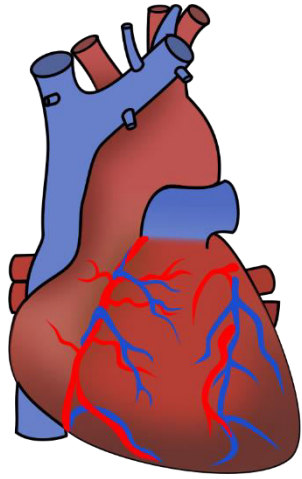


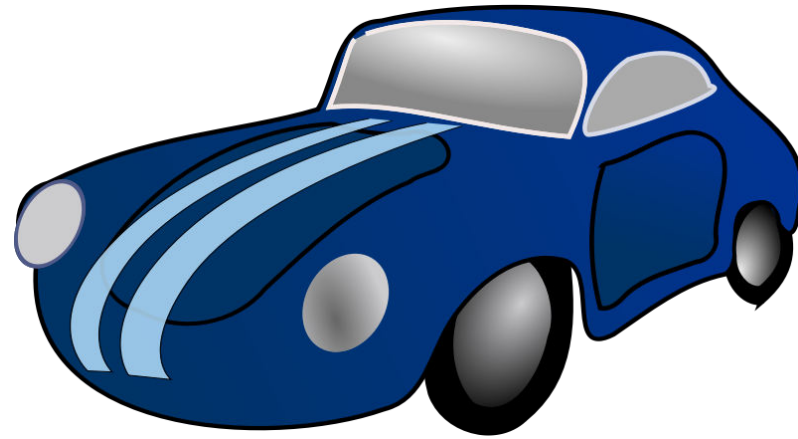
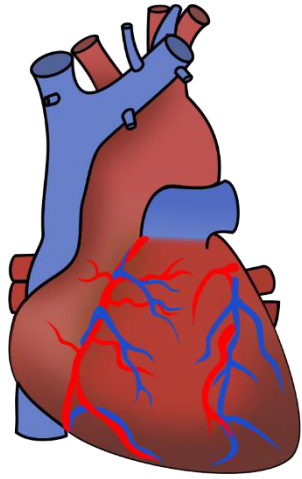
Testing and Confidence

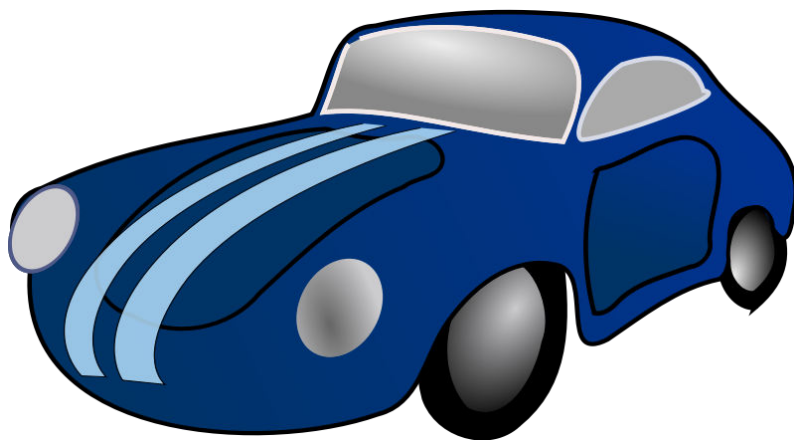
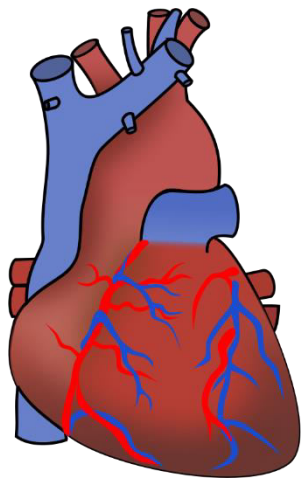


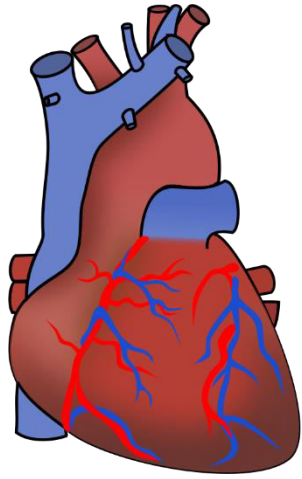
By the end of this video you will be able to...

