CS 452 – FLSM – IP Addressing & Subnetting Solutions

Question 1

Radford Corporation has the following class C Internet License:

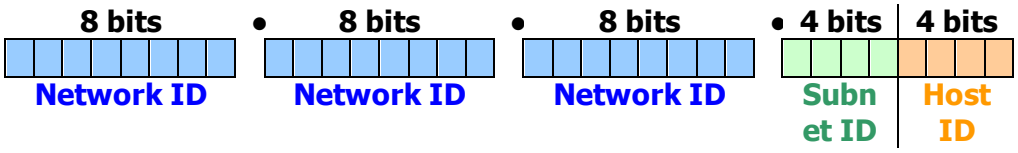
193.45.1.0

Radford Corp. would like to allow for at least 9 sub-networks using classful subnetting.

How should Radford Corp. divide up the bits in their Class C license to allow for this?

193.45.1.0 Network ID Host ID

Break the last 8 bits into a Subnet ID and Host ID for 9 subnets using the formula 9 <= 2^4 – 2 to calculate the number of bits needed for the Subnet ID. The Host ID will use the remainder of the bits available. 14 subnets can be created using 4 bits to identify each.



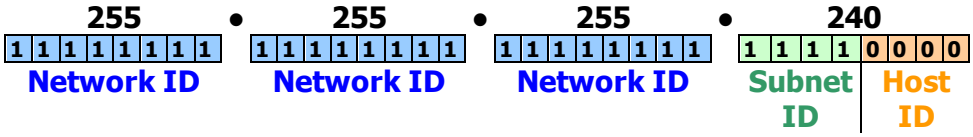
How many devices on each subnet would this allow?

14 devices would be allowed on each subnet since there are 16 possible combinations of 0's and 1's using the 4 available bits but 0000 and 1111 cannot be used.

0000	1000
0001	1001
0010	1010
0011	1011
0100	1100
0101	1101
0110	1110
0111	1111

What would their subnet mask be?

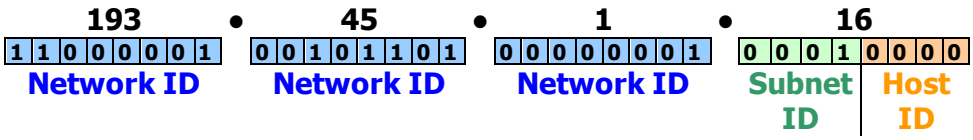
255.255.255.240



The subnet mask identifies the bits used for the Network ID and Subnet ID and the bits used for the Host ID. Since 193.45.1 is the Network ID, the first 24 bits identify the network. The next 4 bits identify the Subnet ID and the last 4 bits identify the Host ID. If the bit is part of the Network ID or Subnet ID it is represented by 1. If it is part of the Host ID it is represented by 0.

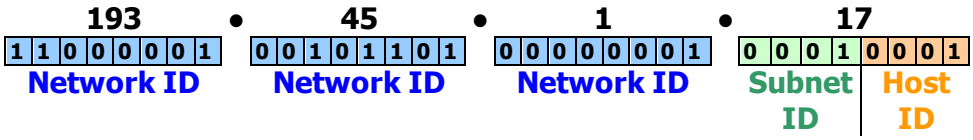
What would be the IP address (Subnet ID) of the first subnet?

193.45.1.16



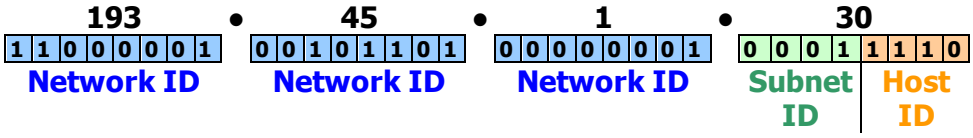
What would be the IP address of the first machine on the first subnet?

193.45.1.17



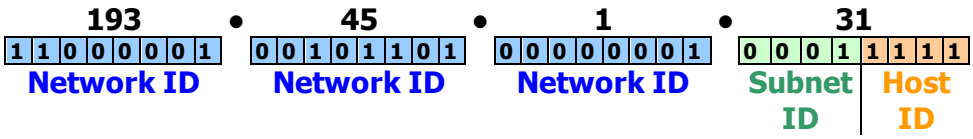
What would be the IP address of the last machine on the first subnet?

193.45.1.30



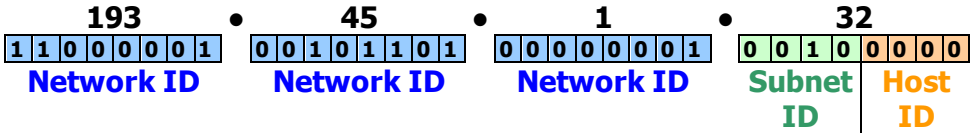
What would be the broadcast address of the first subnet?

