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—ALGOL N—

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PREFACE

A draft report on ALGOL 68, a successor to the famous algorithmic language ALGOL 60, was published as "MR 93" of Mathematisch Zentrum, Amsterdam, and also as Supplement to ALGOL Bulletin 26; we knew that its revision was under discussion in the Working Group 2.1 of the International Federation for Information Processing. After investigation of MR 93, we concluded that we should ask the members of the Working Group 2.1 to reconsider the principle of design and the method of description, and that we should exemplify the possibility of improvement by presenting a newly designed language, namely ALGOL N.

The present document (except Preface) was prepared for this purpose, and was brought to the meeting of Working Group 2.1 at München, December 1968, by N. Yoneda, member of the Working Group. When the design of the main part was worked out, there remained few days to write it down before N. Yoneda's departure, and we were obliged to yield an incomplete document containing many errors, most of which are corrected in this copy. We are now preparing a complete and revised report on ALGOL N.

ALGOL N[†]

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Introduction

The authors of MR93 contributed remarkably to the development of WG2.1 project on prospected ALGOL, realizing in a unified system a huge amount of diverse demands on its power of expression. That document, however, is far from being readable because of the too much complicated mechanism of the language and its description. Simplification should be made without essentially spoilling the power and applicability of the language.

We, members of a working group in Nippon (Japan), present here a design of simplified language, tentatively named ALGOL N, with a simplified method of description. It is designed to be an algorithmic language, not distorted by compiler oriented contrivances, though the efficiency of compilation is not totally neglected. We hope that we have achieved some improvement, particularly in the following points at least.

Plainness of syntax description :
Though we recognize the theoretical importance of the method used for the description of syntax in MR93, we find it preferable, from a practical point of view, to use another method due to T. Simauti, previously reported to the WG2.1 and WG2.2 meetings, summer 1968, which reproduces the ALGOL 60 style of description, modified and enriched by a few conventions ; two of the new conventions, continued dots for 'and so on' and metalinguistic parentheses, are borrowed from usage in mathematics which are familiar to many people. It enables us to describe our syntax very plainly without non-essential construction of intermediate notions.

Compactness of syntax description :

The syntax of ALGOL N is designed to meet the requirement that it should be learned very quickly by a beginner and become the firm foundation of further understanding. It is extremely simple and compact ; it needs even less space than ALGOL 60 syntax. This is achieved by dealing only with the broad framework and the subjects of general character. Details such as coincidence of type are treated separately, soon after the main syntax. Many particular subjects such as assignment statement, conditional expression, etc. are to be found among standard declarations, not in the description of syntax. Such separation of particular subjects serves a great deal to simplify the whole structure of language.

Rigor of semantics :

Simplification of syntax causes simplification of semantics which, together with some conceptual rearrangement such as strict separation of notation and value, facilitate a uniform and rigorous description of semantics for various syntactic elements. A reader can easily follow the rigorous construction of elaboration and can find, if acquainted with MR93, how the bewildering concept of scope is made unnecessary in ALGOL N.

Types above modes :

It is observed that the single leveled specification by modes has caused a lot of inconvenience and immaterial complexity. We distinguish it into two levels, namely the classification of values by 'types', e.g. real , and the specification by 'modes' (in the new sense), e.g. integer . A mode is, so to say, contained in just one type, and there is given a 'rounding' or 'projection' map from (the set of values of) the type to (that of) the mode,

such as the usual rounding of real number to integer. Types are subject to syntactic analysis, but modes are not. Thus a 'procedure' is concerned with parameters belonging to fixed types, not to fixed modes ; its action, however, may deal with the mode of some parameter, as is the case of assigument, where the source value is rounded to the mode of the destination.

Simplified system of types :

Corresponding to the system of composite modes in MR93, we have a much simpler system of composite types. The essential simplicity is that there is no united type and no composite type of reference style. All references are of the same type, independent of what is referred to. This prevents any possibility of looped type. Inconvenience caused by the lack of united types is more than compensated by 'form' declarations, which is a generalizatio and modification of operation declaration.

Coercion eliminated :

Coercions are not considered in the principal part of ALGOL N, since they are partly dissolved in projections and the most popular coercions will spoil the simplicity of the general framework if they are taken in. They are treated as a matter of declarations, and so a matter of adaptation which a programmer may choose. Some are found in standard declarations, but the invocation can be prevented or modified.

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