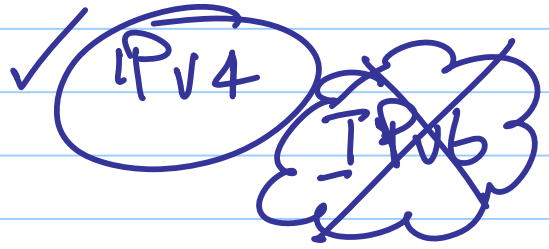
Lesson_05 I.P.

Note Title 4/15/2008

IP addresses
subnet mask
DNS IP addresses
default route
domain name
WINS server

manual or static

dynamic DHCP



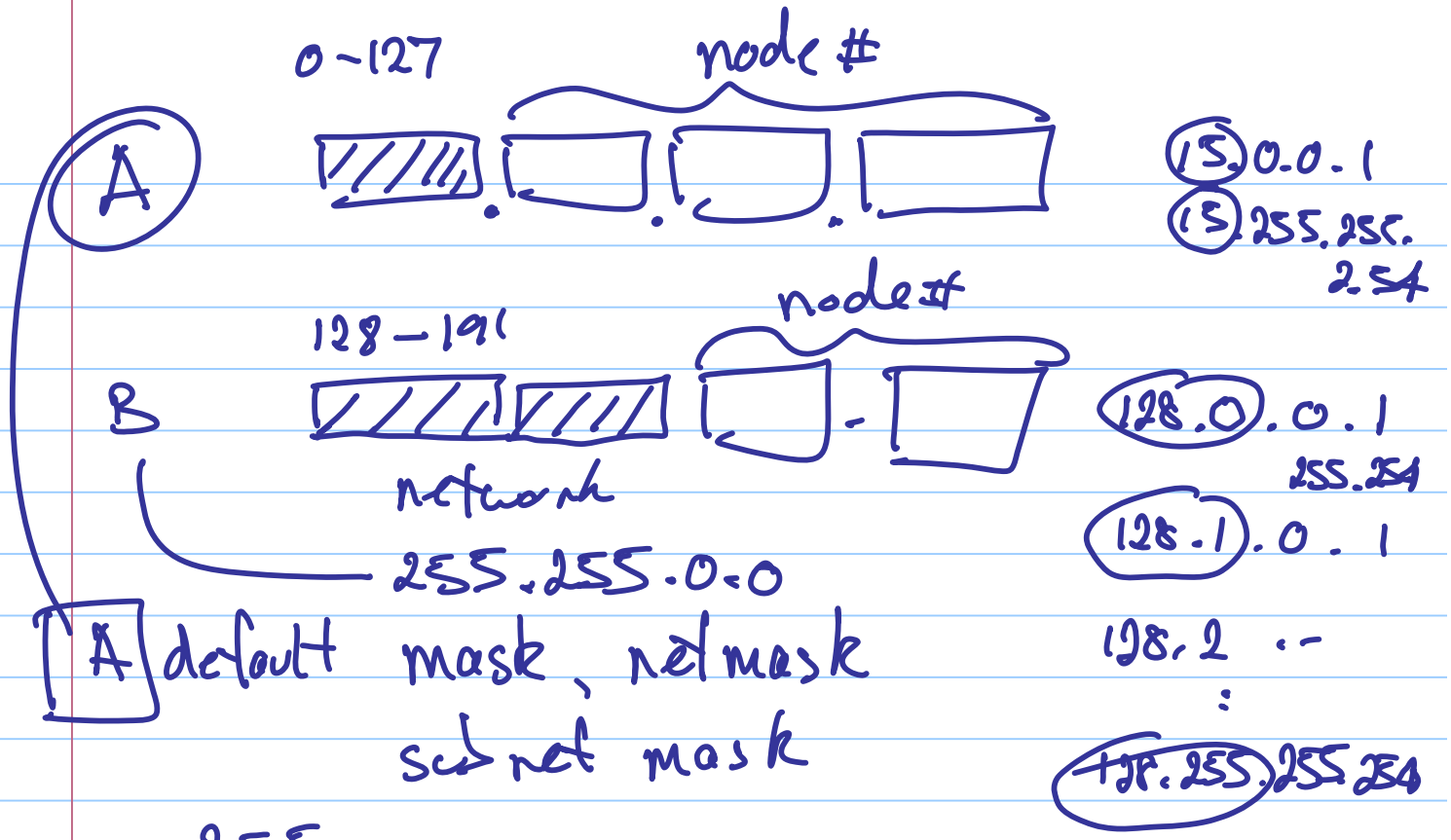
IP addresses

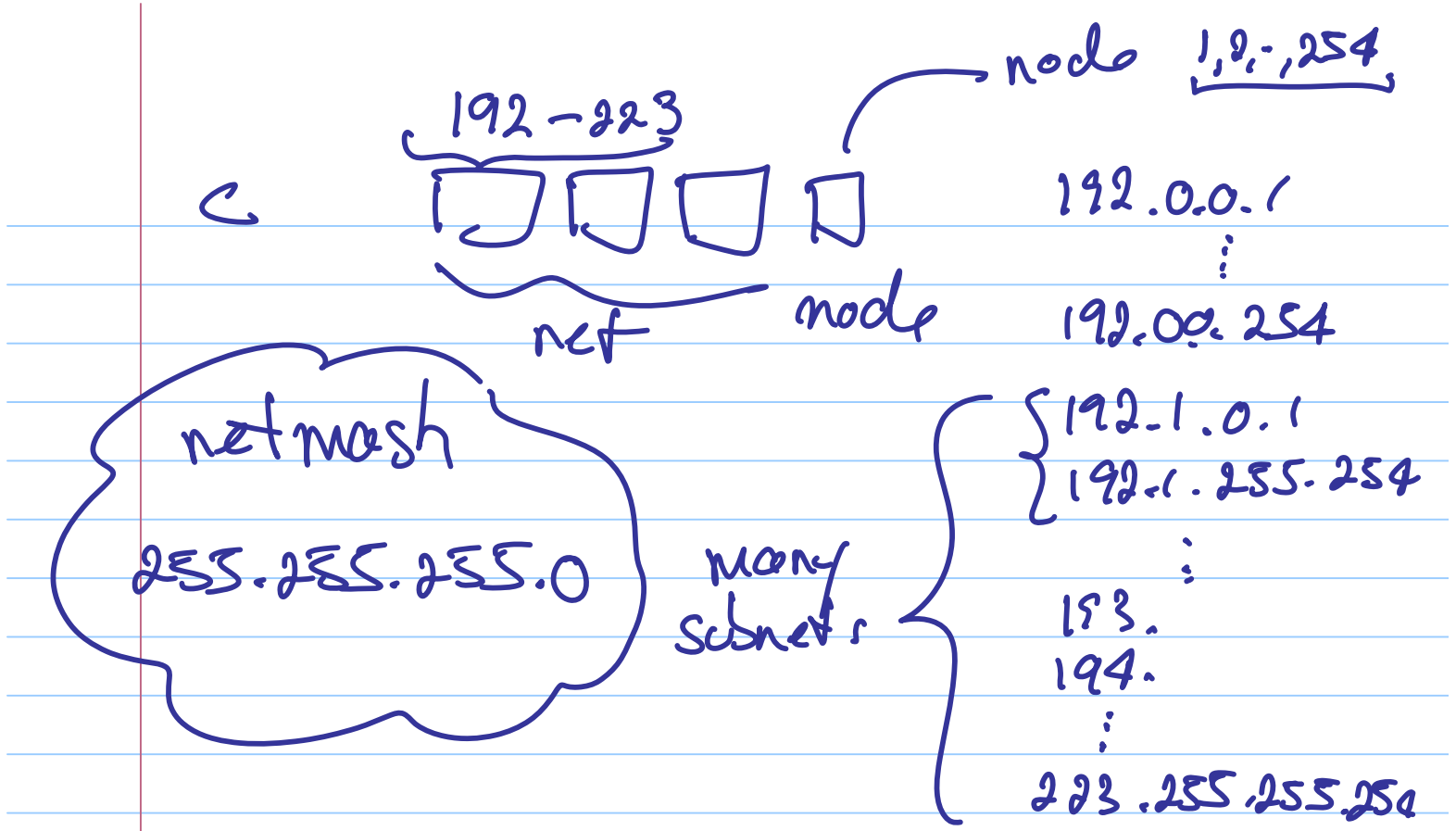
15.24.44.65	class A	H.P.
192.168.2.66	class C	no owner
69.91.130.154	UW	owner
127.0.0.1	local loopback	
169.254.x.x	self-assigned :(	

X .nnn . nnn.nnn

24 bits

class			hosts
A	0 → 127	126 networks	2^{24}
B	128 → 191		2^{16}
C	192 → 223		2^{8}
D	224 → 247	multicast	
E	248 – 255	exp	


0-127
node #
A
15.0.0.1
15.255.255.254
128-191
node #
B
128.0.0.1
255.254
network
255.255.0.0
128.1.0.1
A default mask, net mask
subnet mask
198.2 ..
255.0.0.0
127.255.255.254


node 1, 2, ., 254
192-223
C
192.0.0.1
192.00.254
net
node
netmask
255.255.255.0
many subnets
192.1.0.1
192.1.255.254
153.
194.
223.255.255.254

