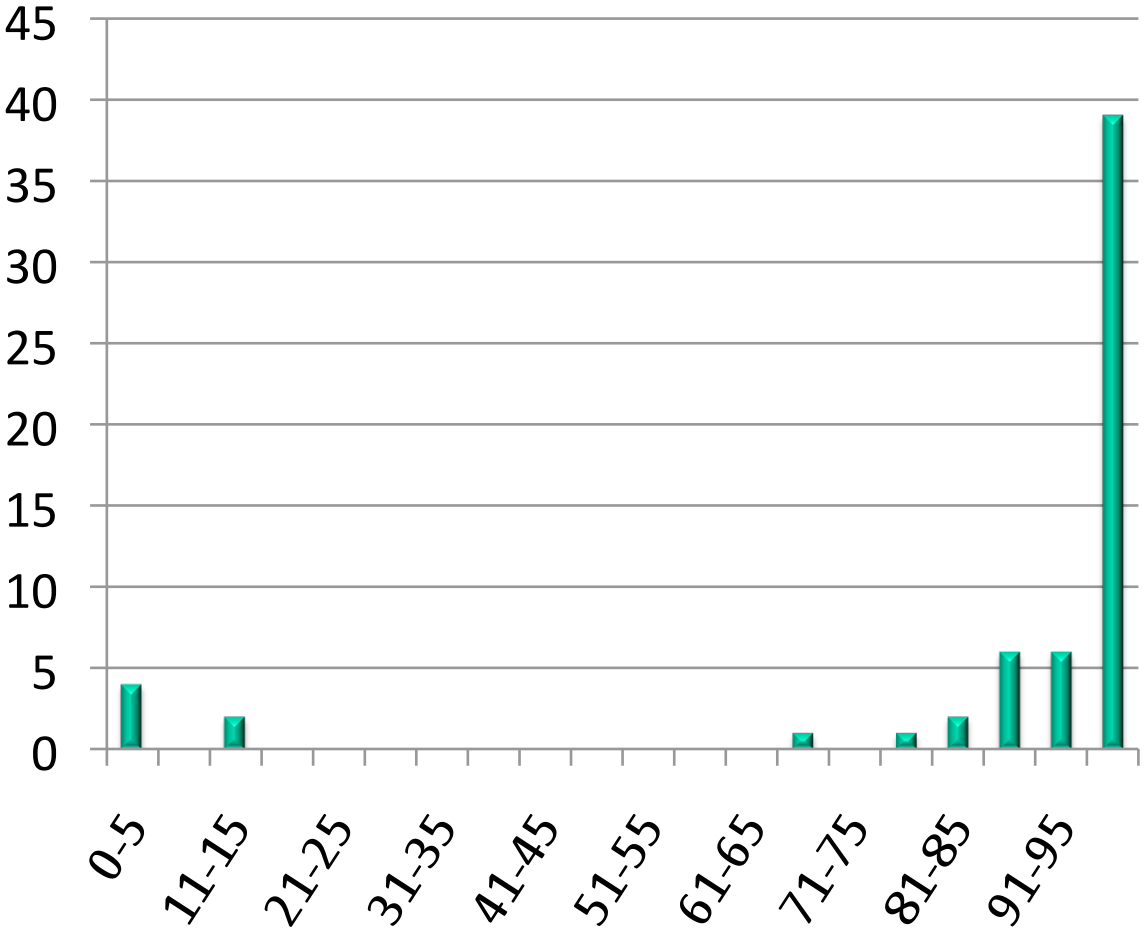
Project 1 grading
&
midterm review

15-441 Computer Networks, Spring 2010

Recitation #8

Project 1 results



- Avg: 87
- Med: 98
- STD: 27.3
- Max: 100
- Min: 0

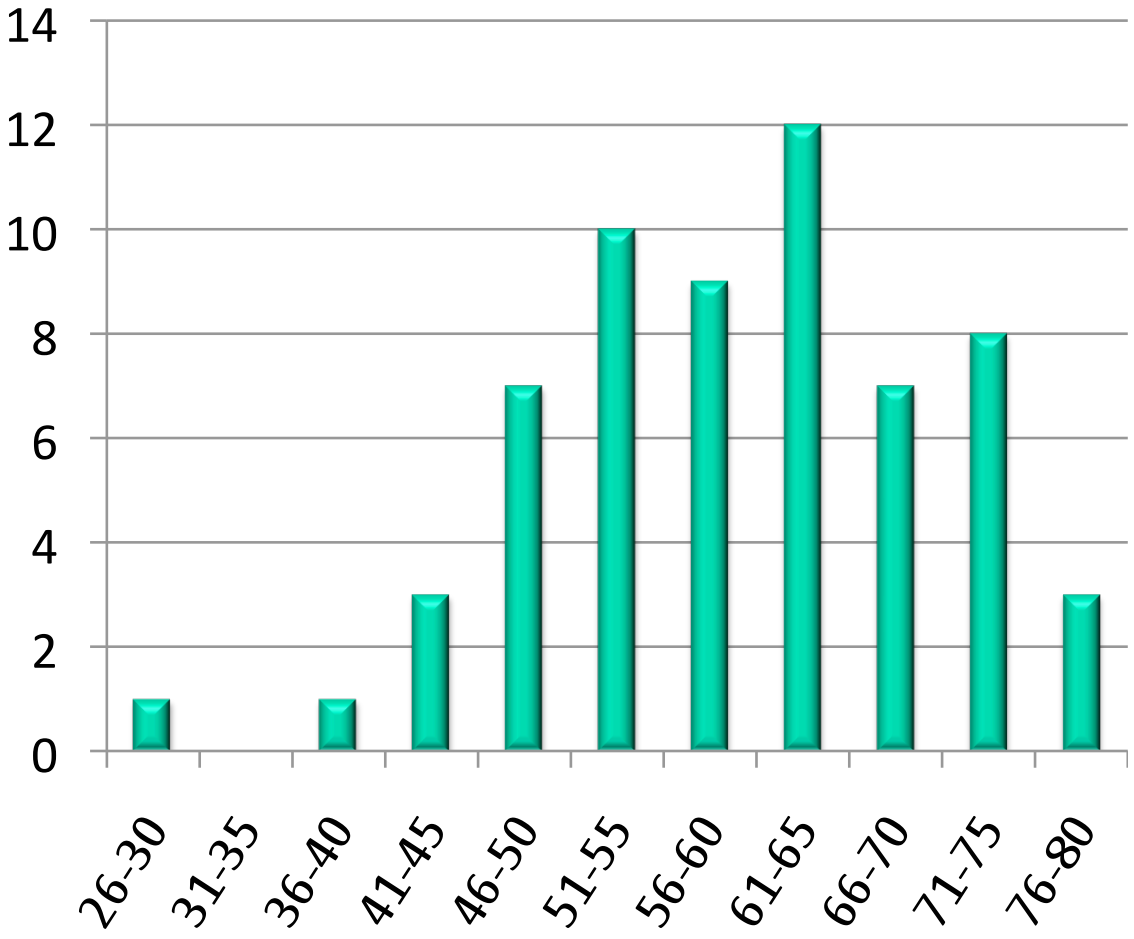
Project 1 grading rubric (1/2)

- Checkpoints – 15 points
  - Does it pass the tests in the checkpoint scripts?
- Server core networking – 20 points
  - Handling connections, concurrency, etc…
- Protocol implementation – 25 points
  - Does it implement the required commands
  - Some people had trouble with WHO and LIST

Project 1 grading rubric (2/2)

- Robustness – 25 points
  - Does it crash or segfault?
  - Specific tests:
    - Client disconnects without calling quit
    - Send unknown commands
    - Send long command with more than 512 bytes
- Style – 15 points
  - Documentation, code structure, command line options, etc

Midterm results



- Avg: 59.5
- Med: 59
- STD: 10.4
- Max: 78
- Min: 28

A – True or False

- ✓ For a bandwidth of t Hz, noise is 1/8th of the received signal strength, can you get 2t bits per second?
- X Both Manchester and NRZI can handle long strings of 1's and long strings of 0's
- ✓ UDP is a better choice than TCP for a real time voice application
- X Modern high speed routers use shared busses to gain benefits from statistical multiplexing.
- ✓ Modern high speed routers use virtual output queues to avoid head-of-line blocking.

A – Longest prefix match implementations

- Binary trie (B) vs Patricia trie (P) vs direct high-radix trie (D)
- Fewest lookups needed? D because it is direct.
- Requires backtracking? P because you can a take to big a leap while following a link.
- Most memory efficient? P because you compress nodes with a single child.

A – DNS (1/2)

- A asks for www.foo.com, nothing in cache:
  1. C asks L;
  2. L asks A_root;
  3. A_root tells L to ask A_com;
  4. L asks A_com, A com tells L to ask A_foo.com;
  5. L asks A_foo.com;
  6. A_foo.com answers to L;
  7. L answers to C.

A – DNS (2/2)

- A asks for ftp.foo.com, www.foo.com in cache:
  1. C asks L;
  2. L asks A_foo.com;
  3. A_foo.com answers to L;
  4. L answers to C.

