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A Code of Good Practices for the Documentation of Digital Computer Programs

Approved December 5, 1967
AMERICAN NUCLEAR SOCIETY
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Prepared by Subcommittee 10
American Nuclear Society Standards Committee
Approved by the Board of Directors
December 5, 1967

FOREWORD

(This Foreword is not a part of the standard.)

The Mathematics and Computation Division of the American Nuclear Society has organized a standing committee charged with making recommendations to the Division's Executive Committee concerning areas and means of cooperative activity among the Division members. Since the Division members are primarily concerned with the preparation and use of large-scale computer programs and systems in nuclear science and engineering applications, the major item considered by this committee is program exchange.

We look upon standardization effort as a two-edge sword. While it has great potential for cutting through costly duplication, it has equal potential for cutting off further development. This dilemma is particularly acute in the area of computing. On the one hand, standardization could reduce the tremendous expenditures of money and manpower required for the creation of computer programs by increasing the utility of each of them. On the other hand, experimentation with many different languages and systems must be permitted and encouraged if we are to close the gap between hardware development and our ability to use it effectively.

The establishment of the USA Standard FORTRAN IV has been an important development. Manufacturers may now theoretically be required to produce compilers compatible with the standard, and users and installations may then be encouraged to program in this standard language for the associated benefits of program-exchange and transfer. But, in fact, we find that users who would like to obtain these benefits cannot realize them in practice with the present level of implementation by manufacturers. In addition, we do not recommend that FORTRAN IV be adapted as a nuclear programming standard. Reactor problems have requirements far exceeding the capabilities of present languages, and further language development is of the utmost importance.

Documentation, however, is one area in which recommendations for minimum standards should be made. In the past, documentation has been directed primarily to the person who prepares input for the program. This type of documentation does permit the program to be used effectively at the originating installation but is generally not sufficient if the program is to be used by others. It is feasible, however, for documentation to be of material help to a programmer in another installation who is incorporating the program into a new operational environment. To this end the quantity of documentation must be increased over that normally supplied. It should certainly include not only the report directed toward the user but also source language comments and installation reports.

The principal criterion determining the extent and the nature of the documentation is the requirement that the technical level and style in which the documentation is written be directed toward someone skilled in the art of writing and using reactor programs. It should **not** be the intent of documentation standards that such exhaustive amounts of detailed material be required that **any** programmer be able to convert the program successfully to any machine. It should not, furthermore, be the intent that the individual providing the documentation be asked to guess the possible environments into which the program may be introduced. Requiring huge quantities of material or omniscience will so burden the original programmer as to deter him from providing any documentation at all. By trying to get too much, nothing will be obtained.

It should also be recognized that not all programs should be considered candidates for exchange and/or transfer and thus all need not be documented in this manner. Many small programs are easier to rewrite than to transfer. Many others are so specific to the job at hand, so transitory in usefulness, and contain so many inherent assumptions that their potential value to others is almost nil. Finally, many programs are never really completed; whole sections may have been included in the original plan but never used and therefore never debugged. Other portions may well have been merely experimental in nature, to be included in other programs if successfully implemented. Standardization that would require such programs to be documented for transfer could well deter program development.

This code of good practices for the documentation of digital computer programs was prepared by the STICE Committee of the Mathematics and Computation Division. This committee had the following membership at the time this standard was prepared:

M. Butler, Chairman, Argonne National Laboratory
R. Blaine, Atomics International
W. Cadwell, Bettis Atomic Power Laboratory
J. Gratteau, General Atomic
K. Hansen, Massachusetts Institute of Technology
H. Honeck, Atomic Energy Commission
B. Maskewitz, Oak Ridge National Laboratory
J. Olhoeft, Westinghouse Atomic Power Department
W. H. Turner, Knolls Atomic Power Laboratory

In addition, W. J. Worlton, Los Alamos Scientific Laboratory, and D. Bingaman, Argonne National Laboratory, participated in this activity.

Comments should be addressed to:

O. J. Du Temple
Executive Secretary
American Nuclear Society
244 E. Ogden Avenue
Hinsdale, Illinois 60521

with a copy to:

R. G. Chalker
Atomics International
P. O. Box 309
Canoga Park, California 91305