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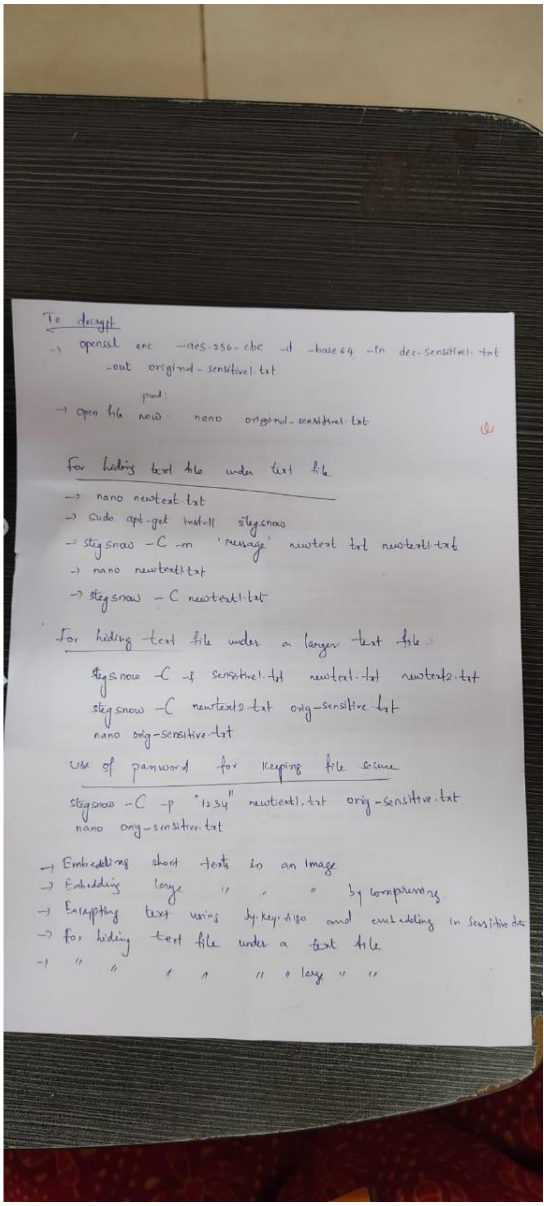
19BCE1027

Information hiding using Steghide and Stegsnow

Commands to execute



To decrypt

```
→ openssl enc -aes-256-cbc -d -base64 -in dec-sensitive1.txt
      -out original-sensitive1.txt
          pwd:
→ open file now.  nano original-sensitive1.txt
```

For hiding text file under text file

```
→ nano newtext.txt
→ sudo apt-get install stegsnow
→ stegsnow -C -m 'message' newtext.txt newtext1.txt
→ nano newtext1.txt
→ stegsnow -C newtext1.txt
```

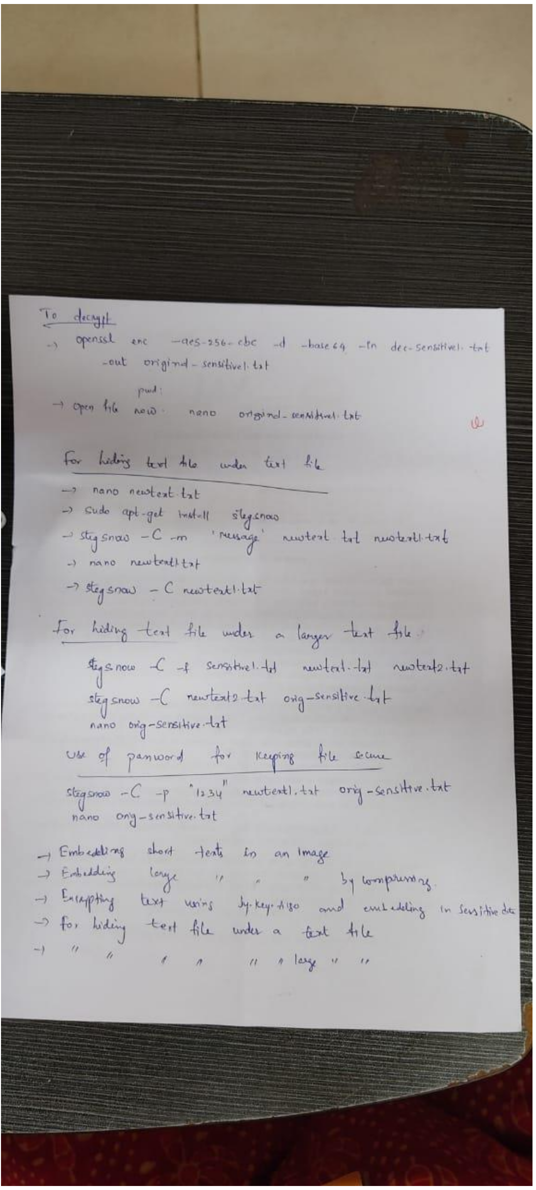
For hiding text file under a larger text file

```
   stegsnow -C -f sensitive1.txt newtext.txt newtext2.txt
   stegsnow -C newtext2.txt orig-sensitive.txt
   nano orig-sensitive.txt
```

Use of password for keeping file secure

```
stegsnow -C -p "1234" newtext1.txt orig-sensitive.txt
nano orig-sensitive.txt
```

→ Embedding short texts in an image
→ Embedding large " " " by compressing
→ Encrypting text using sy. key. Algo and embedding in sensitive data
→ for hiding text file under a text file
→ " " " " " " large " "