B – Ethernet (1/4)

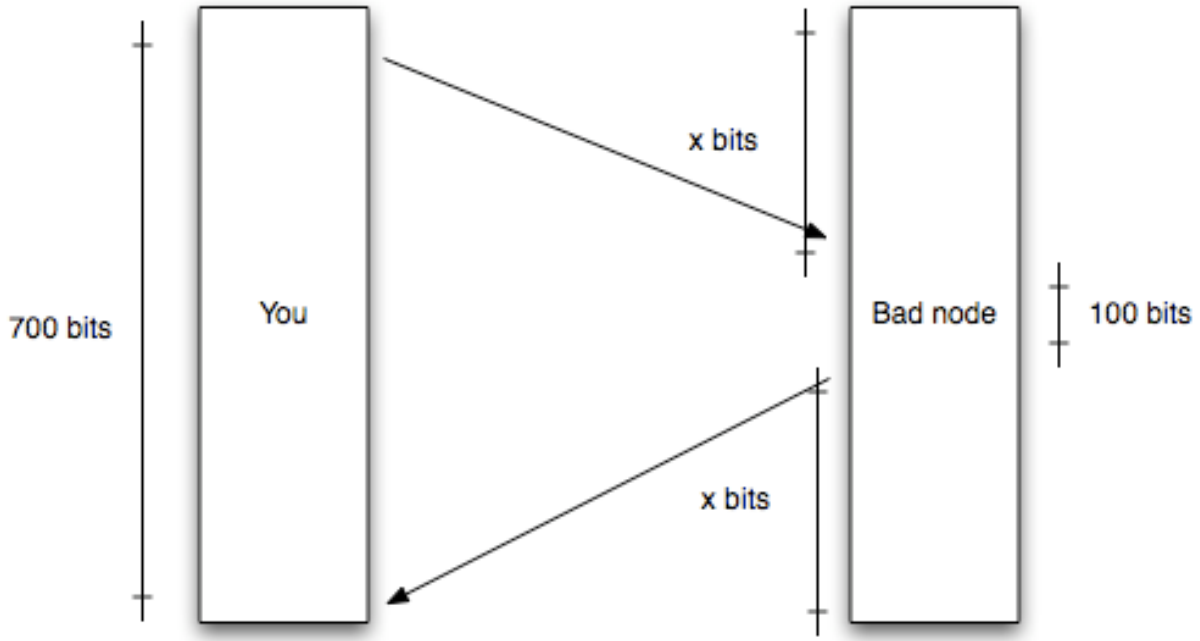
- 8 – Why 48 bit addresses if 16 would be enough?
- Gives us the uniqueness property, this means:
  - no configuration necessary for hooking up a new node;
  - separation of routing from addressing;
  - a basis for unique identification of files, programs and other objects on the networked hosts.
- Common mistakes: saying the addresses need to be unique in the whole world, they don't. We were looking for the advantages that the uniqueness property gives.

B – Ethernet (2/4)

- 9 b) What to do to ensure collision detection when increasing the bandwidth 10 times?
  - Increase the minimum packet size x10
  - Decrease the wire length x10
- Common mistakes: optic fiber is not 10x faster, it won't solve the problem!

B – Ethernet (3/4)

- 9 c) 1Gbps network. Node starts sending after hearing 100 bits and it collides with you after you send 700 bits. How far is he from you?



B – Ethernet (4/4)

