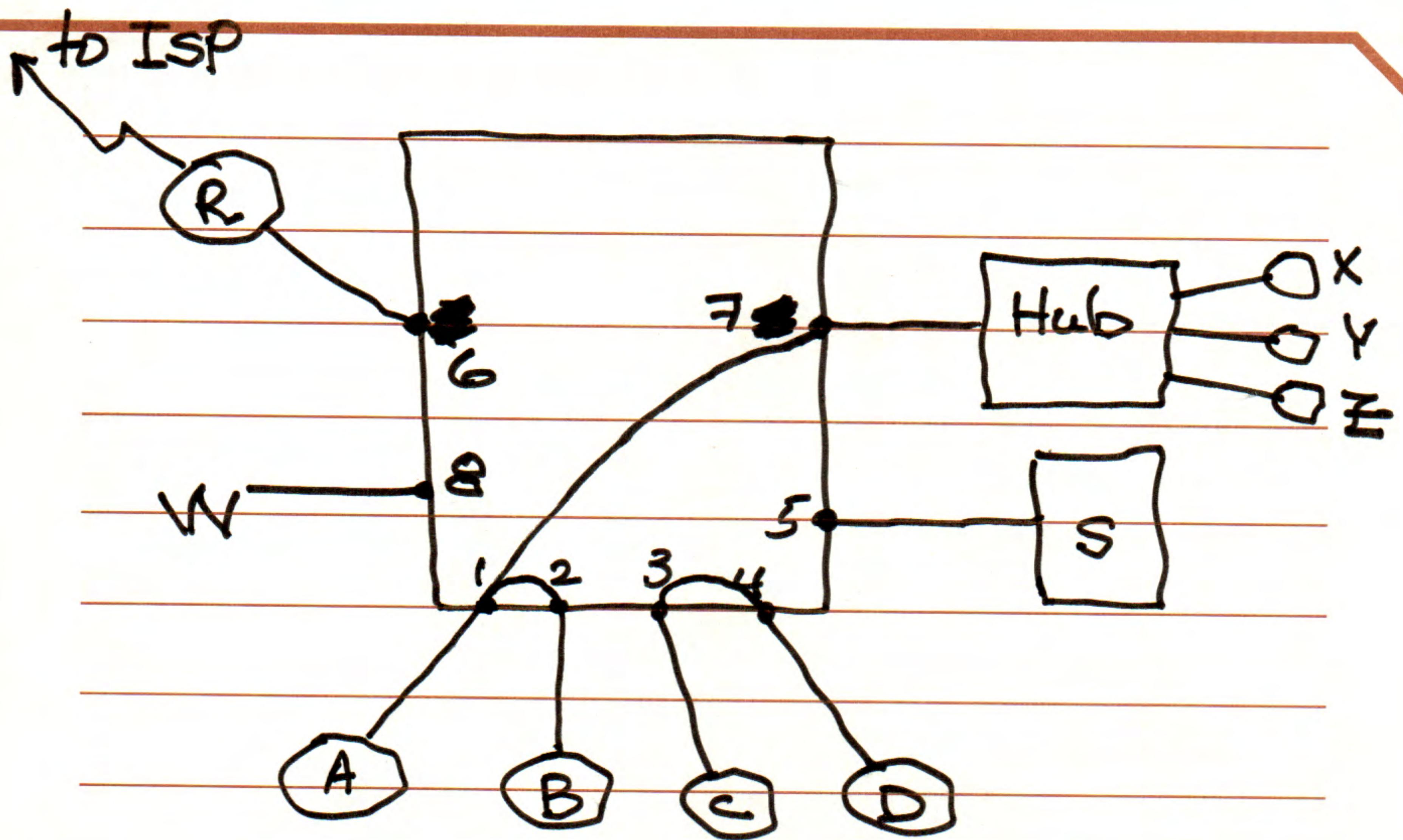


## Switched Ethernet

- ① Replaces a hub by a L2 switch.
- ② L2 switches recognizes MAC addresses but not IP addresses.
- ③ L2 switches are transparent to end nodes (hosts), i.e. hosts are not aware of existence of L2 switches.
- ④ L2 switches are plug & play devices that are capable of configuring themselves without the aid of net. admins (unlike routers).
- ⑤ L2 switches isolate collision domains but doesn't isolate broadcast domains.
- ⑥ L2 switches support simultaneous connections.

