1 Network Protocols

Why does every protocol attach a header to the packet before forwarding it to the following layer?

Because each header contains the information needed by the corresponding protocol, in order the content of the packet to be processed properly.

2 Link Layer

If the computers of a local network are connected through wireless (WiFi), which layer is interested in this information in order to chose the right protocol? Which layers remain the same? Why?

The link layer is interested in this information as it should make, again, the nodes exchange frames through a different physical interconnection media.

Why we do not use only MAC addresses for the naming of the computers connected to the Internet?

Because the MAC addresses do not offer any additional information for the location of the computer and thus, they cannot be used for an efficient routing of the packets.

3 Network Layer

Where do we use the mask of a subnetwork?

At the routing tables and, especially, when the router tries to identify the subnetwork in which the destination belongs.

Does a router should have an entry for every subnetwork in the world in its routing table? More specifically, does a router in China should have an entry for the subnetwork of Cornell and another entry for the subnetwork of the department of Linguistics in Cornell? Why?

No, it suffices to contain the address of the subnetwork of Cornell, as this information is enough to route a packet that heads for the Linguistics department close to its destination.

4 Transport Layer

If you want to built an application for remote file transfer, which Transport layer protocol would you use (TCP or UDP)? Why?

TCP protocol, because provides the reliability that such a service requires.

If we use TCP, how does the source understand that a packet did not reach its destination? Which is a possible reason for such an event (packet loss)?

It understands the loss when it receives no acknowledgement for the packet, within the time period allotted. A possible reason could be a congestion in a router or switch.

5 Application Layer

What is one reason that two processes should establish an application protocol to exchange data, additionally to the transport layer?

To define the ordering of the operations that should be done and the format of the exchanged data.