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      -out original-sensitive1.txt
          pwd:
→ open file now.  nano original-sensitive1.txt
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→ nano newtext1.txt
→ stegsnow -C newtext1.txt
```

For hiding text file under a larger text file

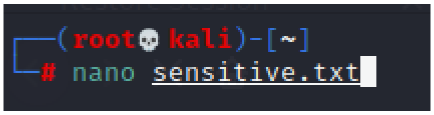
```
   stegsnow -C -f sensitive1.txt newtext.txt newtext2.txt
   stegsnow -C newtext2.txt orig-sensitive.txt
   nano orig-sensitive.txt
```

Use of password for keeping file secure

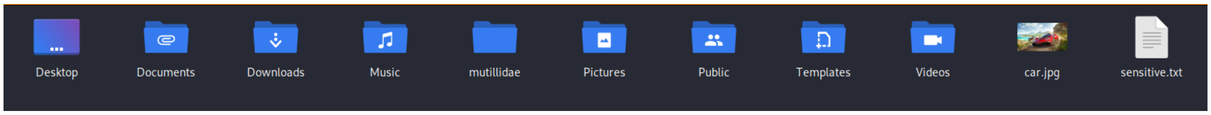
```
stegsnow -C -p "1234" newtext1.txt orig-sensitive.txt
nano orig-sensitive.txt
```

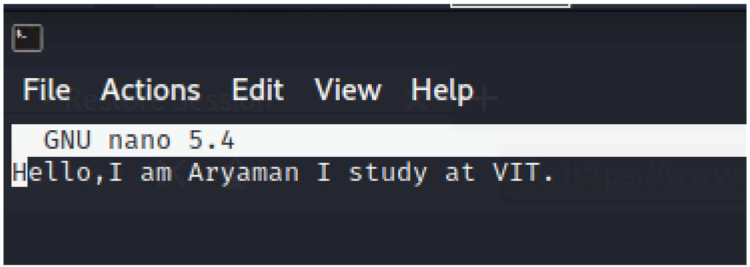
→ Embedding short texts in an image
→ Embedding large " " " by compressing
→ Encrypting text using sy. key. Algo and embedding in sensitive data
→ for hiding text file under a text file
→ " " " " " " large " "

Steghide is a steganography tool that allows you to cover confidential records inside a picture or sound record with a passphrase. Bolsters BMP and JPEG picture group, AU and WAV sound group. This device has its advantages and disadvantages. One upside is that it is much better at covering and can extend a lot without any type of document. It does this by using a propelled calculation to shroud it inside a picture (or sound) record without changing the form (or sound) of the document. This is additionally without using Steghide (or if there is not the same scientific method as Steghide) then it is difficult to remove the hidden documents from the picture.

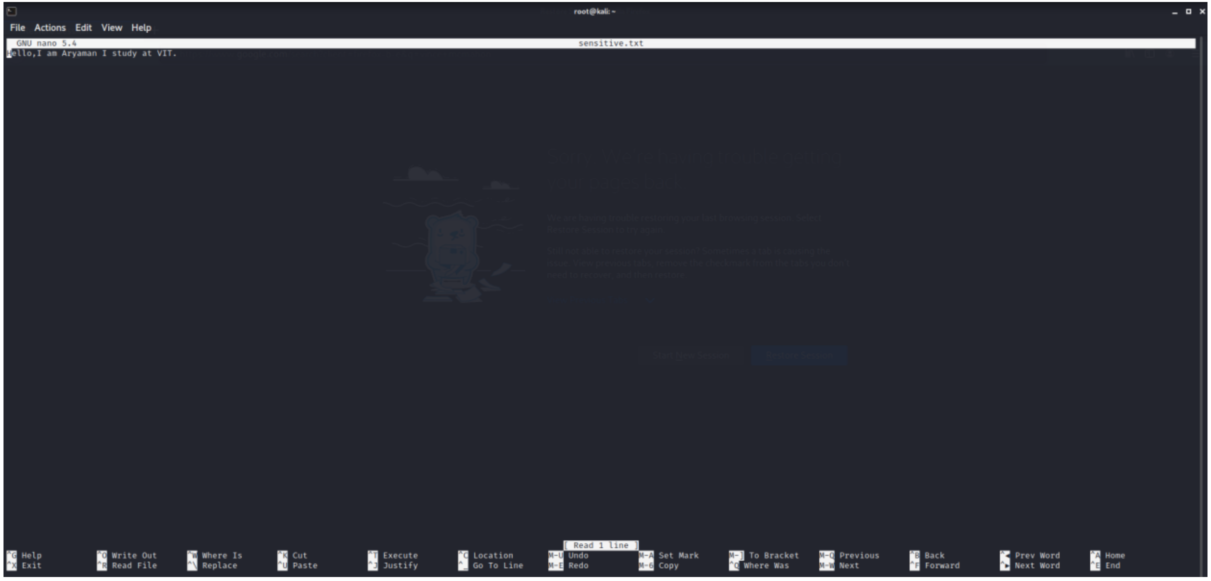


```
┌──(root💀kali)-[~]
└─# nano sensitive.txt
```



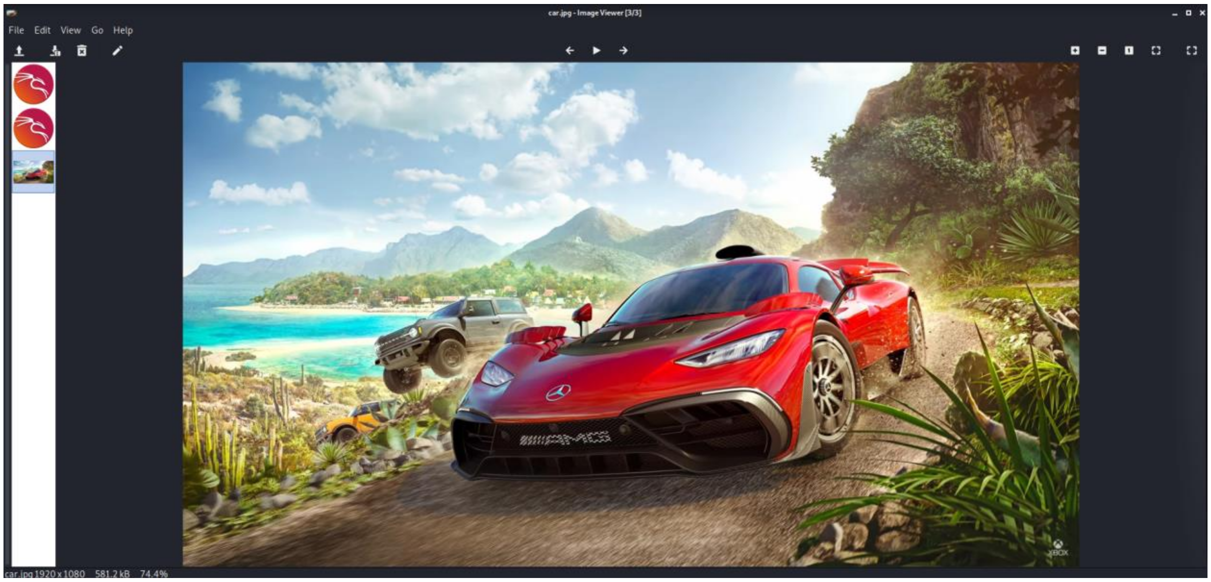


