NETWORKS AND PROTOCOLS

Solutions for Exercise Sheet 2

Exercise 1

Assuming a classful addressing, determine if the following addresses are network or host addresses. Furthermore, determine also the class they belong to.

Address	Is it a network address?	Class (A/B/C)
130.192.0.0	Yes	B
192.168.0.0	Yes	C
80.45.0.0	No	A
112.0.0.0	Yes	A
198.0.1.0	Yes	C
134.188.1.0	No	B
224.0.0.3	No	D
241.0.3.1	No	E
235.0.0.0	No	D

Exercise 2

Complete the following table:

IP Address	Network ID	Subnet. ID	Host ID	Subnet mask	Broadcast Address
132.90.132.5	132.90	132.0	5	255.255.255.240	132.90.132.15
128.66.12.1	128.66	12.0	1	255.255.255.128	128.66.12.127
172.17.192.50	172.17	192.6	2	255.255.255.248	172.17.192.55
200.35.1.99	200.35.1	6	3	255.255.255.240	200.35.1.111
10.255.255.135	10	255.255.4	7	255.255.255.224	10.255.255.159

Exercise 3

Consider the router and the three attached subnets below (A, B, and C). The number of hosts is also shown below. The subnets share the 23 high-order bits of the address space: 10.187.160.0/23 Assign subnet addresses to each of the subnets (A, B, and C) so that the amount of address space assigned is minimal, and at the same time leaving the largest possible contiguous address space available for assignment if a new subnet were to be added. Then answer the questions below.

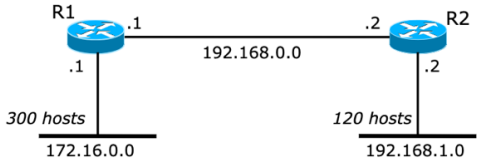
(a) Is the address space public or private? – **Private address**
(b) How many hosts can there be in this address space? – **510 addresses**

(c) What is the subnet address of subnet A? (CIDR notation) – **10.187.160.0 /24**
(d) What is the broadcast address of subnet A? – **10.187.160.255**
(e) What is the starting address of subnet A? – **10.187.160.1**
(f) What is the ending address of subnet A? – **10.187.160.254**
(g) What is the subnet address of subnet B? (CIDR notation) – **10.187.161.64/27**
(h) What is the broadcast address of subnet B? – **10.187.161.95**
(i) What is the starting address of subnet B? – **10.187.161.65**
(j) What is the ending address of subnet B? – **10.187.161.94**
(k) What is the subnet address of subnet C? (CIDR notation) – **10.187.161.0 /26**
(l) What is the broadcast address of subnet C? – **10.187.161.63**
(m) What is the starting address of subnet C? – **10.187.161.1**
(n) What is the ending address of subnet C? – **10.187.161.62**

Exercise 4

Define a classful addressing plan for the network depicted in the figure below. The chosen address ranges should belong to the private addressing space; use the first addresses available in classes A, B or C according to the size of each logical IP network.

The topology includes three IP networks, which can be configured using a single class B (the network with 350 hosts) plus two class C blocks.
As the text of the exercise mandates the use of private addresses (the first available in each block), we must use the class B address 172.16.0.0 for the first network and the class C addresses 192.168.0.0 and 192.168.1.0 for the other two networks.
The solution is shown in the figure below.



Exercise 5

Define a classful addressing plan for the network depicted in the figure below. The chosen address ranges should belong to the private addressing space; use the first addresses available in classes A, B or C according to the size of each logical IP network.

In this exercise, all the LIN but two can be configured with class C addreses. The first exception is the network with 253 elements, whose size exceeds the number of addresses available in a class C block because of the necessity to allocate space for the two reserved addresses (this net and broadcast) and the two routers.
The second exception is the network with 287 elements. Both those networks have to be configured with class B addresses.