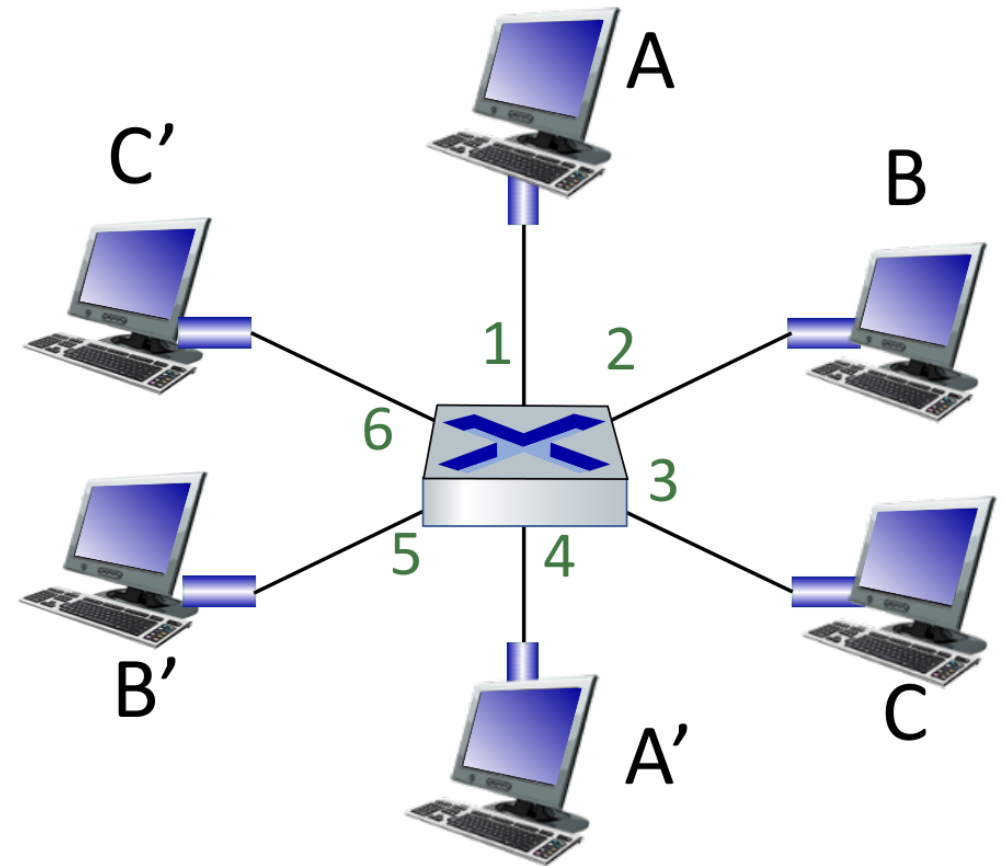**Department of Computer Science**
The University of Alabama at Birmingham

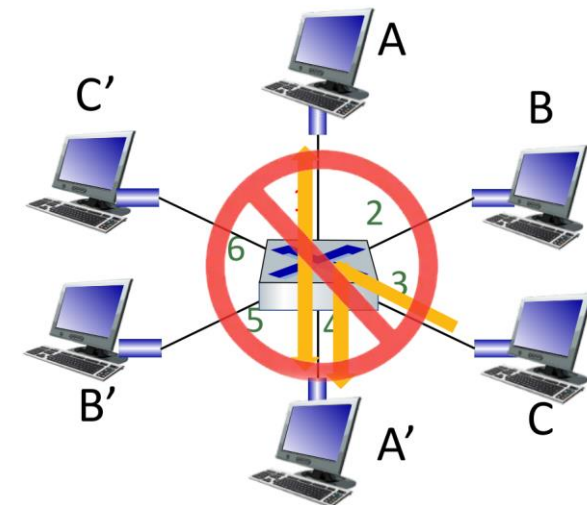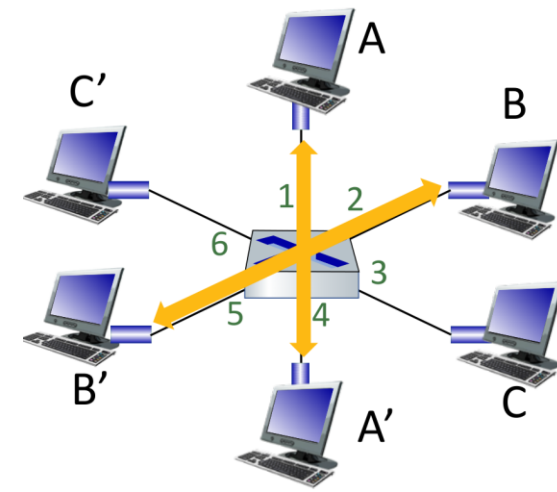<u>CS 334/CS 534: Networking Lab – 3</u>
Switch and VLAN