- Explain the value of having confidence in your code
- Identify ways to build confidence in code correctness

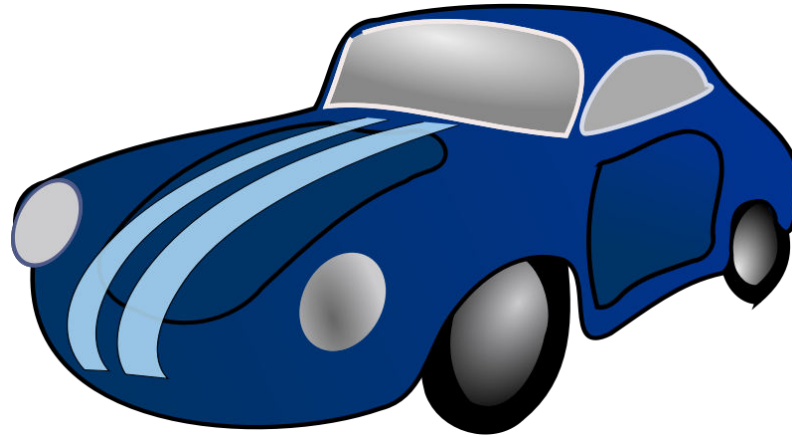


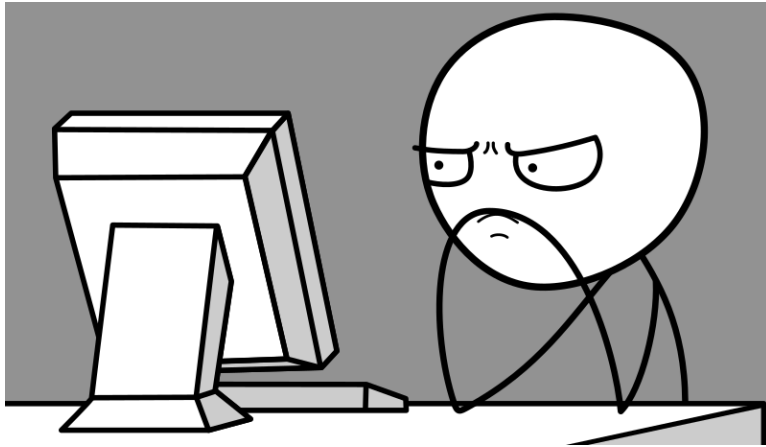




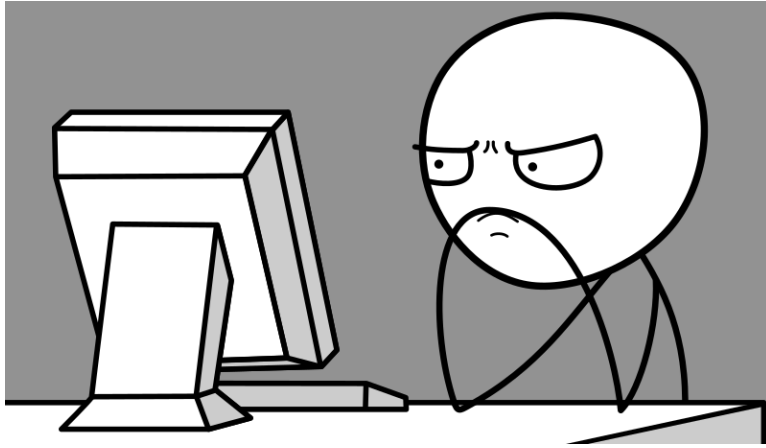


**Confident in
Correctness**





