2. (20 points)
   Pick a specific internet-connected device other than a regular computer or a mobile phone. The more obscure the better, think smart-home, IoT, exercise/health devices, etc. Describe the device from the connectivity perspective.
   Now assume that after it was previously fully powered down, it is turned on. List protocols in all layers that could be utilized over the first few minutes after the device is turned on. State the layer in which they operate, and outline what they do in this case (finish a sentence that starts with "In this particular scenario, the protocol is used to …"
   a. The IoT device that I'll be talking about is the Nintendo DSi. The DSi was made in 2008, and is a cartridge-based, handheld gaming device. It was far ahead of it's time during its release, though in present day it is quite dated to say the least. The device has support for 802.11b, and g, common wireless security modes(WEP, WPA, WPA2), and another proprietary nintendo wireless communication method. In this particular scenario, the device first would already have a randomized MAC address baked into its hardware, and via its network adapter, it would converse with a router to generate an IPv4 address. The two layers utilized in this scenario are the physical and link layers. It also would interact with proprietary Nintendo game cartridges, which utilized flash memory or ROM to send and receive game data. Some cartridges had infrared compatibility(Playing with other Peer devices), which would also operate on the physical layer.
3. (10 points)
   Assume a network running a sliding window protocol with constant window size W = 125,000 bytes over a link with bit-rate R = 100 Mbps. What is the maximum round-trip time T that would still yield 100% utilization? Assume that the packet size is negligible when compared to the window size.
   a. R= 100,000,000bps
   b. W= 125,000b
   c. T= 2(W/R), where a trip one ways is W/R
   d. T= 2(0.00125)
   e. T= 0.0025
4. (10 points)
   Considering ALOHA or CSMA/CD-like protocols, what would happen if the requirement for back-off after a collision was removed from the protocol?
   a. If the backoff was removed, then hosts would seemingly spam packets, congesting the network which would lead to more collisions afterwards.

5. (10 points)
   In CSMA/CA, does the combination of RTS and CTS messages provide a complete protection against collisions? Explain your answer.
   a. Yes, due to the broadcast nature of 802.11, if a RTS is sent at the same time as another RTS, they will both back off for some time, and thus the collision would have been avoided. If a CTS collides with an RTS, then the destination of the CTS will broadcast a 'duplicate'(from the original RTS before the CTS) RTS once some time has passed, and the secondary RTS sender will as well. Two CTSs cannot collide as a host would be connected to one LAN or the other, not both. In all cases, packets get through. This would only be impeded if the nodes weren't generating random back-off times(Similar to CSMA/CD).