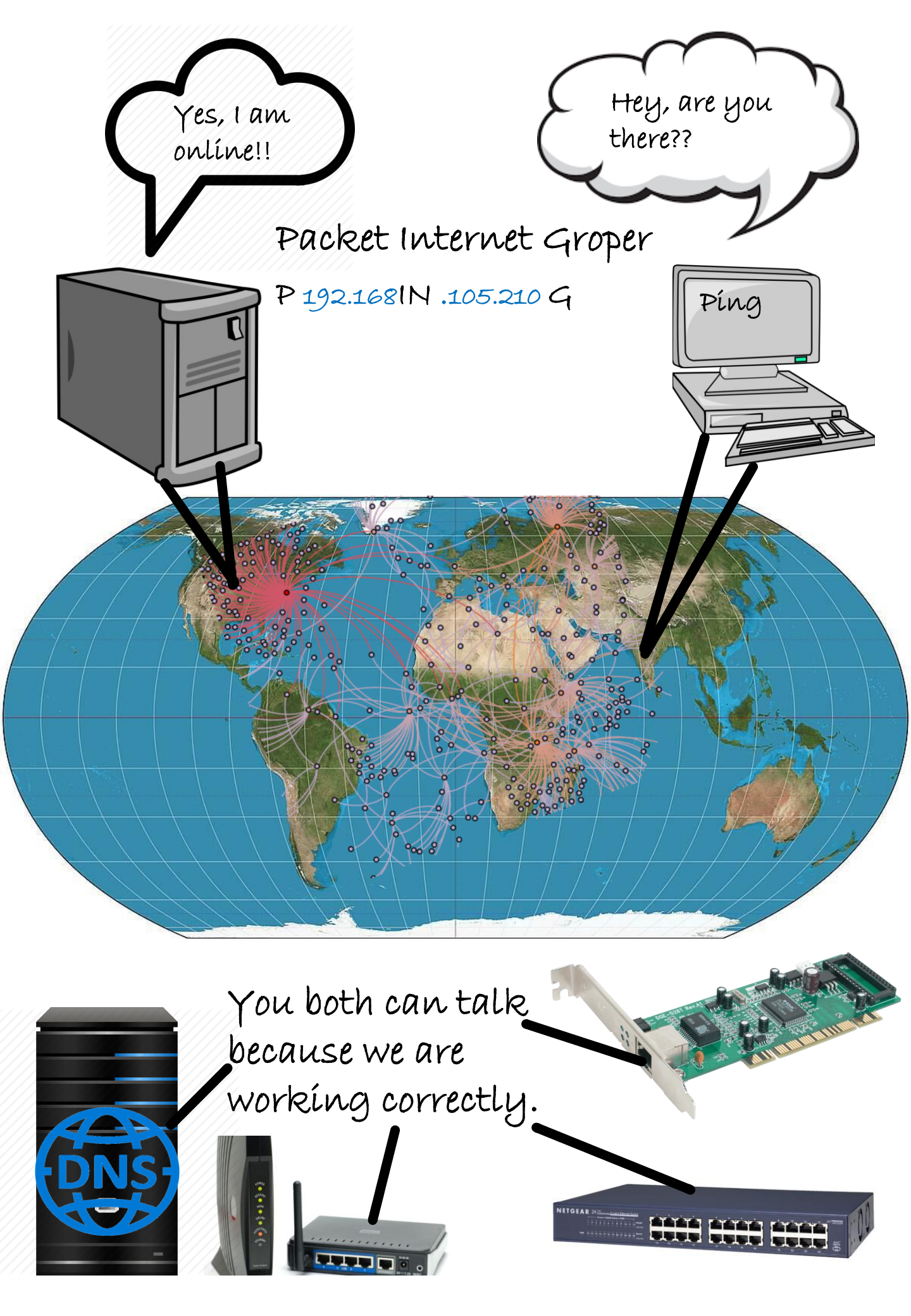

Yes, I am online!!
Hey, are you there??
Packet Internet Groper
P 192.168IN .105.210 G
Ping
You both can talk because we are working correctly.
DNS
NETGEAR

OMG! Today is the last day for registration on IMS. And the site is unreachable !

