

Name: _____	ID No. _____
Date : _____	Section : _____

Answer Key to Problem Set 1

1. BASIC COMPUTER OPERATIONS

Computers perform a variety of operations on data. What are these operations? For each operation, give example(s) of the relevant hardware devices.

A computer is a programmable electronic device that accepts data and performs operations on that data. These operations include:

- **Input**—entering data into the computer. An example of input device is keyboard.
- **Processing**—performing operations on the data. An example of processing device is the CPU.
- **Output**—presenting the results. An example of output device is monitor.
- **Storage**—saving data, programs, or output for future use. An example of storage device is the Hard Disk Drive (HDD).

2. CATEGORIES OF COMPUTERS

There is a variety of computers that meet the range of computing needs today. List these types, give an example of each type of computer and state what that computer might be used for.

There exist five basic categories of computers. These are:

1. **Mobile devices** which are very small computing devices, usually based on a wireless phone or pager. Many mobile devices can be used to access e-mail and Web pages.

2. **Personal computers** (PCs also known as microcomputers) are based microprocessors which allow for the creation of computers small enough to fit on a desk or lap. PCs that are based on the original IBM PC are referred to as compatible-PCs; the latter typically run the Windows operating system (OS). However, other PCs can also run Macintosh manufactured by Apple. Portable PCs—designed to be carried around— **include** not only Notebook PCs and Tablet PCs (either slate or convertible) but also Handheld computers or pocket PCs.
3. **Midrange servers** (also known as Medium-sized computers or minicomputers) fall between microcomputers and mainframes in processing power and thus they are suitable choice for such organizations hospitals and university departments.
4. **Mainframe computers** (also known as high-end servers or enterprise-class servers) Mainframes specialize in high-volume processing of business transactions and thus they are standard choice for most large organizations such as enterprises.
5. **Supercomputers** are computers that are used for applications demanding extraordinary processing power. Using supercomputers offers very fast speeds and extreme degrees of accuracy. Today, supercomputers are commonly created by connecting hundreds or thousands of smaller computers that jointly form a supercomputing cluster.

3. GENERATIONS OF COMPUTERS

The evolution of computers is divided into generations, each characterized by a technological development. What are these generations and the relevant technological developments?

The history of computers is often referred to as generations, from pre-computers and early computers (before 1945) to fifth generation computers (now and the future). Each new generation is characterized by a major technological development. Most pre-computers and early computers were **mechanical machines** that worked with gears and levers. Electromechanical devices (using both electricity and gears and levers) were developed toward the end of this era.

— **First Generation (approximately 1946–1957)** was powered by vacuum tubes, these computers were faster than electromechanical machines, but they were large and bulky, generated excessive heat, and had to be physically wired and reset to run programs. Input was primarily on punch cards; output was on punch cards or paper. Machine and assembly languages were used to program these computers.

- **Second Generation (approximately 1958–1963)** used transistors instead of vacuum tubes. They allowed the computer to be physically smaller, more powerful, more reliable, and faster than before. Input was primarily on punch cards and magnetic tape; output was on punch cards and paper; and magnetic tape and disks were used for storage. High-level programming languages were used with these computers.
- **Third Generation (approximately 1964–1970)** evolved when integrated circuits (IC)—computer chips—began being used instead of conventional transistors. Computers became even smaller and more reliable. Keyboards and monitors were introduced for input and output; magnetic disks were used for storage. The emergence of the operating system meant that operators no longer had to manually reset relays and wiring.
- **Fourth generation of computers (approximately 1971–now)** began with large-scale integration (LSI), which resulted in chips that could contain thousands of transistors. Very large-scale integration (VLSI) resulted in the microprocessor and the resulting microcomputers. The keyboard and mouse are predominant input devices, though many other types of input devices are now available; monitors and printers provide output; storage is obtained with magnetic disks, optical discs, and memory chips.
- **Fifth generation of computers** has no precise classification as experts tend to disagree on defining it, and it is even believed that Fifth generation has not yet begun or it is in its infancy. However, it is generally viewed as allowing for artificial intelligence, voice-based input, and optical tiny devices utilizing nanotechnology.

4. COMPUTER BENEFITS AND RISKS

Write a short opinion (a half page) about benefits and risks brought about by the prevalence of computers in society.

