

The Psychology of Invention in Computer Science

Ronald J. Leach, Caprice A. Ayers

Department of Systems and Computer Science
Howard University
Washington, DC 20059
rleach@howard.edu, cayers@howard.edu

Abstract.

Much of the existing work on the psychology of programmers has been experimental. The purpose of this initial study is to help provide some avenues for future experimental research by addressing creativity in computer scientists. We studied several writings and published interviews with a number of prominent computer scientists in an effort to understand the nature of creativity in computer science and to develop a set of research questions to be answered about the thought processes of programmers. The intent was to identify similar factors of their experiences that may have contributed to their success. Parallels to some existing work on the nature of creativity in mathematics and architecture are also made. The paper concludes with a discussion of how the study of common experiences of creative research computer scientists can be extended to study the creative processes of programmers.

Introduction

Creativity in fields such as astronomy, music, mathematics, and engineering has long been studied. In the nineteenth and early twentieth centuries, it was common for scientists and mathematicians to publish expository papers, educating the masses and discussing creativity in their domains. Computer science derived initially from a combination of mathematical and electrical engineering principles, so one might expect similar patterns of creativity. While the majority of computer scientists have devoted their attention to solving complex problems and introducing new technology, few have written on the thought process behind their creations. We describe some of the relatively sparse literature here.

Research plans of most people active in the field of analyzing programmer behavior include one or more of the following: case study, comparative analysis, and controlled experiment. Often, the process is iterated, with additional studies and experiments as new information and analysis suggest other research questions to be examined.

This paper sits earlier in the research process, gathering information, some of which is anecdotal, about the thought process of computer scientists who have made significant contributions to software. The paper is directed toward helping researchers

