Chapter 8
Reshaping Secure Coding Through Generative AI Approach to Minimizing Programming Challenges

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ABSTRACT

A combination of technical expertise, creativity, and problem-solving skills is needed to succeed in the complicated and demanding profession of programming. As a result, there are several challenges that programmers may run against when creating software or computer systems. The literature on how to optimize and reduce the problems and difficulties in computer programming is reviewed in this chapter. The issue has a global scope and keeps becoming worse on a local scale. Even though there are numerous instructional tools available to support the teaching and learning of computer programming, the issue still exists. Computer introduction courses had high failure and dropout rates even from the beginning. This situation's justifica-

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tion includes the student's inability to solve problems. To overcome the challenges of learning computer programming, these two factors must be taken into account concurrently. This chapter will find out the ways to minimize these challenges.

1. INTRODUCTION

1.1. Background

Programming knowledge is becoming more and more important in today's digital world across a variety of professions, thus it's critical for students to understand the basics of programming languages. However, students frequently run into a number of problems and difficulties while studying programming. This introduction seeks to give a thorough overview of the typical programming problems and difficulties encountered by students, emphasizing the need to remove these obstacles to support efficient learning and skill development (Mallick et al., 2023).

Students, especially those who are new to coding, may find programming to present a unique set of obstacles that are intimidating. The complexity of programming languages itself is one of the main difficulties. Beginners face major obstacles in the form of syntax mistakes, logical flaws, and comprehending the complexities of algorithms (Doe, 2019). Another degree of complexity is added by the fact that programming languages and frameworks are continually evolving, so it's important for students to keep up with the current developments in the industry (Mallick et al., 2023).

The absence of appropriate mentoring and assistance is another problem that students frequently encounter. Programming calls for a disciplined approach, and without the right assistance, students may find it difficult to wade through the plethora of internet knowledge. Their growth may be hampered and exacerbated by a lack of mentors with suitable experience, outdated resources, or outdated materials (Smith & Johnson, 2020).

In addition, a lack of possibilities for real-world application may make it difficult for students to comprehend programming ideas. Although theoretical understanding is necessary, programming is essentially practical, therefore students need chances to put what they have learned to use in practical situations. Without real-world projects or assignments, students could struggle to understand the applications of the theories they learn, which would hinder their potential to become competent programmers (Brown et al., 2018).

Furthermore, programming calls for excellent analytical and problem-solving capabilities. Many students struggle to turn big challenges into smaller, more manageable tasks, which makes it difficult to design and implement workable