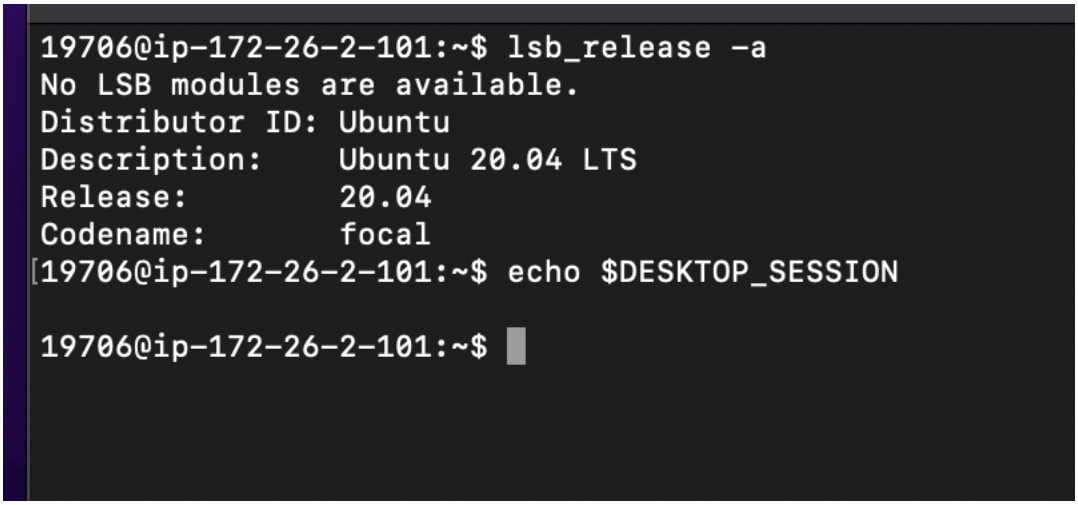
Question no.1
Linux has both CLI and GUI.

- What do they stand for? Which one do you prefer?
  ⇨ CLI stands for Command Line Interface and GUI stands for Graphical User Interference.
  GUI is user-friendly which has visually intuitive. It is helpful for the beginner because it is easier to learn than a CLI (Command Line Interface). CLI has high features which make our work easier. But still, learning from basics can make it more effective than going into a big one at once.
  So, I prefer GUI.

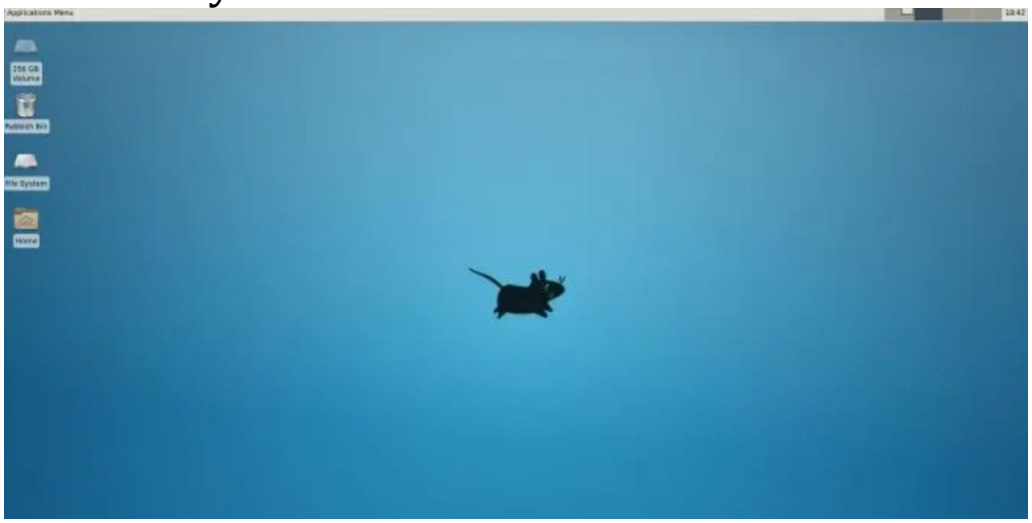
- Take a screenshot of your Desktop Environment from one of your Linux accounts. What type of Desktop Environment is it? How did you find out?
  ⇨ My Linux has a terminal and doesn't support a desktop environment.



There are several desktop environments:

i) GNOME: A modern and sleek desktop environment with a user-friendly interface.

ii) Xfce: A lightweight and fast desktop environment that is easy to use and customize.