Is the server down or is there a problem with my system?

Let's run a **PING** test to find out !

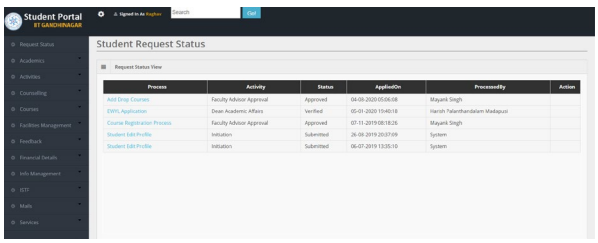
```
C:\Users\RAGHAV>ping ims.iitgn.ac.in

Pinging ims.iitgn.ac.in [14.139.98.79] with 32 bytes of data:
Request timed out
Reply from 14.139.98.79: bytes=32 time=529ms TTL=111
Request timed out
Reply from 14.139.98.79: bytes=32 time=60ms TTL=111

Ping statistics for 14.139.98.79:
    Packets: Sent = 4, Received = 2, Lost = 2 (50% loss),
Approximate round trip times in milli-seconds:
    Minimum = 60ms, Maximum = 529ms, Average = 295ms
```

Ahah! You are connected to the network but there are packet losses. Try restarting your router!

It worked. You are a genius!

Well, it's the work of this useful command. Let me explain it for you!

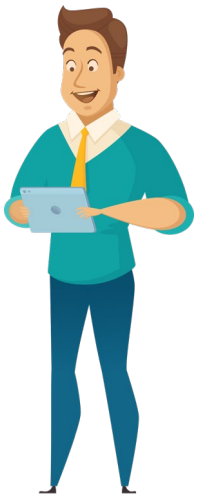
PING



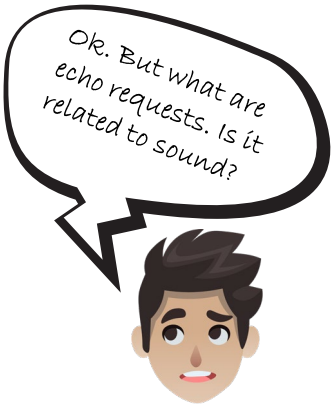
What's **PING** ?

The manual for ping goes like this:

```
NAME
       ping - send ICMP ECHO_REQUEST to network hosts

SYNOPSIS
       ping [-aAbBdDfhLnOqrRUvV46] [-c count] [-F flowlabel] [-i interval]
            [-I interface] [-l preload] [-m mark] [-M pmtudisc_option]
            [-N nodeinfo_option] [-w deadline] [-W timeout] [-p pattern]
            [-Q tos] [-s packetsize] [-S sndbuf] [-t ttl]
            [-T timestamp option] [hop...] {destination}

DESCRIPTION
       ping uses the ICMP protocol's mandatory ECHO_REQUEST datagram to elicit
       an ICMP ECHO_RESPONSE from a host or gateway. ECHO_REQUEST datagrams
       (“pings”) have an IP and ICMP header, followed by a struct timeval and
       then an arbitrary number of “pad” bytes used to fill out the packet.

       ping works with both IPv4 and IPv6. Using only one of them explicitly
       can be enforced by specifying -4 or -6.

       ping can also send IPv6 Node Information Queries (RFC4620).
       Intermediate hops may not be allowed, because IPv6 source routing was
       deprecated (RFC5095).
```



In simple words, ping is used to test if two networked devices are connected. The source device sends echo request packets to a host on the network. In case of a successful ping, the host responds back by sending echo reply packets.



Well yes! In fact, many people believe that the name Ping comes from sonar terminology. In sonar, a ping is an audible sound wave sent out to find an object.

However in technical terms, Echo request and Echo reply are **ICMP messages**. ICMP stands for Internet Control Message Protocol. It is an error-reporting protocol used by network devices.