special cases private IP addressing

A 10

http://www.faqs.org/rfcs/rfc1918.html

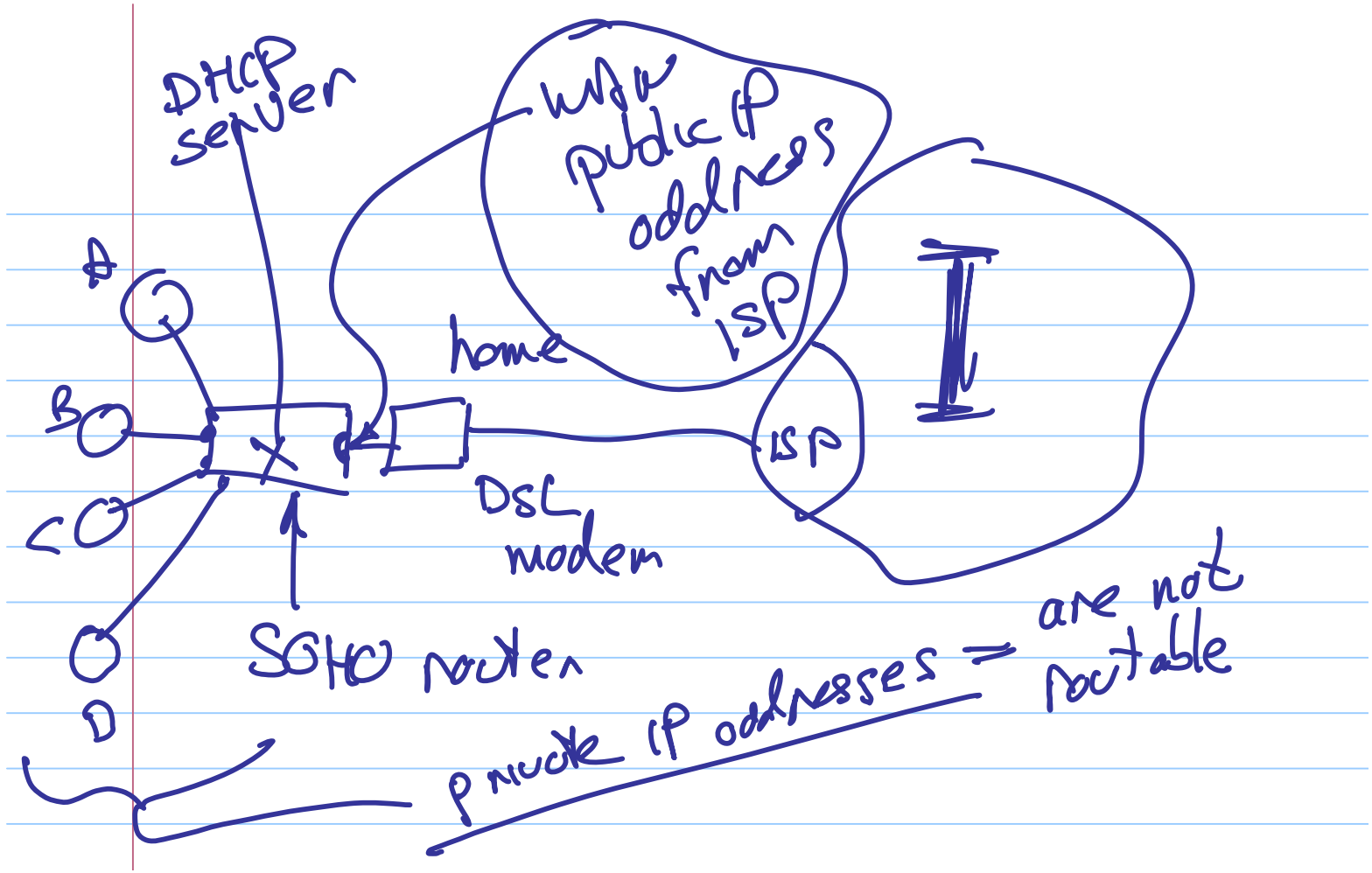
B 172.16 → 172.31

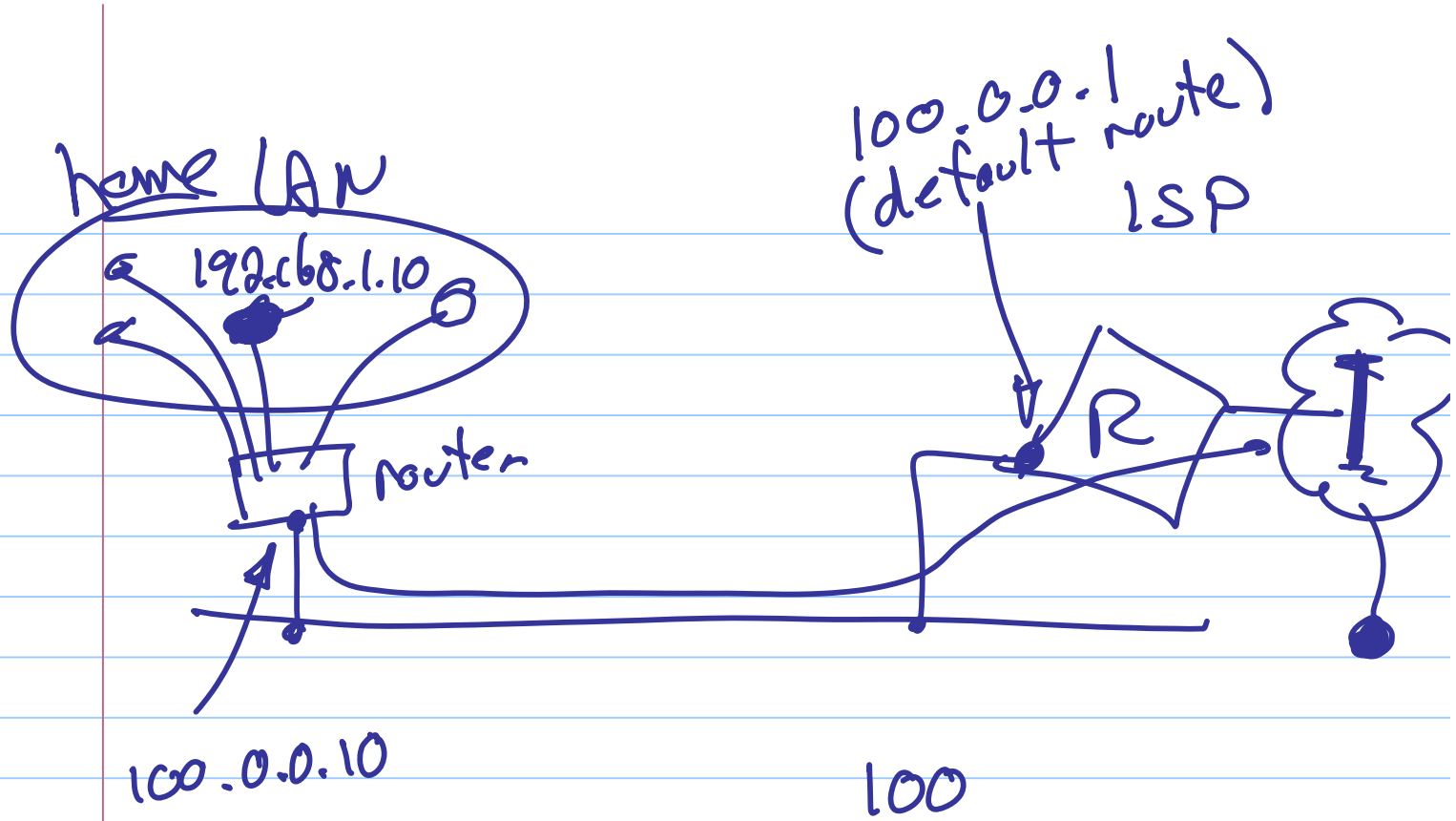
C 192.168.x.x

192.168.0.x

192.168.1.x

192.168.2.x


DHCP server
with public IP addresses from ISP
home
ISP
A
B
C
D
DSL modem
SOHO router
private IP addresses = are not routable


