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ADA PROGRAMMING LANGUAGE: OUTLINE AND FEATURES

If we ask IT specialists anything about Ada programming language, the majority will not give us a direct answer. Only a few will say that it is a dead language, once invented by the Pentagon. In fact, Ada is widely used in various fields nowadays. One of the vivid examples can be found on the fourteenth line of the Paris Underground where you can see a train without a driver's cab. The train movement on this line is fully managed by Ada program.

Ada programming language was designed by a team led by Jean Ichbiah of CII Honeywell Bull during 1977-1983 under contract to the Department of Defense. The official birthday of Ada programming language can was established on February 17, 1983 – the date when the standard ANSI/MIL-STD-1815-A-1983 was approved. The 1815 number was assigned because it was birthday of the namesake of the language Augusta Ada Lovelace. Following the 1815 is the initial "A" indicating that this is the first standard to be established for Ada programming language [1, p.505]

The language addresses many of the same tasks as C but with one of the best type-safety systems available in a statically typed programming language. Both languages approach the reliability vs. efficiency tradeoff from different angles, but each has a place in embedded-systems programming.

C offers a variety of data types and data-structuring facilities (arrays, structs, pointers, unions, enums) with straightforward and efficient implementation, conventional algorithmic features. The language is very much a WYSISWYG ("What You See Is What You Get") language. When you write a C program, you have a good idea of what the resulting compiled code and data will look like. Thus, C becomes a typical choice for low-level software that needs to interact directly with the hardware.

Ada is a strongly typed extensible language, with facilities to define new types in various categories: integers, floating point, fixed point, enumeration, arrays, records (structs), and access types (pointers). Ada's emphasis has always been on the reliability, readability and maintainability, and its benefits show up most clearly when these requirements are critical (for example in a large, long-lived system where total software lifecycle costs need to be taken into account). [2].

Comparing these two languages specialists [3] define:

1. the development of programs in Ada is 60% cheaper than similar software projects realized in C;
2. programs in Ada have less defects than programs in C;
3. the complexity of learning the Ada programming language is no higher than the complexity of learning C;
4. programs in Ada are more reliable than the programs in C.

Being developed in the '80s following an idea of the Department of Defense Ada programming language was updated every approximately ten years giving rise to several releases Ada 83, Ada 95, Ada 2005 and Ada 2012.While no longer mandated for use in work for the Department of Defense, Ada remains an effective language for engineering large programs. Today, many industries use Ada, which is defined by an international programming standards called the language reference manual (LRM).

Choosing a language for a software project was previously a purely technical issue. Nowadays it has become a matter of strategic importance, with far-reaching implications for the success of the project. Thus, using Ada organizations save on development costs because it does not require extended testing, upgrades and quality assurance checks. Instead, it was designed with embedded checks so that users can quickly and effectively detect errors that would be caught during the debugging process with C-based languages. Ada programing language is inter-operable with many other languages. Ada-based programs are ideal for companies because it is easy and inexpensive to train programmers.

The main benefits of Ada programming language:

1. Helps you design safe and reliable code
2. Reduces development costs
3. Supports new and changing technologies
4. Facilitates development of complex programs
5. Helps make code readable and portable
6. Reduces certification costs for safety-critical software

Ada is a highly advanced programming language that is designed according to the fundamental software engineering principles of efficiency, reliability, portability and maintainability. It provides everything from information hiding to abstract data types to concurrent-oriented programming functionality. Almost all professional Ada programmers follow a controlled validation process that eliminates poor practices and vulnerabilities that were possible through old languages like C. Ada programming language is a highly flexible and structured object-oriented computer programming language.

Today, software written in Ada forms the backbone of not only military hardware, but also commercial projects like avionics and air-traffic control systems. Ada code controls rockets, many satellites, and other systems where small glitches can have major consequences.

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