British Informatics Olympiad Final

30 March – 1 April, 2007
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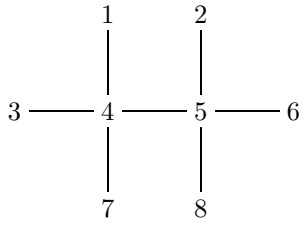
Doohickey

In the latter part of the nineteenth century demand for *Mr. Widget's Finest Doohickeys*, made by the relatively unknown firm of *Widget, Whatsis & Doodah* (est. 1862), began to outpace supply. Eager to satisfy their customers, but wary of losing their trade secrets to the competition, the firm looked for ways to contract out some of the manufacture.

A doohickey was made of several connected components; each pair of components either directly linked, or linked via a chain of other components. It had no 'loops' since no two components were linked (directly or indirectly) in more than one way. The production of these components was contracted out, minimising the number of contractors, and these then reassembled with the utmost secrecy by Mr. Widget himself.

Each contractor was to produce one or more of these components. All of the components produced by a single contractor were to make a single chain themselves, with at most two 'end'-pieces (i.e. components that were only directly linked to a single other component.) The contractors produced all of the components, and no component was produced by more than one contractor.



For example, consider the eight-piece doohickey pictured above, where lines indicate which components are directly connected. One division of labour would be for eight contractors to each produce one of the components. An alternative would be for five contractors, the chain 3 — 4 — 5 — 6 being produced by the first, and the remaining four contractors to each produce a single component; note that none of these contractors can produce more than one component, since there is no way of chaining any of the remaining components together without using the components assigned to the first contractor. Yet another alternative would be for four contractors, the first producing the chain 1 — 4 — 3, the second producing the chain 6 — 5 — 8, and the remaining two contractors each producing a single component; this is the minimum number of contractors that can be used.

Write a program which, given a list of how the components are connected, determines the minimum number of contractors required. The first line of the input will consist of a single number, n ($1 \leq n \leq 5000$), indicating the number of components in the doohickey. The next $n - 1$ lines will each consist of two integers indicating a pair of directly connected components; each component being specified by a unique integer from 1 to n. The input will specify a doohickey which is a single connected object.

You should output a single integer which is the minimum number of contractors required.

Sample Input	**Sample Output**
8 4 1 2 5 8 5 3 4 4 5 5 6 7 4	4