- 9 c) continued

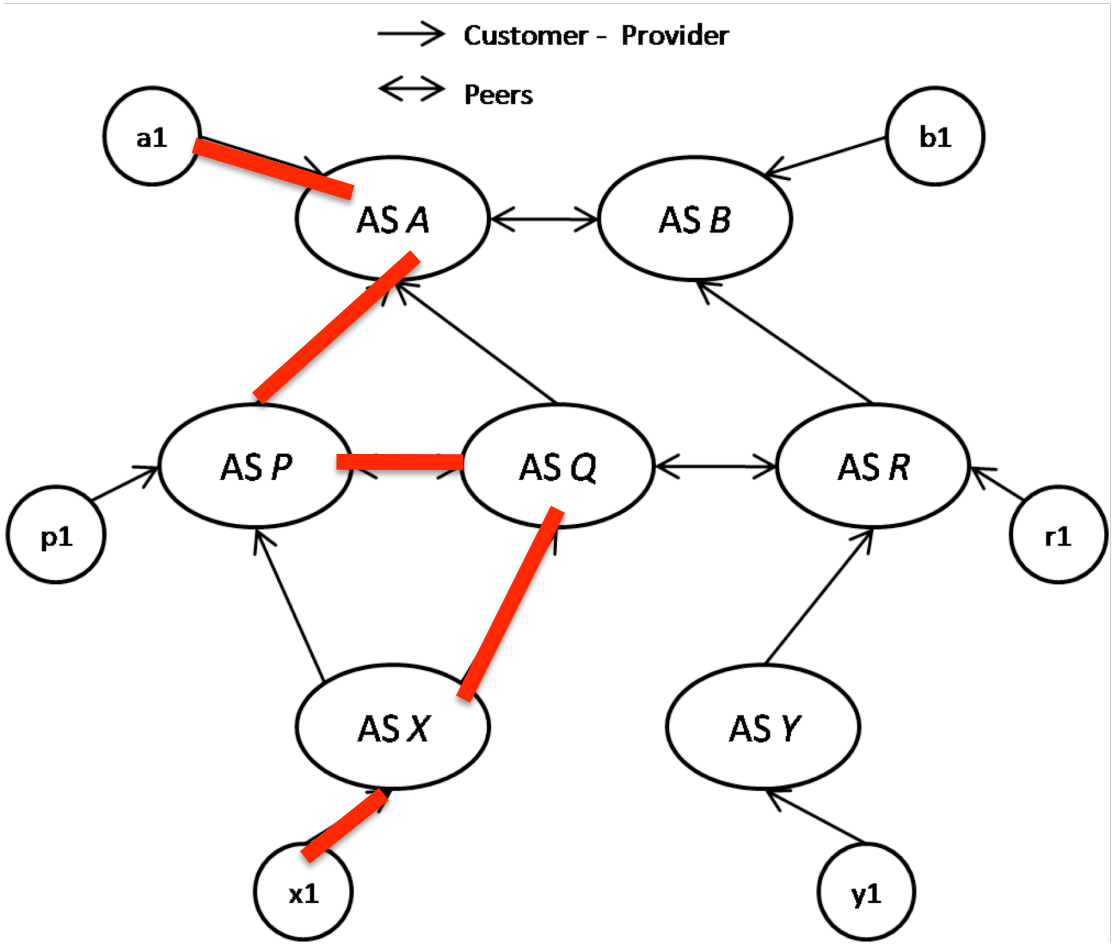
700 = 2x + 100 → x = 300 bits

Prop_delay = 300/10^9 = 3 x 10^-7 s

Dist = Prop_delay * 1.8 x 10^8 = 54 m

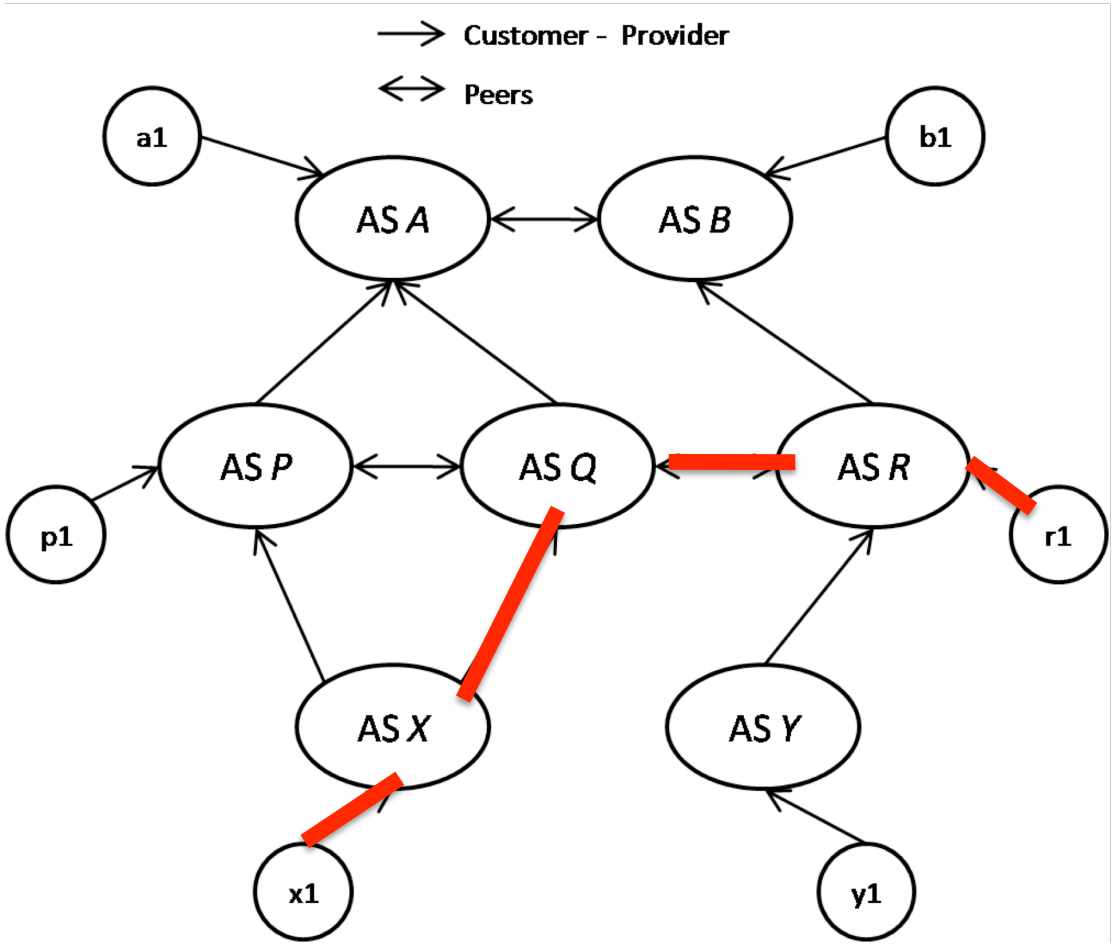
- Common mistakes: no calculations, using 600 or 100 bits instead of 300.