Switch

- Switch is a link-layer device; takes an active role

- **Store, forward** Ethernet (or other type of) frames

- **Examine** incoming frame's **MAC address**, selectively **forward** frame to One-or-more outgoing links

- When frame is to be forwarded on segment, uses CSMA/CD to access segment.

Switch

- **Transparent**: hosts unaware of presence of switches

- Hosts have **dedicated, direct connection** to switch

- **No collisions; full duplex**
  - A-to-A' and B-to-B' can transmit simultaneously
  - But A-to-A' and C to A' can not happen simultaneously

- **Plug-and-play, self-learning**
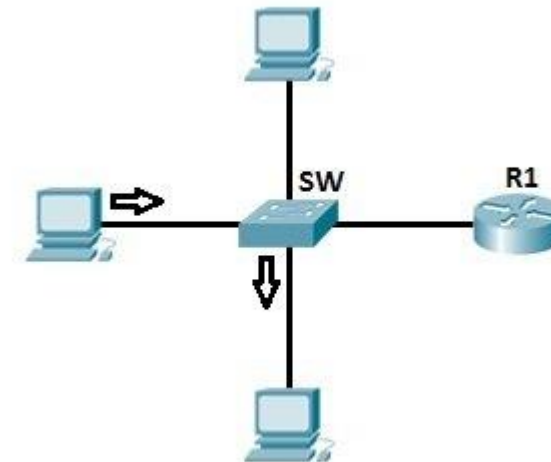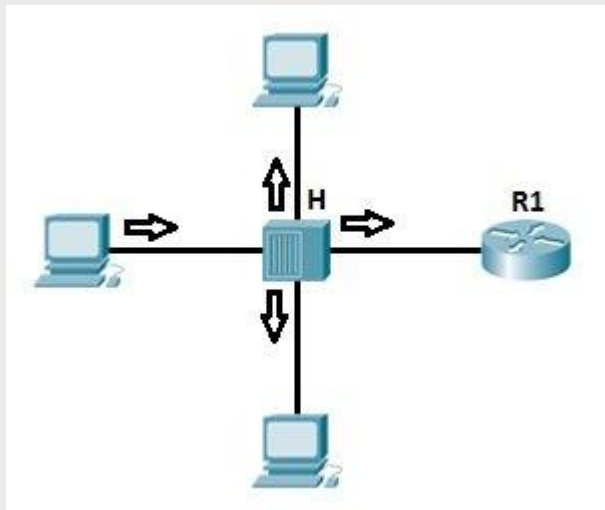 - switches do not need to be configured

