IOI’98 – Setubal/Portugal

Problem Portfolio

CONTACT

Contact is a string processing problem conceived to test precise algorithm design abilities.

What is required is an algorithm to count all required patterns by doing one single pass over the file. The file can be rather large. Therefore, the contestants must find out a good representation for the patterns and a fast lookup table for keeping the running totals incrementally.

Most of the required techniques are standard, but must be mastered with precision. Moreover, the nature of the inputs makes it difficult to check empirically the correctness of the program (that is, by comparing results). So, great care must be given to the design of the code itself.

The classification given by the Portuguese Scientific Committee was as follows:

Problem type:	Geometric
Problem understanding	Easy
Algorithm effort	Easy
Implementation effort	Medium
Number of possible solutions per test	1
Several levels of testing	Yes

We present a solution to the problem written both in Pascal and C.

Patterns are represented by integers (reading bit patterns as binary numerals). An extra 1 is appended to the left of each pattern to distinguish different amounts of leading zeros (say 001 from 01). These integers are used to index a table (represented by an array) that keeps the number of occurrences while the file is scanned. After the file is scanned, the relevant section of the table is sorted and the output file is generated.