```
  GNU nano 5.4
Hello,I am Aryaman I study at VIT.
```

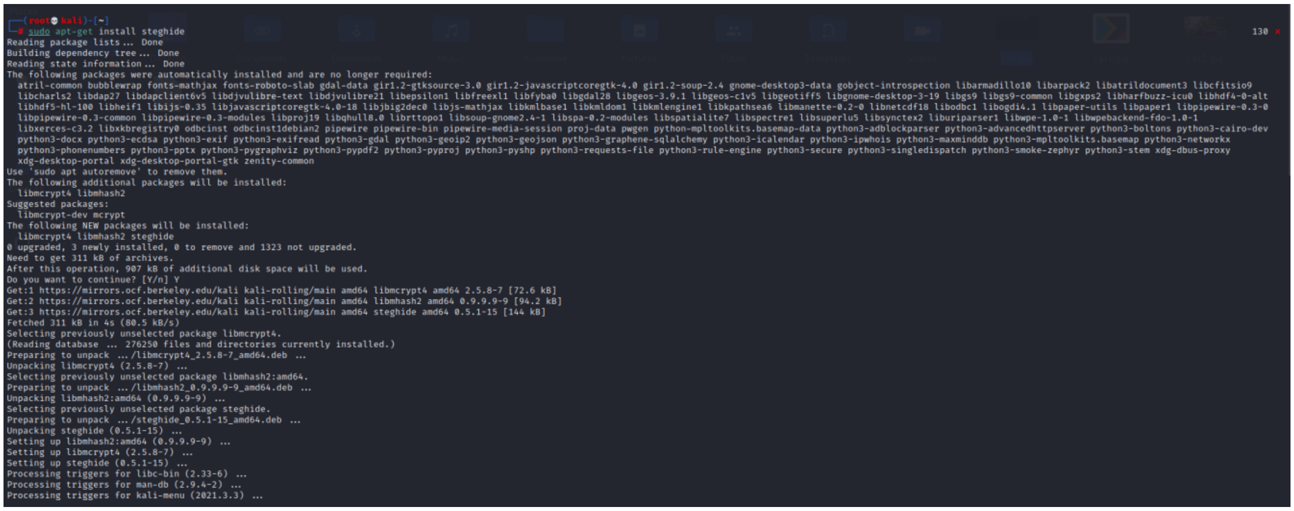


```
  GNU nano 5.4                                sensitive.txt
Hello,I am Aryaman I study at VIT.

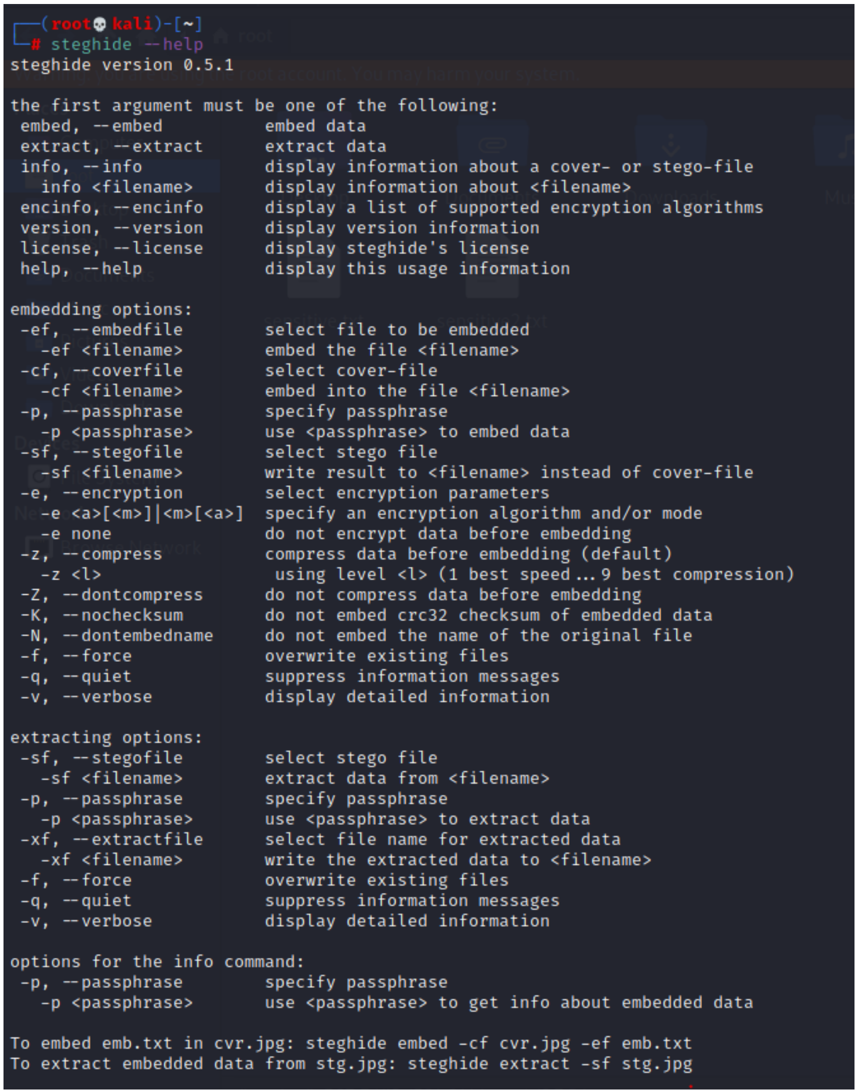
                                   [ Read 1 line ]
Help        Write Out   Where Is    Cut         Execute     Location    Undo        Set Mark    To Bracket  Previous    Back        Prev Word   Home
Exit        Read File   Replace     Paste       Justify     Go To Line  Redo        Copy        Where Was   Next        Forward     Next Word   End
```


car.jpg - Image Viewer [3/3]
File Edit View Go Help
car.jpg 1920 x 1080 581.2 kB 74.4%

Install steghide



