Evaluation of Computer Programs

- Is it correct?
- How easy is it to read and understand the code? Is it well documented?
- How easy is it to make changes to the program?
- How much memory is it needed to run the program?
- For how long will the program run?
- How general is the code? Will it solve problems over a large range of inputs without modification?
- Can the code be compiled and run on a variety of computers, or are modifications needed to run it on different computers?
Testing (Exposé Errors)

- Establishing Correctness is quite difficult, but should be attempted at certain level.
- Exhaustive testing takes too long
- Designing test sets
  - Black Box Methods: Develop test data from function being computed.
  - White Box Method: Test data “covers the program”.
Black Box Methods

- I/O Partition: Partition the I/O space into groups that behave similarly, and the behavior of data in different groups should be quite different (e.g. finding roots (2 roots, 1 root or imaginary roots)).

- Other methods: cause - effect graphing
White Box Methods

- Statement Coverage
- Decision Coverage
- Clause Coverage if( (C1 && C2) || (C3 && C4) )
- Execution path coverage
Debugging (Find and Correct errors)

- Use logical reasoning
- Don’t correct errors by creating exceptions
- Make sure correction does not introduce errors where none existed.
- Test and debug incrementally.