Evolution of LAN Devices

- **Hubs:**
  - Central device in early LANs.
  - Created a single large collision domain.
  - No traffic awareness.
- **Bridges:**
  - Created multiple collision domains.
  - Limited number of ports.
- **Switches:**
  - Modern and widely used.
  - More ports than bridges.
  - Can inspect incoming traffic and make forwarding decisions accordingly
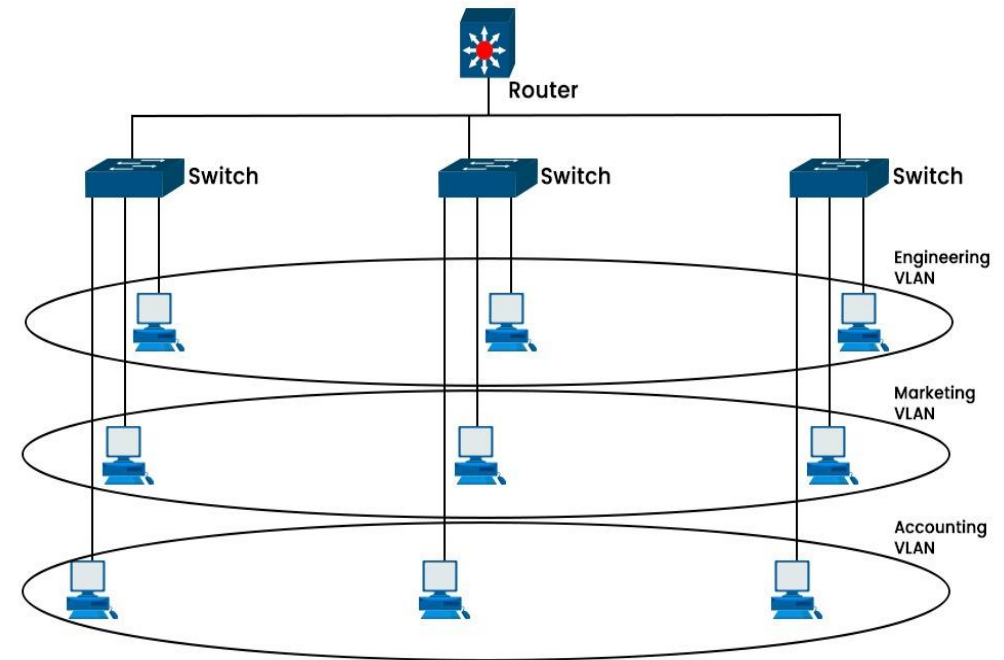 - Each port is a separate collision domain.
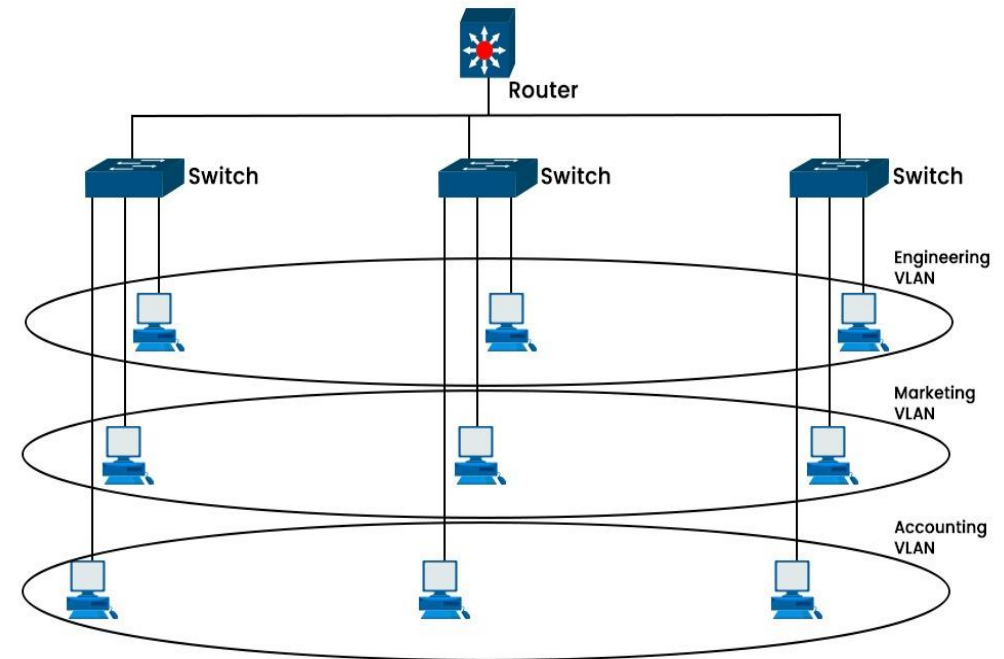
Hub vs Switch

VLAN (Virtual LAN)

- A Virtual LAN (VLAN) is a **logical network segment** created within a physical network.

- It allows devices to be **grouped together** even if they are not connected to the same physical switch.

- Each VLAN acts as a **subgroup** of switch ports in an Ethernet LAN.

- Configured on **switches** by assigning interfaces to specific broadcast domains.

VLAN (Virtual LAN)

- It Increase **broadcast domains** while reducing their size.

- Enhance security:
  - Reduce the number of hosts receiving flooded frames.
  - Isolate sensitive data by placing hosts on a separate VLAN.

- Improve flexibility:
  - Group users by department instead of physical location.

- Simplify network changes:
  - Easily reconfigure ports to the appropriate VLAN.

VLAN (Virtual LAN)