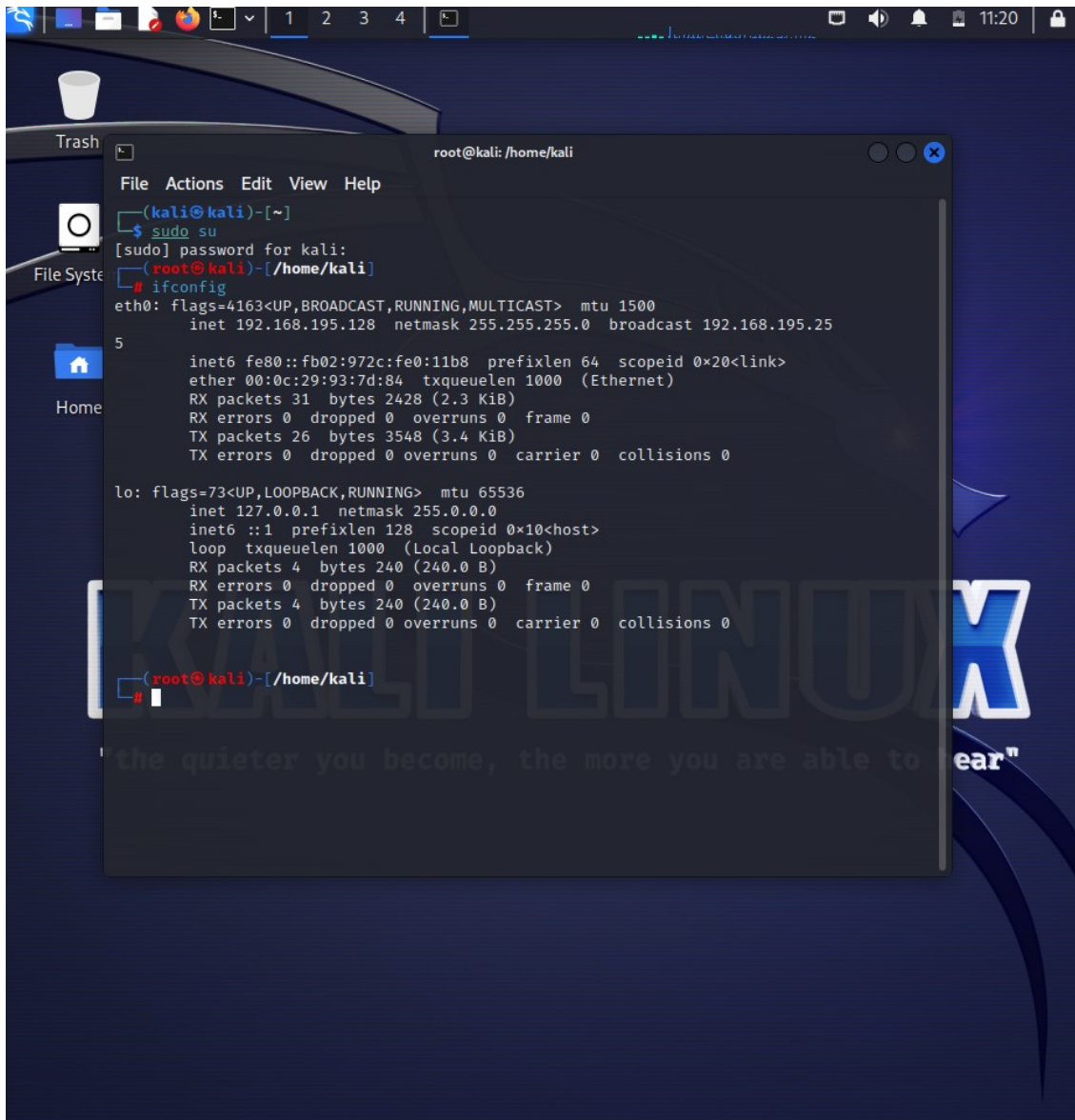


## Homework 1 - Networking Utilities

Note: Zoom in on the outputs.

