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CSCI 334:
Principles of Programming Languages

Lecture 20: Testing

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[Williams](#)

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Topics

Unit testing

Midterm exam review

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Your to-dos

1. Study up for the midterm.
2. Lab 10 (project checkpoint #2), **due Monday, May 13** (group project).

Final project timeline

- ~~1. Minimally working version (Lab 9), due Mon 4/29~~
2. Mostly working version (Lab 10), **due Mon 5/13**
3. Project + video presentation, **due Mon 5/20** (last day of exams)

Ward Prize nomination deadline: **May 6**

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If you want to be considered for the Ward Prize, please let me know and try to get me a version of your project to look at before May 6. There is a cash prize for the Ward Prize!

Unit testing

Unit testing is a quality-assurance method designed to find bugs before software ships. A **unit test** consists of **test code** written to exercise the functionality of a **unit** of code **in isolation**. For example, in functional code, a unit is often thought of as a **module**, **function**, or **primitive** operation.

Note that unit testing is usually **not sufficient** to determine the correctness of code!

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Popular Unit Test Frameworks

Java: JUnit

.NET: MsTest or NUnit

Python: built in!

Ruby: built in!

Rust: built in!

Go: built in!

Tons more!

https://en.wikipedia.org/wiki/List_of_unit_testing_frameworks

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Regression

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Unit testing helps prevent regressions.

A regression is a kind of software bug where a feature that worked earlier stops working.

Because of their expressive and compositional nature, regressions are very common in language development. By developing a unit test suite alongside your implementation, you will save time and write better code because you will be able to detect regressions early.

Test-driven Development

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Test-driven development is a software development process that emphasizes writing a test for a planned feature before implementing a planned feature.

Procedure:

1. Add a test.
2. Run all tests. The new test should fail.
3. Write the simplest implementation that should pass the new test.
4. Run all tests. The new test should pass. If it does not, go to 3.
5. Rewrite as needed to enhance readability or maintainability.

(code)

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Exam review

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Recap & Next Class

This lecture:

Unit testing

Next lecture:

Midterm exam

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