C – BGP Relationships (1/4)



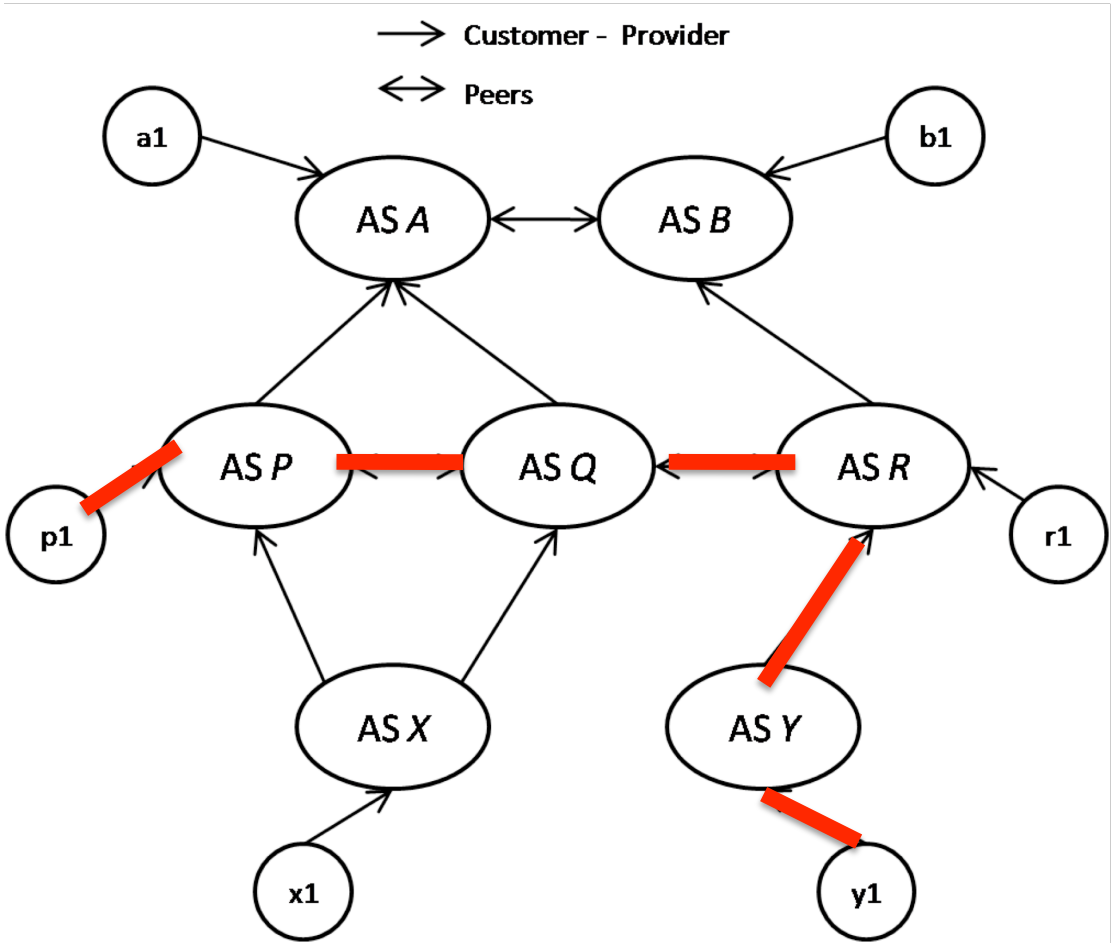
Invalid – violates valley free routing on the P to Q link

C – BGP Relationships (2/4)



Valid!

