

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DEPARTMENT OF AERONAUTICS AND ASTRONAUTICS
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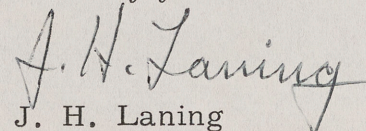
Professor Donald E. Knuth
Department of Mathematics
California Institute of Technology
Pasadena, California

Dear Professor Knuth:

In belated reply to your letter of December 3, I am enclosing a copy of Engineering Memo- E-364 which you may retain. This work has received relatively little attention because it was never put to very significant use in practice. Its initial development was done on a 1024-word machine, and although the version reported in E-364 utilized 2048 words and drum, earlier compromises because of core limitations caused it to be quite slow. Since this was in the days when machine time was king, and people-time was worthless (particularly since I was not even on the Whirlwind staff, but a mere customer) its use was frowned on. It did perhaps pay for itself a few times when a complex problem required solution with a twenty four hour deadline. A more elaborate version was dropped in mid-stream when we got our own computer. With regard to dates, my notes seem to show the initial 1K version of this program to have been completed in March 1953.

You might be interested in passing to know of another organization which has not followed the party line with FORTRAN, ALGOL, etc.. Our algebraic compiler known as MAC (not to be confused with MIT's Project MAC, although it often is), went on the air with our IBM 650 in 1958 and has been with us ever since. As we grew, we passed through a phase in which the 650 produced production tapes for running on a 704, then graduated to our own Honeywell H800 three years ago and to the H1800 more recently. MAC is distinguished in the first place by a three-line format in which exponents and subscripts appear in their proper places, rather than on a single line. Since we run an open shop, with the engineers doing their own keypunching, we might have expected trouble from this source. Instead we have had nothing but enthusiastic support from those who have had first hand experience with both MAC and FORTRAN. The second major point of difference is that MAC identifies its variables by examining the left hand sides of its equations, together with lists in its various input statements, and therefore does not require any delineating to separate variables on the right hand sides. Since much of our work is concerned with simulation of various kinematic problems in guidance, we have a few other attractive features such as a simple vector and matrix notation. A vector is denoted by putting a bar over the symbol, and all ordinary algebraic operations including dot and cross products are permitted. Matrices are denoted by an asterisk over the symbol, and products of matrices with vectors or with each other are indicated by writing the symbols consecutively as in ordinary mathematics. Throughout, our effort has been to attempt to make the language as simple and natural to use as possible, with a minimum number of groundrules and restrictions to be remembered by the beginning programmer.

Sincerely yours,


J. H. Laning

JHL/alr