

## Stages of compilation

Every time that a code is finished, an action called *compilation* needs to be done in order to make sure that the code will work, and it doesn't have any type of mistakes. This action includes 4 steps in general, which are the following:

### 1- Preprocessing:

In this stage, the preprocessor follows the directives, which are the commands that begin with #, this is done by removing comments, expanding macros, and expanding included files. The header from these included files will be copied into the source code file. And with the symbolic constants defined using #, the preprocessor replaces them with their values.

### 2- Compiling:

With the output generated from the previous step, assembly language is generated, which is an intermediate human readable language, specific to the target processor.

### 3- Assembly:

The only thing that happens in this step is that the assembler converts the assembly code into pure binary code (0 and 1). This could be also called object code.

### 4- Linking:

In this final stage the linker merges the object code from several modules into one. In static linking the linker makes a copy of all used library functions to the file, and in dynamic linking, the code is not copied, but it is done by placing the name of the file in the binary file.

## Levels of programming

There are two types of programming levels:

### 1. Low-Level programming:

The languages that are immerse here use looping constructs, procedures, functions, etc; they work line by line. And they are a big improvement over assembly language.

Examples can be BASIC, maybe C, Fortran, etc.

### 2. High-Level Programming:

These are languages that can perform several tasks at the same time, they don't need to work line by line, this meaning that all actions could be performed at the same time without the action is done. It is easier to debug and most social webs use this.

Some examples can be JAVA or Python.

**References:**

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