Evolving an Ada Curriculum to 9X

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Abstract. With the emergence of a significant Ada language upgrade (Ada 9X), the corporate Ada curriculum needs a revision strategy. The strategy must address the unfolding of a 9X introduction all the way through to the final complete integration of the 9X enhancement with course offerings. A phased approach which addresses language and methodology needs for the Ada Software Engineer and manager is recommended. There is a need for thorough planning, early feedback, methodology integration, and contract driven requirements to achieve a total transition by the start of 1997.

1 Background

Loral Federal Systems (LFS), formerly IBM Federal Systems Company, is one of industry’s largest Ada users. LFS has over 20 Ada projects under contract with various international and U.S. Government agencies. These projects constitute a sizable software development effort (over 4m SLOC). To help meet these requirements, an Ada curriculum with course development and teaching resources was established within the IBM FSC Software Engineering Department in 1986.

The curriculum involves week-long hands-on (basic and advanced) language workshops as well as topical seminars on basic and advanced Ada features that are presented in both lecture and tape format. The hands-on courses are targeted principally at designers and programmers. The seminars are targeted at engineers, analysts, testers and managers as well as programmers and designers. Over 2,500 IBM FSC employees were trained in aspects of the curriculum with approximately 1,700 attending the two hands-on workshops.

With the pending advancement of Ada 9X standardization, the Ada curriculum must evolved. A plan was established which mapped a phased implementation over five years beginning in 1992. By the end of 1996 a steady-state Ada 9X curriculum should be in-place, ready to support anticipated Ada 9X RFPs and contract performance. This paper addresses the issues encountered to date and those waiting on the horizon. It elaborates an early introduction strategy, hands-on usage, a management introduction, and a complete curriculum integration. It might prove useful to other large international organizations facing a similar transition.
2 An Early Strategy

It was decided early-on that initial 9X training would reinforce the object based facilities present in Ada’83 and show motivation for additional object-oriented facilities not supported (such as polymorphism, formal classes and class-wide programming) or supported in limited ways (like inheritance). Additionally, given the FSC experience base it was imperative to do the same kind of thing for the real-time features proposed for 9X.

From that initial base-line establishment, the 9X training would go into additional details of the planned language and then address the issue of upward compatibility. A specific style, which would enable an easier transition to 9X, would be taught. And finally there was a need to get some early feed-back on hands-on usage of the new language.

After those course development efforts there would then be a required integration effort needed to blend the principles and exercises in the new courses with the current curriculum. Since 9X is built around Object-Oriented (OO) principles, it was decided to integrate the 9X education materials into both the Ada language workshops and into the existing object methodology course. Additionally, special purpose topical seminars would supplement the new integrated curriculum.

3 Introducing 9X--Motivation and Features

A two-hour overview seminar of planned Ada 9X features was developed in 1992. The seminar focused on the software engineering influences and project needs which precipitated planned 9X features. While the seminar showed syntax examples of a planned feature, the materials and lectures focused on the feature’s draft semantics and software engineering connection. The seminar was divided into four parts. The first part addressed 9X background and status: The second part looked at the planned OO facilities of 9X while the third part examined the planned real-time features. Part four summarized the rest of the planned core 9X language and its annexes.

IBM’s representatives on the Ada Board, WG-9, and ARTEWG areas reviewed the materials. OO methodology experts were also called in and reviewed their appropriate areas of the class materials. They provided meaningful input which improved the thrust and examples of the 9X OOP area.

The resulting two-hour seminar was presented at five IBM FSC sites and over the corporate satellite education network (CENet). The CENet transmission reached several non-FSC IBM sites (including Research, AIX labs and international language labs). Numerous tough questions were fielded and, in some cases, answers were deferred until consultation with two noted IBM OO experts (Norm Cohen and Susan Lilly). Generally, the instructor learned a lot (1) and a few hundred active Ada programmers gained a good basic comprehension of the plans, goals and expressive power of the planned Ada 9X features.

For 1993, a new one-hour module on ‘Coding in Ada in Preparation for 9X’ was developed. The module leaned heavily on Dr. Erhard Ploedereder’s published