Lets do a dry run of **PING** command !

```
C:\Users\RAGHAV>ping iitgn.ac.in

Pinging iitgn.ac.in [72.1.241.188] with 32 bytes of data:
Reply from 72.1.241.188: bytes=32 time=385ms TTL=48
Reply from 72.1.241.188: bytes=32 time=289ms TTL=48
Reply from 72.1.241.188: bytes=32 time=296ms TTL=48
Reply from 72.1.241.188: bytes=32 time=302ms TTL=48

Ping statistics for 72.1.241.188:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 289ms, Maximum = 385ms, Average = 318ms
```

BASIC USAGE: `ping {destination}`

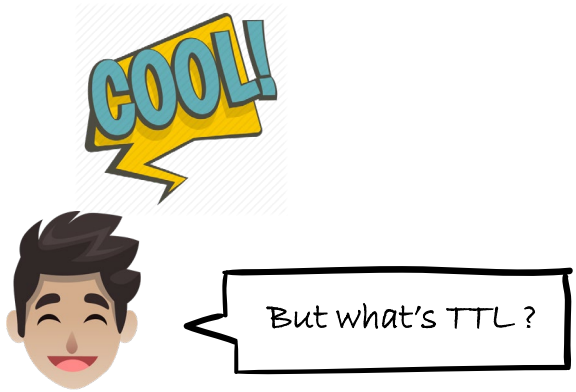
The destination can be the domain name or an IP address of the host

`Pinging iitgn.ac.in [72.1.241.188] with 32 bytes of data`

The DNS converts the domain name(iitgn.ac.in) to the IP address(72.1.241.188). This IP address is pinged with packets comprising 32 bytes of data repeatedly by the source.

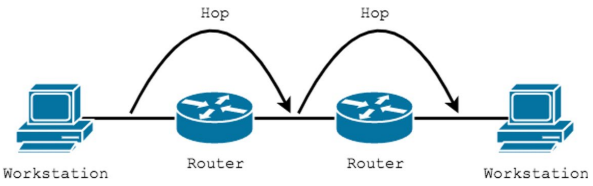
`Reply from 72.1.241.188: bytes=32 time=385ms TTL=48`

This is the response from the host. 32 bytes of packets were received back by the source. The total time taken in the process was 385 ms.



TTL (Time to live)

TTL is the maximum no. of gateways or routers that a packet can cross before being discarded.



In our example, the source sets the TTL to 64 when sending the request. The TTL is subtracted by 1 every time the packet crosses a router. TTL=48 means that the packet crossed 64-48=16 routers before reaching the destination.

Wait! Let me guess what the statistics mean.

```
Ping statistics for 72.1.241.188:
Packets: Sent = 4, Received = 4,
Lost = 0 (0% loss)
```

4 packets were sent, 4 packets were received and 0 packets were lost. Thus the loss percentage is 0.

```
Approximate round trip times
in milli-seconds:
Minimum = 289ms, Maximum =
385ms, Average = 318ms
```

Minimum, maximum and average delays in receiving response from the destination device are 289 ms, 385ms and 318 ms respectively.

Nailed it bro !

Digging deeper into **PING** !

Hey, I found ping to be a very useful tool. I want to understand more uses of ping

Sure lets delve deeper into the magic of ping !

