— calculate network address:
$(IP) \text{ AND } (NM) \Rightarrow NA$

$$\left(\begin{array}{l} IP : 192.168.168.188 \\ NM : 255.255.255.192 \end{array} \right)$$

— calculate the broadcast address:
$(IP) \text{ OR } (\text{NOT}(NM)) \Rightarrow BA$

— determine the host range:
$[NA+1, BA-1]$, because you don't take NA and BA too

— calculate how many IP addresses provides a subnetwork
$\left(2^{32-x} - 2 \right.$, where x is the prefix length $/x$ $(/24)$

→ also how many hosts addresses

— AND and OR operations

AND	0	1
0	0	0
1	0	1

OR	0	1
0	0	1
1	1	1

— private addresses
  10 0.0.0/8 ⟶ 10.255.255.255
  172.16.0.0/12 ⟶ 172.31.255.255
  192.168.0.0/16 ⟶ 192.168.255.255

— subnet addresses with 2 or an odd number at the end or starts with 0 or 127 are invalid

— how many subnets: 2^y, where y is subnet bits;
if x is how many 0 are than y is how many 1 of that number are

— 1024 bytes $* \dfrac{8 \text{ bits / byte}}{32 \text{ bits / second}} = 256$ seconds

— MAC addresses have 6 bytes (48 bits) and only have hexadecimal (ex: 12-34-56-78-90-AB or 07:01:02:01:2C:4B) and also known as Ethernet physical address

— 1 byte = 8 bits

— class A: 1.0.0.0 → 127.255.255.255   (255.0 0 0)
   class B: 128.0.0.0 → 191.255.255.255 (255.255.0.0)
   class C: 192.0.0.0 → 223.255.255.255 (255.255.255.0)
   class D: 224.0.0.0 → 239.255.255.255
   class E: 240.0.0.0 → 255.255.255.255

— valid address: last 8 bits must be divisible with 2^{32-x}
— network can be divided into powers of 2