Question no.2
Ping, nslookup

- Ping these servers: www.cnn.com, www.nhk.or.jp, www.bbc.co.uk, www.batimes.com.ar
- Allow at least 7 or 8 packets to be sent. Control C to stop
- What is the IP address for each of the 4 websites?
- Is the transmission successful? What is the average time it takes to transmit and receive?
- Which one takes the shortest time to transmit? Why? Which one takes the longest? Does it make sense?
- Now type nslookup <website>. What is returned? Does it make sense?

⇨ **For www.cnn.com**

```
[19706@ip-172-26-2-101:~$ ping www.cnn.com
PING www.cnn.com(2a04:4e42:5::773 (2a04:4e42:5::773)) 56 data bytes
64 bytes from 2a04:4e42:5::773 (2a04:4e42:5::773): icmp_seq=1 ttl=49 time=6.60 ms
64 bytes from 2a04:4e42:5::773 (2a04:4e42:5::773): icmp_seq=2 ttl=49 time=6.58 ms
64 bytes from 2a04:4e42:5::773 (2a04:4e42:5::773): icmp_seq=3 ttl=49 time=6.61 ms
64 bytes from 2a04:4e42:5::773 (2a04:4e42:5::773): icmp_seq=4 ttl=49 time=6.63 ms
64 bytes from 2a04:4e42:5::773 (2a04:4e42:5::773): icmp_seq=5 ttl=49 time=6.67 ms
64 bytes from 2a04:4e42:5::773 (2a04:4e42:5::773): icmp_seq=6 ttl=49 time=6.60 ms
64 bytes from 2a04:4e42:5::773 (2a04:4e42:5::773): icmp_seq=7 ttl=49 time=6.57 ms
64 bytes from 2a04:4e42:5::773 (2a04:4e42:5::773): icmp_seq=8 ttl=49 time=6.59 ms
64 bytes from 2a04:4e42:5::773 (2a04:4e42:5::773): icmp_seq=9 ttl=49 time=6.67 ms
^C
--- www.cnn.com ping statistics ---
9 packets transmitted, 9 received, 0% packet loss, time 8015ms
rtt min/avg/max/mdev = 6.568/6.613/6.674/0.035 ms
[19706@ip-172-26-2-101:~$ nslookup www.cnn.com
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
www.cnn.com     canonical name = cnn-tls.map.fastly.net.
Name:   cnn-tls.map.fastly.net
Address: 151.101.23.5
Name:   cnn-tls.map.fastly.net
Address: 2a04:4e42:5::773

19706@ip-172-26-2-101:~$
```

- ⇨ The IP address for cnn.com is 2a04 : 4e42: 5: :773. The average time it takes to transmit and receive is 6.613ms
- ⇨ The shortest time to transmit is 6.568 ms.
- ⇨ The longest time to transmit is 6.674 ms
- ⇨ The “nslookup” gives the result :

```
19706@ip-172-26-2-101:~$ nslookup www.cnn.com
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
www.cnn.com     canonical name = cnn-tls.map.fastly.net.
Name:   cnn-tls.map.fastly.net
Address: 151.101.23.5
Name:   cnn-tls.map.fastly.net
Address: 2a04:4e42:5::773
```

.

- ⇨ For www.nhk.com

```
19706@ip-172-26-2-101:~$ ping www.nhk.com
PING nhk.com (199.188.200.172) 56(84) bytes of data.
64 bytes from server238-3.web-hosting.com (199.188.200.172): icmp_seq=1 ttl=38 time=41.3 ms
64 bytes from server238-3.web-hosting.com (199.188.200.172): icmp_seq=2 ttl=38 time=41.6 ms
64 bytes from server238-3.web-hosting.com (199.188.200.172): icmp_seq=3 ttl=38 time=41.7 ms
64 bytes from server238-3.web-hosting.com (199.188.200.172): icmp_seq=4 ttl=38 time=41.8 ms
64 bytes from server238-3.web-hosting.com (199.188.200.172): icmp_seq=5 ttl=38 time=41.6 ms
64 bytes from server238-3.web-hosting.com (199.188.200.172): icmp_seq=6 ttl=38 time=41.4 ms
64 bytes from server238-3.web-hosting.com (199.188.200.172): icmp_seq=7 ttl=38 time=41.8 ms
64 bytes from server238-3.web-hosting.com (199.188.200.172): icmp_seq=8 ttl=38 time=41.4 ms
64 bytes from server238-3.web-hosting.com (199.188.200.172): icmp_seq=9 ttl=38 time=41.8 ms
64 bytes from server238-3.web-hosting.com (199.188.200.172): icmp_seq=10 ttl=38 time=41.9 ms
64 bytes from server238-3.web-hosting.com (199.188.200.172): icmp_seq=11 ttl=38 time=41.5 ms
^C
--- nhk.com ping statistics ---
11 packets transmitted, 11 received, 0% packet loss, time 10015ms
rtt min/avg/max/mdev = 41.304/41.622/41.905/0.197 ms
19706@ip-172-26-2-101:~$ nslookup www.nhk.com
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
www.nhk.com     canonical name = nhk.com.
Name:   nhk.com
Address: 199.188.200.172

19706@ip-172-26-2-101:~$
```

