

1. Usage – Encoding:

```
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$ ls
a.out beautiful.bmp common.h decode.c decode.h encode.c encode.h main.c secret.txt types.h
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$ ./a.out -e beautiful.bmp secret.txt

Operation Type = encode
-----
INFO: Opening required files
INFO: Opened beautiful.bmp
INFO: Opened secret.txt
INFO: Opened stego.bmp
INFO: Done
INFO: ## Encoding Procedure Started ##
INFO: Checking for secret.txt size
INFO: Done. Not Empty
INFO: Checking for beautiful.bmp capacity to handle secret.txt
INFO: Done. Found OK
INFO: Output File not mentioned. Creating stego.bmp as default
INFO: Copying Image Header
INFO: Done
INFO: Encoding Magic String Signature
INFO: Done
INFO: Encoding secret.txt File Extension
INFO: Done
INFO: Encoding secret.txt File Size
INFO: Done
INFO: Encoding secret.txt File Data
INFO: Done
INFO: Copying Left Over Data
INFO: Done
INFO: ## Encoding Done Successfully ##
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$ ls
a.out beautiful.bmp common.h decode.c decode.h encode.c encode.h main.c secret.txt stego.bmp types.h
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$ |
```

```
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$ ls  
a.out beautiful.bmp common.h decode.c decode.h encode.c encode.h main.c secret.txt stego.bmp types.h  
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$ ./a.out -e beautiful.bmp secret.txt encoded.bmp
```

```
Operation Type = encode
```

```
INFO: Opening required files  
INFO: Opened beautiful.bmp  
INFO: Opened secret.txt  
INFO: Opened encoded.bmp  
INFO: Done  
INFO: ## Encoding Procedure Started ##  
INFO: Checking for secret.txt size  
INFO: Done. Not Empty  
INFO: Checking for beautiful.bmp capacity to handle secret.txt  
INFO: Done. Found OK  
INFO: Creating encoded.bmp as encoded output image file.  
INFO: Copying Image Header  
INFO: Done  
INFO: Encoding Magic String Signature  
INFO: Done  
INFO: Encoding secret.txt File Extension  
INFO: Done  
INFO: Encoding secret.txt File Size  
INFO: Done  
INFO: Encoding secret.txt File Data  
INFO: Done  
INFO: Copying Left Over Data  
INFO: Done  
INFO: ## Encoding Done Successfully ##
```

```
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$ ls  
a.out beautiful.bmp common.h decode.c decode.h encode.c encode.h main.c secret.txt stego.bmp types.h  
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$ |
```



beautiful.bmp file
(Original File)



encoded.bmp file
(Encoded File)

2. Usage – Decoding:

```
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$ ls
a.out beautiful.bmp common.h decode.c decode.h encode.c encode.h encoded.bmp main.c secret.txt types.h
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$ ./a.out -d encoded.bmp

Operation Type = decode
INFO: ## Decoding Procedure Started ##
INFO: Opening required image file
INFO: Opened encoded.bmp
INFO: Decoding Magic String Signature
INFO: Done
INFO: Decoding Output File Extension
INFO: Done
INFO: Output File not mentioned. Creating decoded_secret.txt as default
INFO: Opened decoded_secret.txt
INFO: Done. Opened all required files
INFO: Decoding File Size
INFO: Done
INFO: Decoding File Data
INFO: Done
INFO: ## Decoding Done Successfully ##
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$ ls
a.out beautiful.bmp common.h decode.c decode.h decoded_secret.txt encode.c encode.h encoded.bmp main.c secret.txt types.h
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$ |
```

```
ashithadmin@LAPTOP-DAE19R6D:~/Projects/Steganography$ ls
a.out beautiful.bmp common.h decode.c decode.h decoded_secret.txt encode.c encode.h encoded.bmp main.c secret.txt types.h
ashithadmin@LAPTOP-DAE19R6D:~/Projects/Steganography$ ./a.out -d encoded.bmp decoded

Operation Type = decode
INFO: ## Decoding Procedure Started ##
INFO: Opening required image file
INFO: Opened encoded.bmp
INFO: Decoding Magic String Signature
INFO: Done
INFO: Decoding Output File Extension
INFO: Done
INFO: Creating decoded.txt as decoded output file.
INFO: Opened decoded.txt
INFO: Done. Opened all required files
INFO: Decoding File Size
INFO: Done
INFO: Decoding File Data
INFO: Done
INFO: ## Decoding Done Successfully ##
ashithadmin@LAPTOP-DAE19R6D:~/Projects/Steganography$ ls
a.out beautiful.bmp common.h decode.c decode.h decoded.txt decoded_secret.txt encode.c encode.h encoded.bmp main.c secret.txt types.h
ashithadmin@LAPTOP-DAE19R6D:~/Projects/Steganography$ |
```