Computers and devices based on related technology have become indispensable tools for modern life, making ordinary tasks easier and faster than ever before and helping make today's work more productive than ever before in every kind of activity.

However, there are many societal implications related to our heavy use of the computers and the Internet and the vast amount of information available through the Internet. Issues include health problems, unequal access, environmental concerns resulting from obsolete e-trash, ethical and privacy concerns as well as security risks in online communications. In particular, the anonymity factor, and the amount of unreliable information that can be found on the Internet.

5. MATCHING:

Select the statement that best matches the Key word and write the corresponding number in the in the blank cell at the right of each statement.

1	Computer	A bar that includes a set of options that can be displayed on the screen to enable the user to issue commands to the computer.	24
2	Computer network	A business or other organization that provides Internet access to others, typically for a fee.	21
3	Data	A collection of computers and other hardware devices that are connected together to share hardware, software, and data, as well as to communicate electronically with one another.	2
4	Hardware	A computer used in large organizations (such as hospitals, large businesses, and colleges) that need to manage large amounts of centralized data and run multiple programs simultaneously.	7
5	Information	A form of private chat set up to allow users to easily and quickly exchange real-time typed messages with the individuals they specify.	19
6	Internet	A graphically based interface that allows a user to communicate instructions to the computer easily.	18
7	Mainframe computer	A medium-sized computer used to host programs and data for a small network.	8
8	Midrange server	A numeric Internet address used to uniquely identify a computer on the Internet.	23
9	Output	A person whose primary job responsibility is to write, maintain, and test computer programs.	11
10	Processing	A programmable, electronic device that accepts data input, performs operations on that data, and presents and stores the results.	1
11	Programmer	A text-based Internet address used to uniquely identify a computer on the Internet.	16
12	Software	An Internet address consisting of a user name and computer domain name that uniquely identifies a person on the Internet.	17
13	Supercomputer	Data that has been processed into a meaningful form.	5
14	System software	Performing operations on data that has been input into a computer to convert that input to output.	10

15	Thin client	Programs, such as the operating system, that control the operation of a computer and its devices, as well as enable application software to run on the PC.	14
16	Domain name	Raw, unorganized facts.	3
17	E-mail address	Computers built from multiple less powerful computers and when jointly work become the fastest and most powerful type of computers.	13
18	Graphical user interface (GUI)	The instructions, also called computer programs that are used to tell a computer what it should do.	12
19	Instant messaging (IM)	The largest and most well-known computer network, linking millions of computers all over the world.	6
20	Internet address	The physical parts of a computer system, such as the keyboard, monitor, printer, and so forth.	4
21	Internet service provider (ISP)	The process of placing telephone calls over the Internet.	22
22	Internet telephony	The process of presenting the results of processing; can also refer to the results themselves.	9
23	IP address	What identifies a computer, person, or Web page on the Internet, such as an IP address, domain name, or e-mail address.	20
24	Menu Bar	A PC designed to access a network for processing and data storage, instead of performing those tasks locally. It is sometimes called network computer (NC).	15

BONUS QUESTIONS

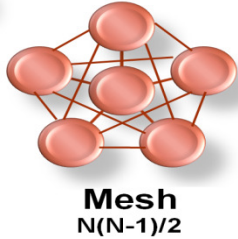
6. HISTORY TIMELINE OF COMPUTING

The history of Computing extends from the abacus to the quantum computer. Read the Computer History Timeline at the end of your book and answer the following questions:

1. When was the first version of Microsoft Windows, a graphical User Interface environment, released? **1984**
2. When was the first version of USB flash drives released? **2000**
3. When the World Wide Web (WWW) was invented? By whom? **1989**
4. Select any event in the timeline you consider most important. Briefly Comment why you consider it so. [**You may select any event, e.g. the World Wide Web (WWW)]**

7. NETWORKING

Suppose you were in end of the second half of the 1980s, and early 1990s when North American Continent (namely the USA) had the largest computer network in the world while other continents had such emerging computer networks. You were given the responsibility of linking the continents of the world into a single global network-- **the Internet**. How would you choose to design the network: ring, star or mesh design? Explain your preferred choice.



Answers may differ.

Mesh Design. In Complete Meshing every Node is connected to every other node (i.e. $N-1$ others) for a total of $N(N-1)/2$ links. This design can provide an alternative ways of routing the data traffic in case a cable is out of service due to any kind of problem.