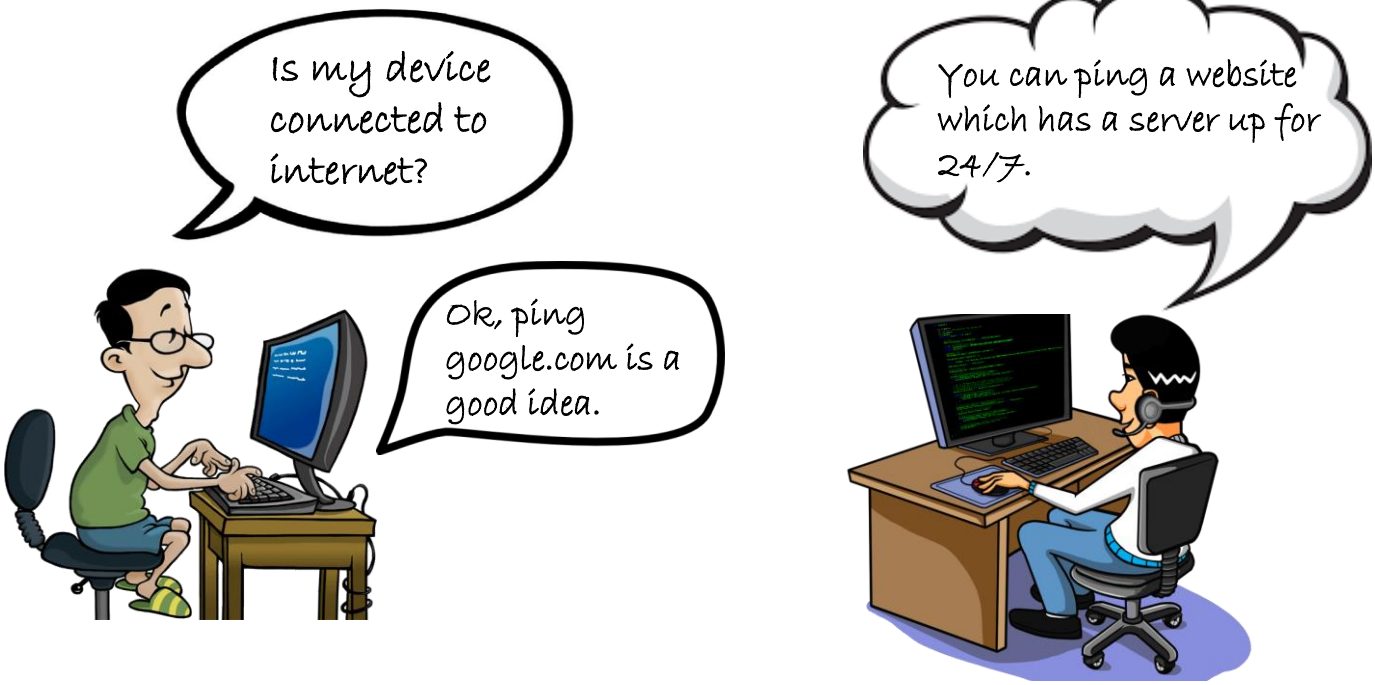
Ping test is a primary test that is used by network engineers to troubleshoot hardware and software issues.

