**Three Nasty bool Pitfalls**

* Pitfall 1: the impossible condition
  + If you use and, make sure it’s possible for all conditions to be true simultaneously
* Pitfall 2: the unavoidable condition
  + If you use or, make sure it is possible for all conditions to be false
* Pitfall 3: silent (implicit) conversion to int
  + If (grade == “A” || “A+” || “A-”)
  + Always true because “A+” and “A-” are non-zero (true values in C++)
  + Always use complete relational expressions

**Writing Loops Correctly**

* Loops are a common source of errors in program
  + Six step plan helps you write correct loops the first time
* Steps 1-3 are the **mechanics** that start and stop
  + 1. What makes the loop stop? The **loop bounds**
  + 2. What setup is required? **Bounds precondition**
  + 3. What moves you to the bounds? **Advance the loop**
* Steps 4-6 do the work of the loop. The **loop goal**
  + 4. Create variables to hold output. **Goal precondition**
  + 5. Change those variables. **Loop operation**
  + 6. How did you leave the loop? **Loop postcondition**

**Different loop bounds**

* C++ has three loops: **while, do-while**, and **for**
* Four ways to control the number of repetitions
  + **Counter-controlled:** fixed repetition
  + **Sentinel:** examine content of input
  + **Data (**aka EOF): process remaining data
  + **Limit**: examine result of calculation