The New C Standard (Excerpted material)

An Economic and Cultural Commentary

Derek M. Jones
derek@knosof.co.uk

6.8.5.1 The while statement

while statement

The evaluation of the controlling expression takes place before each execution of the loop body. 1772

Commentary

The loop body of a **while** statement may be executed zero or more times.

Coding Guidelines

Why do developers choose to use a **while** statement rather than a **for** statement? Technically a loop can be written using either kind of statement. Both forms of iteration statement are likely to involve initializing, testing, and modifying one or more objects that systematically change over successive iterations. The **for** statement places these three components in a contiguous, visibly prominent, location. Other reasons for the choice (65.5% **for**, 34.5% **while**) include:

- *C culture.* The use of a particular kind of loop to perform a particular operation may be something that developers learn as part of the process of becoming a C programmer. Measurements of the two looping constructs (see Table **??** and Table **??**) show that **for** statements often count up to some value and **while** statements iterate until an equality operator is true. The pattern of usage seen in the source being the sum of the operations (e.g., always using a **for** statement to loop over the elements of an array and a **while** statement to loop over a linked list) required to implement the application.
- *Individual habits.* While learning to program a developer may have chosen (perhaps a random selection, or purely a class exercise to practice the using a language construct) to use a particular construction to perform some operation. Reuse of the same construction to perform the same, or similar operations leads to it becoming established as part of their repertoire. The pattern of usage seen in source code being the sum of individual habits.

In both cases the choice of **for**/**while** involves a process of algorithmic problem classification. Which most closely matches the developers mental model of the operations being performed? At the time of this writing there is insufficient information to evaluate whether there is a cost/benefit case to the use of **while** statements, rather than **for** statements. These coding guidelines do not discuss this issue any further.

loop control variable
controlling expression
if statement

There is a commonly seen idiom that uses side effects in the evaluation of the controlling expression to modify the value of an object in the controlling expression (i.e., the loop control variable). The discussion on controlling expressions in an **if** statement showed that removing such side effects in the controlling expression of **while** statements would incur the cost of having to create and maintain two identical statements (one outside the loop and one inside). Your author is not able to estimate if this cost was less than the potential benefits of not having the side effects in the controlling expression. For this reason no guideline is specified here.

References