

CMPSC 465 Homework 1

Submission: For the non-programming part, a photocopy or scanned copy is accepted. For the programming part, the source code file is required.

Part 1. Do the problems in textbook,

Page 7, Ex. 1.1: #4 (in pseudocode), #6

Page 17, Ex. 1.2: #5.b

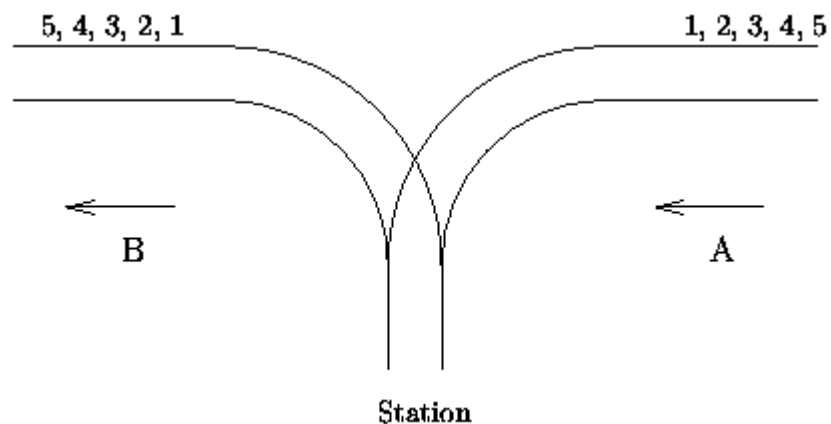
Page 37, Ex. 1.4: #1, #2, #3, #9

Please submit a pdf file including all your answers for part I

Part 2. Programming problem

Note: please only submit the .cpp file. Do not submit the entire Visual Studio project package!

There is a famous railway station in PopPush City. Country there is incredibly hilly. The station was built in last century. Unfortunately, funds were extremely limited that time. It was possible to establish only a surface track. Moreover, it turned out that the station could be only a dead-end one (see picture) and due to lack of available space it could have only one track.



The local tradition is that every train arriving from the direction A continues in the direction B with coaches reorganized in some way.

- Assume that the train arriving from the direction A has $N \leq 1000$ coaches numbered in increasing order $1, 2, \dots, N$.
- The chief for train reorganizations must know whether it is possible to marshal coaches continuing in the direction B so that their order will be a_1, a_2, \dots, a_N . Help him and write a program that decides whether it is possible to get the required order of coaches.
- You can assume that single coaches can be disconnected from the train before they enter the station and that they can move themselves until they are on the track in the direction B.
- You can also suppose that at any time there can be located as many coaches as necessary in the station. But once a coach has entered the station it cannot return to the track in the direction A and also once it has left the station in the direction B it cannot return back to the station.

Program Input

The input file consists of blocks of lines. Each block except the last describes one train and possibly more requirements for its reorganization. In the first line of the block there is the integer N , which is the number of coaches in the train. In each of the next lines of the block there is a permutation of $1, 2, \dots, N$. For example, N is 5, and the permutation could be 5, 3, 2, 1, 4. Your program will take this permutation as input and determine whether you can marshal the coaches from the incoming order 1, 2, 3, 4, 5 to the outgoing order 5, 3, 2, 1, 4 using the station, which can be treated as a stack.

The last line of the block contains just 0.

If a block starts with a zero, the program will terminate.

Program Output

The output file contains the lines corresponding to the lines with permutations in the input file. A line of the output file contains `YES` if it is possible to marshal the coaches in the order required on the corresponding line of the input file. Otherwise it contains `NO`. In addition, there is one empty line after the lines corresponding to one block of the input file. There is no line in the output file corresponding to the last ``null" block of the input file.

Your program should be able to read input from a file, and output the result to another file.

Sample Program Input

Block 1 { 5
1 2 3 4 5
5 4 1 2 3
0

Block 2 { 6
6 5 4 3 2 1
0
0

Sample Program Output

Yes
No

Yes

Here is another sample data.
You can check **input**: lablin.txt and the **output** should be lablout.txt.