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## IP Addressing

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### Exercise 1 IP Adresses

1. Determine the classes of the following IP addresses. Deduce the corresponding network and machine identifiers.  
**192.18.97.39 (www.javasoft.com), 138.96.64.15 (www.inria.fr), 18.181.0.31 (www.mit.edu), 226.192.60.40, 91.216.107.152**
2. Say if the following IP addresses are correct or wrong. Justify your answer.  
**192.168.262.10, 200.30.1.5.2, 1.12.200.13, 55.255.255.255, 153.12.6, 172.24.15.7, 0.0.0.0**
3. Say if the following IP addresses can be used to address machines on the Internet. Justify your answer.  
**205.0.0.1, 192.168.104.0, 127.17.128.2, 172.125.38.224, 172.217.23.196, 10.148.255.255, 195.14.172.255, 128.0.143.2**

### Exercise 2 IP Subnetting

1. Say if the following masks are correct or wrong. Justify your answer.  
**255.255.11.0, 255.255.255.240, 255.200.255.16, 255.255.255.255, 0.0.0.0, 255.255.255.252**
2. We want to send a message to all hosts on a local network with ID 1024. Which IP address to use in binary and decimal format ?
3. Can a machine have more than one IP address ? Justify.
4. Can an IP address be assigned to more than one machine ? Justify.
5. Give the address ranges (low and high addresses) of the different classes and specify the number of addressable machines.

**Exercise 3** A company has the IP address 192.168.124.0 to use in addressing its network, and for better management, the company decides to subdivide it into six subnets.

For each subnet, give in decimal format :

- The subnet address.
- The number of addressable machines.
- The address range.
- The subnet mask.
- The broadcast address in the subnet.

**Exercise 4** A machine uses the IP address **172.16.112.31** and the mask **255.255.224.0**

- Give the address of the network to which this machine belongs,
- How many machines can we address in this network ?
- Gives the lowest and highest addresses.
- Give the broadcast address.

**Exercise 5** Your company has just obtained the IP address 214.123.155.0. You need to create 10 separate subnets for the 10 corporate branches, from this IP address :

- What is the class of this network ?
- What subnet mask should you use ?
- How many distinct IP addresses can be used with such a mask, all possible subnets combined ?
- How many IP addresses (machines or routers) can each subnet receive ?
- What is the network and broadcast address of the 5th usable subnet ?

**Exercise 6** On an Ethernet network (Bus topology), how can a frame be sent to all the machines on the network ? Does this load the network more than sending a frame destined for a single machine ? (Justify the answer).

*Good luck*