**CSC 335 Data Communications and Network I**

**Homework 1**

1. (1 point) What are the components of a communications network?

The components of a communications network are the electronic communication devices (such as PCs, phones, tablets, etc.), network devices (such as hubs, routers, cross-connects, etc.), communication links (such as coaxial cables, twisted pair cables, wireless, etc.), and services (such as phone calls, video, web, software apps, etc.).

1. (1 point) Why is packet switching preferred over circuit switching in today’s communications networks?

Packet switching is preferred over circuit switching because you do not have to dedicate resources to create a connection between the two parties, it is better for interactive data traffic (and the “burst-iness” use of the internet), enables better utilization of the communication links, eliminates single points of failure in communication systems, and through its efficiency, it is much cheaper than circuit switching.

1. (1 point) Provide a high-level overview of the structure of a typical data packet. What kinds of information are you likely to find in the header of a typical packet?

A typical data packet has a header and a body. The header contains control information, such as the source and destination addresses, protocols for handling the packet, and other information, while the body contains the “payload,” which is that actual data meant to be transferred from the source to the destination.

1. (1 point) Name the five layers of the TCP/IP model and explain the main functions of each of the layers.

The five layers of the TCP/IP model are the application later, transport layer, network layer, data link layer, and physical layer. The application layer provides services to the application software running on a computer. The transport layer ensures a reliable data stream (end-to-end transmission). The network layer provides addressing and routing using IP addresses. The data link layer delivers data across some physical network, such as the ethernet (or wi-fi). The physical layer is for signaling the data across some medium (transmission over wires).

1. (2 points) Find the web pages of any two standards bodies for telecommunication networks. Provide their URLs. Find one standard of your choice from one of these sites and write a few sentences describing its characteristics.

International Telecommunication Union (ITU) - <https://www.itu.int/en/Pages/default.aspx>

Internet Engineering Task Force (IETF) - <https://www.ietf.org/>

RFC 20 from the IETF, created in October 1969, standardizes the ASCII format for network interchange. Included is a table of 128 characters used by humans to control the computer’s computations, and how they are represented in bits, thereby standardizing how each character should be referenced in bits across all machines. It continues on to describe each of the characters included in the table, and for the control characters: what they do.