3 Reading

Read the text and find answers to these questions.

1 Do computers understand human languages?
2 What are the differences between low-level and high-level languages?
3 What is an assembler?
4 What is the function of compilers?
5 What do you understand by the terms **source program** and **object program**?
6 In the future, could computers be programmed in Spanish, French or Japanese?

Programming languages

Unfortunately, computers cannot understand ordinary spoken English or any other natural language. The only language they can understand directly is called **machine code**. This consists of the 1s and 0s (binary codes) that are processed by the CPU.

However, machine code as a means of communication is very difficult to write. For this reason, we use symbolic languages that are easier to understand. Then, by using a special program, these languages can be translated into machine code. For example, the so-called **assembly languages** use abbreviations such as ADD, SUB, MPY to represent instructions. These mnemonic codes are like labels easily associated with the items to which they refer.

Basic languages, where the program is similar to the machine code version, are known as **low-level languages**. In these languages, each instruction is equivalent to a single machine code instruction, and the program is converted into machine code by a special program called an **assembler**. These languages are still quite complex and restricted to particular machines.

To make the programs easier to write and to overcome the problem of intercommunication between different types of machines, higher-level languages were designed such as BASIC, COBOL, FORTRAN or Pascal. These are all problem-oriented rather than machine-oriented. Programs written in one of these languages (known as **source programs**) are converted into a lower-level language by means of a **compiler** (generating the **object program**). On compilation, each statement in a **high-level language** is generally translated into many machine code instructions.

People communicate instructions to the computer in symbolic languages and the easier this communication can be made, the wider the application of computers will be. Scientists are already working on Artificial Intelligence and the next generation of computers may be able to understand human languages.