I am not able to access google.com

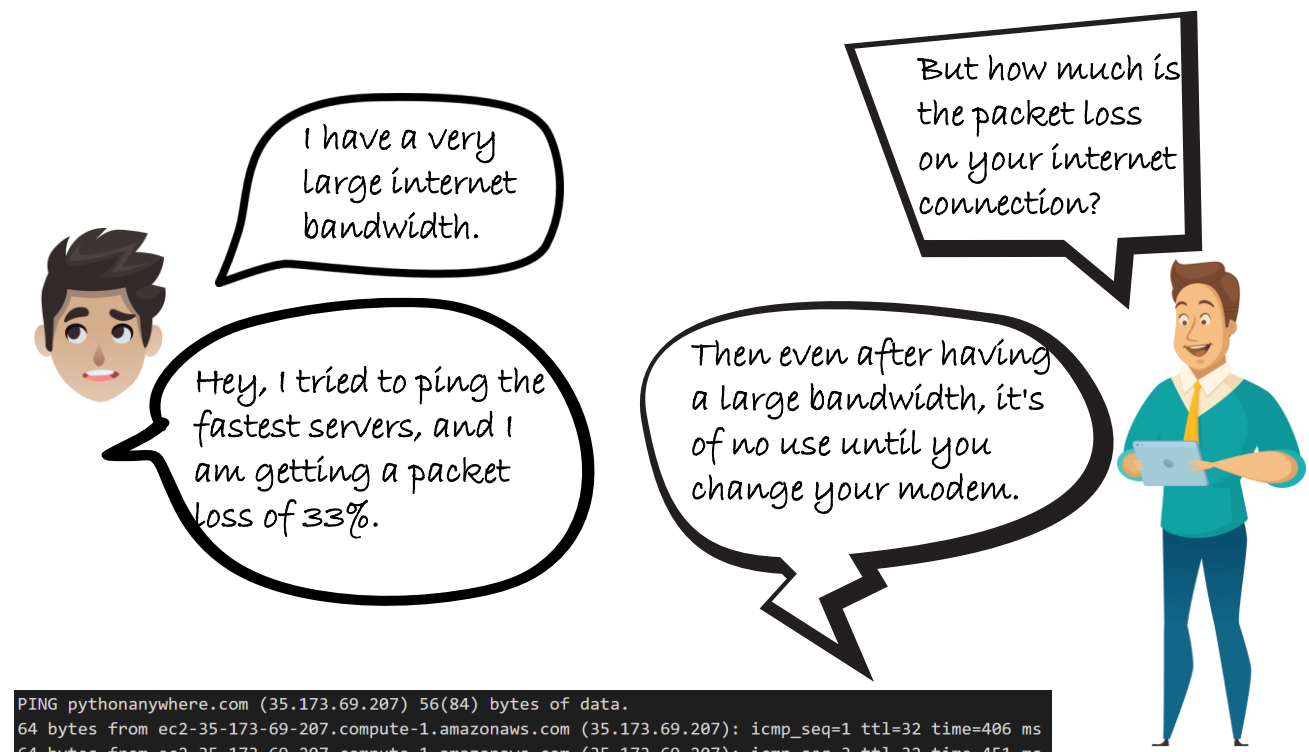
Try this command: "ping 8.8.8.8"

Then the problem is with your DNS name resolution.

Yes, I am receiving packets




```
C:\Users\Devvrat Joshi>ping google.com

Pinging google.com [2404:6800:4007:812::200e] with 32 bytes of data:
Reply from 2404:6800:4007:812::200e: time=74ms
Reply from 2404:6800:4007:812::200e: time=298ms
Reply from 2404:6800:4007:812::200e: time=82ms
Reply from 2404:6800:4007:812::200e: time=67ms

Ping statistics for 2404:6800:4007:812::200e:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 67ms, Maximum = 298ms, Average = 130ms
```




```
PING pythonanywhere.com (35.173.69.207) 56(84) bytes of data.
64 bytes from ec2-35-173-69-207.compute-1.amazonaws.com (35.173.69.207): icmp_seq=1 ttl=32 time=406 ms
64 bytes from ec2-35-173-69-207.compute-1.amazonaws.com (35.173.69.207): icmp_seq=3 ttl=32 time=451 ms
64 bytes from ec2-35-173-69-207.compute-1.amazonaws.com (35.173.69.207): icmp_seq=4 ttl=32 time=371 ms
64 bytes from ec2-35-173-69-207.compute-1.amazonaws.com (35.173.69.207): icmp_seq=5 ttl=32 time=323 ms
64 bytes from ec2-35-173-69-207.compute-1.amazonaws.com (35.173.69.207): icmp_seq=6 ttl=32 time=318 ms
64 bytes from ec2-35-173-69-207.compute-1.amazonaws.com (35.173.69.207): icmp_seq=7 ttl=32 time=340 ms
--- pythonanywhere.com ping statistics ---
7 packets transmitted, 6 received, 14.2857% packet loss, time 6004ms
```

I am trying to ping some.com, but for every packet, the request timed out message is coming.

Yes, it means that the server is down, or the firewall of the server is rejecting the connection.

```
C:\Users\Devvrat Joshi>ping some.com

Pinging some.com [209.237.150.20] with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 209.237.150.20:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

My mobile can connect to the internet with the same wifi but PC is not able to connect.

Then there might be a problem with your network card. Try doing loopback test with ping 127.0.0.1. If you do not receive packets, then there is a problem with your network card.

