

Pointer Error Logging--Towards an Improved Pedagogy for Teaching Pointers in C++

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Abstract

Pointers have always been a difficult concept for students to learn and for instructors to teach. Furthermore, the error messages that students encounter are often unhelpful and serve only to confuse the students. At The Ohio State University, we use a special "checking" implementation of pointers in C++ that allows us to provide detailed and descriptive error messages to students working on assigned labs in CS2. Our infrastructure lets us also record all run-time pointer errors made by the students. For the past two years, the errors made by students on labs dealing with pointers have been logged in a database. The purpose of this project is to analyze the logged data in order to shed some light on what kinds of pointer errors are most frequent, what the most common causes for these errors are, and ultimately how to leverage this information to improve the pedagogy of teaching pointers. We have collected summary information on the distribution of pointer errors in pointer-based assignments, and we are exploring ways to present this information to instructors and students. We are also investigating the use of such information as a starting point for in-class discussions aimed at eliciting from students and instructors what misconceptions and misunderstandings about pointers may be the cause of the most common kinds of pointer errors. The end goal of the project is to gain a better understanding of these issues in an effort to address some of the problems traditionally linked with the teaching and learning of pointers.

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