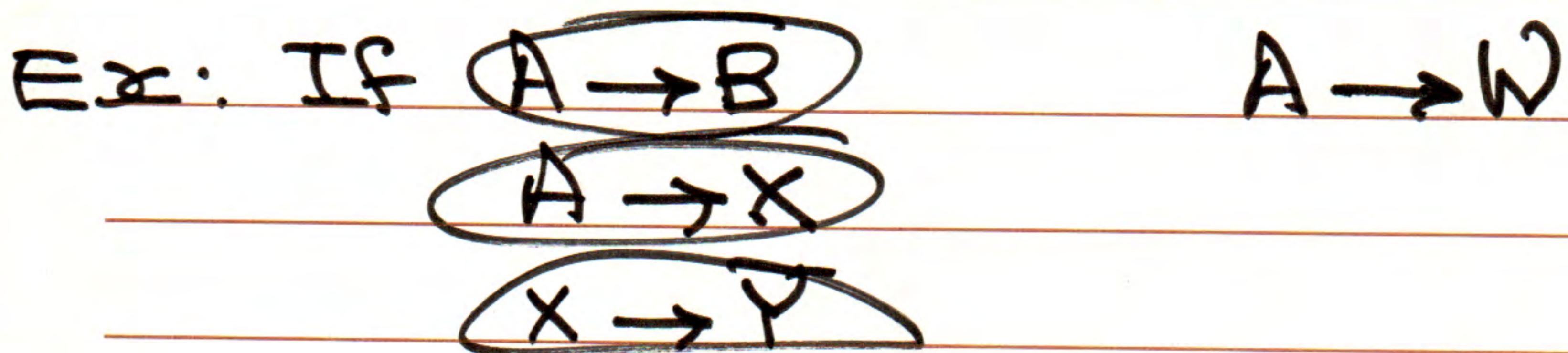


ports 1 through 6 are dedicated ports where as port 7 is a shared port.

Inside the Switch there is a  
«Forwarding» Database

This Database  
is created by  
the Switch  
itself.

PORT #	MAC	LIFETIME	TTL
1	A	5 min	
2	B		
3	C		
4	D		
5	S		
6	R		
7	X, Y, Z		



modes of operation of L2 switch

- ① Filtering
- ② ~~Forwarding~~ Forwarding
- ③ Flooding

a Switch is in a filtering mode if

both the source & destination nodes

are sharing the same port.

a Switch is in a forwarding mode if the Source & destination nodes are on different ports.

a Switch is in a flooding mode if he can't locate the destination MAC address in his database.

In this case, the Switch will flood all the ports (except the one where the frame came through) with that frame.

⇒ L2 switch behaves as a hub.

Broadcast:

