

Solutions for Homework1 McKinney CE311K

1. Name the four generations of electronic computers and their respective years of inclusion.

1940 to 1950	First generation	Computers use vacuum tubes
1950 to 1964	Second generation	Computers use transistors
1964 to 1971	Third generation	Computers use integrated circuits
1971 to Present	Fourth generation	Computers use microprocessors

2. State the six elements of microcomputer system hardware and the purpose of each element. Give examples of each element.

- 1) The Central Processing Unit (CPU) is the “brain” of the computer.
- 2) A display device allows you to see information. A monitor is a display device.
- 3) The CPU receives information from input devices. A keyboard is an input device.
- 4) The CPU sends information to output devices. A common output device is a printer.
- 5) Computers store information in memory. RAM and ROM are the two types of computer memory.
- 6) Storage devices allow programs and data to be saved for easy retrieval at some other time. A hard disk drive is a storage device.

3. What are RAM and ROM? What are the differences between them?

ROM and RAM are the two types of computer memory. ROM is read-only memory; this is permanent memory where the computer’s instruction set resides. No instructions can be added or written to ROM. Furthermore, ROM is not erased when the computer is shut down; instead, it is permanently retained, or *hardwired*, in the computer. Thus, ROM is also known as *non-volatile memory*. RAM, on the other hand, is used as temporary memory or workspace by the computer’s software programs. Unlike ROM, RAM is *volatile memory* that is erased when the computer is shut down.

4. Define the following terms:

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|------------------|--------------------------------------|
| a) Bit | a binary digit; a 0 or 1 |
| b) Byte | a group of eight bits |
| c) Nibble | half of a byte; a group of four bits |
| d) Word | two bytes; a group of sixteen bits |
| e) kilobyte (KB) | 1,024 (2^{10}) bytes |
| f) megabyte (MB) | 1,048,576 (2^{20}) bytes |
| g) gigabyte (GB) | 1,073,741,824 (2^{30}) bytes |

5. What is the difference between a high-level language and a low-level language? Give examples of each.

High-level language – a computer language that uses English-like phrases as instructions
Low-level language – a language in which there is a direct (usually one-to-one) correspondence between its instructions and the related machine language instructions

BASIC, C, Fortran, and Pascal are high-level languages. Assembly language is a low-level language.

6. What is the difference between a compiler and an interpreter? Give example languages for each.

A compiler is a computer program that translates high-level source code into machine language and creates an executable file. An interpreter is a computer language that translates and executes the source code instruction-by-instruction.

C, Fortran, and Pascal are compilers. BASIC and Java are examples of interpreters.