Name:

Student ID:

Chapter 1

Exercises 1.1 through 1.28 Find the word or phrase from the list below that best matches the description in the following questions. Use the numbers to the left of words in the answer. Each answer should be used only once.

1	abstraction	15	embedded system
2	assembler	16	instruction
3	bit	17	instruction set architecture
4	cache	18	local area network (LAN)
5	central processor unit (CPU)	19	memory
6	chip	20	operating system
7	compiler	21	semiconductor
8	computer family	22	server
9	control	23	supercomputer
10	datapath	24	transistor
11	desktop or personal computer	25	VLSI (very large scale integrated circuit)
12	Digital Video Disk (DVD)	26	wafer
13	defect	27	wide area network (WAN)
14	DRAM (dynamic random access memory)	28	yield

1.1 [2] Active part of the computer, following the instructions of the programs to the letter. It adds numbers, tests numbers, controls other components, and so on.

1.2 [2] Approach to the design of hardware or software. The system consists of hierarchical layers, with each lower layer hiding details from the level above.

1.3 [2] Binary digit.

1.4 [2] Collection of implementations of the same instruction set architecture. They are usually made by the same company and vary in price and performance.

1.5 [2] Component of the computer where all running programs and associated data reside.

1.6 [2] Component of the processor that performs arithmetic operations.

1.7 [2] Component of the processor that tells the datapath, memory, and I/O devices what to do according to the instructions of the program.

1.8 [2] Computer designed for use by an individual, usually incorporating a graphics display, keyboard, and mouse.

1.9 [2] Computer inside another device used for running one predetermined application or collection of software.

1.10 [2] Computer used for running larger programs for multiple users often simultaneously and typically accessed only by a network.

1.11 [2] Computer network that connects a group of computers by a common transmission cable or wireless link within a small geographic area (for example, within the same floor of a building).

1.12 [2] Computer networks that connect computers spanning great distances, the backbone of the Internet.

1.13 [2] High-performance machine, costing more than $1 million.

1.14 [2] Integrated circuit commonly used to construct main memory.

1.15 [2] Microscopic flaw in a wafer.

1.16 [2] Nickname for a die or integrated circuit.

1.17 [2] On/off switch controlled by electricity.

1.18 [2] Optical storage medium with a storage capacity of more than 4.7 GB. It was initially marketed for entertainment and later for computer users.

1.20 [2] Program that converts a symbolic version of an instruction into the binary version.

1.21 [2] Program that manages the resources of a computer for the benefit of the programs that run on that machine.

1.22 [2] Program that translates from a higher-level notation to assembly language.

1.23 [2]Technology in which single chip that contains hundreds of thousands to millions of transistors.

1.24 [2] Single software command to a processor.

1.25 [2] Small, fast memory that acts as a buffer for the main memory.

1.26 [2] Specific interface that the hardware provides the low-level software.

1.27 [2] Substance that does not conduct electricity well but is the foundation of integrated circuits.

Exercises 1.29 through 1.45 Using the categories in the list below, classify the following examples. Use the letters to the left of the words in the answer. Unlike the previous exercises, answers in this group may be used more than once.

a	applications software	f	personal computer
b	high-level programming language	g	semiconductor
c	input device	h	supercomputer
d	integrated circuit	i	systems software
e	output device		

1.29 [1] Assembler

1.30 [1] C++

1.31 [1] Liquid crystal display (LCD)

1.32 [1] Compiler

1.33 [1] Cray-1

1.34 [1] DRAM

1.35 [1] IBM PC

1.36 [1] Java

1.37 [1] Scanner

1.38 [1] Macintosh

1.39 [1] Microprocessor

1.40 [1] Microsoft Word

1.41 [1] Mouse

1.42 [1] Operating system

1.43 [1] Printer

1.44 [1] Silicon

1.45 [1] Spreadsheet

1.50 [15] <§1.3> End-to-end delay is an important performance metric for networks. It is the time between the point when the source starts to send data and the point when the data is completely delivered to the destination. Consider two hosts A and B, connected by a single link of rate R bps. Suppose the two hosts are separated by m meters, and suppose the propagation speed along the link is s m/sec. Host A is sending a file of size L bits to host B.

a. Obtain an expression for the end-to-end delay in terms of R, L, m, and s.

(Hint: first compute the end-to-end delay = propagation delay + transmission time)

b. Suppose there is a router between A and B, and the data from A must be forwarded to B by the router. If the forwarding process takes t sec, then what is the end-to-end delay?

c. Suppose the router is configured to provide QoS (Quality of Service) control for different kinds of data. If the data is a multimedia stream, such as video conference data, it will forward it at a shorter delay of $t/2$ sec. For other kinds of data, the delay is t sec. If host A is sending a multimedia stream of size $2L$, what is the end-to-end delay?