- ⇨ The IP address for cnn.com is “199.188.200.172”. The average time it takes to transmit and receive is 41.622ms

- The shortest time to transmit is 41.304 ms.
  The longest time to transmit is 41.905 ms
- The result of “nslookup” is:

```
19706@ip-172-26-2-101:~$ nslookup www.nhk.com
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
www.nhk.com     canonical name = nhk.com.
Name:   nhk.com
Address: 199.188.200.172
```

- For www.bbc.co.uk

```
ping: www.bbc.cowk: Name or service not known
[19706@ip-172-26-2-101:~$ ping www.bbc.co.uk
PING bbc.map.fastly.net (151.101.20.81) 56(84) bytes of data.
64 bytes from 151.101.20.81 (151.101.20.81): icmp_seq=1 ttl=49 time=9.91 ms
64 bytes from 151.101.20.81 (151.101.20.81): icmp_seq=2 ttl=49 time=9.91 ms
64 bytes from 151.101.20.81 (151.101.20.81): icmp_seq=3 ttl=49 time=9.97 ms
64 bytes from 151.101.20.81 (151.101.20.81): icmp_seq=4 ttl=49 time=10.0 ms
64 bytes from 151.101.20.81 (151.101.20.81): icmp_seq=5 ttl=49 time=9.96 ms
64 bytes from 151.101.20.81 (151.101.20.81): icmp_seq=6 ttl=49 time=9.96 ms
64 bytes from 151.101.20.81 (151.101.20.81): icmp_seq=7 ttl=49 time=9.96 ms
64 bytes from 151.101.20.81 (151.101.20.81): icmp_seq=8 ttl=49 time=9.94 ms
64 bytes from 151.101.20.81 (151.101.20.81): icmp_seq=9 ttl=49 time=9.94 ms
64 bytes from 151.101.20.81 (151.101.20.81): icmp_seq=10 ttl=49 time=9.93 ms
64 bytes from 151.101.20.81 (151.101.20.81): icmp_seq=11 ttl=49 time=9.89 ms
64 bytes from 151.101.20.81 (151.101.20.81): icmp_seq=12 ttl=49 time=9.98 ms
64 bytes from 151.101.20.81 (151.101.20.81): icmp_seq=13 ttl=49 time=9.96 ms
64 bytes from 151.101.20.81 (151.101.20.81): icmp_seq=14 ttl=49 time=9.97 ms
64 bytes from 151.101.20.81 (151.101.20.81): icmp_seq=15 ttl=49 time=9.97 ms
64 bytes from 151.101.20.81 (151.101.20.81): icmp_seq=16 ttl=49 time=9.93 ms
^C
--- bbc.map.fastly.net ping statistics ---
16 packets transmitted, 16 received, 0% packet loss, time 15020ms
rtt min/avg/max/mdev = 9.892/9.949/10.032/0.032 ms
[19706@ip-172-26-2-101:~$ nslookup www.bbc.co.uk
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
www.bbc.co.uk   canonical name = www.bbc.co.uk.pri.bbc.co.uk.
www.bbc.co.uk.pri.bbc.co.uk     canonical name = bbc.map.fastly.net.
Name:   bbc.map.fastly.net
Address: 151.101.20.81

19706@ip-172-26-2-101:~$
```

