CS314 Software Engineering White Box (Coverage) Testing

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Program testing types

- Black-box testing
 - Specifications drive test inputs and expected outputs
 - No code, design or internal documentation are available
- White-box testing
 - Code structure drives test inputs
 - Specification used to derive tests outputs
 - Code, design, and internal documentation are available
 - Goal is to "cover" the code to gain confidence and detect defects.

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White Box Testing

- Statement Coverage
 - Requires all statements to be executed
- Branch Coverage
 - Require decisions evaluate to true and false at least once
 - Implies statement coverage
- Path Coverage
 - Require all possible paths to be executed
 - Implies branch coverage

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Coverage Problems

- Statement
 - May not exercise all the conditions in predicates
- Branch
 - May not exercise all combinations of branches
- Path
 - combinatorial explosion
 - infinite paths for loops
 - not all paths are feasible

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```
1. public double fun(double x, int y){
Coverage
                          2.
                                int p;
                          3.
                                double z;
                          4.
                                if (y > 0)
 Statements
                          5.
                                    p = y;
                          6.
                                else
                          7.
                                    p = 0 - y;
  Branch
                          8.
                                z = 1.0;
                                while (p-->0)
                          9.
 Path
                          10.
                                    z = z * x;
                               if (y < 0 \&\& z != 0.0)
                          11.
                          12.
                                    z = 1.0/z;
                          13.
                                 return z;
```

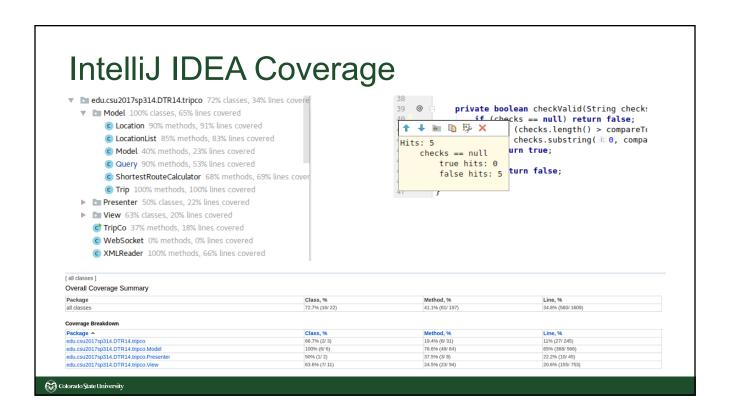
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IntelliJ IDEA Coverage

- https://www.jetbrains.com/help/idea/code-coverage.html
- https://www.youtube.com/watch?v=yNYzZvyA2ik

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Path	Coverage
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