Task 1. Read the contents of a file

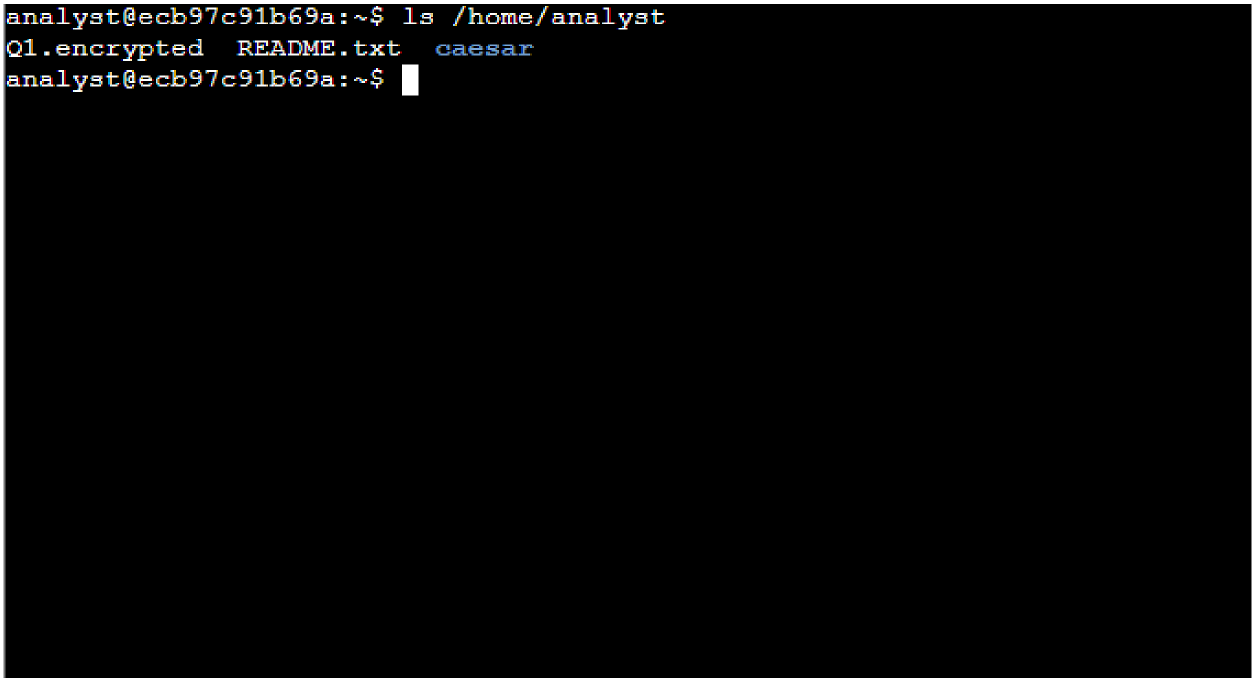
The lab starts in your home directory, `/home/analyst`, as the current working directory.

In this task, you need to explore the contents of your home directory and read the contents of a file to get further instructions.

1. Use the `ls` command to list the files in the current working directory.

The command to complete this step:

```
ls /home/analyst
```



```
analyst@ecb97c91b69a:~$ ls /home/analyst
Q1.encrypted  README.txt  caesar
analyst@ecb97c91b69a:~$
```