- The IP address for cnn.com is “151.101.20.81”. The average time it takes to transmit and receive is 9.949ms
- The shortest time to transmit is 9.892 ms.
  The longest time to transmit is 10.032 ms
- The result of “nslookup” is:

```
[19706@ip-172-26-2-101:~$ nslookup www.bbc.co.uk
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
www.bbc.co.uk   canonical name = www.bbc.co.uk.pri.bbc.co.uk.
www.bbc.co.uk.pri.bbc.co.uk     canonical name = bbc.map.fastly.net.
Name:   bbc.map.fastly.net
Address: 151.101.20.81
```

- For www.batimes.com.ar

```
[19706@ip-172-26-2-101:~$ ping www.batimes.com.ar
PING www.batimes.com.ar(2606:4700:20::681a:7d0 (2606:4700:20::681a:7d0)) 56 data bytes
64 bytes from 2606:4700:20::681a:7d0 (2606:4700:20::681a:7d0): icmp_seq=1 ttl=49 time=8.20 ms
64 bytes from 2606:4700:20::681a:7d0 (2606:4700:20::681a:7d0): icmp_seq=2 ttl=48 time=8.22 ms
64 bytes from 2606:4700:20::681a:7d0 (2606:4700:20::681a:7d0): icmp_seq=3 ttl=48 time=8.18 ms
64 bytes from 2606:4700:20::681a:7d0 (2606:4700:20::681a:7d0): icmp_seq=4 ttl=48 time=8.26 ms
64 bytes from 2606:4700:20::681a:7d0 (2606:4700:20::681a:7d0): icmp_seq=5 ttl=48 time=8.21 ms
64 bytes from 2606:4700:20::681a:7d0 (2606:4700:20::681a:7d0): icmp_seq=6 ttl=48 time=8.18 ms
64 bytes from 2606:4700:20::681a:7d0 (2606:4700:20::681a:7d0): icmp_seq=7 ttl=48 time=8.20 ms
64 bytes from 2606:4700:20::681a:7d0 (2606:4700:20::681a:7d0): icmp_seq=8 ttl=48 time=8.17 ms
64 bytes from 2606:4700:20::681a:7d0 (2606:4700:20::681a:7d0): icmp_seq=9 ttl=48 time=8.24 ms
64 bytes from 2606:4700:20::681a:7d0 (2606:4700:20::681a:7d0): icmp_seq=10 ttl=48 time=8.21 ms
64 bytes from 2606:4700:20::681a:7d0 (2606:4700:20::681a:7d0): icmp_seq=11 ttl=49 time=8.35 ms
64 bytes from 2606:4700:20::681a:7d0 (2606:4700:20::681a:7d0): icmp_seq=12 ttl=48 time=8.20 ms
64 bytes from 2606:4700:20::681a:7d0 (2606:4700:20::681a:7d0): icmp_seq=13 ttl=48 time=8.23 ms
64 bytes from 2606:4700:20::681a:7d0 (2606:4700:20::681a:7d0): icmp_seq=14 ttl=48 time=8.26 ms
64 bytes from 2606:4700:20::681a:7d0 (2606:4700:20::681a:7d0): icmp_seq=15 ttl=49 time=8.31 ms
^C
--- www.batimes.com.ar ping statistics ---
15 packets transmitted, 15 received, 0% packet loss, time 14021ms
rtt min/avg/max/mdev = 8.170/8.226/8.349/0.047 ms
[19706@ip-172-26-2-101:~$ nslookup www.batimes.com.ar
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
Name:   www.batimes.com.ar
Address: 172.67.71.142
Name:   www.batimes.com.ar
Address: 104.26.7.208
Name:   www.batimes.com.ar
Address: 104.26.6.208
Name:   www.batimes.com.ar
Address: 2606:4700:20::681a:6d0
Name:   www.batimes.com.ar
Address: 2606:4700:20::ac43:478e
Name:   www.batimes.com.ar
Address: 2606:4700:20::681a:7d0
```

- ⇨ The IP address for cnn.com is “2606:4700:20: :681a:7d0”. The average time it takes to transmit and receive is 8.226ms
- ⇨ The shortest time to transmit is 8.170ms.
  The longest time to transmit is 8.349ms
- ⇨ The result of “nslookup” is:

```
[19706@ip-172-26-2-101:~$ nslookup www.batimes.com.ar
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
Name:   www.batimes.com.ar
Address: 172.67.71.142
Name:   www.batimes.com.ar
Address: 104.26.7.208
Name:   www.batimes.com.ar
Address: 104.26.6.208
Name:   www.batimes.com.ar
Address: 2606:4700:20::681a:6d0
Name:   www.batimes.com.ar
Address: 2606:4700:20::ac43:478e
Name:   www.batimes.com.ar
Address: 2606:4700:20::681a:7d0
```

⇨ The common answer.

i) Why it is the shortest?

