CSE 5381,4392   Information Security II (Cryptography)
Spring 2022, © DL, UTA, 2022

       Programming Assignment
       Steganography
       Due: On Canvas

Description:

 The user will give a plaintext file which can be any format (P), a message (M) that
 may also be of any format, and three additional parameters (S) the starting bit number,
 (L) the length (actually the periodicity) of the replacement (in bits) and
 (C) the chosen mode of operation.

1. Given a message (M) which may be of any format (commonly a text, JPG, MPG, or
   similar) which will be the message we wish to "hide".

2. And, given a file (P) which will act as a carrier, one wishes to "embed" a
   message (M – the payload) by "modulating" (changing) the contents of the carrier
   (P).

3. With the carrier (P) (this is the "plaintext" carrier) which is length LenP bits,
   one wants to change every Lth bit, (where L is supplied by the user).
   Every Lth bit is replaced by successive bits from M, the message.

4. Frequently, we wish to skip S bits at the beginning of P, because of the format
   or "type" of P (otherwise P will appear "corrupted").

5. A simple enhancement would allow L to change during processing (L = 8, then 16,
   then 28, then 8 again, etc.), which will be specified by the mode (C).

6. Both the message (M) and the plaintext (P) may be of any format (commonly a JPG,
   MP4, OGG, MPG, AVI, MOV, WAV, DOC, text or similar)

7. This process should be reversible, to be able to retrieve the message.

8. For compressed files (jpg, etc.) you will often get significantly better results
   if you decompress first and modify that, but not recompress (why not?)

To do:

 Implement (both placement and retrieval)

 Discuss how someone could find M or P, given (only) L.

  These may be of some help (?):
   http://graphics.stanford.edu/~seander/bithacks.html
   https://github.com/scott-griffiths/bitstring

Background:
https://www.wired.com/story/steganography-hacker-lexicon/
https://null-byte.wonderhowto.com/how-to/introduction-steganography-its-uses-0155310/
https://null-byte.wonderhowto.com/how-to/steganography-hide-secret-data-inside-image-audio-file-seconds-0180936/
https://www-users.cs.umn.edu/~hoppernj/tc-stego.pdf

Please, Submit ONLY to Canvas.
All work must be your own, you may reference web sites, books, etc, but
You MUST site the references.