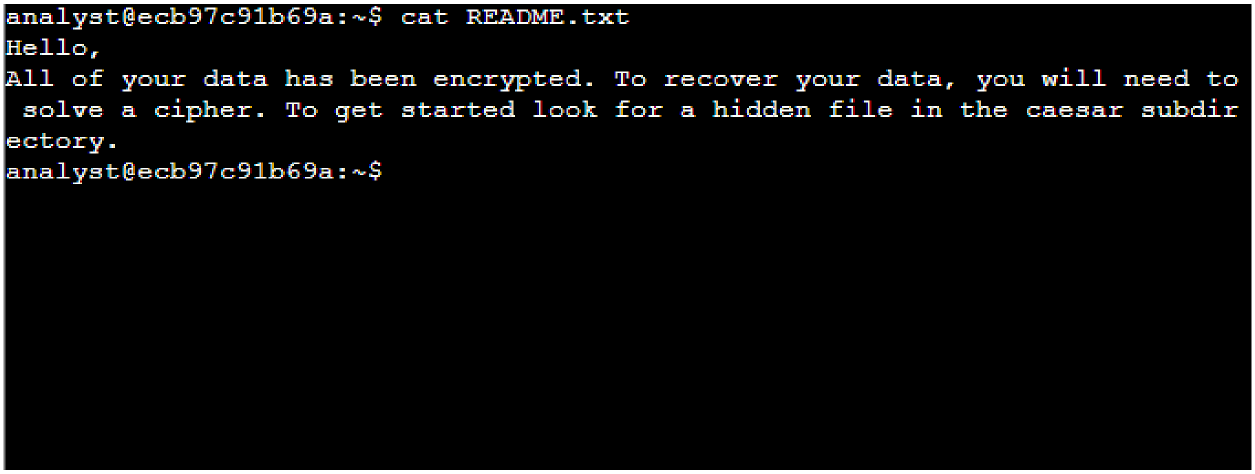
Two files, `Q1.encrypted` and `README.txt`, and a subdirectory, `caesar`, are listed:

The `README.txt` file contains an important message with instructions you need to follow.

2. Use the `cat` command to list the contents of the `README.txt` file.

The command to complete this step:

```
cat README.txt
```



```
analyst@ecb97c91b69a:~$ cat README.txt
Hello,
All of your data has been encrypted. To recover your data, you will need to
 solve a cipher. To get started look for a hidden file in the caesar subdir
ectory.
analyst@ecb97c91b69a:~$
```

The message in the `README.txt` file advises that the `caesar` subdirectory contains a hidden file.

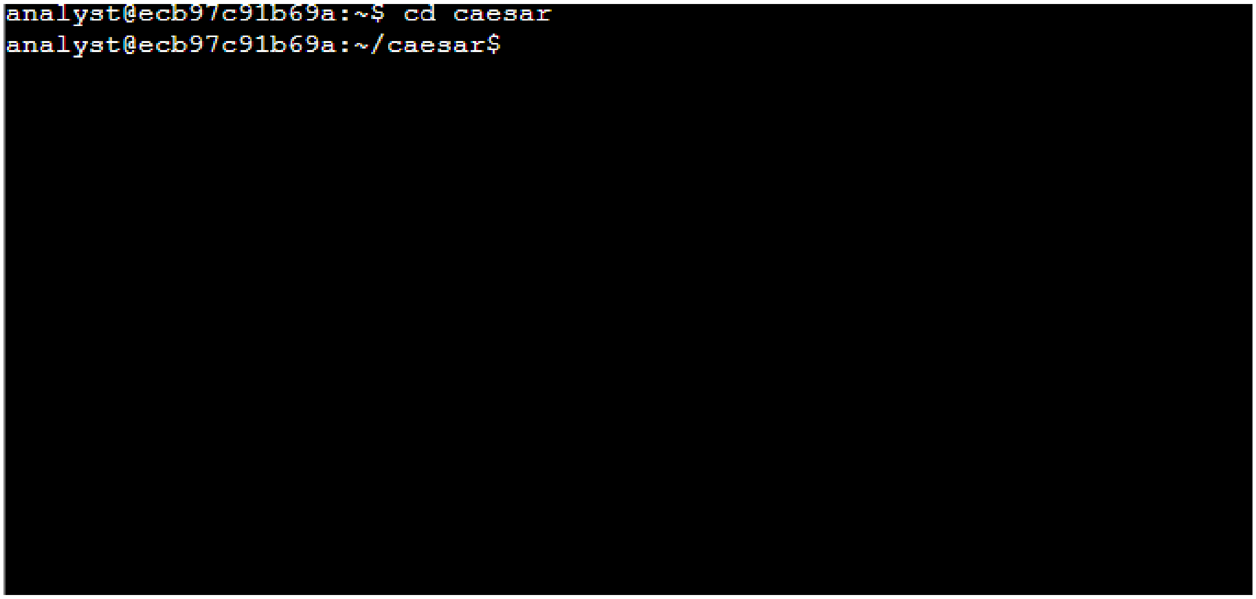
In the next task, you'll need to find the hidden file and solve the Caesar cipher that protects it. The file contains instructions on how to recover your data.

