

## Chapter V

### System Testing and Performance Measurement

#### 5.1 System Testing

In order to test the correctness of the AWK-to-C translation system thoroughly, a test suite comprising 243 AWK programs was developed. These test programs include all of the 193 AWK programs used as examples in Aho, Kernighan, and Weinberger (1988), the book that officially defines and describes the AWK language.

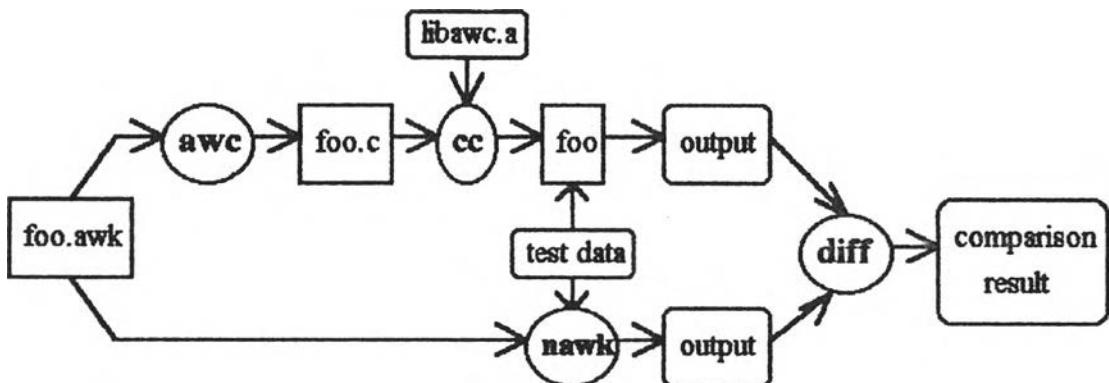


Figure 5.1 Illustration of the test procedure

Each test program in the test suite is processed as illustrated in Figure 5.1. The test program *foo.awk*, for example, is translated into *foo.c*, which in turn is compiled and executed with a test data to produce an output file. *foo.awk* is also run by the Unix AWK interpreter *nawk* with the same test data to produce another output file. Both output files are then compared using the Unix *diff* command. The test procedure is considered a success if there is no output from *diff*.

The whole testing process on the test suite is largely automated by using the Unix *make* utility. The test programs have

revealed many bugs, both trivial and serious ones, in the AWK-to-C translation system. All of them have been fixed.

## 5.2 Performance Measurement

Since one of the expected benefits of the AWK-to-C translation system is the speed improvement in processing AWK programs, a performance measurement suite was developed to evaluate the translation system for that matter. Ten nontrivial AWK programs were selected from the test suite for this purpose. The execution times of the translator-generated C programs were measured and then compared with those of the corresponding AWK source programs running by *nawk*. Table 5.1 summarizes the results. The second column of the table is the execution times of the test programs processed by *nawk* while the third one is the execution times of their translator-generated counterparts. The last column shows the speed improvement of each translator-generated program over the corresponding *nawk*-processed one.

Table 5.1 Execution Times of Test Programs  
(Times are in seconds)

Test Program	nawk	awc	Speed Improvement
awkparser	8.9	9.6	-7%
bridge	15.1	9.3	63%
calc3	7.9	7.4	7%
compat	14.2	13.5	5%
fmt	22.0	14.4	53%
graph	7.1	5.7	24%
hist	21.5	9.1	135%
pearls	139.9	99.9	40%
reverse	14.1	12.1	17%
walk	65.1	74.5	-13%

The results show that eight out of ten translator-generated programs run faster than their interpreted counterparts, with the speed improvement ranging widely from 5% to 135%. In the other two

cases, the interpreted programs do run faster than the translator-generated ones by 7% and 13% respectively. The average of the speed improvement percentages is 32%.