On the Choice of VBA

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Introduction

Choosing a suitable computer language to teach undergraduate chemical engineering students has been the topic of debate for some time. Generally the debate has been embedded in the more general issue of how much computer training is needed to prepare the undergraduate student for work in industry or graduate school.

Edgar (1) indicated five abilities that the B.S. Ch.E. graduates should have. He notes that programming language expertise is not included in his list and discusses a number of numerically oriented programs that are available for equation solving, optimization, process simulation and other mathematical capabilities. He suggests programs such as Matlab, Mathematica and Maple are suitable alternatives for numerical analysis as a required course.

In support of the idea that programming training is not needed,
Davis et. el. (2) indicated that most engineers in industry feel that such
training is not expected.

There is a downside to the above, however. In the research environment of graduate school a programming proficiency is often critical to the research. When a programming skill is needed in the corporate workplace, industry will often argue that the skill can be hired outside via a consultant. Though this may be the case, once the job is done by a consultant there is no one available to understand, maintain and extend the work. The outside consultant's work then is wasted. In addition, the consultant is often not really familiar with the application as is the full time staff member. It is the author's observation that having a programming skill within a company is a real advantage both to the employee and the company.

There is also a downside to the teaching of a number of different tools to the student as he/she passes through various courses. The student rarely has time to learn any of the programs very well. Few tools can be learned without continual use. As a result the tool loses its potential effectiveness.

There is, in addition, a downside to teaching a student to program in FORTRAN, C , C++ or Visual Basic so as to enable the student to address a variety of problems. Each of the languages takes a long time to learn and takes a considerable effort to apply to a particular problem.

The VBA Choice

Building on the use of the Excel spreadsheet program (3) is an attractive alternative. Excel has emerged as a general standard spreadsheet program and is the one program that the student has learned and applies on a regular basis. What can be taught is Excel's macro language Visual Basic for Applications (VBA).

There are already a large number of available spreadsheet programs that can be used throughout the curriculum. The VBA language itself is procedural and object oriented. It provides a means of calling routines in other languages (FORTRAN, C, Matlab, Mathcad).

A possible scenario would be to offer a two-hour credit course in the freshman level that introduces the use of spreadsheets, the VBA language and numerical methods. The student could use the capabilities of Excel with VBA to meet essentially his entire undergraduate computing needs (4,5). Use of a process simulator (e. g. Aspen Plus, HYSYS) may be useful as a supplement.

A long recognized advantage of the spreadsheet is that it enables the student to thoroughly understand an algorithm or a computational procedure. From a teaching point of view this is much better than using a series of black boxes.

Spreadsheets are widely used in industry. The author has used the VBA language in a range of research and development projects. Industrial personnel respond well to the use of spreadsheets.

VBA comes with applications other than Excel. It is the same language used in all of Microsoft's Office Application in addition to programs such as AUTOCAD and Microsoft's Project. Once VBA is learned in one application it can be used in others.

There are currently no college textbooks that point to the use of VBA in homework problems. The appearance of such textbooks would be of considerable benefit. Use of other books (6, 7, 8, 9), however, can be made. The Internet has a large number of VBA oriented sites.

References

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