Assignment #1 solution Winter 2020 term

1. Mesh topology: 190 links
   Star topology: 20 links
   Bus topology: 20 drop lines
   Ring topology: 20 links

2. It could be simplex, half-duplex, or full-duplex.
   Simplex: After you start the video watching, the UoA website sends video to your computer, and you computer may not have data to the UoA website. In this sense, it is simplex.
   Duplex: If you have interactions with the UoA website (for example, you may pause, or you may skip a portion of the video), you also have data to the UoA website during your watching. If you use WiFi or Ethernet, then your connection with your router is half-duplex in a short term, and full-duplex in a long term. In this sense, your video watching is half-duplex in a short term and full-duplex in a long term.

   Your video watching is packet switching.

3. In circuit switching, resources are reserved along the path. So each message will be processed immediately at each node. Thus, there is no need to "store and forward."

   In packet switching, there is no resource reservation. When a message arrives at a router, the router may be busy handling other messages. Thus, the router needs a buffer to store its incoming message. The router will process messages in its buffer (for example, in a first-in first-out manner), and forward them to the next-hop node.

4. The backbone network uses a bus topology. Each wireless router forms a sub-network, in which a star topology is used.

5. a) transport layer

   b) network layer

   c) data link layer and transport layer

   d) physical layer

   e) presentation layer

   f) application layer

   g) session layer

   h) data link layer