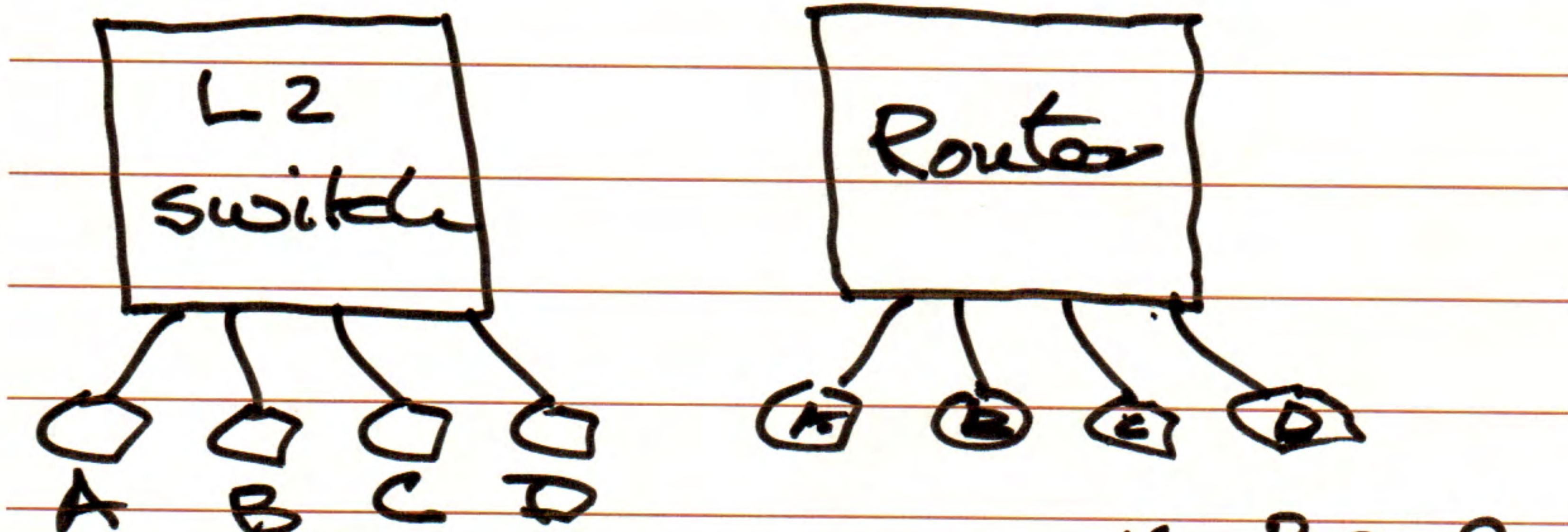
L2 switch doesn't isolate broadcast domains