### Task 1



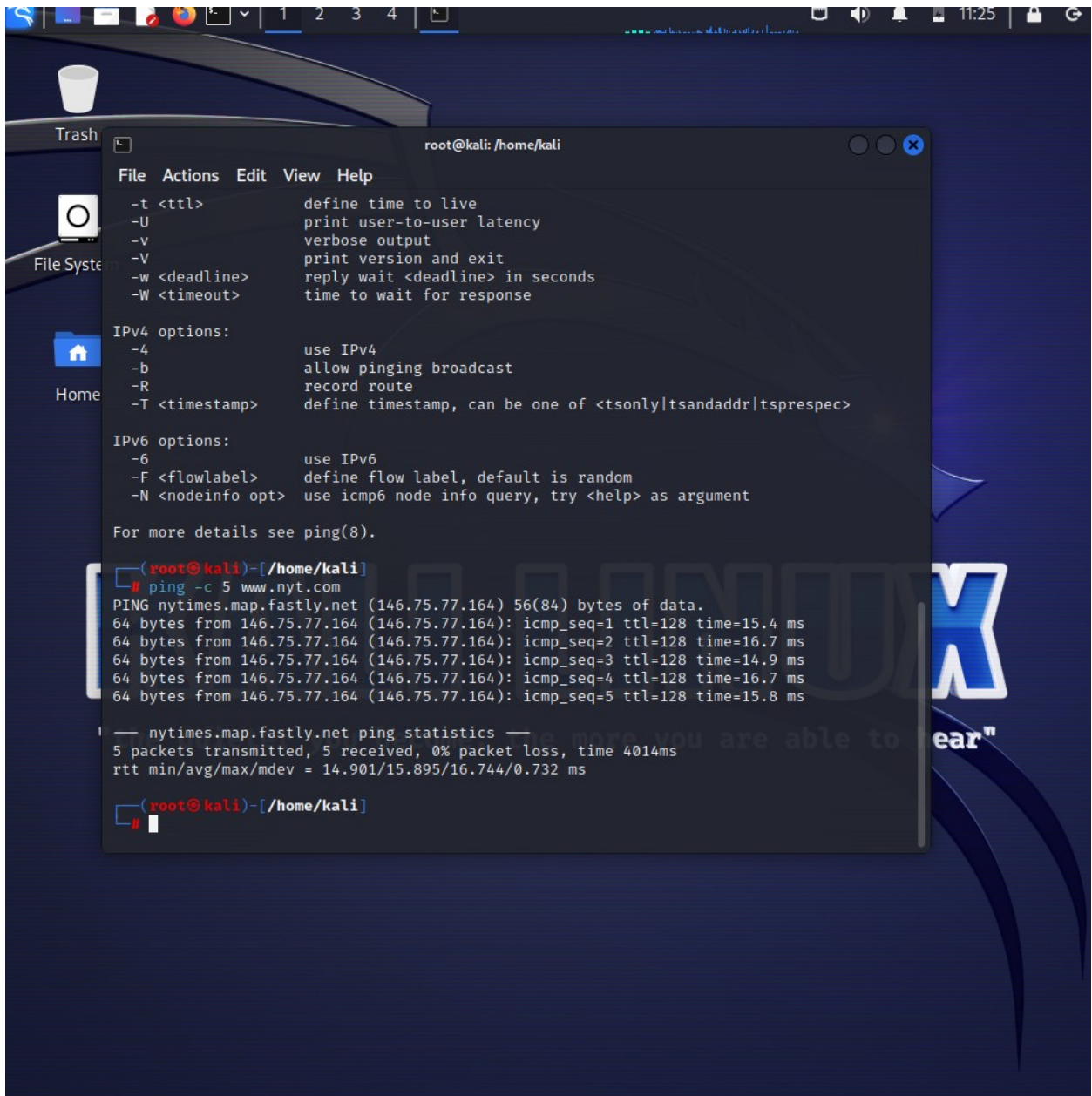
The screenshot shows a Kali Linux desktop environment. A terminal window is open, displaying the following commands and outputs:

```
root@kali: /home/kali
File Actions Edit View Help
(kali@kali)-[~]
$ sudo su
[sudo] password for kali:
(root@kali)-[/home/kali]
# ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.195.128 netmask 255.255.255.0 broadcast 192.168.195.255
    ether 00:0c:29:93:7d:84 txqueuelen 1000 (Ethernet)
    RX packets 31 bytes 2428 (2.3 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 26 bytes 3548 (3.4 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 4 bytes 240 (240.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 4 bytes 240 (240.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

(root@kali)-[/home/kali]
#
```

