Homework 12 - Introduction and Methods

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1 Abstract

We performed a qualitative analysis on a small study asking questions about code evaluation and questions about debugging. The code samples included programming concepts or syntax unfamiliar to the students. We saw different strategies such as following order of execution or reading code from the top of the file down, and strategies often changed from question to question. We believe evaluating these strategies is important because a programmer's choice of strategy can affect their success of failure in maintaining, changing, or interacting with code written by others, which often occurs.

2 Introduction

Programmers often have to look at code they are unfamiliar with for a variety of reasons whether they are students or professionals. In industry, programmers often work with a large code base and fixing a bug or finding code that does something in particular may not be easy or entirely understandable. Computer science students sometimes start programming assignments with a code base that they are expected to alter or add to, but not necessarily have the background to understand some of it, and may be extremely confused if they cannot figure out where to change or add code. Programmers with any amount of experience need effective strategies to understand existing code depending on the code and their objective.

In our qualitative study we asked two questions about code evaluation and two questions about code debugging. In each of the questions we embedded a concept we did not expect our participants to be familiar with or code that we thought would be hard to understand. These included overly complicated functions, an unfamiliar programming language, or the functional programming concept of passing a function as an argument. Having questions about code evaluation and debugging answered by each participant was important to us since the research we have read has looked at code evaluation on its own or debugging on its own but not together with the same participant. We wanted to know if strategies changed or were more or less effective depending on the situation.

We found that a participant's choice of strategy could affect their success in solving the problem by being able to avoid or understand complicated code or unfamiliar concepts. One participant in particular chose two different strategies for an evaluation problem and a debugging problem. The strategies helped him understand an unfamiliar concept in the evaluation problem and avoid complicated functions in the debugging problem.

The primary contribution of this work is a qualitative analysis of how different strategies helped a student overcome unknown concepts both in code evaluation and in debugging. As a small qualitative study, there are many questions that could be focused on next. In particular, we are interested in other strategies that could be used for each problem, their effectiveness, and what leads students to choose which strategy. We could also follow up on some factors that may have affected some of the decisions students made about strategy in this study such as length of code or access to resources such as Google.

3 Data Collection Methods

4 Data Analysis Methods