a broadcast domain is a set

of all nodes connected to

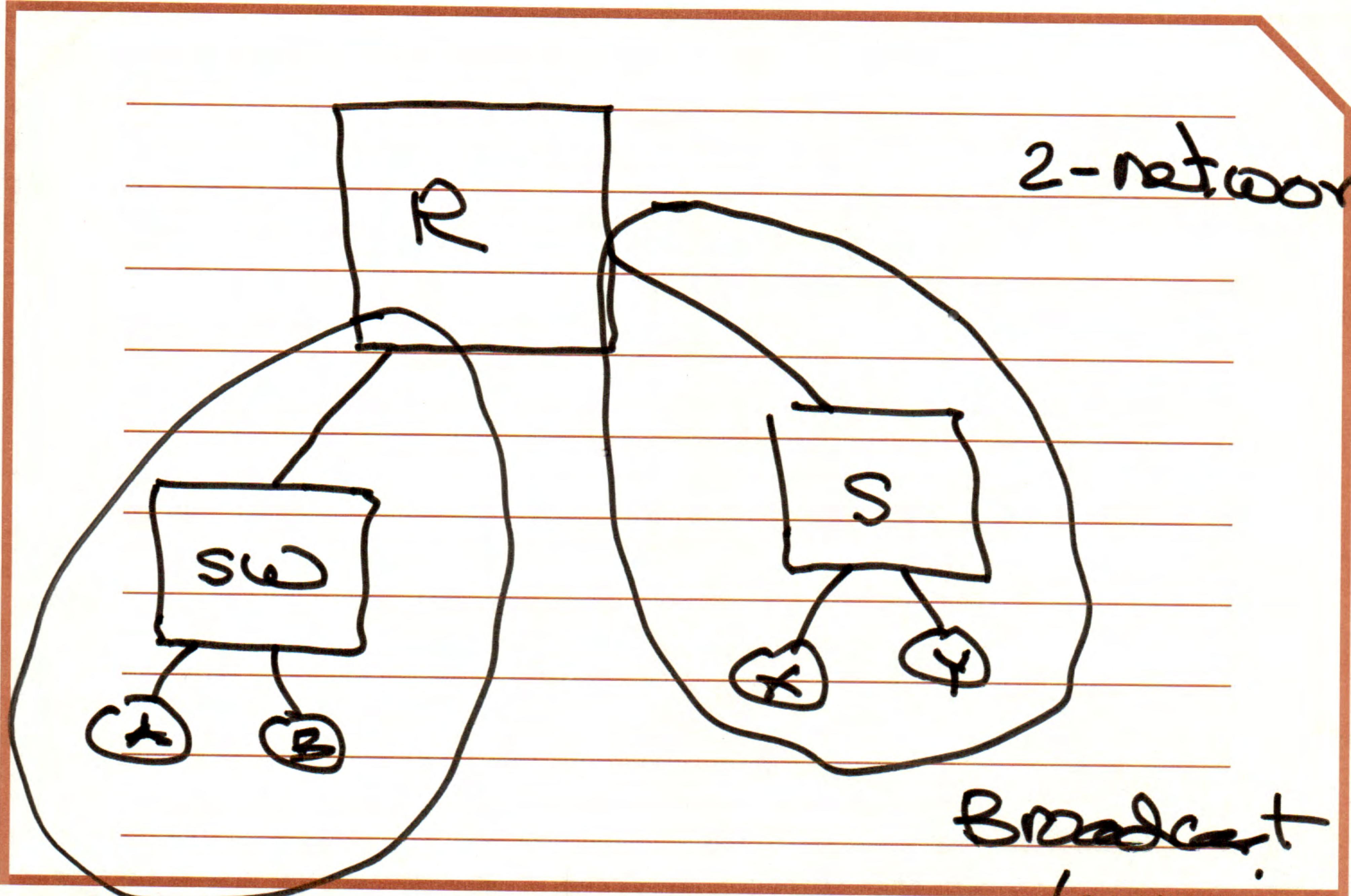
same network ⇒ all nodes

must receive the broadcast frame



1 Broadcast domain

4-Broadcast domains.