```
┌──(root💀kali)-[~]                                                                                    130 ×
└─# sudo apt-get install steghide
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  atril-common bubblewrap fonts-mathjax fonts-roboto-slab gdal-data gir1.2-gtksource-3.0 gir1.2-javascriptcoregtk-4.0 gir1.2-soup-2.4 gnome-desktop3-data gobject-introspection libarmadillo10 libarpack2 libatrildocument3 libcfitsio9
  libcharls2 libdap27 libdapclient6v5 libdjvulibre-text libdjvulibre21 libepsilon1 libfreexl1 libfyba0 libgdal28 libgeos-3.9.1 libgeos-c1v5 libgeotiff5 libgnome-desktop-3-19 libgs9 libgs9-common libgxps2 libharfbuzz-icu0 libhdf4-0-alt
  libhdf5-hl-100 libheif1 libijs-0.35 libjavascriptcoregtk-4.0-18 libjbig2dec0 libjs-mathjax libkmlbase1 libkmldom1 libkmlengine1 libkpathsea6 libmanette-0.2-0 libnetcdf18 libodbc1 libogdi4.1 libpaper-utils libpaper1 libpipewire-0.3-0
  libpipewire-0.3-common libpipewire-0.3-modules libproj19 libqhull8.0 librttopo1 libsoup-gnome2.4-1 libspa-0.2-modules libspatialite7 libspectre1 libsuperlu5 libsynctex2 liburiparser1 libwpe-1.0-1 libwpebackend-fdo-1.0-1
  libxerces-c3.2 libxkbregistry0 odbcinst odbcinst1debian2 pipewire pipewire-bin pipewire-media-session proj-data pwgen python-mpltoolkits.basemap-data python3-adblockparser python3-advancedhttpserver python3-boltons python3-cairo-dev
  python3-docx python3-ecdsa python3-exif python3-exifread python3-gdal python3-geoip2 python3-geojson python3-graphene-sqlalchemy python3-icalendar python3-ipwhois python3-maxminddb python3-mpltoolkits.basemap python3-networkx
  python3-phonenumbers python3-pptx python3-pygraphviz python3-pypdf2 python3-pyproj python3-pyshp python3-requests-file python3-rule-engine python3-secure python3-singledispatch python3-smoke-zephyr python3-stem xdg-dbus-proxy
  xdg-desktop-portal xdg-desktop-portal-gtk zenity-common
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  libmcrypt4 libmhash2
Suggested packages:
  libmcrypt-dev mcrypt
The following NEW packages will be installed:
  libmcrypt4 libmhash2 steghide
0 upgraded, 3 newly installed, 0 to remove and 1323 not upgraded.
Need to get 311 kB of archives.
After this operation, 907 kB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 https://mirrors.ocf.berkeley.edu/kali kali-rolling/main amd64 libmcrypt4 amd64 2.5.8-7 [72.6 kB]
Get:2 https://mirrors.ocf.berkeley.edu/kali kali-rolling/main amd64 libmhash2 amd64 0.9.9.9-9 [94.2 kB]
Get:3 https://mirrors.ocf.berkeley.edu/kali kali-rolling/main amd64 steghide amd64 0.5.1-15 [144 kB]
Fetched 311 kB in 4s (80.5 kB/s)
Selecting previously unselected package libmcrypt4.
(Reading database ... 276250 files and directories currently installed.)
Preparing to unpack .../libmcrypt4_2.5.8-7_amd64.deb ...
Unpacking libmcrypt4 (2.5.8-7) ...
Selecting previously unselected package libmhash2:amd64.
Preparing to unpack .../libmhash2_0.9.9.9-9_amd64.deb ...
Unpacking libmhash2:amd64 (0.9.9.9-9) ...
Selecting previously unselected package steghide.
Preparing to unpack .../steghide_0.5.1-15_amd64.deb ...
Unpacking steghide (0.5.1-15) ...
Setting up libmhash2:amd64 (0.9.9.9-9) ...
Setting up libmcrypt4 (2.5.8-7) ...
Setting up steghide (0.5.1-15) ...
Processing triggers for libc-bin (2.33-6) ...
Processing triggers for man-db (2.9.4-2) ...
Processing triggers for kali-menu (2021.3.3) ...
```



```
┌──(root💀kali)-[~]
└─# steghide --help
steghide version 0.5.1

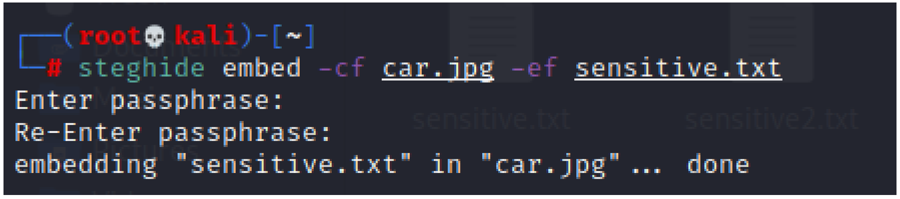
the first argument must be one of the following:
 embed, --embed          embed data
 extract, --extract      extract data
 info, --info            display information about a cover- or stego-file
   info <filename>       display information about <filename>
 encinfo, --encinfo      display a list of supported encryption algorithms
 version, --version      display version information
 license, --license      display steghide's license
 help, --help            display this usage information