⇨ The “rtt min” value in the "rtt min/avg/max/mdev" line in the ping output represents the shortest round-trip time (RTT) it took for a packet to be sent from the source and received back at the source. But it may not be accurate always.

ii) Does it make sense?

⇨ Yes, it makes sense. Understanding the round-trip time (RTT) values from the ping command can help provide an idea of network performance and connectivity. The "rtt min" value represents the shortest RTT it took for a packet to be sent and received, while the "rtt max" value represents the longest RTT it took for a packet to be sent and received. These values, along with the average RTT and the standard deviation, can provide a general

understanding of network performance and connectivity.

iii) Now type nslookup <website>. What is returned? Does it make sense?

⇨ The "nslookup" command is used to query the Domain Name System (DNS) to obtain information about a specific domain name or IP address.

It returns the information about the IP address and name servers associated with the website in the output. This information can include the official name of the website, its IP address, and the name servers that are responsible for its domain.

The information returned by the "nslookup" command makes sense as it provides details about the domain name and IP address of the website specified in the command. Whether or not it makes sense to a specific user depends on their understanding of DNS and network infrastructure

Question no.3

Go to this website and finish all the steps in Tutorial Three. This tutorial talks about sort, who, redirection

➔ cat and sort command:

```
[19706@ip-172-26-2-101:~$ cat >list1
[mango
[peach
[apple
[oragne
[19706@ip-172-26-2-101:~$ cat list1
mango
peach
apple
oragne
[19706@ip-172-26-2-101:~$ cat >> list2
[grape
[papaya
[pomegranate
[raspberries
[19706@ip-172-26-2-101:~$ cat list2
grape
papaya
pomegranate
raspberries
[19706@ip-172-26-2-101:~$ sort
[yak
[ant
[zebra
[bat
ant
bat
yak
zebra
[19706@ip-172-26-2-101:~$ cat list1 list2 > biglist
[19706@ip-172-26-2-101:~$ cat biglist
mango
peach
apple
oragne
grape
papaya
pomegranate
raspberries
[19706@ip-172-26-2-101:~$ sort < biglist
apple
grape
mango
oragne
papaya
peach
pomegranate
raspberries
[19706@ip-172-26-2-101:~$ sort <biglist> slist
[19706@ip-172-26-2-101:~$ cat slist
apple
grape
mango
oragne
papaya
peach
pomegranate
raspberries
```

➔ who :

```
[19706@ip-172-26-2-101:~$ who
19706    pts/0        2023-02-03 15:02 (67.170.198.143)
19843    pts/1        2023-02-03 12:26 (99.22.53.56)
19792    pts/2        2023-02-03 14:07 (209.36.108.210)
19864    pts/4        2023-02-03 15:36 (209.36.108.210)
[19706@ip-172-26-2-101:~$ who > names.txt
[19706@ip-172-26-2-101:~$ sort ,names.txt
sort: cannot read: ,names.txt: No such file or directory
[19706@ip-172-26-2-101:~$ sort < names.txt
19706    pts/0        2023-02-03 15:02 (67.170.198.143)
19792    pts/2        2023-02-03 14:07 (209.36.108.210)
19843    pts/1        2023-02-03 12:26 (99.22.53.56)
19864    pts/4        2023-02-03 15:36 (209.36.108.210)
[19706@ip-172-26-2-101:~$ who | sort
19706    pts/0        2023-02-03 15:02 (67.170.198.143)
19792    pts/2        2023-02-03 14:07 (209.36.108.210)
19843    pts/1        2023-02-03 12:26 (99.22.53.56)
19864    pts/4        2023-02-03 15:36 (209.36.108.210)
[19706@ip-172-26-2-101:~$ who | wc -l
4
19706@ip-172-26-2-101:~$
```

Question no.4

Given the following text:

From fairest creatures we desire increase,
That thereby beauty's rose might never die,
But as the riper should by time decease,
His tender heir might bear his memory:
But thou contracted to thine own bright eyes,
Feed'st thy light's flame with self-substantial fuel,
Making a famine where abundance lies,
Thy self thy foe, to thy sweet self too cruel:
Thou that art now the world's fresh ornament,
And only herald to the gaudy spring,
Within thine own bud buriest thy content,
And tender churl mak'st waste in niggarding:
Pity the world, or else this glutton be,
To eat the world's due, by the grave and thee.