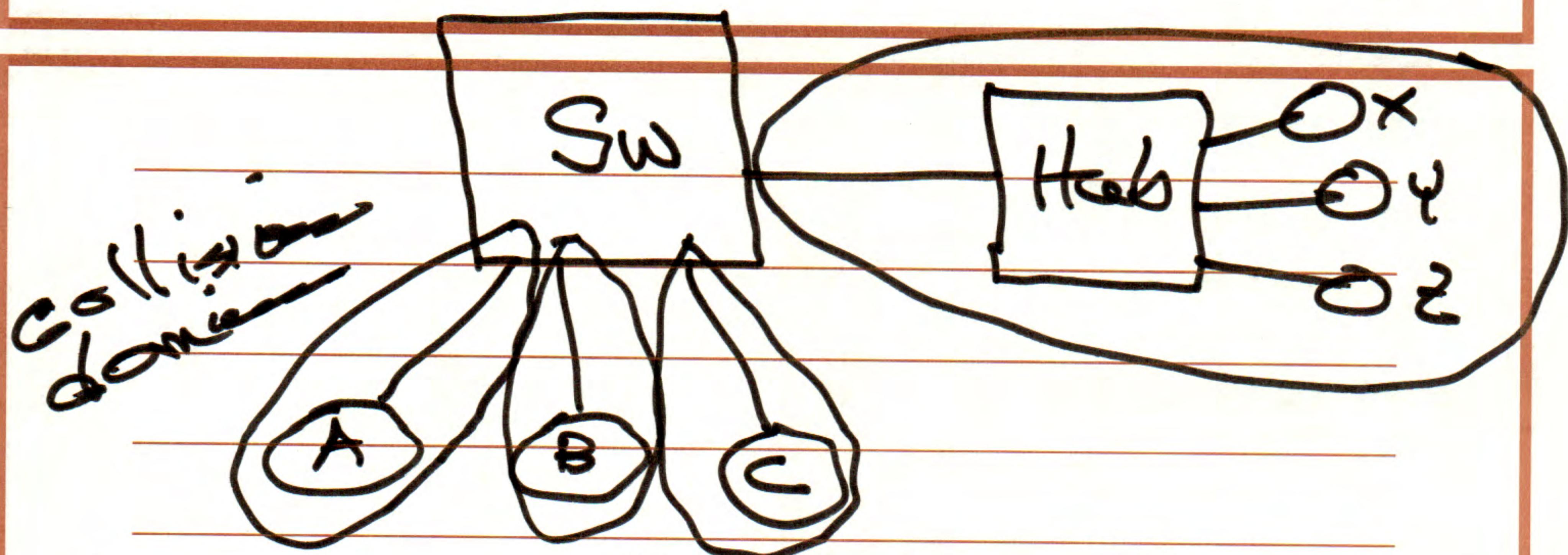
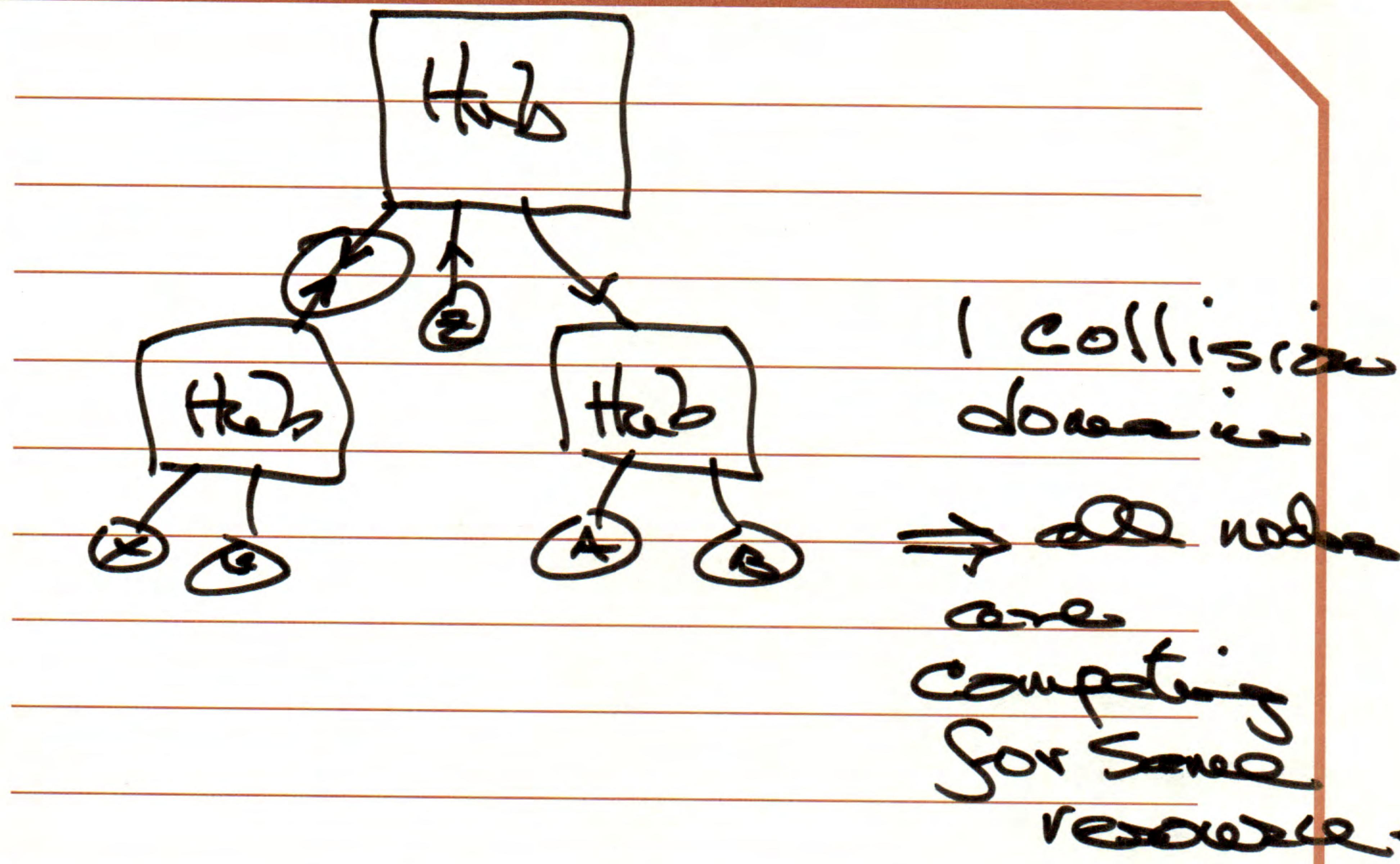
Broadcast domain

What is a collision domain?

A collision is a set of nodes sharing the same resource.

<sup>↓</sup>  
(competing for)

(6)



how many collision domains does  
 have

answer 4 collision domain  
 each port of a switch constitute  
 a collision domain.

~~Collision domain can be elided if Switch is configured for FDX communication.~~

⇒ No collision.