embedding options:
 -ef, --embedfile        select file to be embedded
   -ef <filename>        embed the file <filename>
 -cf, --coverfile        select cover-file
   -cf <filename>        embed into the file <filename>
 -p, --passphrase        specify passphrase
   -p <passphrase>       use <passphrase> to embed data
 -sf, --stegofile        select stego file
   -sf <filename>        write result to <filename> instead of cover-file
 -e, --encryption        select encryption parameters
   -e <a>[<m>]|<m>[<a>]  specify an encryption algorithm and/or mode
   -e none               do not encrypt data before embedding
 -z, --compress          compress data before embedding (default)
   -z <l>                 using level <l> (1 best speed...9 best compression)
 -Z, --dontcompress      do not compress data before embedding
 -K, --nochecksum        do not embed crc32 checksum of embedded data
 -N, --dontembedname     do not embed the name of the original file
 -f, --force             overwrite existing files
 -q, --quiet             suppress information messages
 -v, --verbose           display detailed information

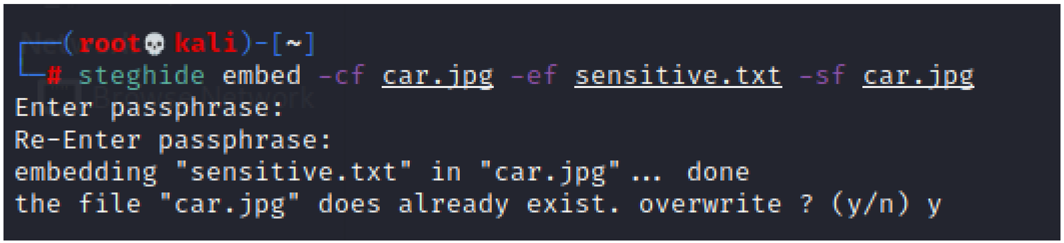
extracting options:
 -sf, --stegofile        select stego file
   -sf <filename>        extract data from <filename>
 -p, --passphrase        specify passphrase
   -p <passphrase>       use <passphrase> to extract data
 -xf, --extractfile      select file name for extracted data
   -xf <filename>        write the extracted data to <filename>
 -f, --force             overwrite existing files
 -q, --quiet             suppress information messages
 -v, --verbose           display detailed information

options for the info command:
 -p, --passphrase        specify passphrase
   -p <passphrase>       use <passphrase> to get info about embedded data

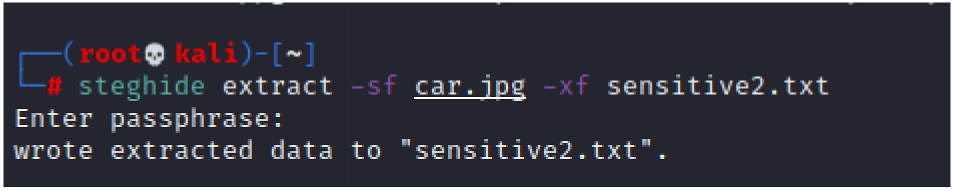
To embed emb.txt in cvr.jpg: steghide embed -cf cvr.jpg -ef emb.txt
To extract embedded data from stg.jpg: steghide extract -sf stg.jpg
```



```
┌──(root💀kali)-[~]
└─# steghide embed -cf car.jpg -ef sensitive.txt
Enter passphrase:
Re-Enter passphrase:
embedding "sensitive.txt" in "car.jpg"... done
```



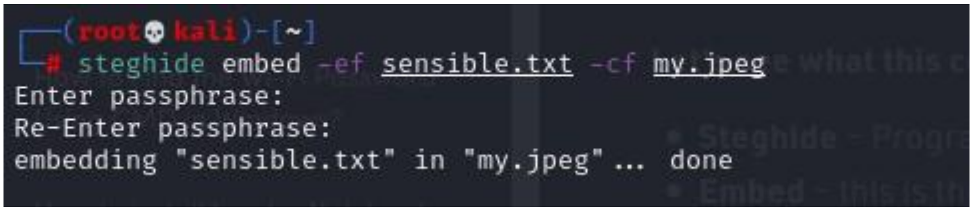
```
┌──(root💀kali)-[~]
└─# steghide embed -cf car.jpg -ef sensitive.txt -sf car.jpg
Enter passphrase:
Re-Enter passphrase:
embedding "sensitive.txt" in "car.jpg"... done
the file "car.jpg" does already exist. overwrite ? (y/n) y
```



```
┌──(root💀kali)-[~]
└─# steghide extract -sf car.jpg -xf sensitive2.txt
Enter passphrase:
wrote extracted data to "sensitive2.txt".
```

Embedding data in the image:

We hide the data in the image using the Steghide so that only the person who accepts it can read it. Therefore, we created a text file named “sensible.txt”, in which we wrote our confidential data and images. JPEG is the file in which we are embedding our data.



