Jean E. Sammet

PROGRAMMING LANGUAGES: HISTORY AND FUNDAMENTALS

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Inasmuch as we know up to the present, the monograph devoted to programming languages, written by Jean E. Sammet, is the most thorough work developed in the field of algorithmic languages. It is a most useful synthesis for the users of programming languages, as well as for those who deal with the development of programming systems and with the design of new languages and compiling programs.

In the following paragraphs we shall very shortly acquaint the reader with the subject matter of this monograph, as divided in a sequence of chapters. The accompanying notes are but mere illustrations recorded in order to supply the reader with a clearer picture of the concepts and problems tackled in this book.

I. *General Introduction*

— a definition of the programming languages (data terminology, the distinction between programming languages and package applications);

— a classification of the programming languages and the suggested definitions.

II. *Functional Features of Programming Languages*

— types of programming languages and methods used for their definition (syntax, mathematics and pragmatic, formal notation, types of documentation);

— assessment of algorithmic languages based on the experience gained during their application in actual practice.

III. *Technical Features of Programming Languages*

— basic notations, structure of a program, types of operating data;

— structure of algorithmic languages and interaction with the compiling program and with the operating system;

— algorithmic language design in view of efficient implementations.

IV. *Languages Used in Scientific Digital Problems*

— FORTRAN, ALGOL (including ALGOL 68), SIMULA;

— on-line algorithmic languages of the JOSS, QUIKTRAN or BASIC types.

V. *Languages Used For Economic Data Processing in the Business Area*

— COBOL and FACT.

VI. *Languages Used in Processing the Series and Listings*

— LIST, CONIT and SNOBOL.

VII. *Languages Used in Handling the Algebraic Formulas*

— FORMAC, MATHLAB and ALTRAN.

VIII. *Languages Designed For Several Purposes*

— PL/I.

IX. *Special Languages*

— programming languages designed for the following applications: control of machine-tools; civil engineering; logical design; compilers' writing; discrete simulation; graphical information processing; computerized design; text processing and editing operating systems' writing.

X. *Unachieved Significant Concepts*

— UNCOL;

— Informational algebra;

— APL (K. Ivason);

— Physical performance of programming languages by means of equipment.

XI. *Future Long-Term Developments*

— theoretical concepts;

— practical concepts.

A. *Arrangement of References according to the List of Authors*

B. *Summary of Languages*

Index of Names and Systems

Subject Index

This monograph is written at a high scientific level. It is not intended to be a handbook explaining the use of any of the algorithmic languages described. It is assumed instead that the reader has attended programming training courses and that he has gained a certain amount of experience in this field.

In my opinion, it is worth noting that this book fully succeeds in being (1) a reference source for whatever synthetic concern regarding the automatic programming languages and, at the same time, (2) the most complete development, for the present stage at least, of the knowledge and concepts we have gathered up to now regarding the unitary theory of algorithmic languages. As to the first point mentioned above, it is interesting to note that the monograph reviews nearly 120 programming languages, out of which about fifteen have a broad range of application and rouse continuous interest on the part of technical people. With regard to the second point, we may mention that this monograph supplies basic material for the following types of training courses: algorithmic languages; data structures; the building up of compilers; formal languages and syntactic analysis; heuristic programming. Furthermore, Chapter III is noteworthy for its presentation of the overall background for the various languages, as wel as Chapter X, specifying the problems which are still open to debate.

The author states: "...it is my strong opinion that this purpose" (i. e. the development of a strictly universal algorithmic language), "not only cannot be achieved in the predictable future, but also that this is not something desirable..." I believe we have nothing to worry about here, since some of the existing programming languages — and PL/I is a good example — satisfactorily meet the demands in this respect. By creating generally applicable and speedy compilation techniques and by searching for efficient implementation methods we will solve more pressing problems than by devising new programming languages.

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