DOLPHIN-FEW - AN EXAMPLE OF A WEB SYSTEM TO ANALYZE AND STUDY COMPILER BEHAVIOR

Paulo Jorge Teixeira Matos
Escola Superior de Tecnologia e de Gestãode Bragança
Campus Santa Apolónia, 5300 Bragança
pmatos@ipb.pt

Pedro Rangel Henriques
Departamento de Informática da Universidade do Minho
Gualtar, 4700 BRaga
prh@di.uminho.pt

ABSTRACT

DOLPHIN is a framework conceived to develop and test compiler components. DOLPHIN-FEW (Front-End for the Web) is the DOLPHIN module that integrates all Web-related functionalities. Initially conceived to monitor the behavior of some routines of the compilers back-end, it is, nowadays, also usable as a visual tool to teach how those code analysis, optimization, and code generation routines work. This paper introduces DOLPHIN-FEW, a software system that takes advantage of the web environment and associated technologies to be a powerful pedagogical tool to teach compiler construction topics.

KEYWORDS

Compiler construction, education, training, e-learning.

1. INTRODUCTION

DOLPHIN is a framework (Matos, 2002), under development, conceived to help in the construction of compilers. It is composed by several software components that can be directly or indirectly applied (by parameterization or by generation) to build new compilers. It is also used as a test-bed to experiment new compiling algorithms.

DOLPHIN-FEW is one of the components, developed using web-based technology, conceived to:

- Offer a (full) compilation system available over the net, that is, accessible through a WWW browser;
- Offer a visual tool to analyze the behavior of several compiler routines;

Moreover, DOLPHIN-FEW also allows to bring out DOLPHIN framework over the web to the compiler developers community.

The compiler takes a program written in a high level language, whose statements are semantically more powerful than the machine instructions and more compact, and converts them to low-level instructions that are semantically less powerful and more extensive. This is done in several stages, some that are responsible for the interpretation of the source code, others that work to generate the output code and even others, that work along the compilation process to optimize the code or to collect information to support these optimizations.

A compiler developed under the DOLPHIN framework contains a set of functionalities that provide information about the code at the intermediate levels of the compilation process. These functionalities are controlled by a set of flags that are activated when the source program is submitted to the compilation. The information generated is very important to understand the effects of the compilation routines, namely those for code optimization. The compiler generates:

- The intermediate code, representing the meaning of source program;