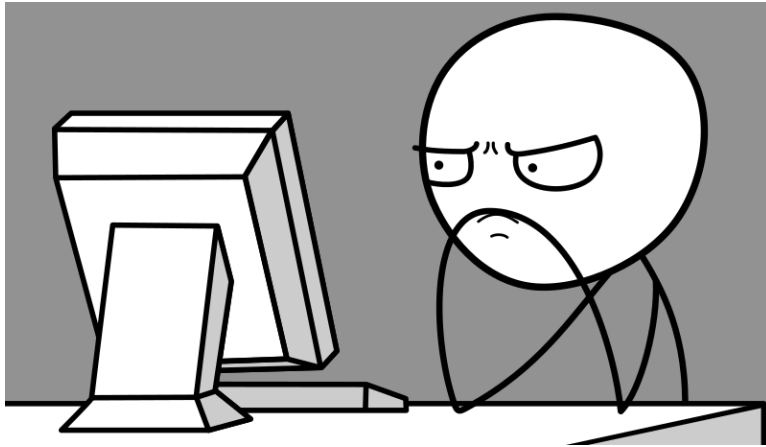
Users



Users



Hackers



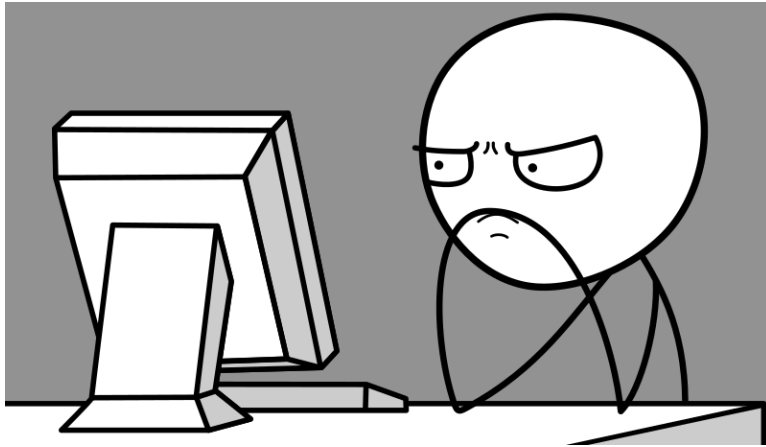
Users



Hackers



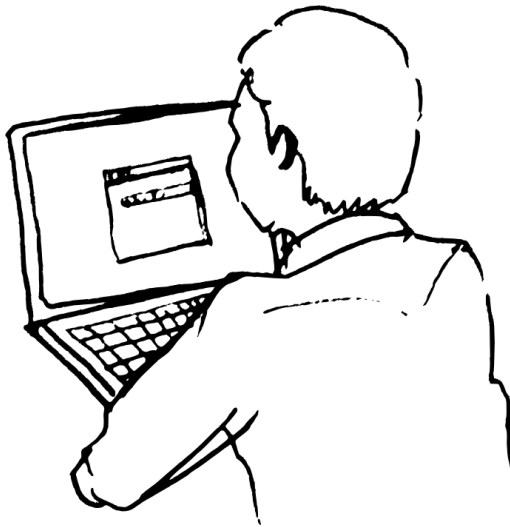
Programmers



Users



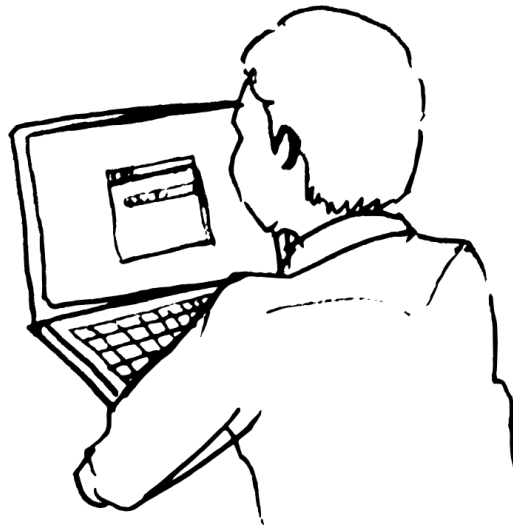
Hackers



Programmers



Yourself!