C – BGP Relationships (3/4)

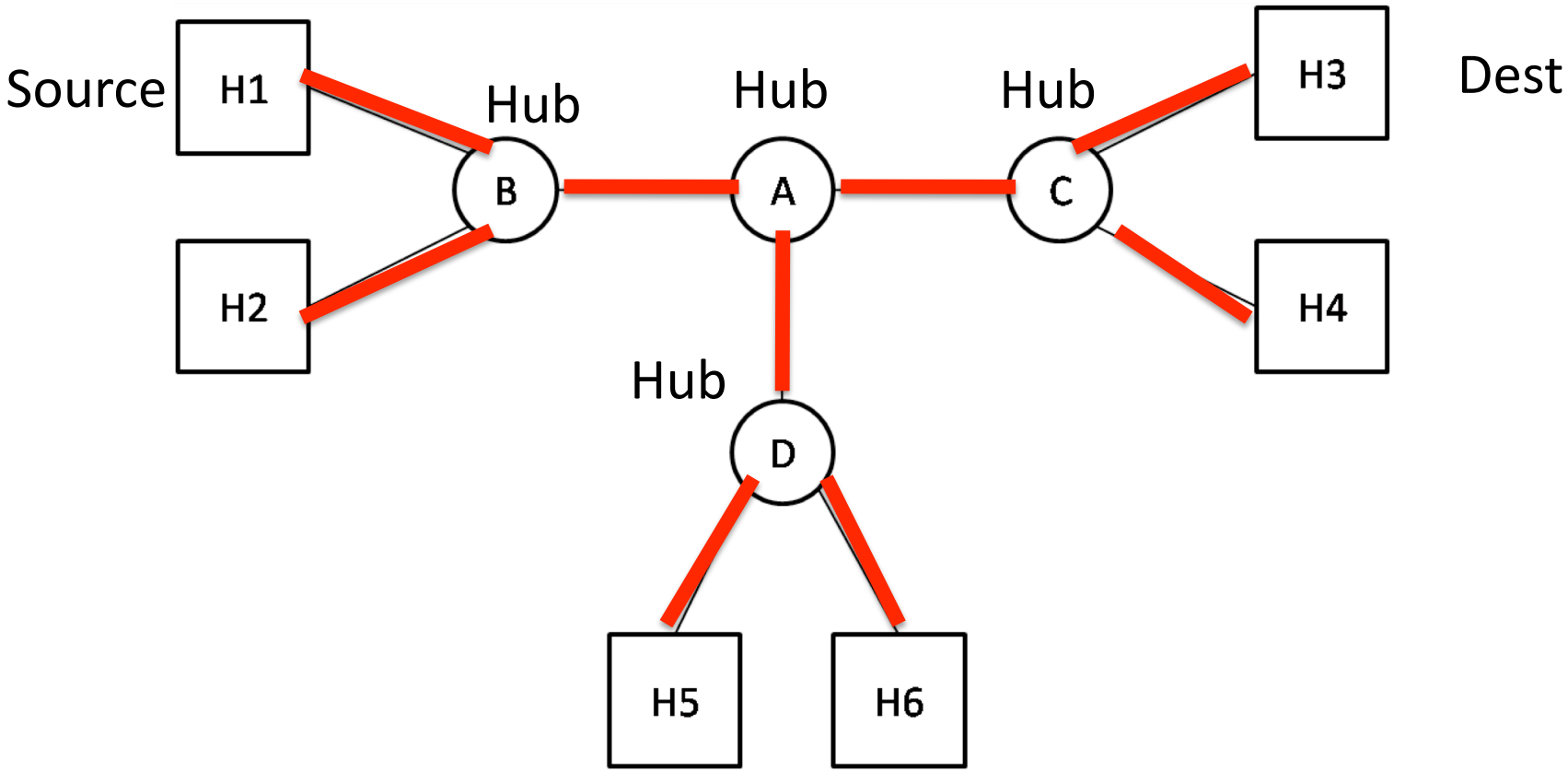


Invalid – violates valley free routing on the Q to P link,
Q is loosing

C – BGP Relationships (4/4)