Task 2. Find a hidden file

In this task, you need to find a hidden file in your home directory and decrypt the Caesar cipher it contains. This task will enable you to complete the next task.

1. First, use the `cd` command to change to the `caesar` subdirectory of your home directory:

```
cd caesar
```



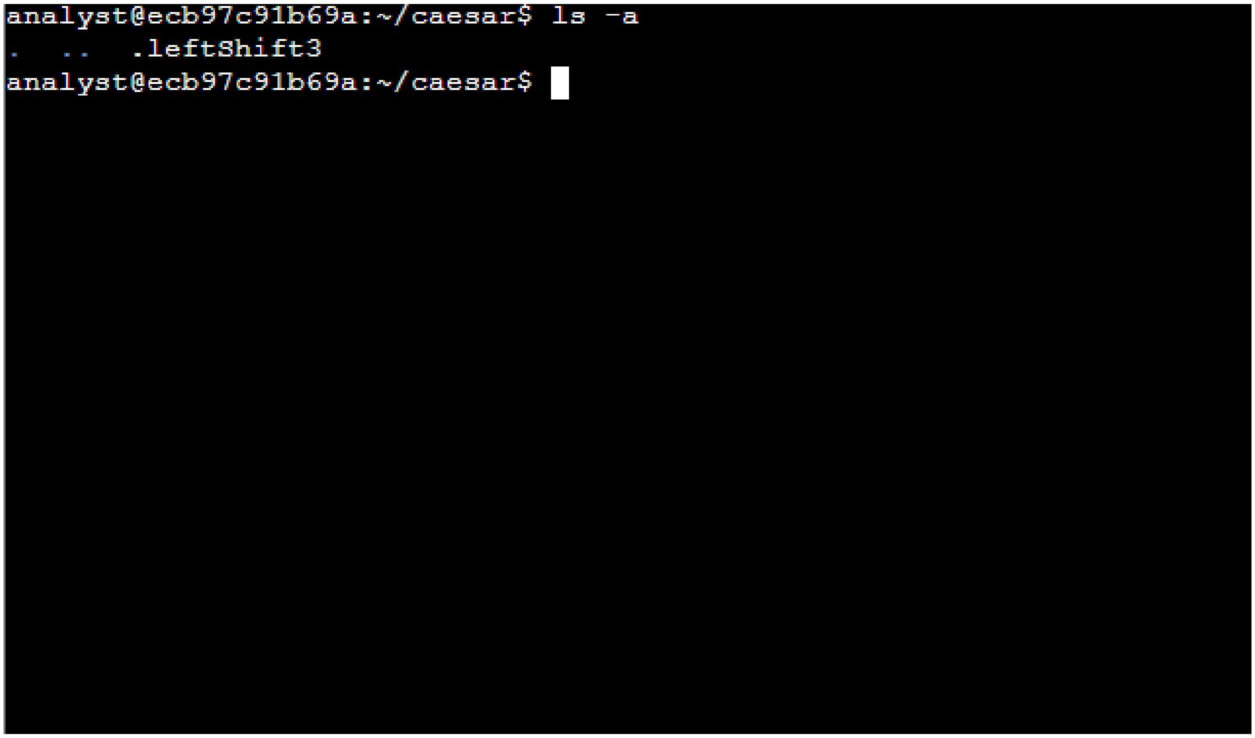
```
analyst@ecb97c91b69a:~$ cd caesar
analyst@ecb97c91b69a:~/caesar$
```

2. Use the `ls -a` command to list all files, including hidden files, in your home directory.

The command to complete this step:

```
ls -a
```

This will display the following output:



