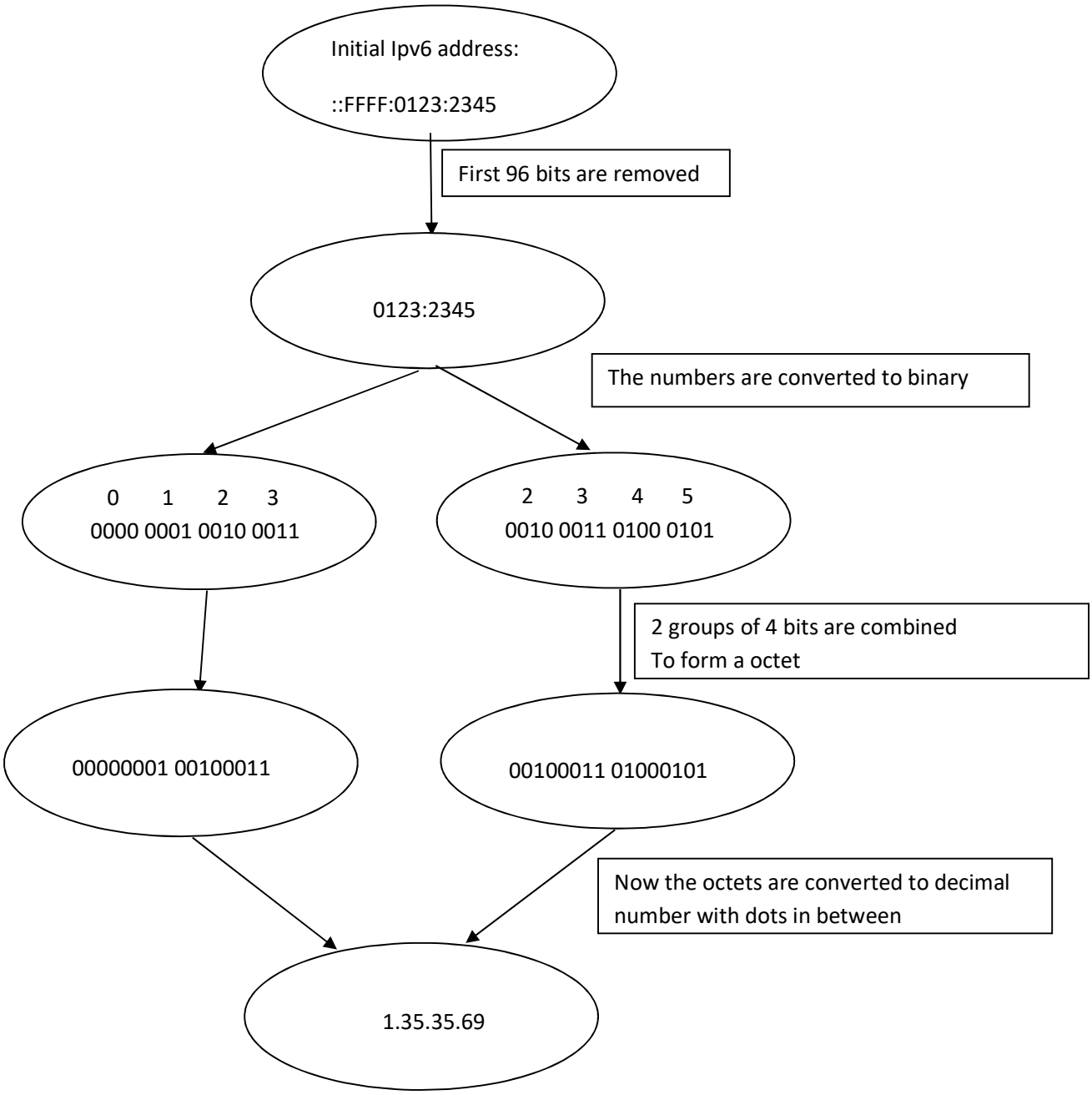
Assignment 6

Q1) when we ping ::FFFF:0123:2345, How is this conversion happening to ipv4?