## Task 2



The screenshot shows a Kali Linux desktop with a terminal window open. The terminal displays the help text for the `ping` command, followed by the execution of `ping -c 5 www.nyt.com`. The output shows five successful ping requests to `nytimes.map.fastly.net` (IP: 146.75.77.164) with varying response times. Ping statistics are also displayed at the end of the command execution.

```
root@kali: /home/kali
File Actions Edit View Help
-t <ttl>          define time to live
-U              print user-to-user latency
-v             verbose output
-V            print version and exit
-w <deadline>    reply wait <deadline> in seconds
-W <timeout>     time to wait for response

IPv4 options:
-4            use IPv4
-b            allow pinging broadcast
-R            record route
-T <timestamp> define timestamp, can be one of <tsonly|tsandaddr|tsprespec>

IPv6 options:
-6            use IPv6
-F <flowlabel> define flow label, default is random
-N <nodeinfo opt> use icmp6 node info query, try <help> as argument

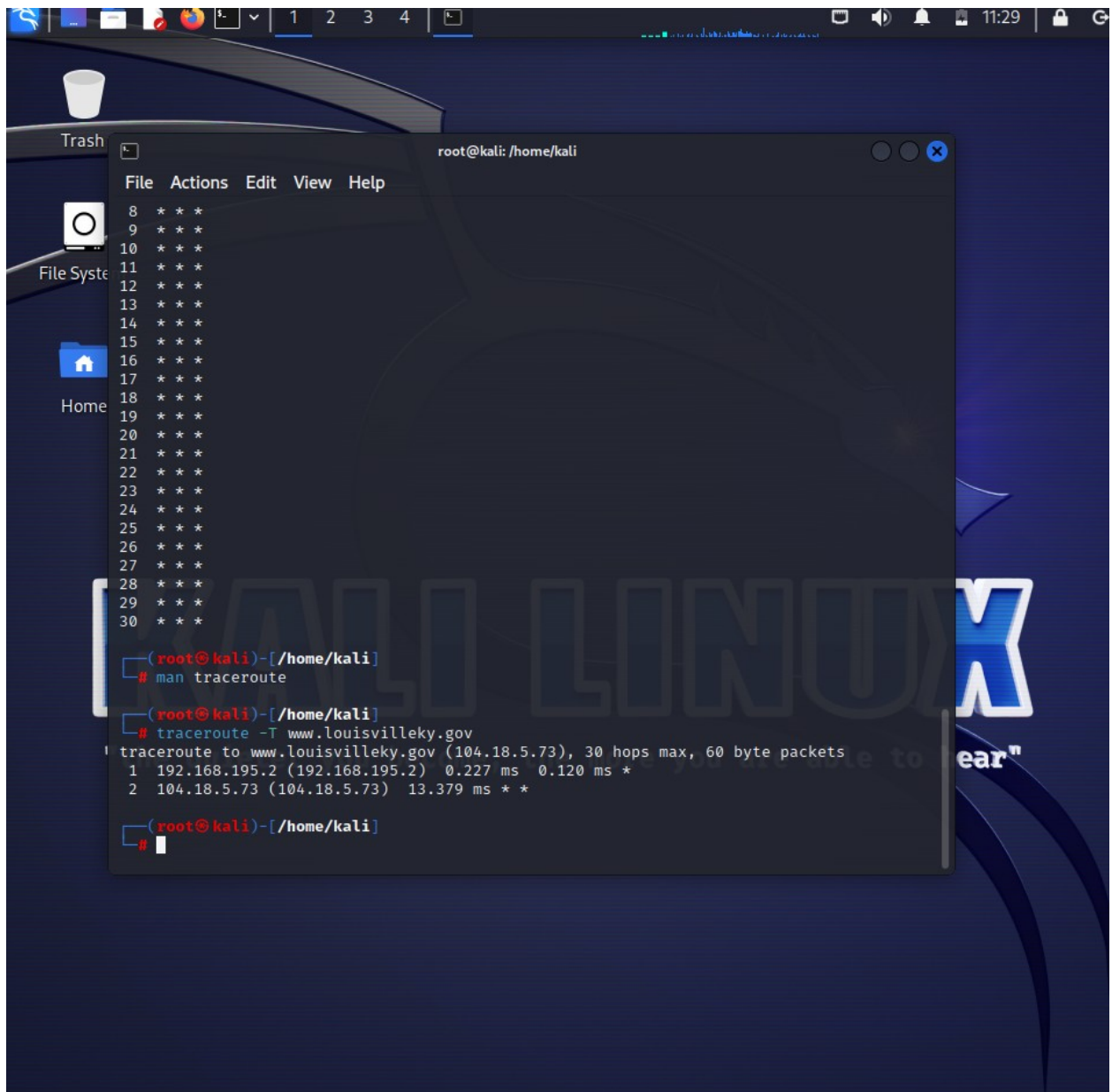
For more details see ping(8).

(root@kali)-[/home/kali]
# ping -c 5 www.nyt.com
PING nytimes.map.fastly.net (146.75.77.164) 56(84) bytes of data.
64 bytes from 146.75.77.164 (146.75.77.164): icmp_seq=1 ttl=128 time=15.4 ms
64 bytes from 146.75.77.164 (146.75.77.164): icmp_seq=2 ttl=128 time=16.7 ms
64 bytes from 146.75.77.164 (146.75.77.164): icmp_seq=3 ttl=128 time=14.9 ms
64 bytes from 146.75.77.164 (146.75.77.164): icmp_seq=4 ttl=128 time=16.7 ms
64 bytes from 146.75.77.164 (146.75.77.164): icmp_seq=5 ttl=128 time=15.8 ms

— nytimes.map.fastly.net ping statistics —
5 packets transmitted, 5 received, 0% packet loss, time 4014ms
rtt min/avg/max/mdev = 14.901/15.895/16.744/0.732 ms

(root@kali)-[/home/kali]
```