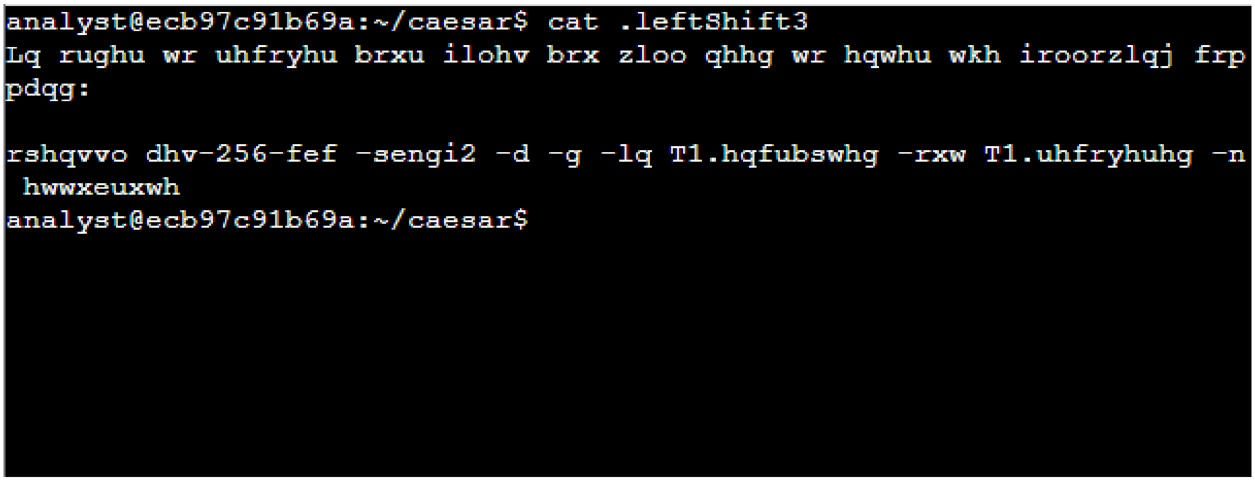
```
analyst@ecb97c91b69a:~/caesar$ ls -a
.  ..  .leftShift3
analyst@ecb97c91b69a:~/caesar$ 
```

Hidden files in Linux can be identified by their name starting with a period (.).

3. Use the `cat` command to list the contents of the `.leftShift3` file.

The command to complete this step:

```
cat .leftShift3
```



```
analyst@ecb97c91b69a:~/caesar$ cat .leftShift3
Lq rughu wr uhfryhu brxu ilohv brx zloo qhhg wr hqwhu wkh iroorzlqj frp
pdqg:

rshqvvo dhv-256-fef -sengi2 -d -g -lq T1.hqfubswhg -rxw T1.uhfryhuhg -n
 hwwxeuxwh
analyst@ecb97c91b69a:~/caesar$
```

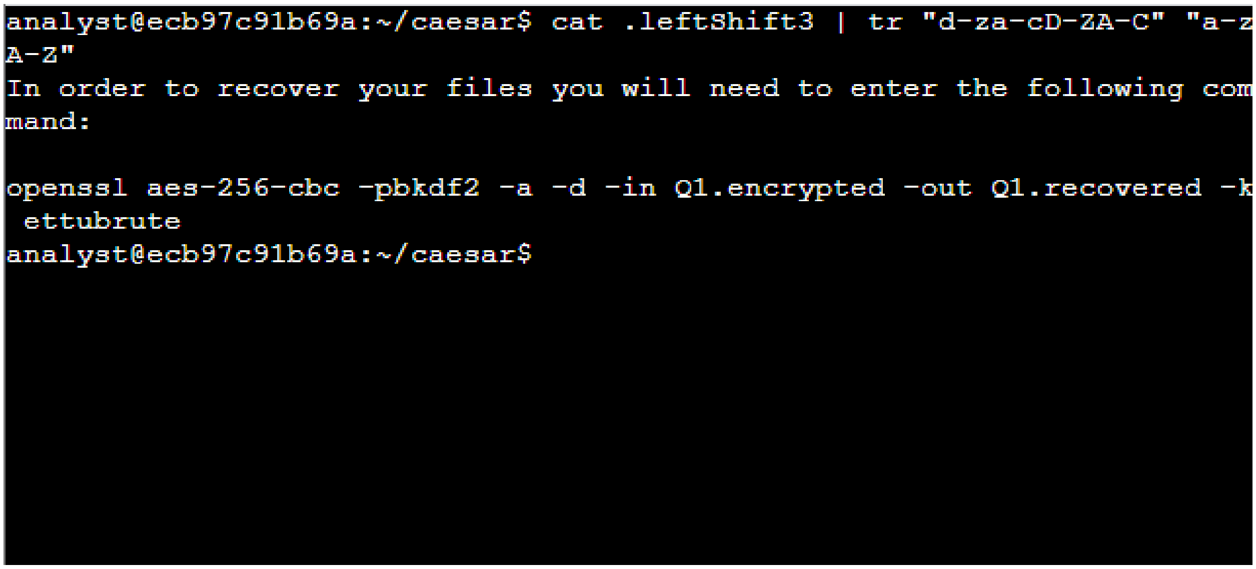
The message in the `.leftShift3` file appears to be scrambled. This is because the data has been encrypted using a Caesar cipher. This cipher can be solved by shifting each alphabet character to the left or right by a fixed number of spaces. In this example, the shift is three letters to the left. Thus "d" stands for "a", and "e" stands for "b".

