Cisco switches have 3 functions:

- Choose to forward or filter a frame based on its destination MAC address
- Learn MAC addresses to prepare for future forwarding decisions
- Create a loop-free environment where a frame can't be forwarded again by re-entering the switch

SWITCHING LOGIC

Add the incoming port and the frame's source MAC address pairing to the MAC address table. Even if it's already in the table, at least set the aging (inactivity) timer back to 0 to ensure that only unused MAC addresses are flushed from the table. If the table gets full, the oldest entry will be flushed, even if its timer hasn't expired.

Within the frame's VLAN, if the destination MAC address is in the MAC address table, send the frame out the named port (as long as that's not where it came in), otherwise flood it out all ports in the same VLAN, except the one it came in.

A Broadcast or Multicast frame is treated just like a frame to an unrecognized MAC address; it's flooded out all ports in the same VLAN, except the port it came in.

STP (Spanning Tree Protocol)—to prevent loops, some ports are automatically blocked—they don't forward frames. Details are part of CCNA 200-105.

Note that a trunk interface connected to another switch may have many MAC addresses associated with it (perhaps all the MAC addresses on the attached switch).

VERIFYING SWITCHING

Cisco switches are ready to switch out of the box. By default, the ports autonegotiate their speed and aren't shut down, all interfaces are in the same VLAN (1), and STP is even running. Some commands:

```
SW> show mac-address-table [dynamic]
```
Tells port and VLAN for each known MAC. "Dynamic" tells it to only show learned MAC addresses, omitting its own MAC addresses (the Ethernet ports on a switch have MACs too).
```
SW> show mac-address-table dynamic address HHHH.HHHH.HHHH
```
Limit the output to a specific MAC address
```
SW> show mac-address-table dynamic interface fa0/1
```
Limit the output to a given interface
```
SW> show mac-address-table dynamic vlan 5
```
Limit the output to a given VLAN
```
SW# clear mac-address-table dynamic
```
Requires privileged exec.
```
SW> show interfaces status
```
"Connected" status in the output means the port has a cable and is functional
```
SW> show interfaces fa0/1 counters
```
Counts of frames and bytes in / out
```
SW> show mac-address-table aging-time
```
Default is 300 seconds for many switches