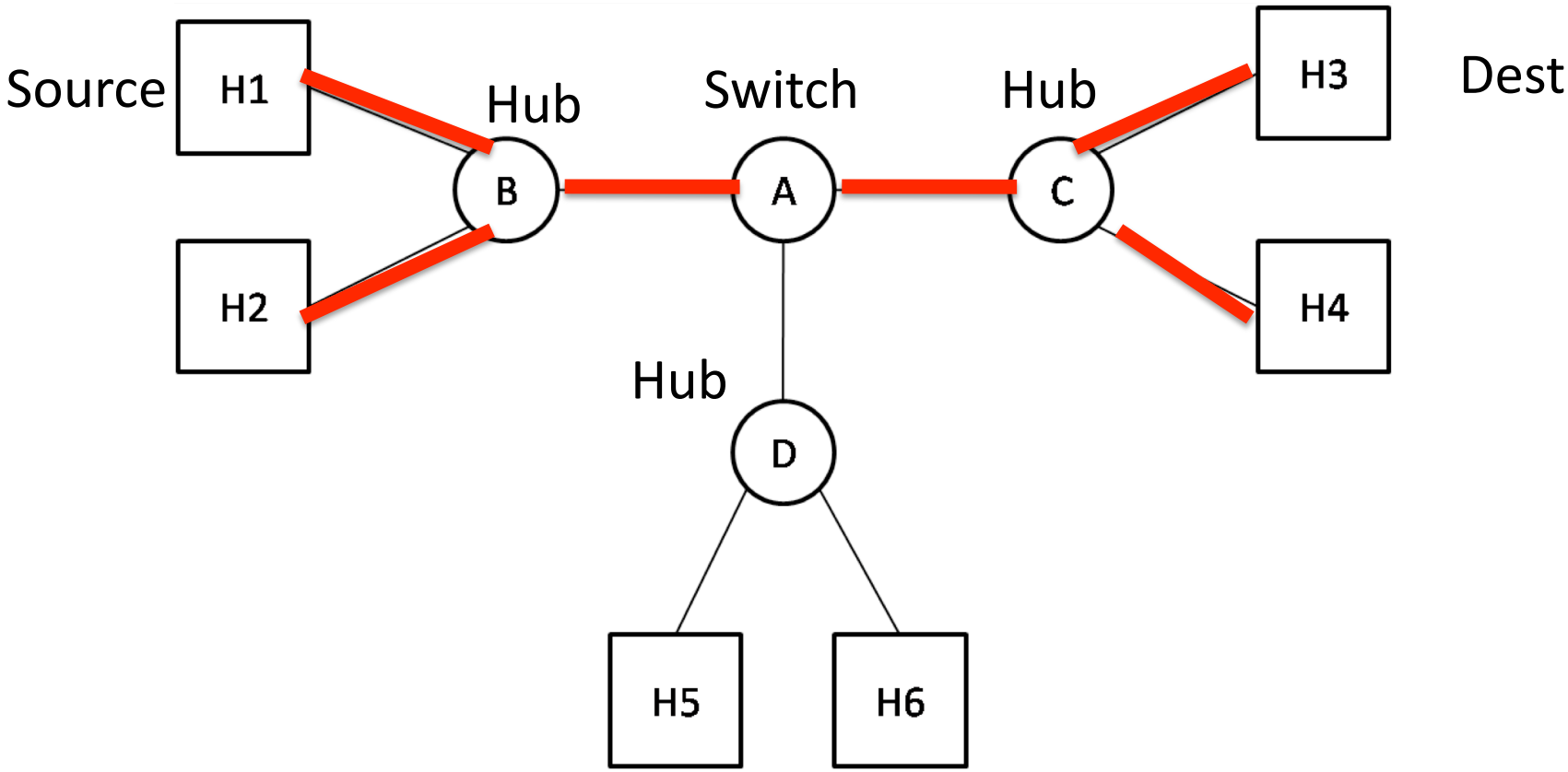
- 11 a) Can AS Q prevent outbound traffic from going through AS R?
  - Yes, just announce routes through other ASs
- 11 b) Can AS R simply stop serving AS R's costumers?
  - No, it needs to announce reachability to AS R to its costumers

D – Repeaters, Bridges, Routers and Tunneling (1/5)



