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ip address classes
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ip address is designed to be hierarchial in nature, so that we can group computers into different networks and can manage the traffic between them easily. So
the ip address of 32-bit length is broken down into 4 octets of each 8 bit in length.

That means always the ip address is represented as x.x.x.x where x is an decimal number equivalent to the 8 bit binary value of each octet.

The hierarchial ip address has #2 addresses in it
1. network address = The network address helps us in identifying the right/specific network where the computer belongs to
2. host address    = host address helps us in identifying the right computer within the network

out of 32 bits length of ip address, how many octets/bits should be assigned to network address and how many octets should be used for representing host
address? Can this be defined statically saying #3 octets are representing network address and #1 octet is used for host address

For eg.. if we consider #3 octets are used for network address and 1 octet is used for host address, Then within any given network we cannot have computers
more than 255.
In this case an organization who has #2000 employees working, cannot be connected aspart of one-single network as we only have 8 bits given for representing
host address.

From the above we can understand the network and host bits within an ip address cannot be fixed/static, it should be decided based on number of networks and
number hosts within each network we wanted to connect aspart of the network.
Since the number of network and hosts bits within a given ip is not fixed, by looking at an ip address we cannot say what is its network address and its
host address. So to help us in identifying a network address and host address from a given ip address, the IP ADDRESS CLASSIFICATION has been introduced.

The classfull ip address has classified the ip address schema into 5 classes as A, B, C, D and E respectively. Based on the class of the ip address we can
derive how many bits out of 32 are given to network and how many host address, so that we can derive network and host address for a given ip.

How to tell by looking at an ip address, what is its class?
Based on the higher 3-bit values in the first octet we can determine the ip address belongs to which class, so that we can identify network and host address
of that ip address
```
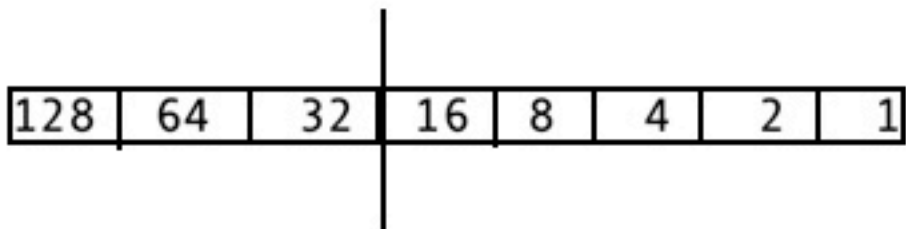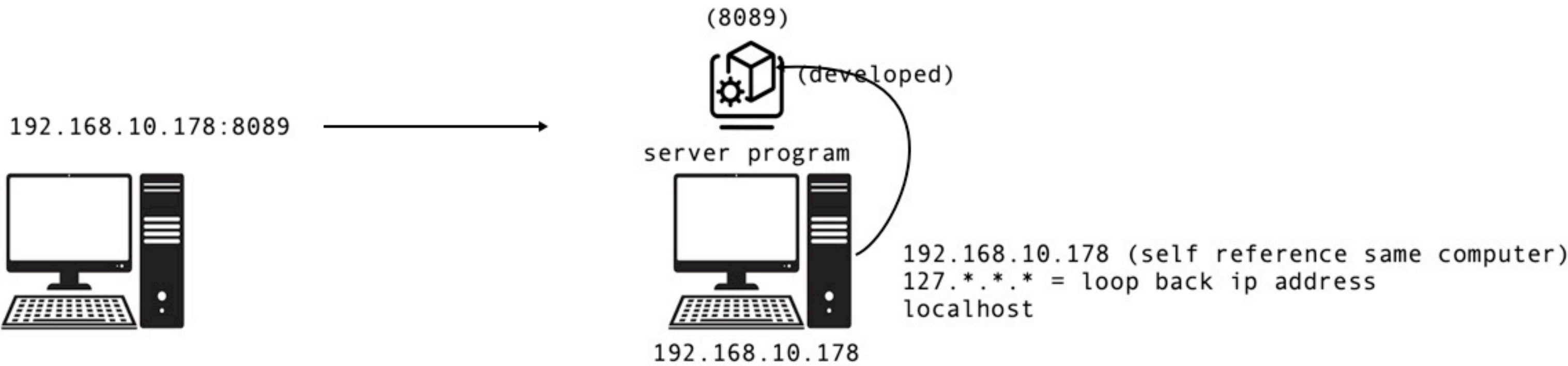
```
                                    | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
```

```
Range              IP Class          Network Bits            Host Bits
1   - 126          A                    8 bits               24 bits
128 - 191          B                   16 bits               16 bits
192 - 223          C                   24 bits                8 bits
224 - 239          D                 used for multicasting and bits are not classified
240 - 254          E                 reserved for experimental or future usage
```

```
#1.
0 = is always assigned to gateway

#2
127 = any ip address that starts with 127 in first octet is called loopback ip address.
```



```
                        (8089)
                           (developed)
        192.168.10.178:8089  ────────►   server program

                                          192.168.10.178 (self reference same computer)
                                          127.*.*.* = loop back ip address
                                          localhost
                                    192.168.10.178
```

```
#3
255.*.*.* = represents an broadcast ip address, that means if a sender sends the data with destination ip address as 255.*.*.* the data will be send to all
computers on that network.
```

```
        132.19.29.2 = class B          192.168.10.11 = class C
        network address = 132.19       network address = 24 bits
        host address = 29.2            host address    = 8 bits

                                       192.168.10 = network address
                                       11 = host address
```