Writing the "Best" Program: The How and When of Efficient Programming

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It's relatively easy to write programs that optimize the use of CPU and other machine resources. There is a large and continually growing body of literature on the subject. What isn't as straightforward is knowing **when** to employ the techniques - blind implementation of tuning techniques is often not required by the task at hand and can sometimes even be counterproductive.

This paper addresses both the "how to" and "when to" aspects of writing efficient programs. It describes design and coding techniques that conserve hardware resource usage. It also identifies other, non-machine implications of their usage that could dissuade the programmer from their use. For example, using temporary array elements is more efficient than using named elements but has the documented-but-obscure behavior of retaining values across observations. Maintenance of such code by other than "seasoned" and up to date programmers can be unexpectedly problematic.

The concept of efficiency used in the paper includes all aspects of the program life cycle. We apply the "how and when" question to system design issues, system startup, DATA steps, procedures, and macros. Emphasis is on Base SAS software in all supported SAS environments. The reader should finish the paper comfortable with the idea that the "best" program is not always the one that minimizes hardware resources.

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