home LAN
192.168.1.10
router
100.0.0.10
100.0.0.1
(default route)
ISP
R
I
100

16 bits 2^{16} nodes

100.100.x.x

65536 - 2

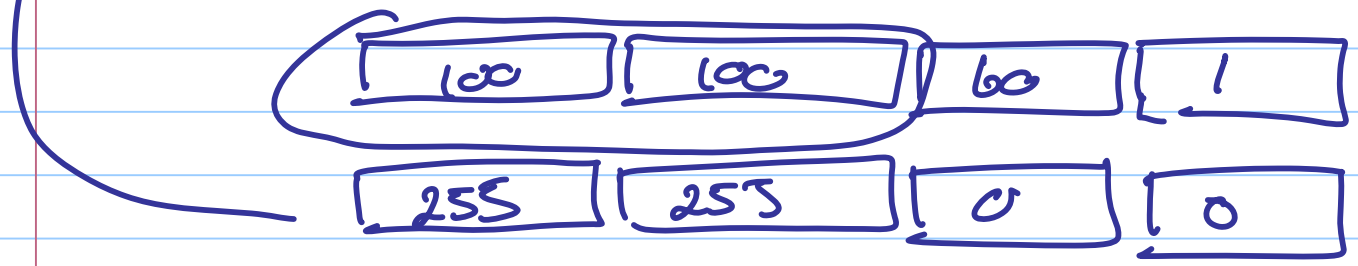
65534 nodes

255.0.0.0

255.255.0.0

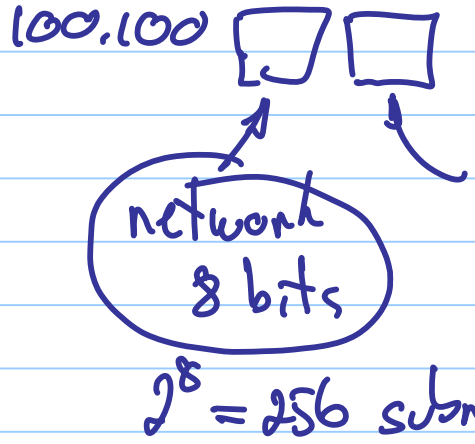
100.100.0.0/16

100.100.60.1



http://www.subnet-