```
┌──(root💀kali)-[~]
└─# steghide embed -ef sensible.txt -cf my.jpeg
Enter passphrase:
Re-Enter passphrase:
embedding "sensible.txt" in "my.jpeg"... done
```

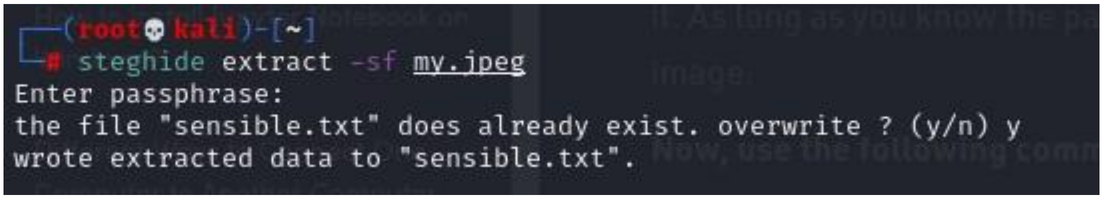
Here, ef and cf are termed as embedded files and cover files, respectively.

Let’s see what this command is doing:

Steghide – Program Name
Embed – this is the command
-cf – This flag is for the cover file (the file used to embed the data)
filename – this is the name of the cover file
-ef – This flag is for the embed file (the file that will be embedded)
Filename – This is the name of the embedded file

Extraction of Data From Image Via Steghide:

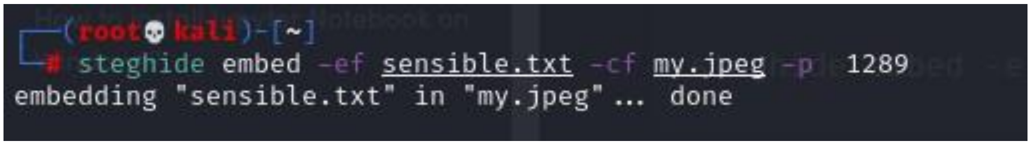
Using Steghide adds an extra layer of security by allowing us to use a password for it. As long as you know the passphrase, it is quite easy to extract data from the image.



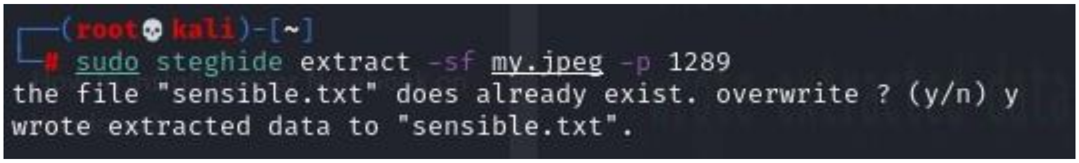
```
┌──(root💀kali)-[~]
└─# steghide extract -sf my.jpeg
Enter passphrase:
the file "sensible.txt" does already exist. overwrite ? (y/n) y
wrote extracted data to "sensible.txt".
```

Password Protect Files:

Now, we can also extract files using the following command. This command is different in that it specifies a password in the command itself, therefore, we do not need to specify it separately.



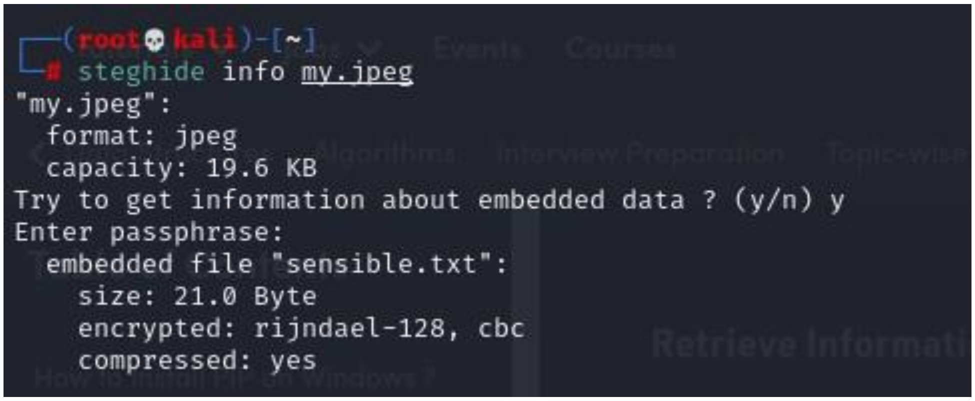
```
┌──(root💀kali)-[~]
└─# steghide embed -ef sensible.txt -cf my.jpeg -p  1289
embedding "sensible.txt" in "my.jpeg"... done
```



```
┌──(root💀kali)-[~]
└─# sudo steghide extract -sf my.jpeg -p 1289
the file "sensible.txt" does already exist. overwrite ? (y/n) y
wrote extracted data to "sensible.txt".
```

Retrieve Information of Embedded File:

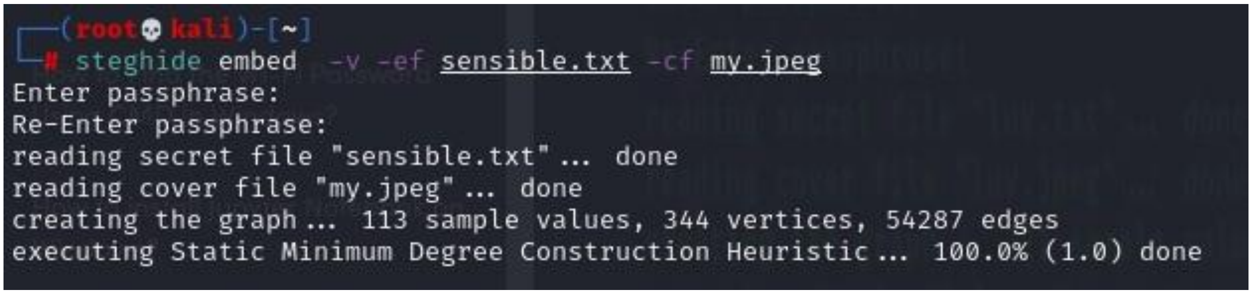
If we have an image in which the data is suspected to be hidden and if so, what algorithm is used to encrypt the data in the file?



```
┌──(root💀kali)-[~]
└─# steghide info my.jpeg
"my.jpeg":
  format: jpeg
  capacity: 19.6 KB
Try to get information about embedded data ? (y/n) y
Enter passphrase:
  embedded file "sensible.txt":
    size: 21.0 Byte
    encrypted: rijndael-128, cbc
    compressed: yes
```

Verbose Mode

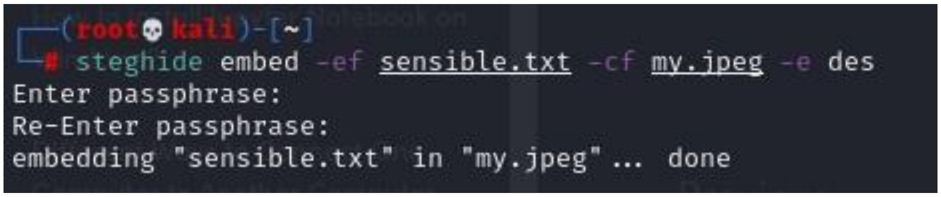
To obtain every information of a file during extraction, we can use verbose mode. The verbose mode gives you detailed information.



