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Using Test-driven Development to Enhance Computer Programming Exercises

Practice helps students master complex skills such as computer programming. Computer science instructors often apply this teaching strategy by assigning numerous programming activities and providing feedback on students' answers. However, instructors often struggle to provide timely feedback because computer programs can be difficult to understand and debug, there are multiple programming problems in an exercise, and they need to check each students' exercise. The goal of this project is to leverage test-driven development (TDD) to generate feedback on students' answers automatically. Instructors only analyze errors that fail the unit tests designed for each problem thereby reducing checking time as well as providing students with immediate feedback. Specifically, this project will develop a repository of computer programming problems with associated unit tests that instructors can readily use for their classes. As a result, this project aims to facilitate timely feedback on programming exercises, enrich students' learning experience and increase learning gains.