193.45.1.31



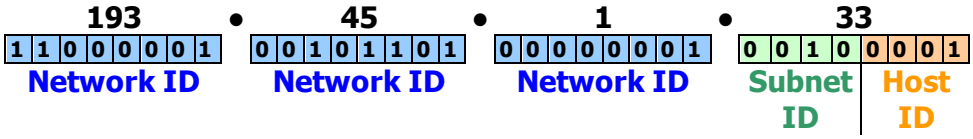
What would be the IP address (Subnet ID) of the second subnet?

193.45.1.32



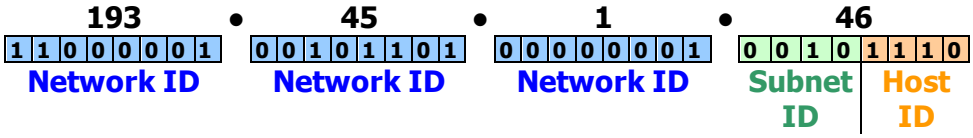
What would be the IP address of the first machine on the second subnet?

193.45.1.33



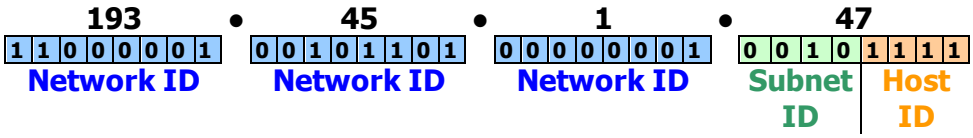
What would be the IP address of the last machine on the second subnet?

193.45.1.46



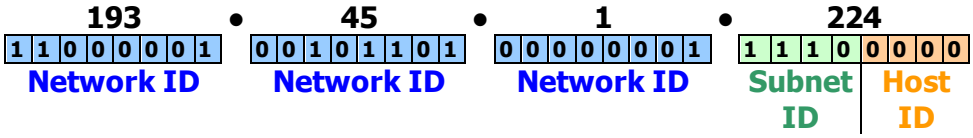
What is the broadcast address of the second subnet?

193.45.1.47



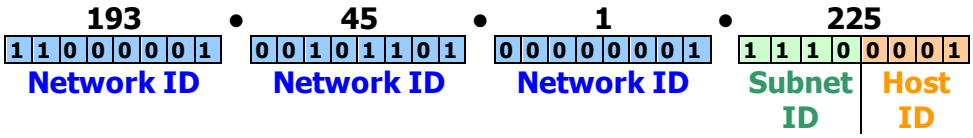
What would be the IP address (Subnet ID) of the last subnet?

193.45.1.224



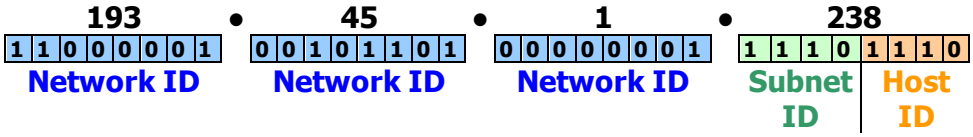
What would be the IP address of the first machine on the last subnet?

193.45.1.225



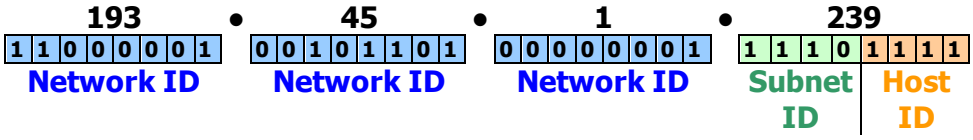
What would be the IP address of the last machine on the last subnet?

193.45.1.238



What is the broadcast address of the last subnet?

193.45.1.239



Question 2

RU Corporation has the following class B licence:

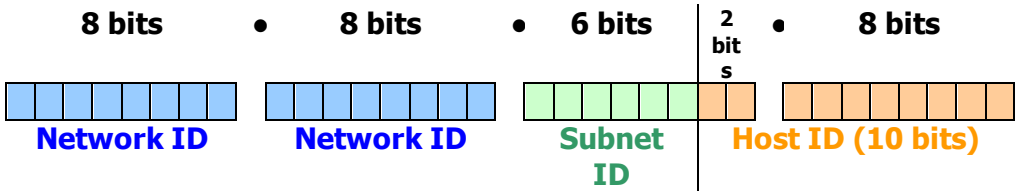
132.45.0.0.

RU Would like to classfully divide this into exactly 62 (sub-) networks.

How should RU Corp divide up the bits in their Class B license to allow for this?

132.45.0.0 Network ID Host ID

Break the last 16 bits into a Subnet ID and Host ID. For 62 subnets use the formula 62 <= $2^6 - 2$ to calculate the number of bits needed for the Subnet ID. The Host ID will use the remainder of the bits available.



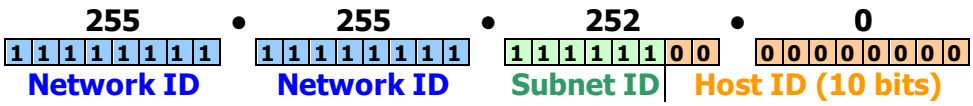
How many devices on each subnet would this allow?