subnet calculator = helpful aid



100.100.0.0/16

↓

100.100.1.0/24

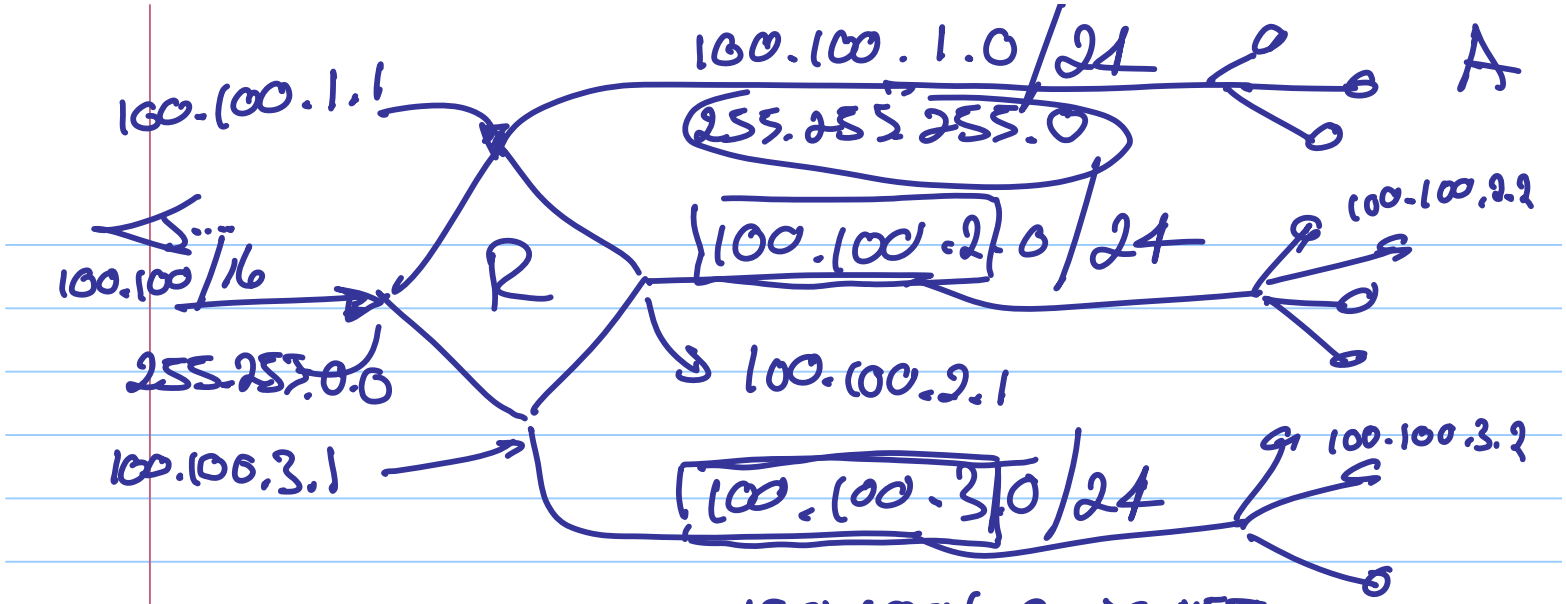
-2

$2^8 = 256$ nodes

.1

⋮

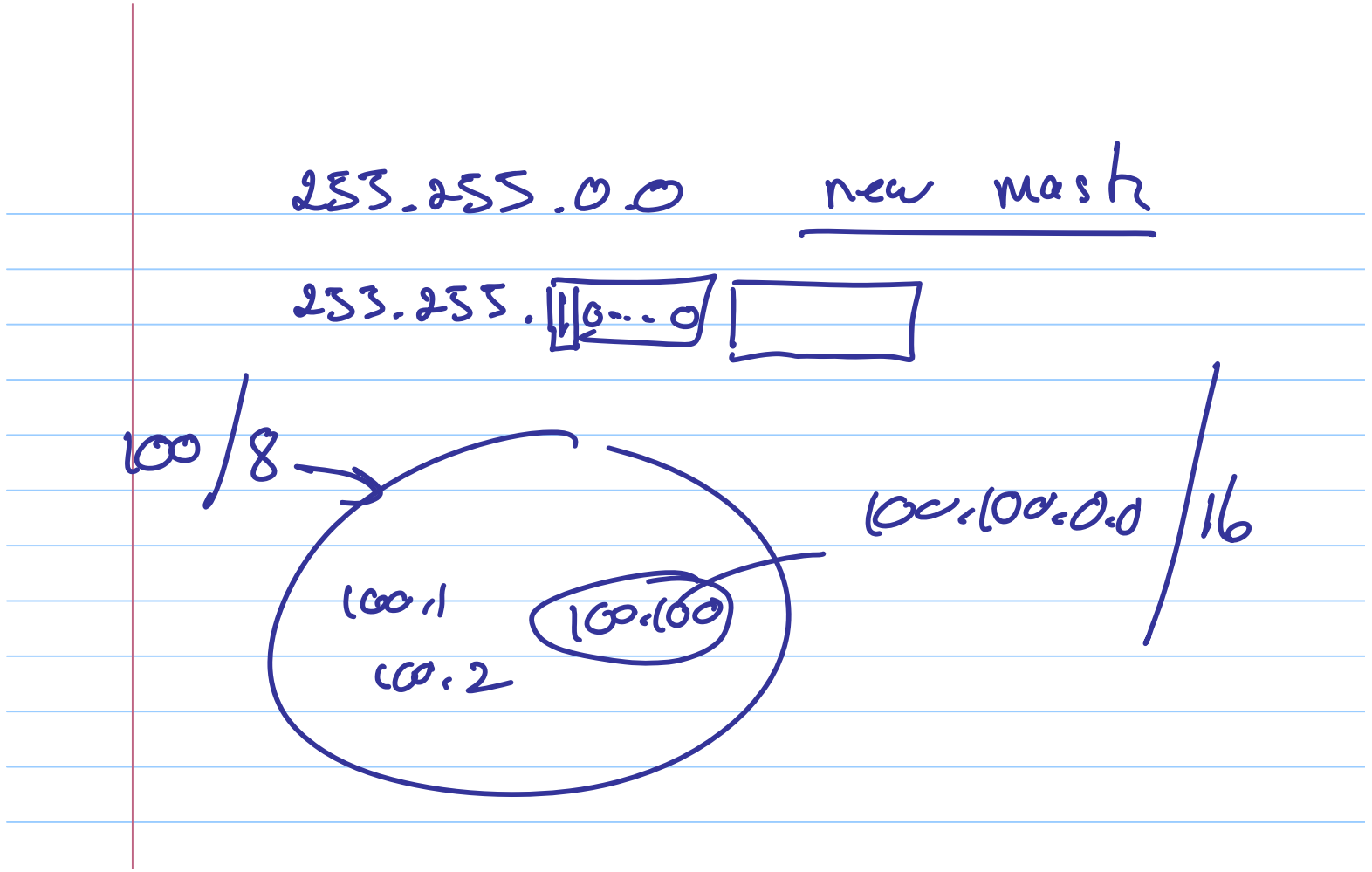
255/24



A 100.100.1.X

100.100.1.0 X NET
100.100.1.1
100.100.1.2
⋮
100.100.1.254
100.100.1.255 BROADCAST

node IP address (254)