```
┌──(root💀kali)-[~]
└─# steghide embed  -v -ef sensible.txt -cf my.jpeg
Enter passphrase:
Re-Enter passphrase:
reading secret file "sensible.txt"... done
reading cover file "my.jpeg"... done
creating the graph... 113 sample values, 344 vertices, 54287 edges
executing Static Minimum Degree Construction Heuristic... 100.0% (1.0) done
```

Encrypting Algorithms:

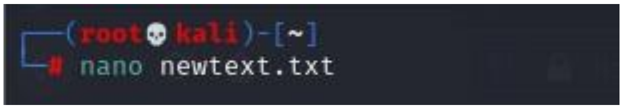
We can encrypt the data we are hiding using encryption techniques.



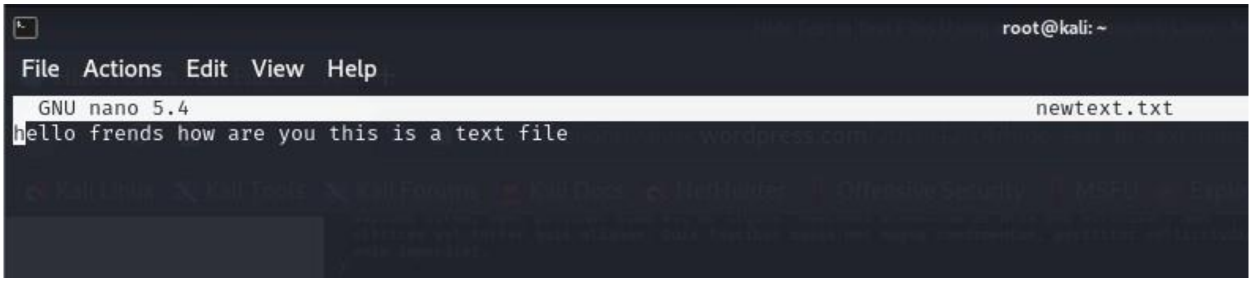
```
┌──(root💀kali)-[~]
└─# steghide embed -ef sensible.txt -cf my.jpeg -e des
Enter passphrase:
Re-Enter passphrase:
embedding "sensible.txt" in "my.jpeg"... done
```

Hiding text file under text file

Creating a new text file

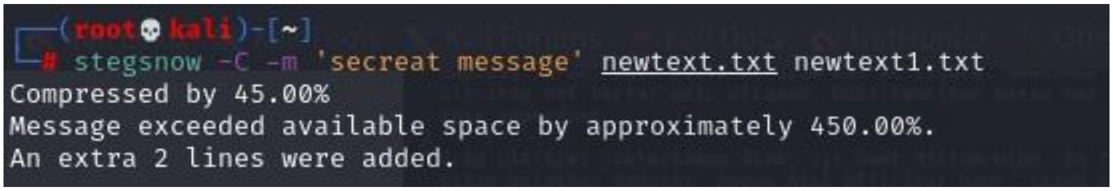


```
┌──(root💀kali)-[~]
└─# nano newtext.txt
```



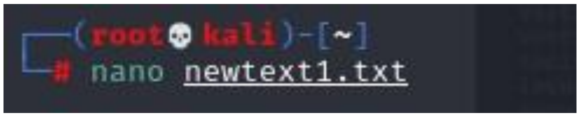
```
  GNU nano 5.4                                                         newtext.txt
hello frends how are you this is a text file
```

This command encodes the message inside newtext.txt and saves the resulting file that contains the message in newtext1.txt.

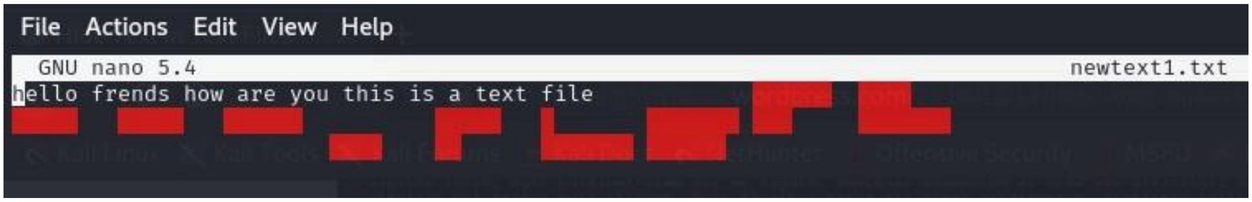


```
┌──(root💀kali)-[~]
└─# stegsnow -C -m 'secreat message' newtext.txt newtext1.txt
Compressed by 45.00%
Message exceeded available space by approximately 450.00%.
An extra 2 lines were added.
```

Checking newtext1 file



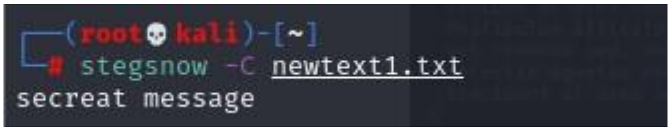
```
┌──(root💀kali)-[~]
└─# nano newtext1.txt
```



```
  GNU nano 5.4                                                     newtext1.txt
hello frends how are you this is a text file
```

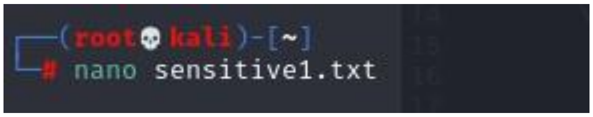
[redacted]

Checking using stegsnow

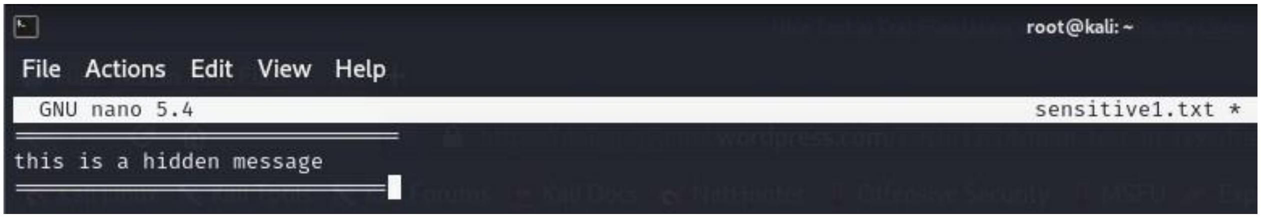