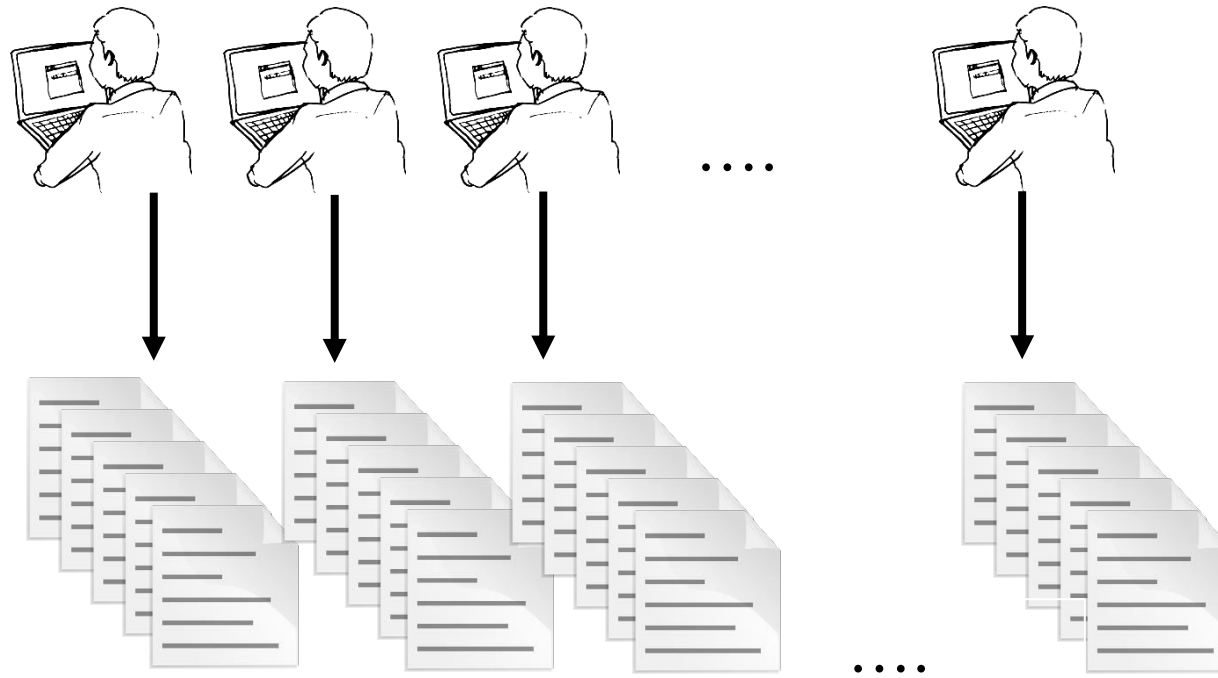
Programmers

30 Programmers

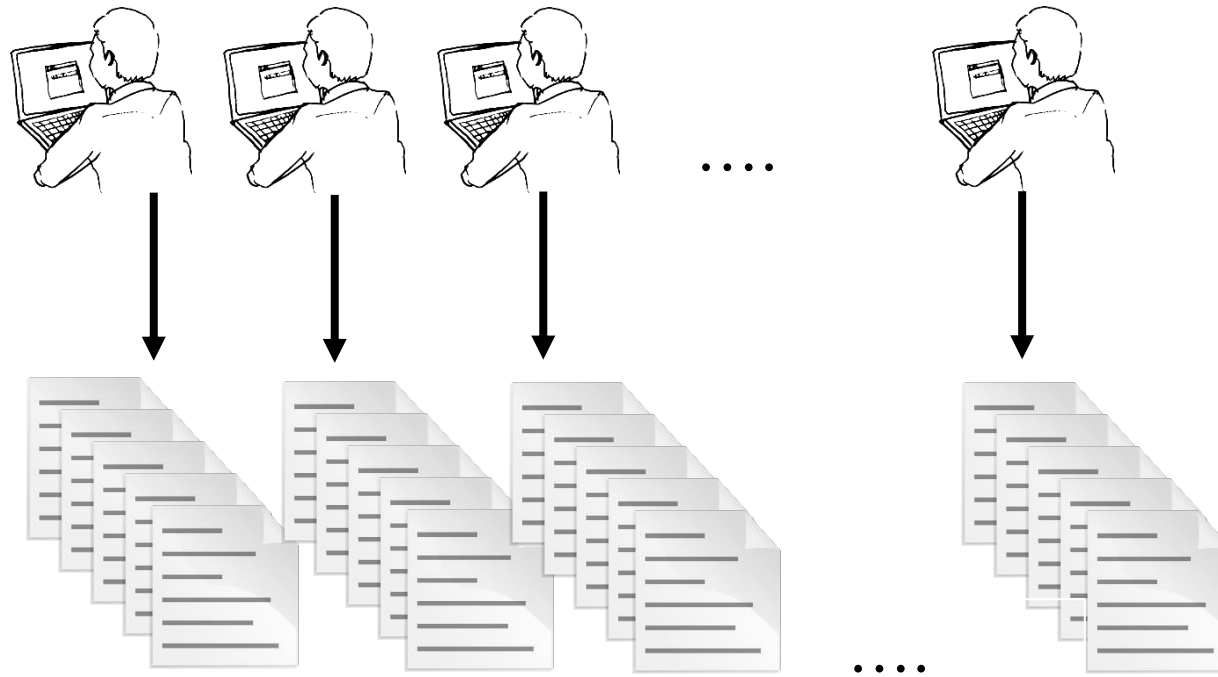


30
Programmers

10 methods
each



30
Programmers

