

J1A4 The Processor

1. What is hardware? Give two examples.

Hardware is any physical component of a computer system (ex. Input Devices, Processor).

2. What component of a computer system is directly responsible for running a program?

The processor is responsible.

3. What is a machine instruction?

A machine instruction consists of several bytes in memory that tell the processor to perform one machine operation. The collection of machine instructions in main memory is called a machine language program or (more commonly) an executable program.

4. What is a machine language program?

It is a sequence of machine language instruction in the main memory.

5. What is a machine language program typically called?

It is called Assembly Language.

6. When machine language programs are running, where are they located?

In the processor.

7. Do question #4 at the bottom of

http://programmedlessons.org/java5/Notes/chap04/ch04_4.html and demonstrate your programs for your teacher.

8. When the processor runs a program, how many machine instructions are executed at a time?

The processor runs a program one machine instruction at a time.

9. What is a group of machine instructions that executes repeatedly called?

The collection of machine instructions in main memory is called a machine language program or (more commonly) an executable program.

10. How many machine instructions does a modern processor execute (run) in 1 second?

A modern processor executes billions of instructions per second.

11. Give a brief description of what the architecture of a computer processor is.

The architecture of a processor is the choices that have been made for its machine operations, how they have been organized and implemented, and how they interact with main memory and other components. Architecture is concerned with the general plan and functions of a processor; it is not much concerned with electronic details. A course in computer architecture is part of most computer science departments.

12. Why do most programmers use a high level programming language?

It is rare for programmers to write programs in machine language like we did for the light bulb. The executable files (the directly runnable machine language programs) for most applications contain hundreds of thousands (or even millions) of machine language instructions. It would be very hard to create something like that from scratch. Most programs are created using a high level programming language such as Java, C, C++, or BASIC. With a high level language, a programmer creates a program using powerful, "big" operations which will later be converted into many little machine operations.

13. What is a source program?

A source program is a text file that contains instructions written in a high level language. It can not be executed (made to run) by a processor without some additional steps. A source program is also called a source file, source code, or sometimes, just source.

14. What needs to be done in order for the processor to execute (run) the instructions that have been written into a source program?

Usually, a source program is translated into a machine language program. An application program called a translator takes a source program as input and produces a machine language program as output. A machine language program is also called an executable program, executable file, or sometimes, just executable. For example, the C program addup.c could be translated into an executable program. The executable program might be called addup.exe and can be saved on the hard disk. Now the executable version of the program can be copied into main memory and executed.

15. What does a (source code) interpreter do?

An interpreter reads through a source program written in a high level language and performs the actions that the source program asks for.

16. What is a virtual processor?

It is a physical central processing unit (CPU) that is assigned to a virtual machine.