After Encoding & Decoding:

```
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$ ls
a.out beautiful.bmp common.h decode.c decode.h decoded.txt encode.c encode.h encoded.bmp main.c secret.txt types.h
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$ hd beautiful.bmp | head
00000000 42 4d 36 00 24 00 00 00 00 00 36 00 00 00 28 00 |BM6.$....6...|.
00000018 00 00 00 04 00 00 00 03 00 00 01 00 18 00 00 00
00000020 00 00 00 00 24 00 c4 0e 00 00 c4 0e 00 00 00 00 |....$....|
00000038 00 00 00 00 00 00 01 01 01 03 03 03 03 05 05 03
00000040 05 05 02 04 04 01 03 03 01 06 05 03 08 07 03 0a
00000050 07 00 06 03 00 06 03 00 09 06 02 0b 08 06 0f 0c
00000060 04 10 0a 00 09 03 00 04 03 00 03 02 00 04 03 00
00000070 08 06 00 0a 07 00 0c 08 00 10 09 02 12 0b 0c 1e
00000080 17 03 15 0e 01 11 0a 03 13 0c 05 13 0f 01 0f 0b
00000090 01 0c 09 03 11 0b 03 11 0b 04 15 0c 05 14 0c 02
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$ hd encoded.bmp | head
00000000 42 4d 36 00 24 00 00 00 00 00 36 00 00 00 28 00 |BM6.$....6...|.
00000018 00 00 00 04 00 00 00 03 00 00 01 00 18 00 00 00
00000020 00 00 00 00 24 00 c4 0e 00 00 c4 0e 00 00 00 00 |....$....|
00000038 00 00 00 00 00 00 00 00 01 02 02 02 03 05 04 02
00000040 05 04 03 04 05 00 02 02 00 06 04 02 08 06 02 0a
00000050 06 00 06 02 00 06 02 00 08 06 02 0a 08 06 0e 0c
00000060 04 10 0a 01 08 02 00 04 03 00 03 03 01 04 02 01
00000070 09 07 00 0b 06 00 0c 09 01 11 09 02 12 0a 0c 1f
00000080 17 03 14 0f 00 10 0a 02 12 0c 04 12 0e 00 0e 0a
00000090 00 0c 08 02 10 0a 02 10 0a 04 14 0c 04 14 0c 02
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$ ls -l beautiful.bmp encoded.bmp secret.txt decoded.txt
-rw-r--r-- 1 ashithadmin ashithadmin 2359351 Aug  7 2018 beautiful.bmp
-rw-r--r-- 1 ashithadmin ashithadmin      25 Nov 30 16:08 decoded.txt
-rw-r--r-- 1 ashithadmin ashithadmin 2359351 Nov 30 16:05 encoded.bmp
-rw-r--r-- 1 ashithadmin ashithadmin      25 Nov 16 16:08 secret.txt
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$ cat secret.txt
My password is SECRET ;)
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$ cat decoded.txt
My password is SECRET ;)
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$
```