1022 devices on each subnet would be allowed since there are 1024 combinations of 0's and 1's using the 10 bits available but 0000000000 and 1111111111 cannot be used.

0000000000
0000000001
0000000010
•••
•••
1111111110
1111111111

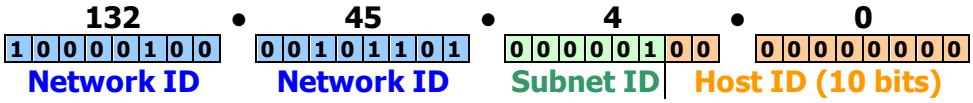
What would their subnet mask be?

255.255.252.0



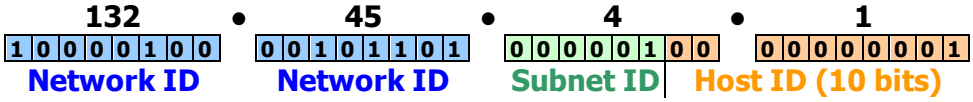
What would be the IP address (Subnet ID) of the first subnet?

132.45.4.0



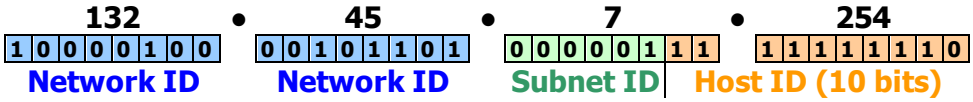
What would be the IP address of the first machine on the first subnet?

132.45.4.1



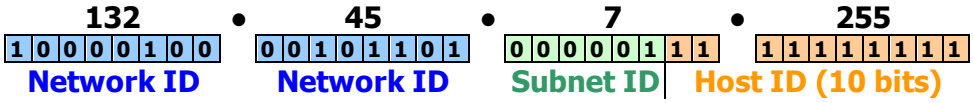
What would be the IP address of the last machine on the first subnet?

132.45.7.254



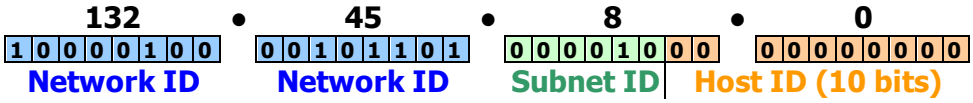
What would be the broadcast address of the first subnet?

132.45.7.255



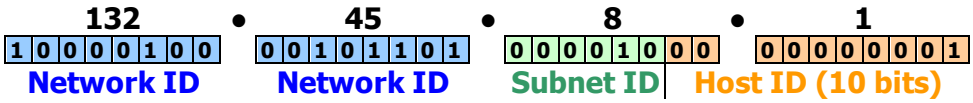
What would be the IP address (Subnet ID) of the second subnet?

132.45.8.0



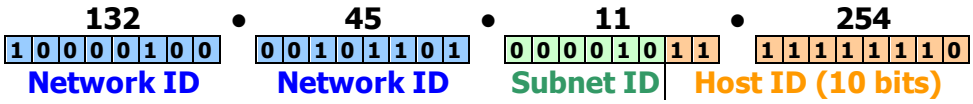
What would be the IP address of the first machine on the second subnet?

132.45.8.1



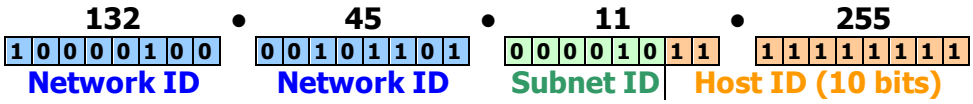
What would be the IP address of the last machine on the second subnet?

132.45.11.254



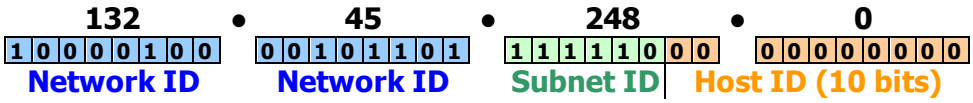
What is the broadcast address of the second subnet?

132.45.11.255



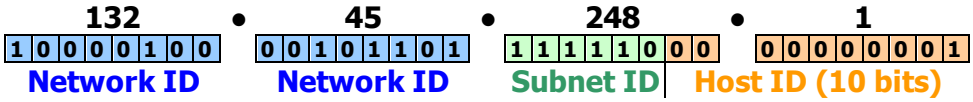
What would be the IP address (Subnet ID) of the last subnet?

132.45.248.0



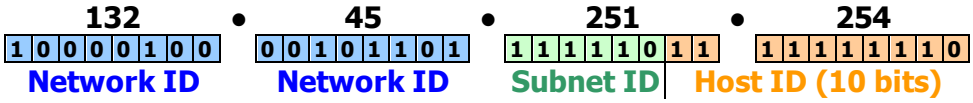
What would be the IP address of the first machine on the last subnet?

132.45.248.1



What would be the IP address of the last machine on the last subnet?

132.45.251.254



What is the broadcast address of the last subnet?

132.45.251.255