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The Programming Language Ada

Ada is a powerful high-level programming language that focuses on the development of reliable software.

Ada was created in 1979-1980 for the Ministry Defense USA. The aim was to reduce the number of different languages used in the Ministry for different purposes (for 1983 - over 450) by developing a common language that satisfies the requirements of the Ministry. For this was established working group HOLWG, which is primarily made up a set of requirements for the high-level language development for embedded systems. These requirements have focused on reliability, maintainability and efficiency. Among other things, they were exception handling, error checking during execution and the possibility of parallel computing.

After formulating language requirements were analyzed existing languages, which showed that none of them is met adequately. A competition was held to develop a new language, which won by Jean Ishbia of CII Honeywell Bull. Language features are:

- strong typing. There are no untyped objects in the language, and data conversions have to be explicit.
- modularity mechanism includes three types of program units: tasks (units of concurrent execution), packages (modularity units, used, for example, for implementing abstract data types) and procedures.
- a rich set of tools for error checks and exception handling, both at compile-time and at run-time. The language focuses on detecting as many errors as possible at compile-time. Compiler error messages are made to provide as much information as possible.
- dynamic memory management has no generic pointers, but rather explicitly declared access types. The language semantics allow to do automatic garbage collection, but most implementation don't have this feature.
- one of the key requirements was readability of the code, even though it hurt ease of coding. As a result, the syntax is a bit overweight: keywords and operators (except for math) use English words without abbreviations.
- support for generic programming, which was not included in the Steelman requirements.
- support for concurrent programming, based on rendezvous mechanism.

Nowadays there exist hundreds of Ada implementations for virtually every operating system, plus compilers to Java and .NET bytecode. It is still widely used in USA and Europe when developing large-scale mission-critical applications (which are not limited to army purposes).