Reading assignment 2

* 1. **Networks, Packets, and Protocols**
* A computer network consists of machines interconnected by communication channels. We call

these machines hosts and routers.

* A protocol is an agreement about the packets exchanged by communicating programs

and what they mean. A protocol tells how packets are structured—for example, where the

destination information is located in the packet and how big it is—as well as how the information is to be interpreted

* Implementing a useful network requires solving a large number of different problems.

To keep things manageable and modular, different protocols are designed to solve different

sets of problems. TCP/IP is one such collection of solutions, sometimes called a protocol suite.

* 1. **About Addresses**
* Internet addresses are binary numbers. They come in two flavours, corresponding to the

two versions of the Internet Protocol that have been standardized. The most common type is

version 4 (“IPv4,”); the other is version 6 (“IPv6,”)

* Technically, each Internet address refers to the connection between a host and an underlying communication channel—in other words, a network interface. A host may have several interfaces;
* The port number in TCP or UDP is always interpreted relative to an Internet address.

Returning to our earlier analogies, a port number corresponds to a room number at a given

street address, say, that of a large building.

* In each version of IP, certain special-purpose addresses are defined. One of these that

is worth knowing is the loopback address, which is always assigned to a special loopback

interface, a virtual device that simply echoes transmitted packets right back to the sender.

* Another group of IPv4 addresses reserved for a special purpose includes those reserved

for “private use.” This group includes all IPv4 addresses that start with 10 or 192.168, as well

as those whose first number is 172 and whose second number is between 16 and 31

* 1. **About Names**
* First, names are obviously easier for humans to remember than dotted-quads (or, in the case of IPv6, strings of hexadecimal digits). Second, names provide a level of indirection, which insulates users from IP address changes. During the writing of the first edition of this book, the address of the Web server www.mkp.com changed. Because we always refer to that Web server by name, and because the change was quickly reflected in the service that maps names to addresses.
  1. **Clients and Servers**
* The terms client and server are descriptive of the typical situation in which the server makes a particular capability—for example, a database service—available to any client that is able to communicate with it

Whether a program is acting as a client or server determines the general form of its

use of the sockets API to establish communication with its peer. (The client is the peer of

the server and vice versa.) Beyond that, the client-server distinction is important because

the client needs to know the server’s address and port initially, but not vice versa.

* 1. **What Is a Socket?**
* A socket is an abstraction through which an application may send and receive data, in much

the same way as an open file handle allows an application to read and write data to stable

storage. A socket allows an application to plug in to the network and communicate with other applications that are plugged in to the same network. Information written to the socket by an application on one machine can be read by an application on a different machine and vice versa.

* The main types of sockets in TCP/IP today are stream sockets and datagram sockets.

Stream sockets use TCP as the end-to-end protocol (with IP underneath) and thus provide

a reliable byte-stream service.