### Task 3



## Task 4

```
root@kali: /home/kali

File Actions Edit View Help

<Socket> {-t|--tcp} {-u|--udp} {-U|--udplite} {-S|--sctp} {-w|--raw}
{-x|--unix} --ax25 --ipx --netrom
<AF> Use '-6|-4' or '-A <af>' or '--<af>'; default: inet
List of possible address families (which support routing):
inet (DARPA Internet) inet6 (IPv6) ax25 (AMPR AX.25)
netrom (AMPR NET/ROM) rose (AMPR ROSE) ipx (Novell IPX)
ddp (Appletalk DDP) x25 (CCITT X.25)

(root@kali)-[/home/kali]
# netstat -t -u
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 192.168.195.128:59370   55.65.117.34.bc.g:https TIME_WAIT
tcp        0      0 192.168.195.128:55578   209.100.149.34.bc:https ESTABLISHED
tcp        0      0 192.168.195.128:42612   ord38s30-in-f14.1:https TIME_WAIT
tcp        0      0 192.168.195.128:42014   191.144.160.34.bc:https ESTABLISHED
tcp        0      0 192.168.195.128:60594   53.121.117.34.bc:https ESTABLISHED
tcp        0      0 192.168.195.128:48608   239.237.117.34.bc:https TIME_WAIT
tcp        0      0 192.168.195.128:57886   ord37s51-in-f14.1:https ESTABLISHED
tcp        0      0 192.168.195.128:57842   102.115.120.34.bc:https TIME_WAIT
tcp        0      0 192.168.195.128:52368   ec2-3-220-77-232.:https TIME_WAIT
tcp        0      0 192.168.195.128:48974   server-18-64-183-:https TIME_WAIT
tcp        0      0 192.168.195.128:48028   201.181.244.35.bc:https ESTABLISHED
tcp        0      0 192.168.195.128:54090   ord38s28-in-f3.1e:https TIME_WAIT
tcp        0      0 192.168.195.128:60402   ord37s51-in-f14.1:https TIME_WAIT
tcp        0      0 192.168.195.128:55988   191.144.160.34.bc:https TIME_WAIT
tcp        0      0 192.168.195.128:59378   55.65.117.34.bc.g:https ESTABLISHED
tcp        0      0 192.168.195.128:48050   ord37s35-in-f3.1e:https TIME_WAIT
tcp        0      0 192.168.195.128:56424   ord38s28-in-f14.1:https TIME_WAIT
tcp        0      0 192.168.195.128:38018   21.103.201.35.bc:https TIME_WAIT
tcp        0      0 192.168.195.128:43762   36.75.98.34.bc.go:https TIME_WAIT
udp        0      0 192.168.195.128:bootpc  192.168.195.254:bootps ESTABLISHED

(root@kali)-[/home/kali]
#
```



