OBJECT-ORIENTED DESIGN AND PROGRAMMING WITH C++ IN FIRST-YEAR COMPUTER SCIENCE COURSES: ONE DEPARTMENT'S DECISION

PANEL DISCUSSION

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ABSTRACT

The national debate in the computer science community over the issues of whether and how to incorporate object-oriented programming and design into the first-year undergraduate courses has been fueled by the controversy over which programming language to use. To paraphrase a famous line: To C++ or not to C++. However, there is much more to consider if a department is thinking about the move to OO.

Last March after a year-long discussion the computer science faculty at Valparaiso University made a decision, beginning with this Fall semester, to restructure its first three courses for majors so that the OO paradigm would be interwoven throughout these courses. At the same time the programming language used in these courses would be changed from Pascal to C++. The three panelists, including the moderator, will discuss the reasons for this decision and provide a preliminary report on the revisions in the content of the courses resulting from this decision.

Greg Hume will discuss the evolution of computer science topics that have led to the acceptance of the OO paradigm and the need for it to be included in the CS1 course. The OO paradigm is, yet, another abstraction. The process of creating abstractions began when the first interpreter for machine code was created. Since that time we have seen high level languages, data types, no column orientation, modularity, software engineering practices and so on. More recently we have seen the abstract data type and encapsulation. All of these features have slowly filtered into the introductory sequence. The OO paradigm is the next step in the evolutionary growth of our discipline.

Bill Marion will give an overview of why the decision was made and talk about one of the issues that led to the change. The move to incorporate the OO paradigm into the first three courses raises a whole series of questions, two of which are: (1) should OO design and programming be phased into the first three courses, where appropriate, (thus, beginning CS1 with the procedure-oriented approach) or should we take the plunge and introduce OO from the start? and (2) no matter how we answer question 1, what do we leave out of the current three

courses? In order to help answer these questions, a year ago, even before the final decision was made, Bill taught the third course in the sequence (Data Structures) from an object-oriented perspective with C++ as the language for the course (Pascal was the language used in the first two courses.) He will talk about his experience and how that influenced the direction the program is now taking.

Jim Caristi will present and analyze all of the forces that influenced the final decision (pedagogical, political, financial, philosophical, expedient) together with all the alternatives considered (move to Turbo Pascal with Objects, use C++, use Ada 95, use Scheme, use Oberon, use Java, use Delphi, involve much GUI, use some 00 teaching language). He will indicate how C++ and 00 have changed the content of CS1 (and CS2).