# Debugging and Testing

Debugging and testing are
normal parts of programming.

"As soon as we started programming, we found to our surprise that it wasn't as easy to get programs right as we had thought. Debugging had to be discovered. I can remember the exact instant when I realized that a large part of my life from then on was going to be spent in finding mistakes in my own programs."

- Maurice Wilkes, in 1949

# Testing versus Debugging

# Testing Palindrome Code

# General Testing Tip #1

Don't be afraid to prove yourself wrong.

# General Testing Tip #2

Have test cases that test the behavior of your program in different cases.

## General Testing Tip #3

Make your test cases structurally different to avoid bias.

# General Testing Tip #4

Make your test cases structurally different to avoid bias.

*(This is harder than it looks!)*

## General Testing Tip #5

When you find a bug, figure out what the code *is* doing, not what it's *not* doing.

# General Testing Tip #6

If you have a lot of test cases, consider automating your testing.

# General Testing Tip #7

Be sure to test edge cases!

## General Testing Tip #8

Testing rarely shows the *absence* of bugs. It only shows the *presence* of bugs.

# Time-Out for Announcements!

# Programming Assignments

- Assignment 5 is due today at 3:15PM.

  - Due Friday with one late period and Monday with two.

- Assignment 6 (**Array Algorithms**) goes out today, is due one week from Friday at 3:15PM.

  - Demo time!

# Returning Midterms