When forty winters shall besiege thy brow,
And dig deep trenches in thy beauty's field,
Thy youth's proud livery so gazed on now,
Will be a tattered weed of small worth held:
Then being asked, where all thy beauty lies,
Where all the treasure of thy lusty days;
To say within thine own deep sunken eyes,
Were an all-eating shame, and thriftless praise.
How much more praise deserved thy beauty's use,
If thou couldst answer 'This fair child of mine
Shall sum my count, and make my old excuse'

- Save the text into a file called story.
  ⇨

```
19706@ip-172-26-2-101:~$ touch story
19706@ip-172-26-2-101:~$ vi story
19706@ip-172-26-2-101:~$ cat story
From fairest creatures we desire increase,
That thereby beauty's rose might never die,
But as the riper should by time decease,
His tender heir might bear his memory:
But thou contracted to thine own bright eyes,
Feed'st thy light's flame with self-substantial fuel,
Making a famine where abundance lies,
Thy self thy foe, to thy sweet self too cruel:
Thou that art now the world's fresh ornament,
And only herald to the gaudy spring,
Within thine own bud buriest thy content,
And tender churl mak'st waste in niggarding:
Pity the world, or else this glutton be,
To eat the world's due, by the grave and thee.
When forty winters shall besiege thy brow,
And dig deep trenches in thy beauty's field,
Thy youth's proud livery so gazed on now,
Will be a tattered weed of small worth held:
Then being asked, where all thy beauty lies,
Where all the treasure of thy lusty days;
To say within thine own deep sunken eyes,
Were an all-eating shame, and thriftless praise.
How much more praise deserved thy beauty's use,
If thou couldst answer 'This fair child of mine
Shall sum my count, and make my old excuse'
19706@ip-172-26-2-101:~$
```

- Now count the number of characters, number of words, and number of lines for this text
  ⇨ For the character:
  The command is wc -c story.

```
[19706@ip-172-26-2-101:~$ wc -c story
1103 story
19706@ip-172-26-2-101:~$
```

- ⇨ For the number of words:
  The command is wc -w story.

```
[19706@ip-172-26-2-101:~$ wc -w story
195 story
19706@ip-172-26-2-101:~$
```

- ⇨ For the number of lines:
  The command is wc -l story

```
[19706@ip-172-26-2-101:~$ wc -l story
25 story
19706@ip-172-26-2-101:~$
```

- Grep out the lines with the word "to" (case insensitive)
  - ⇨ The command is grep -i to story

```
[19706@ip-172-26-2-101:~$ grep -i to story
But thou contracted to thine own bright eyes,
Thy self thy foe, to thy sweet self too cruel:
And only herald to the gaudy spring,
Pity the world, or else this glutton be,
To eat the world's due, by the grave and thee.
To say within thine own deep sunken eyes,
19706@ip-172-26-2-101:~$
```

- Grep out the lines with either a word "to" or "the" (case insensitive)
  - ⇨ The command is grep -iE "to|the" story.

```
19706@ip-172-26-2-101:~$ grep -iE "to|the" story
That thereby beauty's rose might never die,
But as the riper should by time decease,
But thou contracted to thine own bright eyes,
Thy self thy foe, to thy sweet self too cruel:
Thou that art now the world's fresh ornament,
And only herald to the gaudy spring,
Pity the world, or else this glutton be,
To eat the world's due, by the grave and thee.
Then being asked, where all thy beauty lies,
Where all the treasure of thy lusty days;
To say within thine own deep sunken eyes,
19706@ip-172-26-2-101:~$
```

- Use grep to help you grep outlines that have a 10-lettered word. For example, the word "contracted" has 10 letters. The line that has that word should be grep'ed out. What words have 10 letters?
  - ⇨ The command is grep -E "\b[a-zA-Z]{10}\b" story.

```
19706@ip-172-26-2-101:~$ grep -E "\b[a-zA-Z]{10}\b" story
But thou contracted to thine own bright eyes,
And tender churl mak'st waste in niggarding:
Were an all-eating shame, and thriftless praise.
19706@ip-172-26-2-101:~$
```

  - ⇨ The regular expression pattern "\b[a-zA-Z]{10}\b" matches any 10-letter word composed of alphabetical characters and surrounded by word boundaries (\b).