

1. Bus arbitration is a process by which the next device becomes the bus controller by transferring bus mastership to another bus.
2.
 - a. It asserts the request line, then the grant line is asserted by the arbiter when the bus isn't in use. The grant line signal then passes through devices until it reaches the requesting device.
 - b. Same as above, except if a device asserts the request line during the arbitration phase that is closer to the arbiter than the other device requesting, it will have priority and the later device will have to continue to wait.
 - c. If no one is using the bus, the arbiter asserts the grant line. The assertion propagates down the daisy chain to the device that wants the bus. That device then begins using the bus, and simultaneously it negates the request line and asserts the ACK line. When the arbiter notices that ACK is asserted, it negates the grant line and is again ready to undertake arbitration. Now when the request line is asserted by another device—while the first device is still using the bus, the arbiter asserts the grant line, and the assertion propagates to the device that requested it. Instead of grabbing the bus, however, it senses that the ACK line is asserted and waits. When the device using the bus finishes, it negates ACK, which the next device senses. It that device begins using the bus, negates its request line, asserts ACK, and the process continues.
 - d. Initially, when no one wants the bus, the grant line is propagated throughout the daisy chain. When device i wants the bus, if the busy line is high, it waits. If not, it simply negates its outgoing grant line, and asserts the busy line. It then begins using the bus. When it is done, it negates the busy line and again passes the grant line to the next device in the chain. At this point, the next device can take the bus.
3.
 - a. Starvation is when a device with lower priority than others is unable to output anything because the higher priority devices are being needed/used more often and whenever the lower priority device wants to be used.
 - b. All devices except device one can experience starvation. Device one could constantly be in use, so devices 2-5 would never be able to be used.
4.
 - a. Advantages
 - i. Increased Bus use
 - b. Disadvantages
 - i. Starvation