```
┌──(root💀kali)-[~]
└─# stegsnow -C newtext1.txt
secreat message
```

Creating sensitive1 file

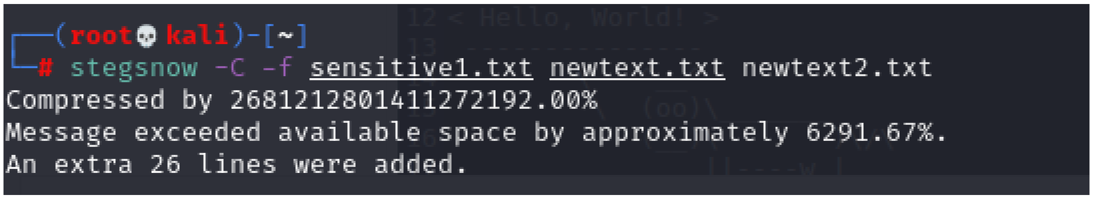


```
┌──(root💀kali)-[~]
└─# nano sensitive1.txt
```



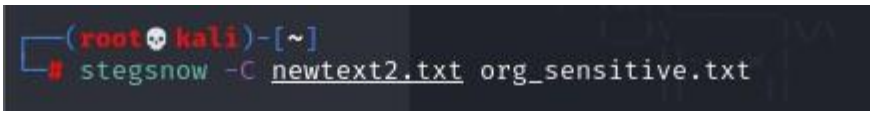
```
  GNU nano 5.4                                                 sensitive1.txt *
════════════════════════════════
this is a hidden message
═══════════════════════════════
```

Hiding text file under a layer text file



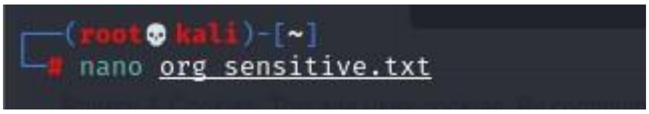
```
┌──(root💀kali)-[~]
└─# stegsnow -C -f sensitive1.txt newtext.txt newtext2.txt
Compressed by 2681212801411272192.00%
Message exceeded available space by approximately 6291.67%.
An extra 26 lines were added.
```

Encode newtext2 file inside org_sensitive file

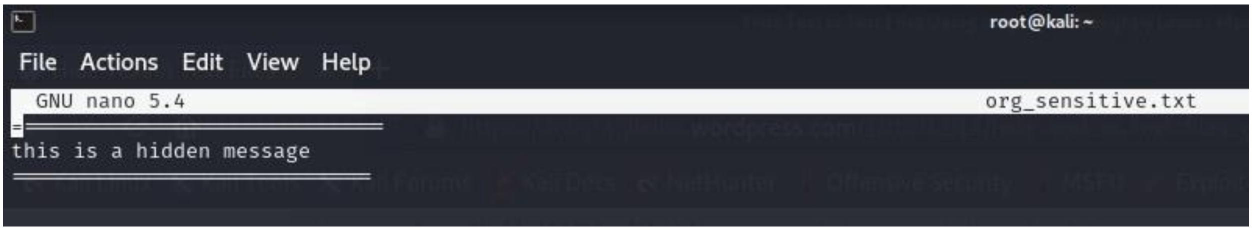


```
┌──(root💀kali)-[~]
└─# stegsnow -C newtext2.txt org_sensitive.txt
```

Checking org_sensitive file

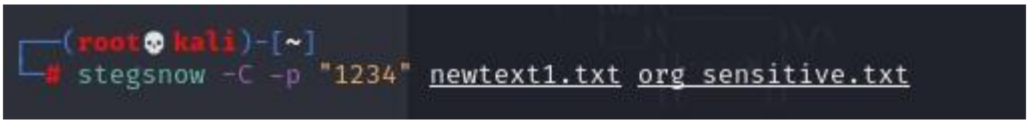


```
┌──(root💀kali)-[~]
└─# nano org_sensitive.txt
```



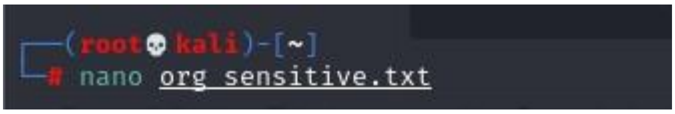
```
  GNU nano 5.4                                                   org_sensitive.txt
=══════════════════════════════
this is a hidden message
═══════════════════════════════
```

Encoding using password for keeping file secure

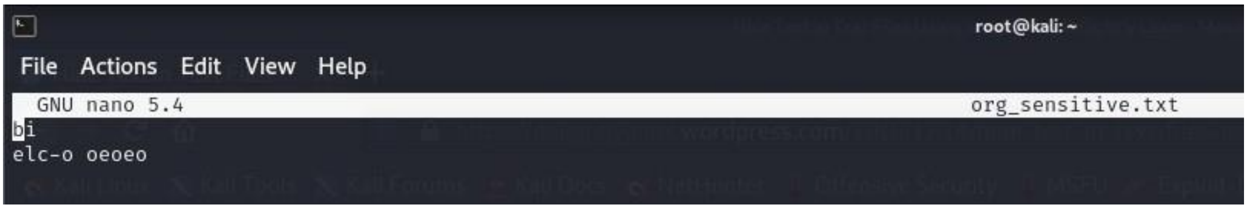


```
┌──(root💀kali)-[~]
└─# stegsnow -C -p "1234" newtext1.txt org_sensitive.txt
```

Checking org_sensitive file



```
┌──(root💀kali)-[~]
└─# nano org_sensitive.txt
```



```
  GNU nano 5.4                                                   org_sensitive.txt
bi
elc-o oeoeo
```