Teaching Object-Oriented Programming Using the Macintosh MPW/MacApp Environment

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Abstract

Experience with object-oriented systems can be provided using the powerful Macintosh™ environment. Adding to and modifying the MacApp™ application framework using ObjectPascal provides a learning-by-example solution to the difficulty of teaching Object Oriented Programming and Design.

Advanced training and funding for high-end hardware, additional tools and better documentation are the prime requisites. The Mac tools need to be more efficient, user-friendly and well-documented before they can be used widely by software engineering students. These difficulties will likely be overcome, making the Macintosh environment a useful classroom tool to prepare students to meet the demands of future software technology.
Introduction

Experience in using and developing large, object-oriented, graphical interface systems is needed to prepare students to meet the challenge of modern software technology. Object-oriented programming's popularity is based on its encouragement of reusability and the building of large systems from component parts, but it is difficult to teach [O'Shea87]. Well done graphical interfaces provide friendly, easy-to-use products conducive to the object-oriented approach, but are complex and normally difficult to develop [Cox86]. Software engineering students need practice in these modern programming practices, but how do we pack it all into an already busy course?

In previous semesters, students at The University of Texas have developed, enhanced, (re)used and evaluated software tools as projects in the undergraduate software engineering course [Werth89]. Last year, for example, students used the TeamWork™ CASE tool in the design of products which, in turn, enhanced TeamWork’s capabilities. These projects, written in C in a UNIX® environment on the Hewlett Packard 9000 workstations, were successful in providing both quantitative productivity improvements and qualitative learning enhancements [Werth88]. Students gained experience in working within a large system, though they actually needed only to understand the ACCESS routines provided with the system.

When funding became available for the acquisition of Macintosh SEs for the undergraduate labs, MPW (Macintosh™ Programmers WorkShop) and MacApp™ (Extended Macintosh™ Application) were added as an integrated development environment for the software engineering class. The MPW tools, Apple's ObjectPascal language, and the MacApp object library and application framework, made it possible for students to develop standard Macintosh interface applications in a single semester, achieving many of the learning goals outlined above.

This paper briefly describes the course organization and Macintosh environment. Difficulties in teaching object-oriented programming and design which motivated this approach are outlined, together with the advantages and disadvantages encountered during the semester. Conclusions about the future follow.

1 UNIX is a register trademark of AT&T Information Systems