## Task 5

```
root@kali: /home/kali
File Actions Edit View Help

-l, --listening      display listening server sockets
-a, --all            display all sockets (default: connected)
-F, --fib            display Forwarding Information Base (default)
-C, --cache          display routing cache instead of FIB
-Z, --context        display SELinux security context for sockets

<Socket> {-t|--tcp} {-u|--udp} {-U|--udplite} {-S|--sctp} {-w|--raw}
               {-x|--unix} --ax25 --ipx --netrom
<AF> Use '-6|-4' or '-A <af>' or '--<af>'; default: inet
List of possible address families (which support routing):
inet (DARPA Internet) inet6 (IPv6) ax25 (AMPR AX.25)
netrom (AMPR NET/ROM) rose (AMPR ROSE) ipx (Novell IPX)
ddp (Appletalk DDP) x25 (CCITT X.25)

(root@kali)-[/home/kali]
# service ssh start;

(root@kali)-[/home/kali]
# netstat -tuln
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 0.0.0.0:22              0.0.0.0:*               LISTEN
tcp6       0      0 :::22                  :::*                    LISTEN

(root@kali)-[/home/kali]
# service ssh stop
```

## Task 6

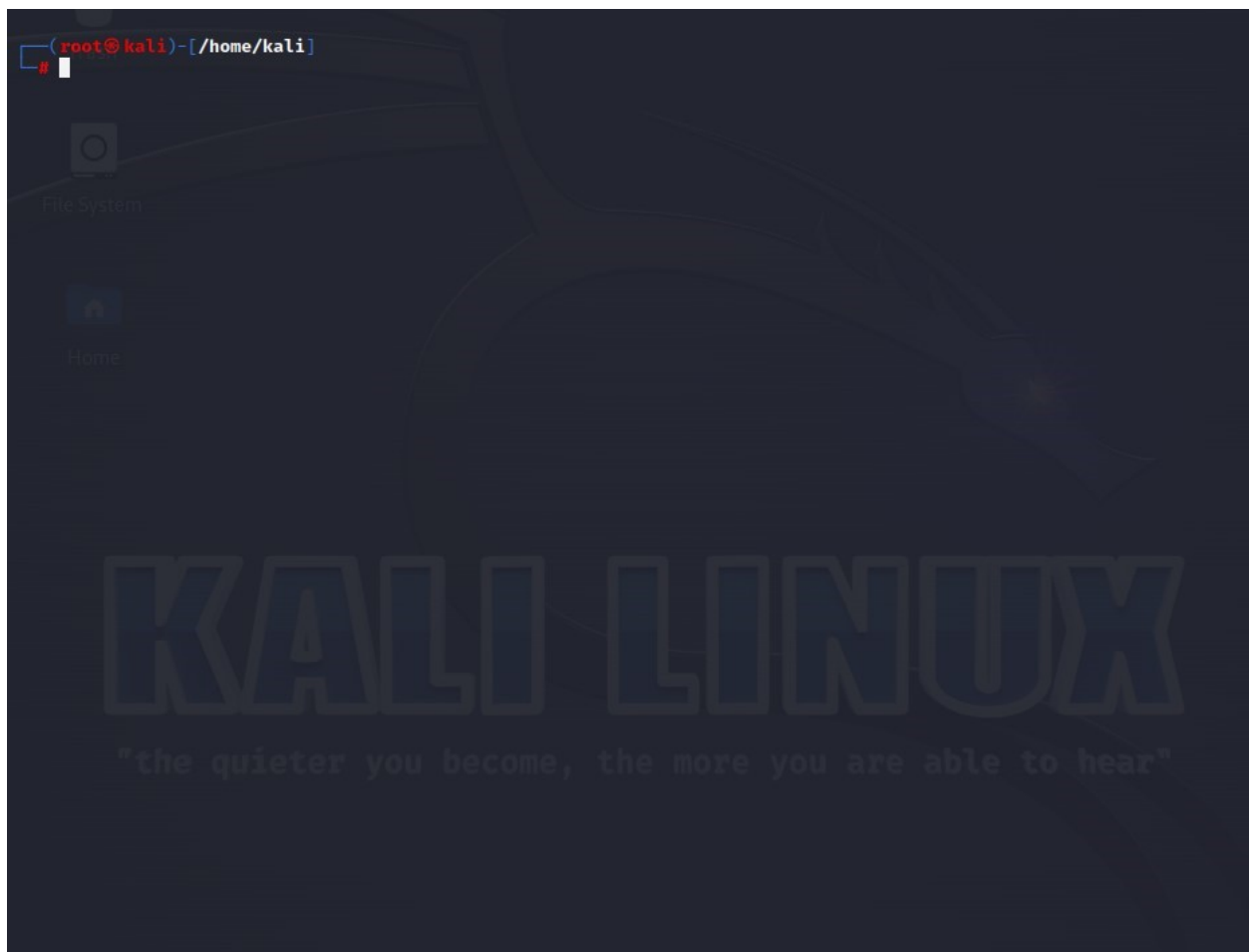
Wget:

```
(root@kali)-[/home/kali]
# wget www.uky.edu
--2023-09-02 12:23:23-- http://www.uky.edu/
Resolving www.uky.edu (www.uky.edu)... 128.163.35.46