How does the Switch "learn" the MAC address of the nodes without communicating with the nodes?

Learning Process (Back to ex. Page 2)

initially

empty DB

Port #	MAC address
1	A
3	C
7	X
4	D
7	Y

A → B

C → X

X → Z

D → A

Y → X

Flooding

Flooding

Flooding

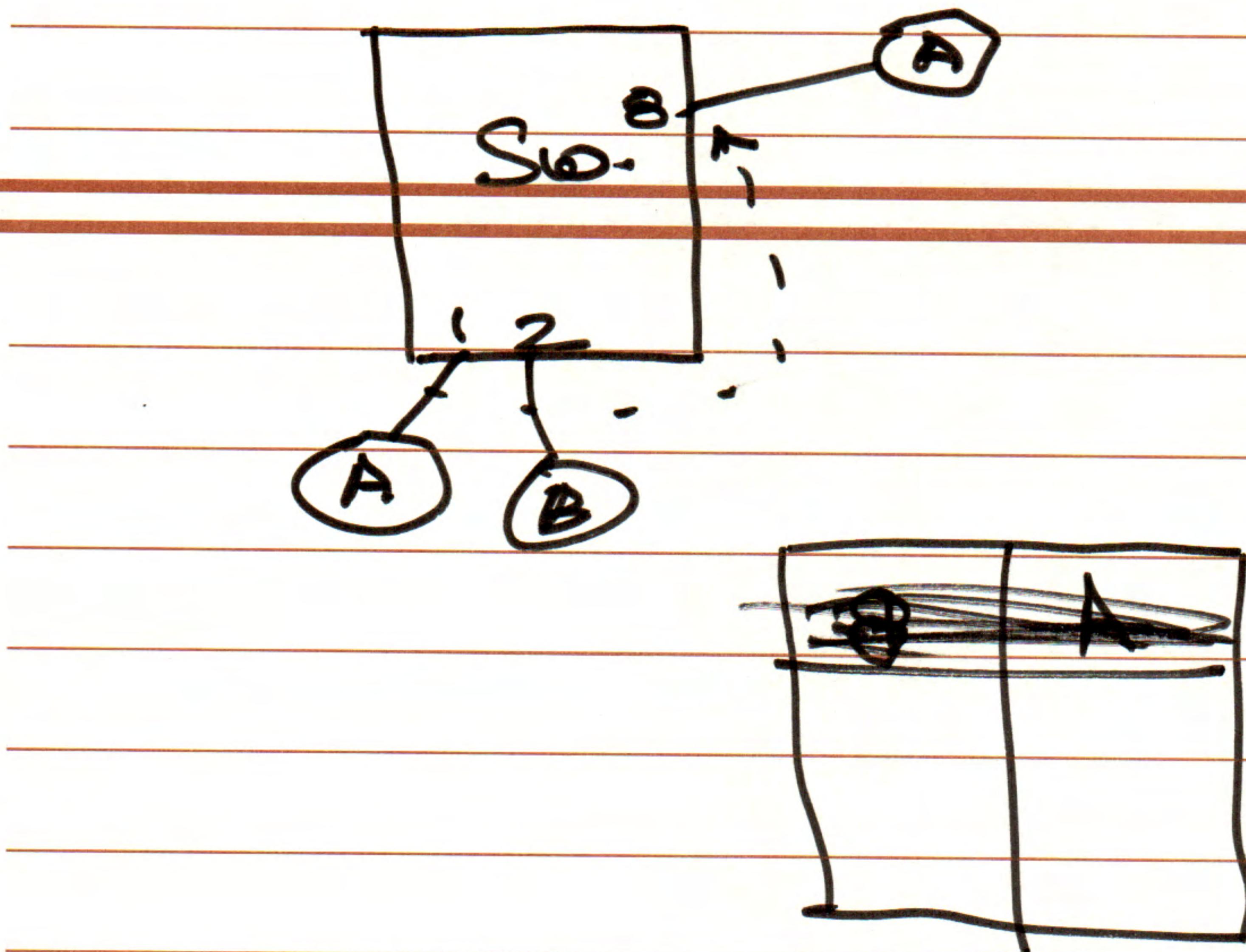
Forward

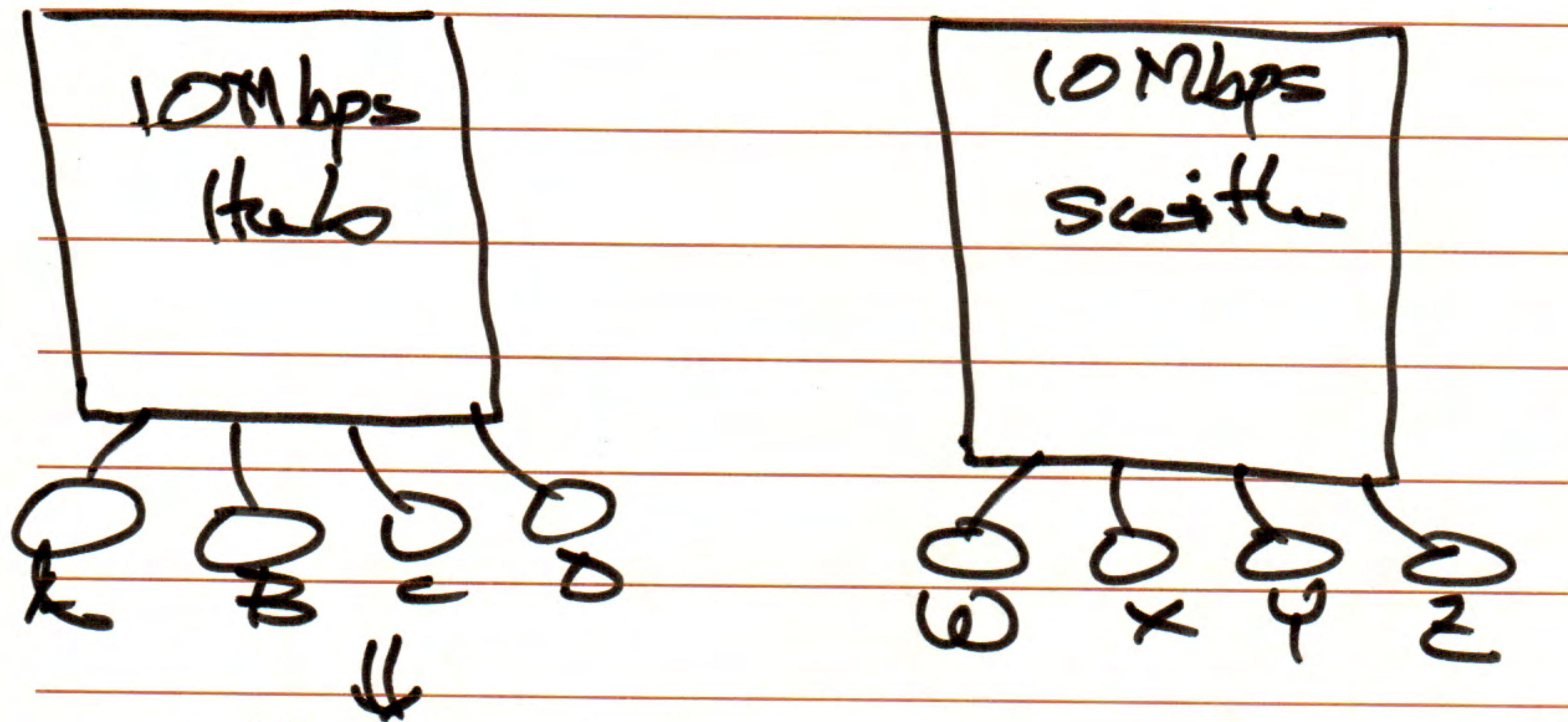
Filtering

and so on...

Q: Is there a node here to do for the switch to "learn" its MAC address?

A: No  
The answer: The node should send a frame to any destination.





~~on the link~~

the ~~throughput~~/node

2.5Mbps

~~average~~  
throughput  
per node

~~max throughput/node~~

10Mbps.

= 10Mbps

~~Max throughput~~  
node

~~aggregate rate~~  
of the hub

10Mbps

= 10Mbps

~~aggregate~~  
throughput  
of switch

40Mbps