255.255.00
new mask
255.255.
1|0...0
100/8
100.100.0.0/16
100.1
100.2
100.100

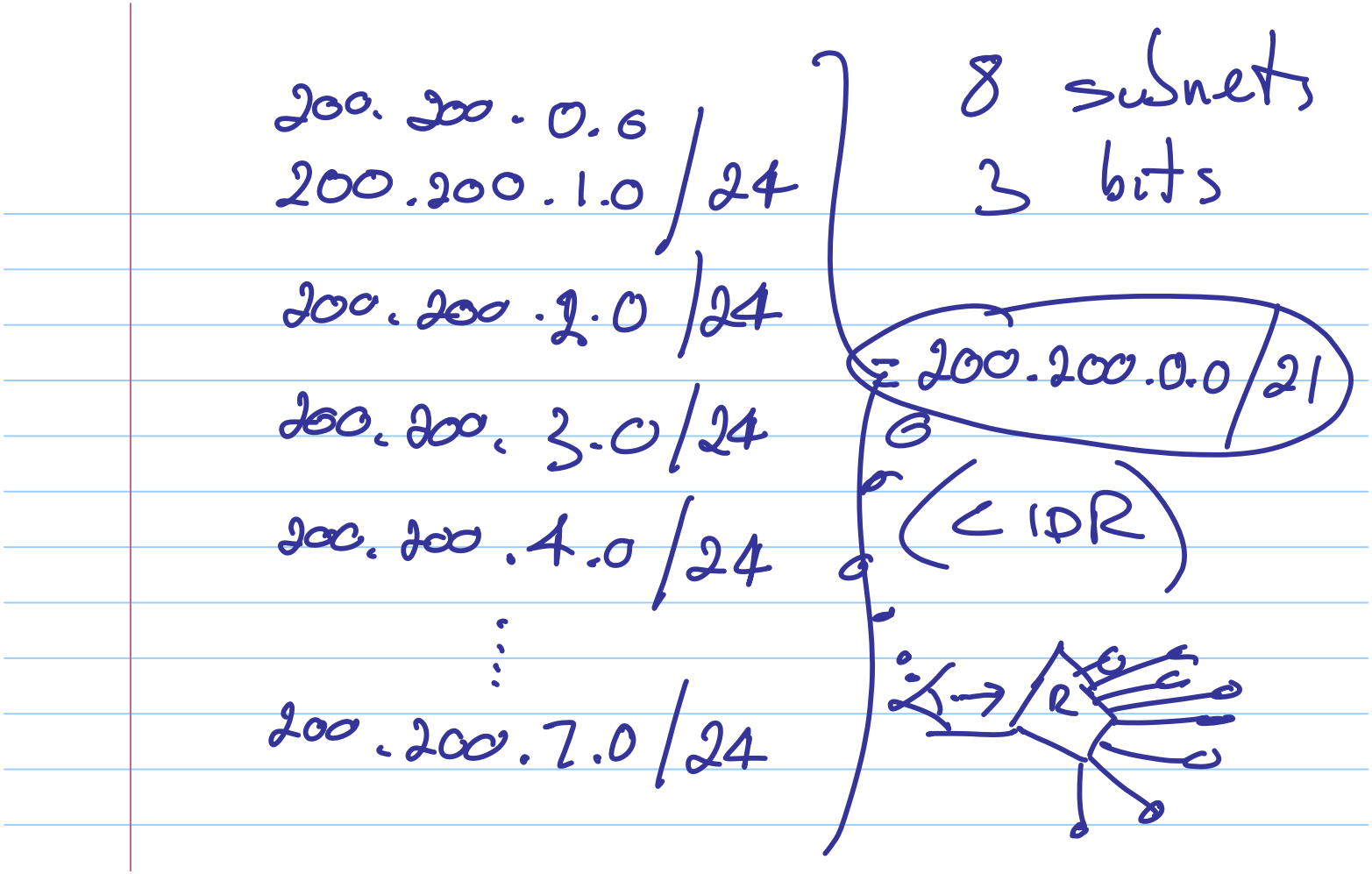
100.100.0.0/24

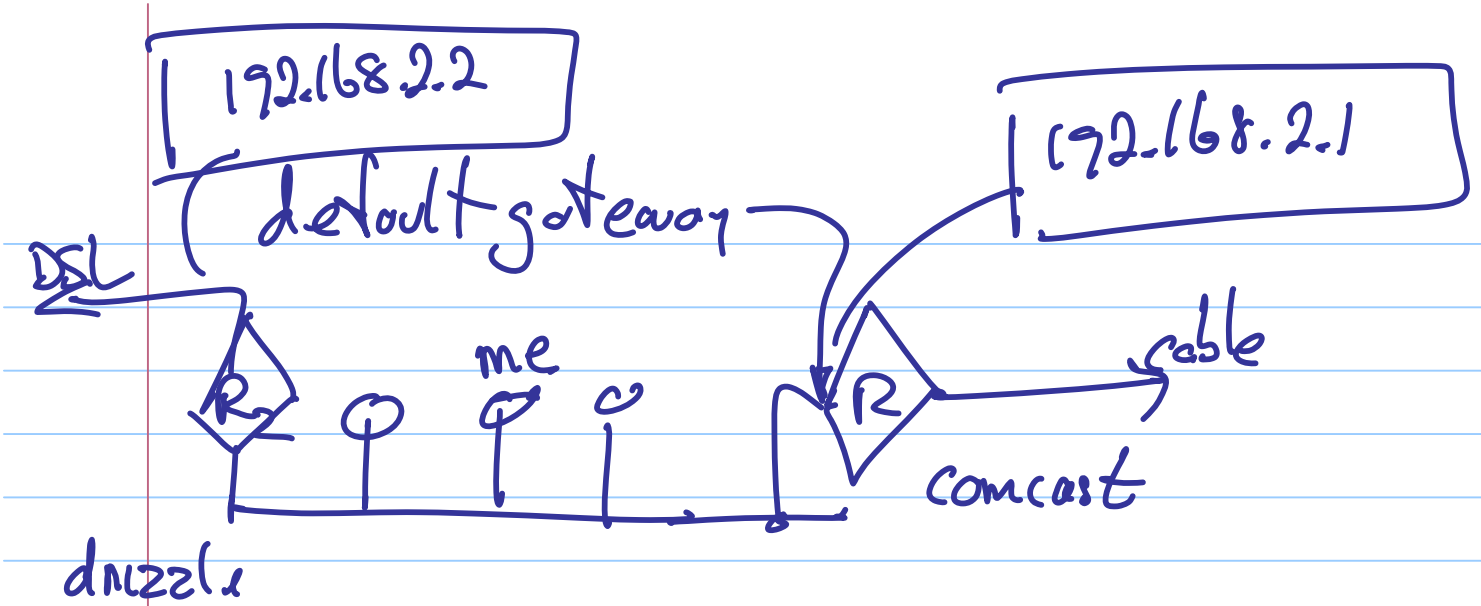
↳ 24 bits in network

255.255.255.0

24 bits

