Worksheet Class 1: Protocols and Layering

Discussion Question 1: Protocol Structure (~15 minutes)

Alice and Mila are Swatties starting out their semester and are roommates. Alice wants to give Mila a reminder to get milk.

1. **Structure of the message:**
    - Construct the message that Alice posts to Mila. (Example on class slides)
    - Other than the sender/receiver information, what other metadata about the message might you add?

2. **Organizing a drop-off point.**
    - Who chooses the drop-off point?

3. **Write a protocol to write a note /post—it to your housemate. A protocol defines the message format and the transfer procedure.**

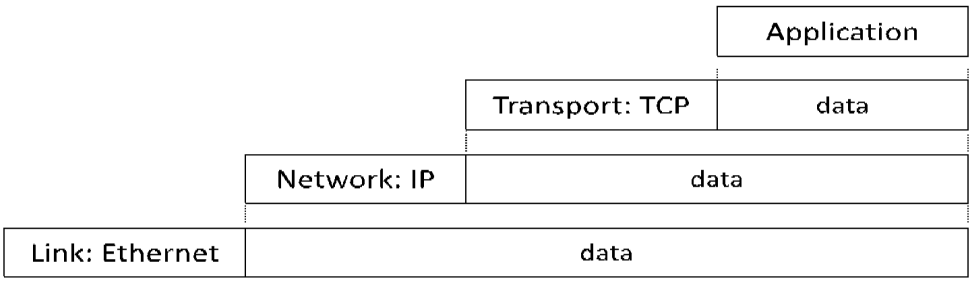
Alice moves to Chicago and Mila to Seattle for summer internships. Alice wants to send Mila a birthday card. Think of this as filling two different pieces of information (1. the birthday card, 2. the mailing envelope).

1. **Construct the message and header portions. Have these changed from the previous scenario?**

2. **List the message format and transfer procedure of the "mail sending protocol" that Alice uses.**
    a. **Who chooses the drop-off point?**
    b. **Is this the only protocol used by Alice to deliver mail to Mila?**

3. **Message transportation and delivery. Whose job is it to:**
    a. **choose the carrier?**
    b. **plan the route?**
    c. **deliver the message?**
    d. **ensure the message is not lost?**

Discussion Question 2: Message Encapsulation (~20 minutes)



The Internet has a layered architecture, in order to divide up the responsibilities of transmitting a packet from the source to the destination - similar to postal mail. The application layer is at the top of the hierarchy, and this is where the actual payload or data is constructed. Layering helps separate out the functions, and provides a nice abstraction to the layers above and below about the services it provides.

Message transportation and delivery: In our mail analogy, whose responsibility should it be to carry out the following tasks? Do each of these tasks represent different "services" at different layers?

1. Choice of carrier (USPS vs FedEx)
2. Route planning
3. Transport vehicles
4. Delivery acknowledgement

Networks have many concerns, such as reliability, error checking, and data ordering. Who/what should be responsible for addressing them? (Why?) Discuss which of these options you think is most suitable.

A. The network should take care of these for us.
B. The communicating hosts should handle these.
C. Some other entity should solve these problems.

Given the layered architecture above, discuss the following statement: layering and separation of functions is..

A. Great! It has a nice clean design and we can easily swap any protocol we want at any layer.
B. Not really... there are some glaring disadvantages to it.

Consider the figure shown below. Which layers do routers participate in? (Getting data from host to host.)

A. All of Them
B. Transport through Physical
C. Network, Link and Physical
D. Link and Physical