4. You can decrypt the Caesar cipher in the `.leftshift3` file by using the following command:

```
cat .leftShift3 | tr "d-za-cD-ZA-C" "a-zA-Z"
```

Note: *The `tr` command translates text from one set of characters to another, using a mapping. The first parameter to the `tr` command represents the input set of characters, and the second represents the output set of characters. Hence, if you provide parameters "abcd" and "pqrs", and the input string to the `tr` command is "ac", the output string will be "pr".*

This will display the following output:



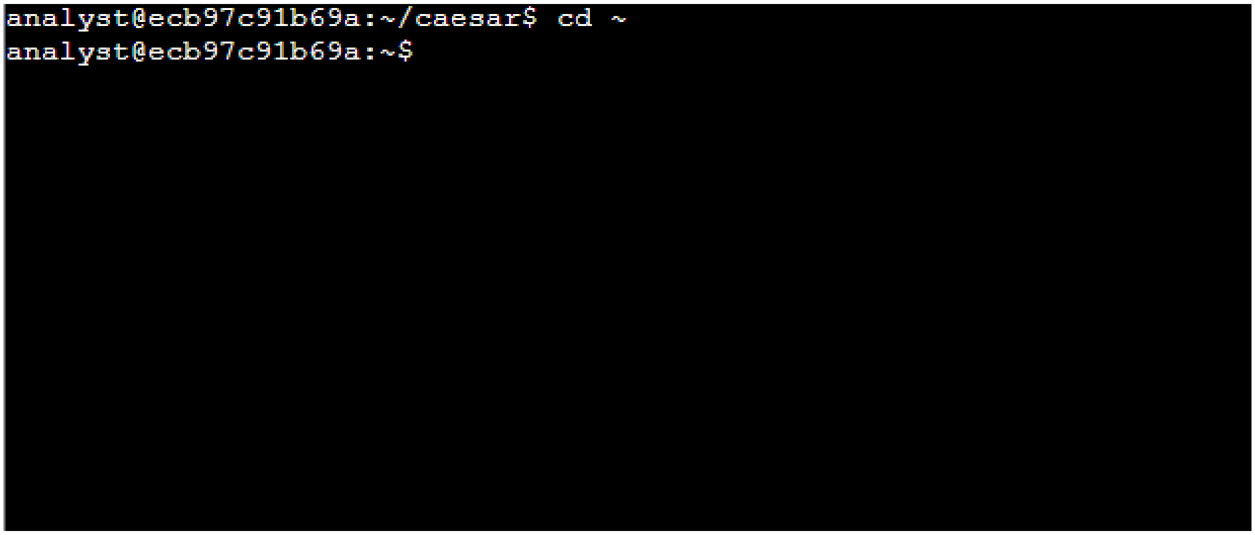
```
analyst@ecb97c91b69a:~/caesar$ cat .leftShift3 | tr "d-za-cD-ZA-C" "a-z
A-Z"
In order to recover your files you will need to enter the following com
mand:

openssl aes-256-cbc -pbkdf2 -a -d -in Q1.encrypted -out Q1.recovered -k
 ettubrute
analyst@ecb97c91b69a:~/caesar$
```

In this case, the command `tr "d-za-cD-ZA-C" "a-zA-Z"` translates all the lowercase and uppercase letters in the alphabet back to their original position. The first character set, indicated by `"d-za-cD-ZA-C"`, is translated to the second character set, which is `"a-zA-Z"`.