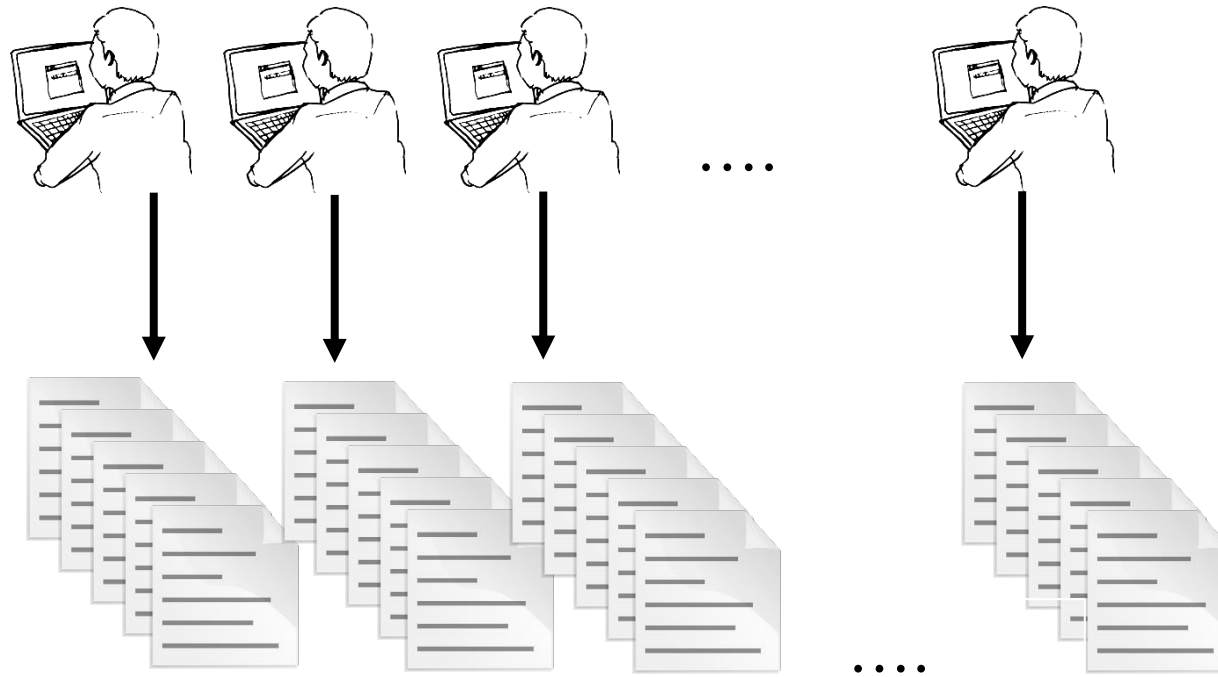


10 methods
each

300 methods

99% chance
correct

30
Programmers



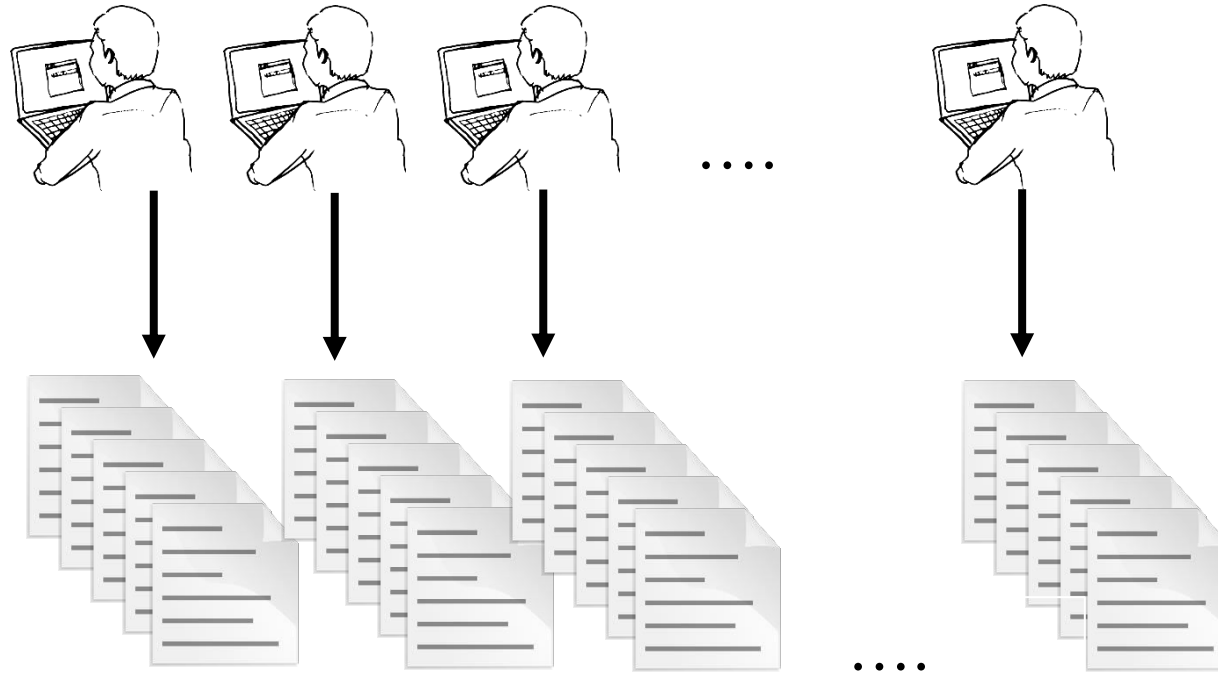
10 methods
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99% chance
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**95% chance
one is broken**

