今天下午两点在智园1008有讲座！

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CS304 Software Engineering

Lab 10 Mutation Testing

Test Case

- Hand-written
- *Question*: can we generate test cases automatically?

- Facts
  - Developers write different test cases (length, coverage…)
  - All possibilities cannot be covered (e.g. a String with length of 10)
  - Know more about the code, more efficient test cases
  - …

- **What are good test suites?**

How to evaluate?

- Coverage? (cover all input?)
- Fault-localization? (more errors, higher efficiency?)
- Regression testing? (evolving program code)

Mutation Testing

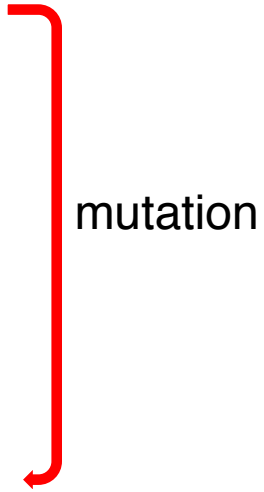
- Artificial bugs in the code

- Mutate elements of the program
  - Numeric numbers
  - Constants
  - Conditions
  - …

- If a unit test does not fail in this situation, it may indicate an issue with the test suite.

For example

```
While (x < 100 && y > 0) {
        // do some things
}
```




```
While (x <= 100 && y <= 0) {
        // do some things
}
```

Any comments?

- Assignment 2 (bonus): write an essay on Mutation Testing

PIT

- PIT runs your unit tests against automatically modified versions of your application code. When the application code changes, it should produce different results and cause the unit tests to fail.

Assignment 1: due 23:59pm, May 28

- Read the materials to understand how PIT works :
  - http://pitest.org/quickstart/basic_concepts/
  - http://pitest.org/quickstart/mutators/
- Run mutation testing on **ORIGINAL TestSuite.java** provided in Lab6.

- **Submit**:
  - Screenshots for running PIT
  - ORIGINAL Report generated by PIT
  - Report with *result analysis*, your *configurations* for PIT and any comments

Assignment 2 (bonus 1 point): due 23:59, Jun 4

- Write a short essay to analyze Mutation Testing, at least **800** words.

- Choose **two or more** from these keywords:
  - *current state, pros, cons, how to improve, compare to other technique*