```
Pinging localhost [127.0.0.1] with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 127.0.0.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss)
```

Hey you were right, the network card needs to be changed on my PC.

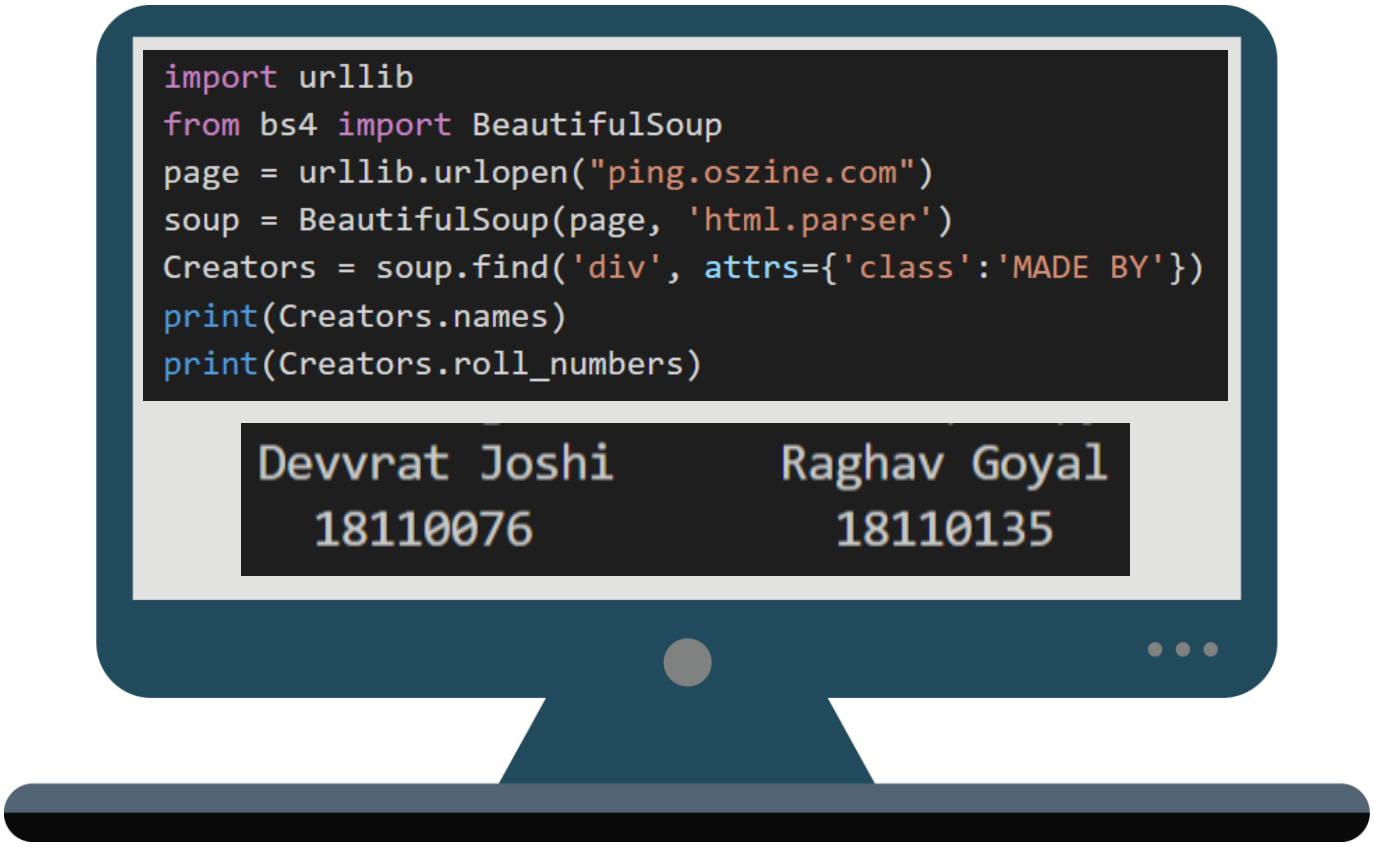


Image Sources

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