30
Programmers



10 methods
each

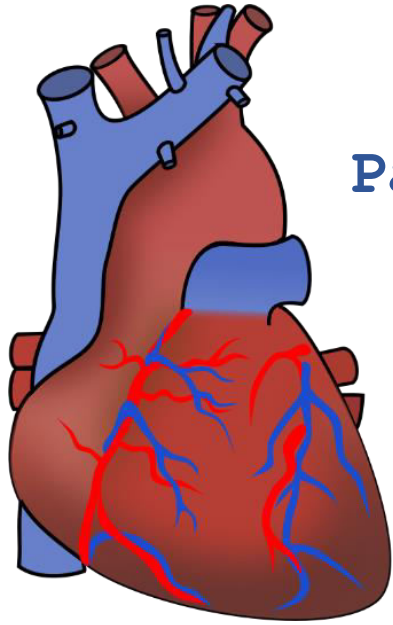
300 methods

99% chance
correct

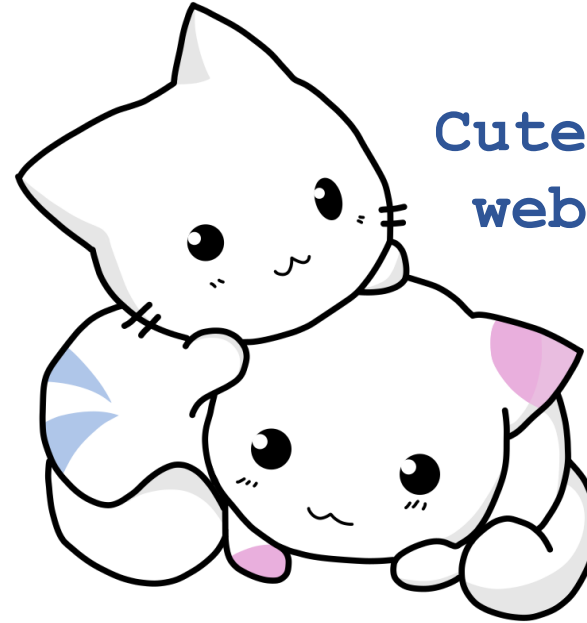
**95% chance
one is broken**

**Ignores
interactions
between methods**

Another view? Risk Assessment...

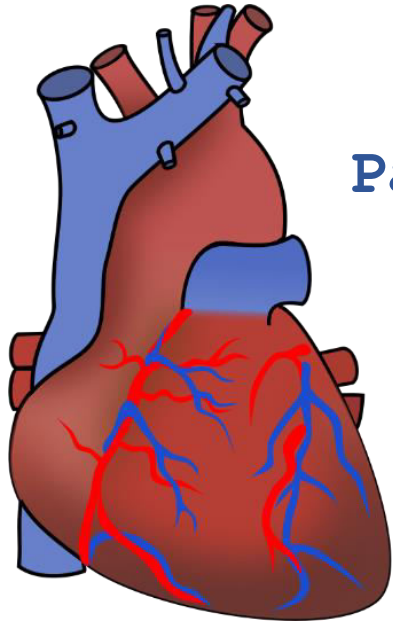


Pacemaker
code



Cute Cats
website

Another view? Risk Assessment...



Pacemaker
code



Cute Cats
website

**Different degrees of
confidence apply**

Code State	Confidence
Written, hasn't compiled	Extremely low

Code State	Confidence
Written, hasn't compiled	Extremely low
Compiled, haven't run	Extremely low

Code State	Confidence
Written, hasn't compiled	Extremely low
Compiled, haven't run	Extremely low
Tested against basic input	Low

Code State	Confidence
Written, hasn't compiled	Extremely low
Compiled, haven't run	Extremely low
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Tested against corner cases	Medium

Code State	Confidence
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Tested against users	Medium-High

Code State	Confidence
Written, hasn't compiled	Extremely low
Compiled, haven't run	Extremely low
Tested against basic input	Low
Tested against corner cases	Medium
Tested against users	Medium-High

**Wait, can't I just test
against all inputs?**

Testing against all inputs?

- If your method only depends on a boolean, sure.

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- If your method only depends on a boolean, sure.
- What if the output depends on three ints?
 - An int has more than **four billion** possible values
 - Three ints have **79,228,162,514,264,337,593,543,950,336** possible combinations

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- What if the output depends on three ints?
 - An int has more than **four billion** possible values
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- An array? A database? **Yikes!**

How can we increase confidence?

- Be critical of our algorithms/code
- Consider/test corner cases
- Attempt to formally reason about correctness
- Create automated test cases

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Let's do this next!