High-Level Languages


John Backus

Machine and assembly language are **low-level languages**, tied to a specific CPU's instruction set. In the mid-1950s, **John Backus** lead a team at IBM which developed the first high-level programming **language.** FORTRAN (or the **FOR**mula **TRAN**slator), allowed scientists and engineers to write their own programs.

COBOL (the **CO**mmon **B**usiness **O**riented **L**anguage), allowed accountants and bankers to write programs using a vocabulary with which they were comfortable. In 1958, **John McCarthy** at MIT built a third high-level language named LISP (the **LIS**t **P**rocessing Language) to help him with his research into artificial intelligence.

These three high-level languages allowed non-computer specialists to write their own programs, but they were not **general-purpose** languages; scientists could not use COBOL to write code for NASA, and accountants could not use FORTRAN.

In 1960, the designers of FORTRAN, COBOL and LISP gathered together in Paris to remedy that, producing the **Algo**rithmic**L**anguage (ALGOL). Modern languages derive much of their syntax and many core concepts from ALGOL.

This photo, taken at the 1974 ACM Conference on the History of Programming Languages, shows six of the original participants who attended the 1960 Algol Conference in Paris. Top row: John McCarthy (LISP), Fritz Bauer, Joe Wegstein (COBOL). Bottom row: John Backus (FORTRAN), Peter Naur, Alan Perlis.

Many new languages followed rapidly in the next seven decades. Here are two:

- BASIC, the Beginner's All-purpose Symbolic Instruction Code, was developed at Dartmouth University in 1964. The professors **Kemeny** and **Kurtz** wanted to teach programming to university students using the new, interactive, time-share computers. BASIC was later the first language available on micro-computers, implemented by Bill Gates for the Altair. Even later, in the 1990s, Microsoft introduced **Visual Basic**, a graphical version, popular in the business world.
- In 1972, the Swiss computer scientist Nicholas Wirth felt that BASIC was teaching students bad programming habits, so he created the popular teaching language Pascal, (named after the philosopher, Blaise Pascal). Strongly influenced by Algol, Pascal enforced structured programming techniques. It was the first programming language taught in most university computing programs until about 2000. Wirth later designed Modula, Oberon, and Ada, a language still in wide use in avionics and in defense.