

Examples of Semantic Errors

Semantic errors are

- **mistakes in implementation** and are
- often typographic / small.

Code to print numbers from 1 to 10...

```
int32_t i;
for (i = 0; 10 >= i; i++) {
    printf ("%s\n", &i);
}
```

Avoiding and Fixing Semantic Errors

Walk through code in a debugger.

Use regression testing

- Bugs tend to resurface (more than one person makes the same mistake).
- **Every** time someone finds a **bug**, **add a test** that exposes the bug.
- **Pass all tests before committing changes.**

Syntax Errors and How to Avoid Them

Syntax errors are

- **Errors caught by a compiler** a
- (as errors or warnings).

Easy to avoid and fix:

- **Turn on all warnings** (`-Wall`).
- **Fix all warnings and errors...**
- **...but NOT by guessing!**

Summary of Techniques

1. Use code reading (and/or pair programming).
2. Avoid making assumptions.
3. Document assumptions.
4. Assert requirements.
5. Avoid overloading meaning.
6. Test corner cases.
7. Walk through all paths in debugger.
8. Use regression tests.