Note: *The output provides you with the command you need to solve the next task! You don't need to copy the command revealed in the output. It will be provided in the next task.*

5. Now, return to your home directory before completing the next task:

```
cd ~
```



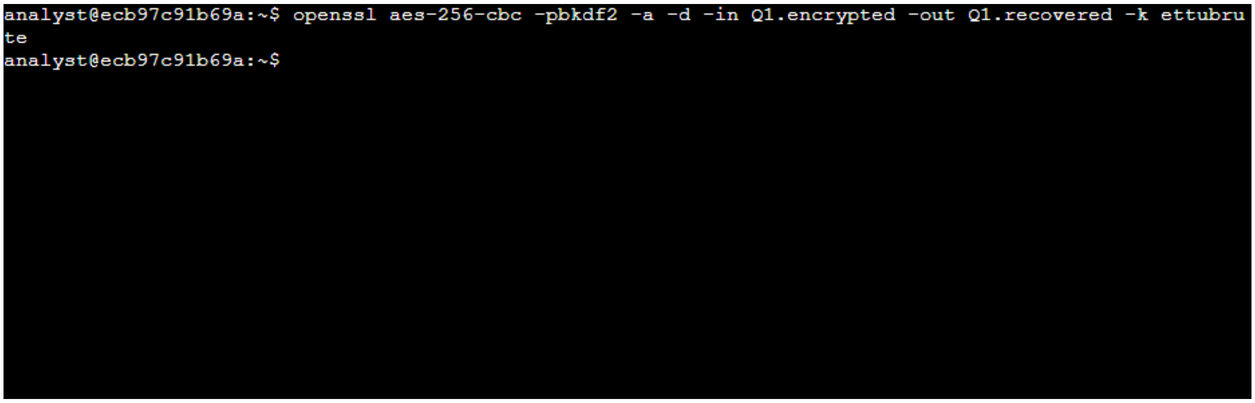
```
analyst@ecb97c91b69a:~/caesar$ cd ~
analyst@ecb97c91b69a:~$
```

Task 3. Decrypt a file

Now that you have solved the Caesar cipher, in this task you need to use the command revealed in `.leftshift3` to decrypt a file and recover your data so you can read the message it contains.

1. Use the exact command revealed in the previous task to decrypt the encrypted file:

```
openssl aes-256-cbc -pbkdf2 -a -d -in Q1.encrypted -out Q1.recovered -k
ettubrute
```



```
analyst@ecb97c91b69a:~$ openssl aes-256-cbc -pbkdf2 -a -d -in Q1.encrypted -out Q1.recovered -k ettubru
te
analyst@ecb97c91b69a:~$
```

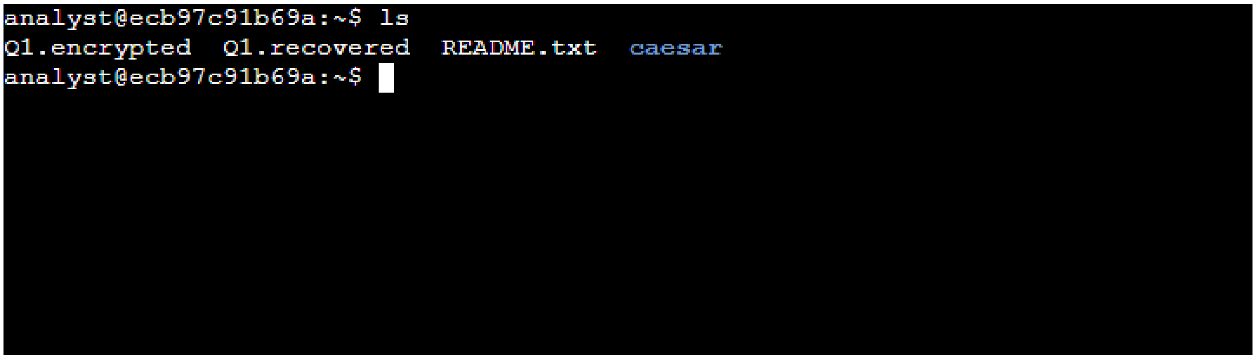
Although you don't need to memorize this command, to help you better understand the syntax used, let's break it down.