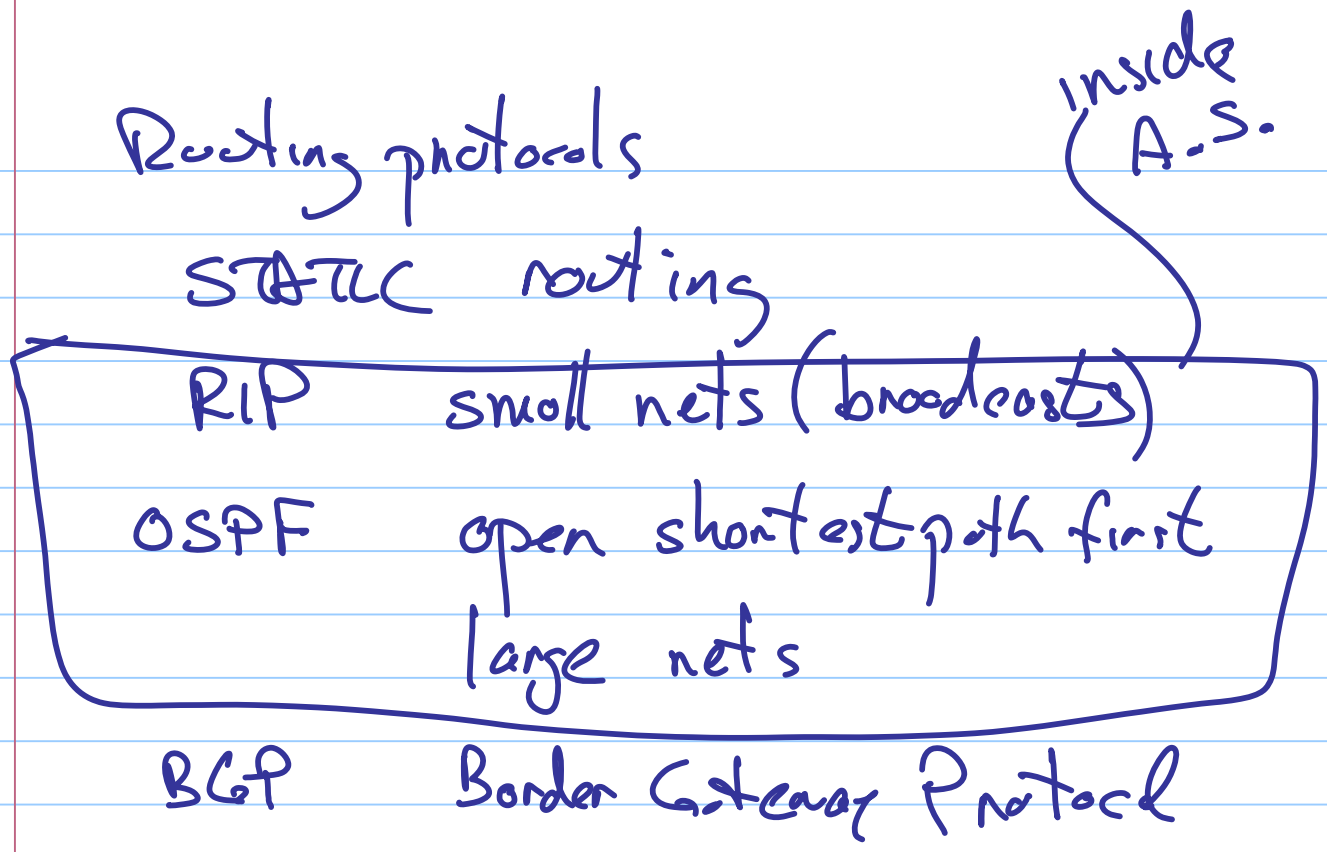
100.100.3.0/24 ⟷ 100.100.2.0/24

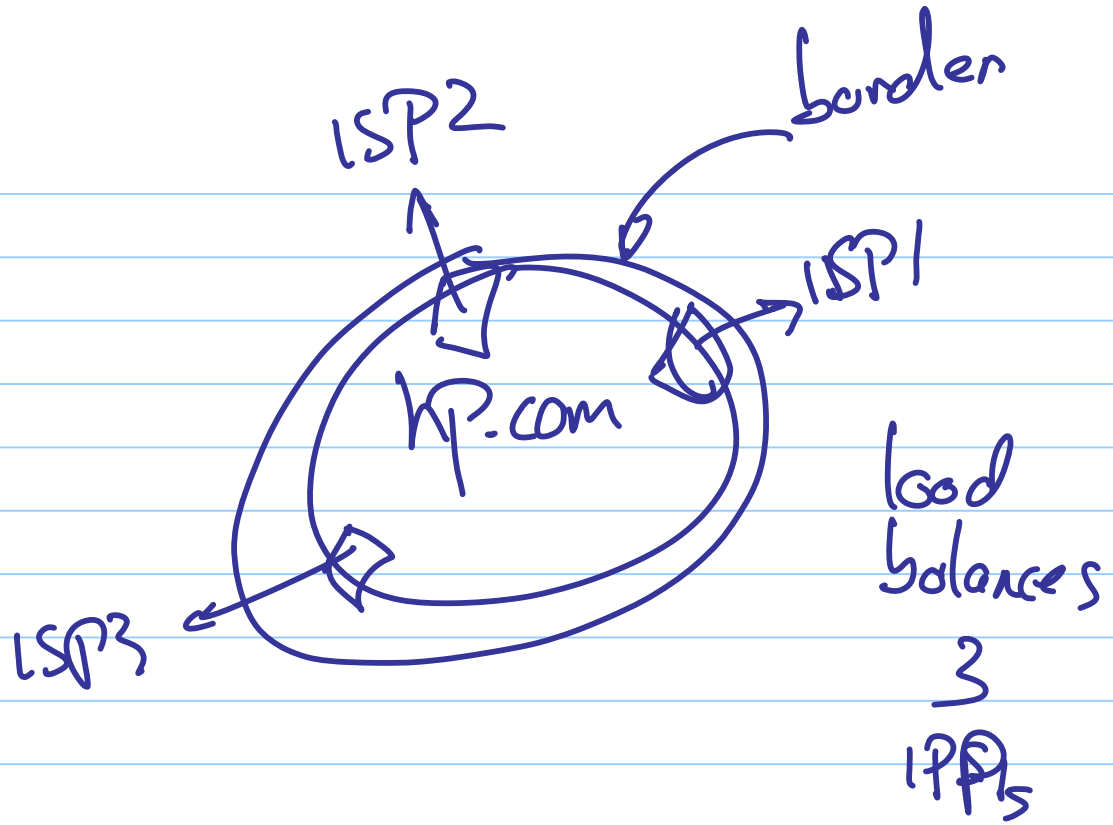

200.200.0.0/24
200.200.1.0/24
200.200.2.0/24
200.200.3.0/24
200.200.4.0/24
200.200.7.0/24
8 subnets
3 bits
= 200.200.0.0/21
CIDR
R



automatic routing?

routing protocol (RIP)


Routing protocols
inside A.S.
STATIC routing
RIP small nets (broadcasts)
OSPF open shortest path first
large nets
BGP Border Gateway Protocol


ISP2
border
ISP1
hp.com
ISP3
load
balances
3
IPs