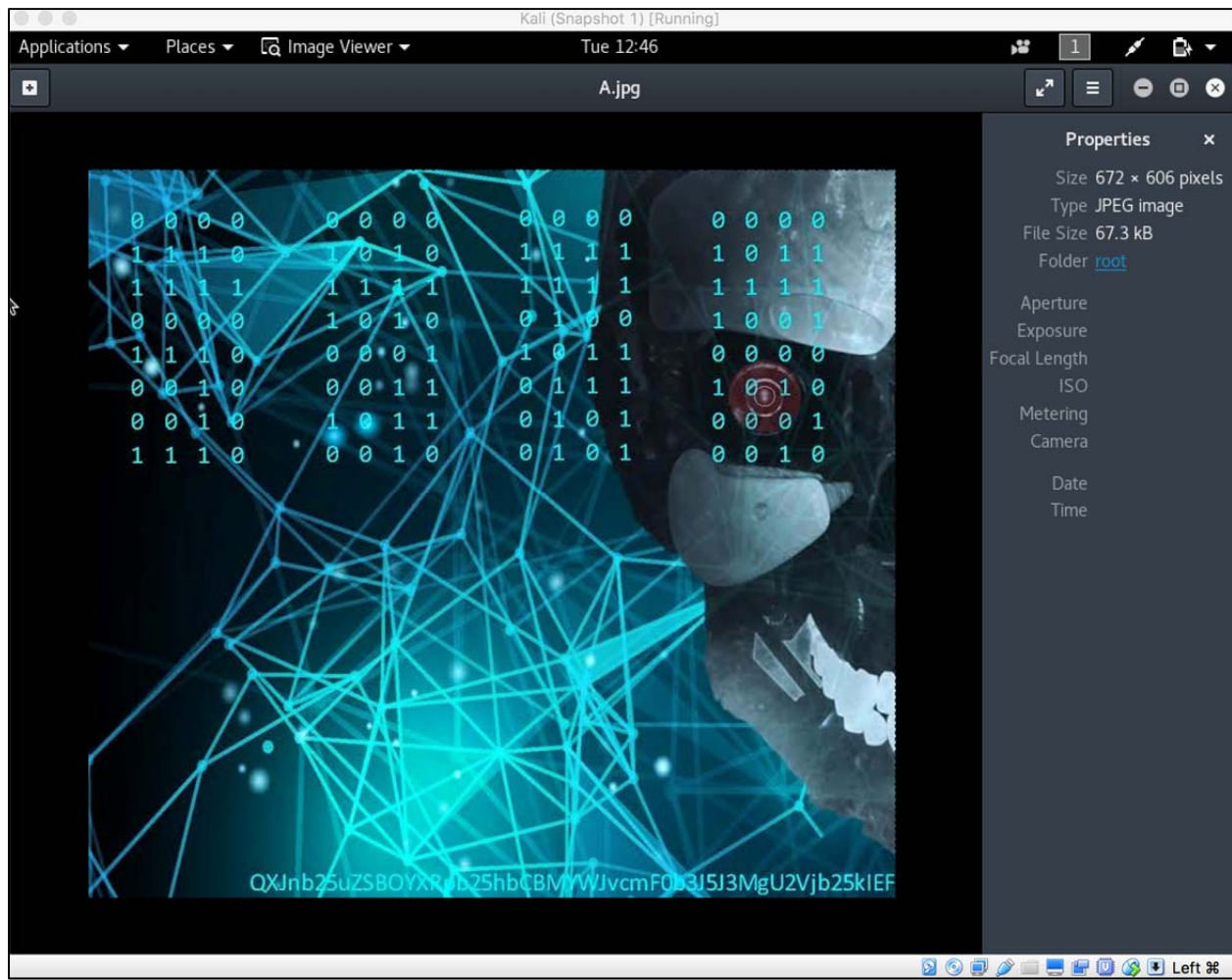


FIGURE 7 – PIECES OF FOUR