In this instance, the `openssl` command reverses the encryption of the file with a secure symmetric cipher, as indicated by `AES-256-CBC`. The `-pbkdf2` option is used to add extra security to the key, and `-a` indicates the desired encoding for the output. The `-d` indicates decrypting, while `-in` specifies the input file and `-out` specifies the output file. The `-k` specifies the password, which in this example is `ettubrute`.

2. Use the `ls` command to list the contents of your current working directory again.

The command to complete this step:

```
Ls
```



```
analyst@ecb97c91b69a:~$ ls
Q1.encrypted  Q1.recovered  README.txt  caesar
analyst@ecb97c91b69a:~$ 
```

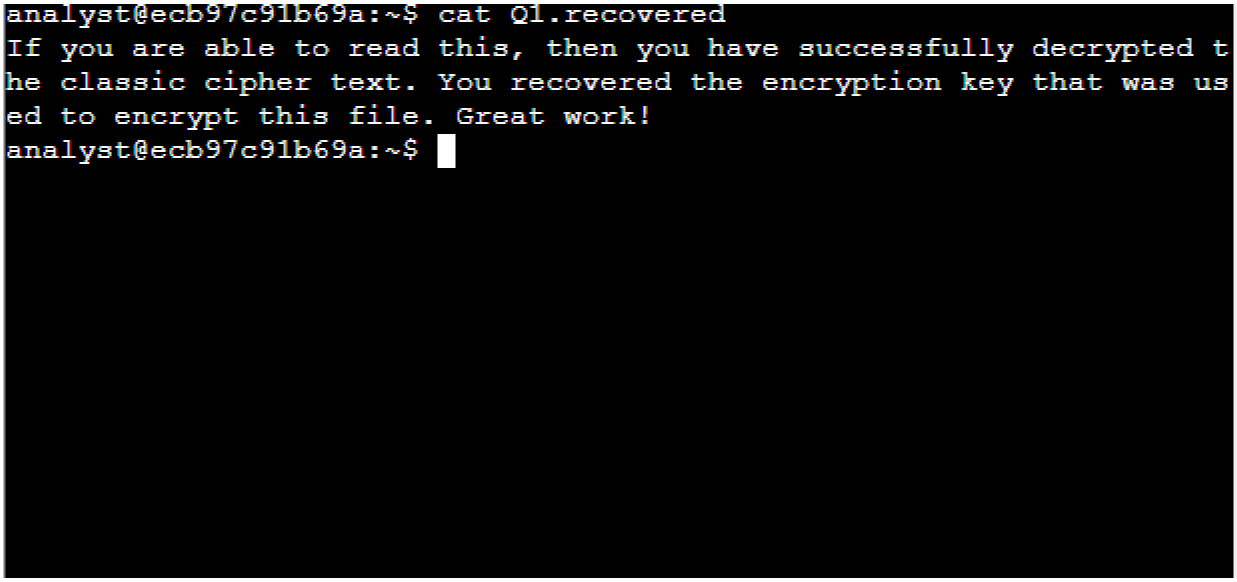
The new file `Q1.recovered` in the directory listing is the decrypted file and contains a message.

3. Use the `cat` command to list the contents of the `Q1.recovered` file.

The command to complete this step:

```
cat Q1.recovered
```

This will display the following output:



```
analyst@ecb97c91b69a:~$ cat Q1.recovered
If you are able to read this, then you have successfully decrypted t
he classic cipher text. You recovered the encryption key that was us
ed to encrypt this file. Great work!
analyst@ecb97c91b69a:~$ 
```