
JAMES T. SMITH, San Francisco State University
Overloading and Information Hiding in 1907

Mathematicians have never agreed on the most graceful way to construct real arithmetic from rational arithmetic. Around 1900 there were several choices, all of which seemed to require logic beyond the comfort level of many mathematicians. Dedekind's famous method, simplified by Pasch, was rather straightforward: set-theoretic operations on certain classes of rationals behaved like familiar operations on real numbers. Pasch used them informally as such; Russell claimed they "were" real numbers. Peano complained that such identification conflicted with his ideography: writing x [proper subset of] y , when one really meant x [less than] y , was confusing and could lead to logical errors. In 1907 Mario Pieri suggested a simple logical technique as a remedy. Peano's problem reappeared when programming languages were devised for large-scale electronic manipulation of coded data of different but analogous types, using different algorithms for analogous operations. Pieri's suggested solution foreshadowed the identifier overloading and information hiding techniques of object-oriented programming. Overloading enhances reliability by making programming more intuitive; information hiding does so by fostering portability and by preventing disruption of low-level computations by errors in higher-level software. This might be a promising topic for historians of logic and computer science.