3. Error Handling:

```
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$ ./a.out  
  
ERROR: ./a.out : INVALID ARGUMENTS  
USAGE:  
Encoding : ./a.out -e <.bmp_file> <.c/.sh/.txt_file> [.bmp_output_file(optional)]  
Decoding : ./a.out -d <.bmp_file> [decoded_output_file_name_without_extention(optional)]
```

```
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$ ./a.out -e  
  
ERROR: ./a.out -e : INVALID ARGUMENTS  
USAGE:  
Encoding : ./a.out -e <.bmp_file> <.c/.sh/.txt_file> [.bmp_output_file(optional)]  
Decoding : ./a.out -d <.bmp_file> [decoded_output_file_name_without_extention(optional)]
```

```
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$ ./a.out -t beautiful.bmp  
-----  
Operation Type = unsupported  
-----  
  
ERROR: ./a.out -t beautiful.bmp : INVALID ARGUMENTS  
USAGE:  
Encoding : ./a.out -e <.bmp_file> <.c/.sh/.txt_file> [.bmp_output_file(optional)]  
Decoding : ./a.out -d <.bmp_file> [decoded_output_file_name_without_extention(optional)]
```

```
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$ ./a.out -e beautiful.bmp  
-----  
Operation Type = encode  
-----  
  
ERROR: ./a.out -e beautiful.bmp : INVALID ARGUMENTS  
USAGE:  
Encoding : ./a.out -e <.bmp_file> <.c/.sh/.txt_file> [.bmp_output_file(optional)]  
Decoding : ./a.out -d <.bmp_file> [decoded_output_file_name_without_extention(optional)]
```

```
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$ ./a.out -e beautiful.bmp secret
-----
Operation Type = encode
-----
ERROR: Secret message file should be .txt/.sh/.c file only.

ERROR: ./a.out -e beautiful.bmp secret : INVALID ARGUMENTS
USAGE:
Encoding : ./a.out -e <.bmp_file> <.c/.sh/.txt_file> [.bmp_output_file(optional)]
Decoding : ./a.out -d <.bmp_file> [decoded_output_file_name_without_extention(optional)]
```

```
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$ ./a.out -e image.bmp secret.txt
-----
Operation Type = encode
-----
INFO: Opening required files
fopen: No such file or directory
ERROR: Unable to open file image.bmp
```

```
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$ vi image.bmp
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$ ./a.out -e image.bmp secret.txt
-----
Operation Type = encode
-----
INFO: Opening required files
INFO: Opened image.bmp
INFO: Opened secret.txt
INFO: Opened stego.bmp
INFO: Done
INFO: ## Encoding Procedure Started ##
INFO: Checking for secret.txt size
INFO: Done. Not Empty
INFO: Checking for image.bmp capacity to handle secret.txt
ERROR: "image.bmp" doesn't have the capacity to encode "secret.txt"
```

```
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$ ./a.out -e beautiful.bmp secret.txt hello
-----
Operation Type = encode
-----
ERROR: Destination file hello is not a .bmp file.

ERROR: ./a.out -e beautiful.bmp secret.txt hello : INVALID ARGUMENTS
USAGE:
Encoding : ./a.out -e <.bmp_file> <.c/.sh/.txt_file> [.bmp_output_file(optional)]
Decoding : ./a.out -d <.bmp_file> [decoded_output_file_name_without_extention(optional)]
```

```
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$ ./a.out -e beautiful.bmp secret.txt hello.bmp dest  
ERROR: ./a.out -e beautiful.bmp secret.txt hello.bmp dest : INVALID ARGUMENTS  
USAGE:  
Encoding : ./a.out -e <.bmp_file> <.c/.sh/.txt_file> [.bmp_output_file(optional)]  
Decoding : ./a.out -d <.bmp_file> [decoded_output_file_name_without_extention(optional)]
```

```
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$ ./a.out -t beautiful.bmp secret.txt hello.bmp  
-----  
Operation Type = unsupported  
-----  
  
ERROR: ./a.out -t beautiful.bmp secret.txt hello.bmp : INVALID ARGUMENTS  
USAGE:  
Encoding : ./a.out -e <.bmp_file> <.c/.sh/.txt_file> [.bmp_output_file(optional)]  
Decoding : ./a.out -d <.bmp_file> [decoded_output_file_name_without_extention(optional)]
```

```
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$ ./a.out -d decode  
-----  
Operation Type = decode  
-----  
ERROR: Entered decode is not .bmp file.  
  
ERROR: ./a.out -d decode : INVALID ARGUMENTS  
USAGE:  
Encoding : ./a.out -e <.bmp_file> <.c/.sh/.txt_file> [.bmp_output_file(optional)]  
Decoding : ./a.out -d <.bmp_file> [decoded_output_file_name_without_extention(optional)]
```

```
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$ ./a.out -d decode.bmp  
-----  
Operation Type = decode  
-----  
INFO: ## Decoding Procedure Started ##  
INFO: Opening required image file  
fopen: No such file or directory  
ERROR: Unable to open file decode.bmp
```

```
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$ vi decode.bmp
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$ ./a.out -d decode.bmp
-----
Operation Type = decode
-----
INFO: ## Decoding Procedure Started ##
INFO: Opening required image file
INFO: Opened decode.bmp
INFO: Decoding Magic String Signature
ERROR: Unable to read decode.bmp file to decode magic string.
```

```
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$ ./a.out -d beautiful.bmp hello.txt
-----
Operation Type = decode
-----
ERROR: Entered hello.txt should not contain extention. Since extension is encoded in image file.
ERROR: ./a.out -d beautiful.bmp hello.txt : INVALID ARGUMENTS
USAGE:
Encoding : ./a.out -e <.bmp_file> <.c/.sh/.txt_file> [.bmp_output_file(optional)]
Decoding : ./a.out -d <.bmp_file> [decoded_output_file_name_without_extention(optional)]
```

```
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$ ./a.out -d beautiful.bmp hello
-----
Operation Type = decode
-----
INFO: ## Decoding Procedure Started ##
INFO: Opening required image file
INFO: Opened beautiful.bmp
INFO: Decoding Magic String Signature
ERROR: Decoded magic string doesn't match original magic string(#*).
```

```
ashithadmin@LAPTOP-OAE19R6D:~/Projects/Steganography$ ./a.out -d beautiful.bmp hello dest
-----
Operation Type = decode
-----
ERROR: ./a.out -d beautiful.bmp hello dest : INVALID ARGUMENTS
USAGE:
Encoding : ./a.out -e <.bmp_file> <.c/.sh/.txt_file> [.bmp_output_file(optional)]
Decoding : ./a.out -d <.bmp_file> [decoded_output_file_name_without_extention(optional)]
```