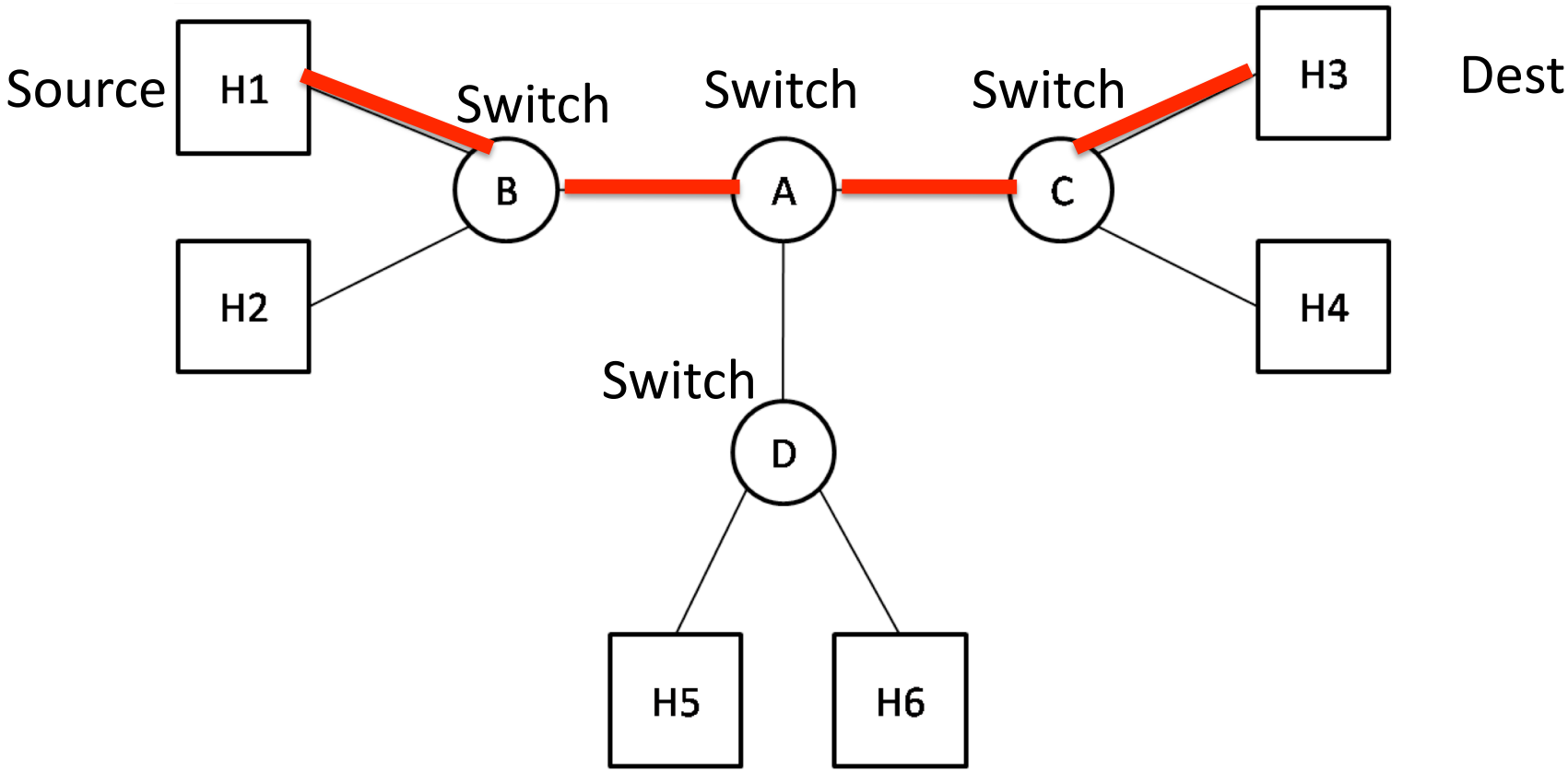
Everyone will hear it!

D – Repeaters, Bridges, Routers and Tunneling (2/5)



A doesn't forward to D!

D – Repeaters, Bridges, Routers and Tunneling (3/5)



No one overhears the packet!

D – Repeaters, Bridges, Routers and Tunneling (4/5)

13 a) A is a switch, B, C and D are hubs. A packet is sent from H1 to H4, what do the headers look like while crossing the B-A link?

Header type	Source Address	Destination address
Link-layer	MAC-H1	MAC-H4
IP	IP-H1	IP-H4

13 b) They are all routers.

Header type	Source Address	Destination address
Link-layer	MAC-B	MAC-A
IP	IP-H1	IP-H4

D – Repeaters, Bridges, Routers and Tunneling (5/5)

13 c) A, B, C and D are all routers. There is an IP-in-IP tunnel from B to C. A packet is sent from H1 to H4, what do the headers look like while crossing the B-A link?

Header type	Source Address	Destination address
Link-layer	MAC-B	MAC-A
IP	IP-B	IP-C
IP	IP-H1	IP-H4

Parting thoughts

- Still 62.5% of points up for grabs!
- Don’t forget to submit Project 2 CP2 today.
- Homework 3 is due Tuesday in class.