Firstly the starting 96 bits are removed from the address.
Then the next 32 bits are converted to binary number and then from that binary 4 octets are made and then those octets are converted to decimal with dots between each octet. This is the ipv4 address



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Command Prompt

```
C:\Users\Dell>ping ::FFFF:0123:2345

Pinging 1.35.35.69 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 1.35.35.69:
    Packets: Sent = 3, Received = 0, Lost = 3 (100% loss),
Control-C
^C
```

Q2) How does the Decimal values get converted into dotted decimal. Does it always have to be 10 digits? Can it be more? Attached screenshot for the conversion. How will i convert decimal to into a ipv6. Put a screenshot where you show the conversion.

Decimal value is converted to binary number . Then from that binary 4 octets are made which is then converted to dotted decimal.

```
C:\Users\Dell>ping 255

Pinging 0.0.0.255 with 32 bytes of data:
PING: transmit failed. General failure.
PING: transmit failed. General failure.
PING: transmit failed. General failure.
PING: transmit failed. General failure.

Ping statistics for 0.0.0.255:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

This number 255 is converted to binary and with zero padding is made
Binary of 255 is 11111111 So with this 24 zeroes are appended to make a 32 bit number
Number is 0000000 0000000 0000000 11111111
And now these octets are converted to decimal with dots in between the octets
So the ip is 0.0.0.255

Another way is to take modulus of number with 256 this gives its last bytes. Then the number is divided by 256 and again modulus of this new number is taken with 256 which gives second last bytes. This is done 4 times to get the value

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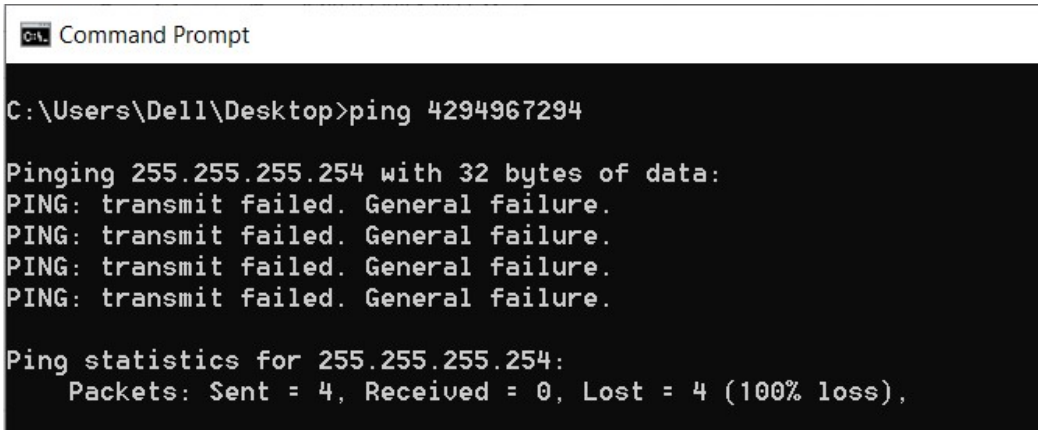

4294967294 is the biggest 32 bit binary number which is being pinged. As it is 11111111 11111111 11111111 11111110 which is the biggest 32 bit number(all 32 1's do not work)
There were different cases where the numbers greater than this number also worked
Maximum up to 11 digits there were numbers which were converted to corresponding ip addresses.
In some cases only the last 32 bits were considered and converted to ipv4 address but the reason for this is not fully understood

By the other way:
4294967294 mod 256 gives 254
Then 4294967294 divided by 256 gives 16777215 whose mod with 256 gives 255
And in this way we get the full ip address

Decimal to Ipv6:

In this a decimal number is converted to binary and then the its length is made upto 128 bits after which this is converted to hexadecimal number by taking 4 bits and converting to corresponding hexadecimal number. And after 4 such number a : colon sign is placed and this is how decimal is converted to ipv6.

Another way is to divide by 16 and the remainder is the hex value starting from LSB we move towards MSB and after every 2 bytes colon is placed.

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If we consider 340282366920938463463374607431768211455
It's binary representation is 128 times 1 so here all bits are 1 so when we pair 4 bits together they will become 1111 which is F in hexadecimal notation due to which we get ffff: ffff: ffff: ffff: ffff: ffff: ffff: ffff as hexadecimal value

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