Connecting to www.uky.edu (www.uky.edu)|128.163.35.46|:80... connected.
HTTP request sent, awaiting response... 302 Moved Temporarily
Location: https://www.uky.edu [following]
--2023-09-02 12:23:24-- https://www.uky.edu/
Connecting to www.uky.edu (www.uky.edu)|128.163.35.46|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 95486 (93K) [text/html]
Saving to: 'index.html.1'

index.html.1          100%[=====>] 93.25K --.-KB/s  in 0.1s

2023-09-02 12:23:24 (776 KB/s) - 'index.html.1' saved [95486/95486]
```

Clear:



Grep w/ delimiter

```

(root@kali)-[/home/kali]
# grep 'href=' index.html | cut -d "/" -f3
www.uky.edu
www.uky.edu
default
default
default
link.html.twig" --><a href="#main-content" class="skip-nav">
www.uky.edu

www.ukalumni.net
www.uky.edu
uky.campuslabs.com
calendar.uky.edu" class="">Calendar<
www.uky.edu
www.uky.edu
" class="">Faculty &amp; Staff<
www.uky.edu
www.uky.edu
ukjobs.uky.edu" class="">Jobs<
libraries.uky.edu
www.uky.edu
registrar.uky.edu
www.uky.edu
www.uky.edu
techhelpcenter.uky.edu
www.uky.edu
my-uk-logo.html.twig" --><a class="my-uk-logo" href="https:

applyuk.com
uky.networkforgood.com
visit.uky.edu">VISIT<
13">#UK4KY<
www.visitlex.com
50">Accreditation<
24">Administration<
coldstream.uky.edu
commencement.uky.edu

```