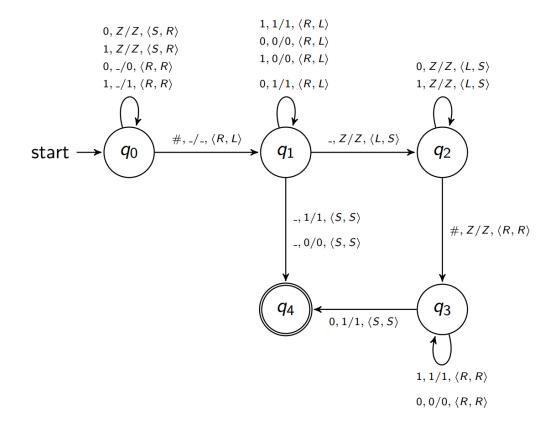
Implement a Turing machine according to the graphical representation:



<u>Expected input:</u> Two non-empty binary strings with no leading zeroes, separated by "#". A leading zero is any 0 digit that comes before the first nonzero digit, if any, in a number string.

When your program receives a valid input from input.txt, it should output the output.txt containing the list of configurations (see configurations format) followed by "YES"/"NO": "YES", if a Turing machine accepts the string from the input file and "NO" otherwise. It the input is invalid, output.txt should contain "Invalid input".

Examples of valid input strings: "0#111", "10111101#1011100", "10101#11"

Examples of invalid input strings: "11#0101#1", "00011#1010"

Configurations format

TM configurations should be printed each on a new line in the form: "q", "x^y", "a^ β ",

where q – state of the control device,

 x^y - string and the head position on the input tape (^ stands for \uparrow in the course material),

 $a \wedge \beta$ - string and the head position on the memory tape.

input.txt 1100#1001 output.txt q0, ^1100#1001, ^Z q0, ^1100#1001, Z^ q0, ^1100#101, Z^ q0, 1^100#101, Z1^ q0, 11^00#101, Z11^ q0, 11^00#101, Z11^ q0, 110^0#101, Z110^ q0, 1100#101, Z110^ q1, 1100#101, Z1100^ q1, 1100#101, Z1100 q2, 1100#1001, Z1100 q3, 100#101, Z100 q2, 1100#1001, Z1100 q3, 100#101, Z100	Example 1	Example 2
1100#1001		
output.txt output.txt q0, ^1100#1001, ^Z q0, ^100#101, ^Z q0, ^1100#1001, Z^^ q0, ^100#101, Z^^ q0, 1^100#1001, Z1^^ q0, 1^00#101, Z1^^ q0, 1100#1001, Z110^^ q0, 100^#101, Z10^^ q0, 1100*1001, Z110^^ q0, 100*101, Z10^^ q1, 100#^1001, Z110^^ q1, 100#^101, Z10^^ q1, 1100#1^001, Z11^00 q1, 100#10^1, Z^100 q1, 1100#10^01, Z1^100 q1, 100#10^1, ^Z100 q1, 100#10^1, Z1100 q2, 100#10^1, ^Z100 q2, 1100#10^1, ^Z1100 q2, 100#^101, ^Z100 q2, 1100#1^001, ^Z1100 q3, 100#^101, Z100 q2, 1100*1001, ^Z1100 q3, 100#1^01, Z100 q2, 1100*1001, ^Z1100 q3, 100#1^01, Z100 q2, 1100*1001, ^Z1100 q3, 100#10^1, Z100	input.txt	input.txt
q0, ^1100#1001, ^Z q0, ^100#101, ^Z q0, ^1100#1001, Z^^ q0, ^100#101, Z^^ q0, 1^100#1001, Z1^^ q0, 1^00#101, Z1^^ q0, 11^00#1001, Z11^^ q0, 10^0#101, Z10^^ q0, 110^0#1001, Z110^^ q0, 100^#101, Z100^^ q1, 1100*1001, Z1100^ q1, 100#101, Z10^0 q1, 1100#1^001, Z11^00 q1, 100#10^1, Z^100 q1, 1100#100^1, Z1^100 q1, 100#101^, ^Z100 q1, 1100#100^1, ^Z1100 q2, 100#101, ^Z100 q2, 1100#10^01, ^Z1100 q2, 100*101, ^Z100 q2, 1100#1001, ^Z1100 q3, 100#^101, Z1^00 q2, 1100*1001, ^Z1100 q3, 100#10^1, Z1^00	1100#1001	100#101
q0, ^1100#1001, Z^ q0, ^100#101, Z^ q0, 1^100#1001, Z1^ q0, 1^00#101, Z1^ q0, 11^00#1001, Z11^ q0, 10^0#101, Z10^ q0, 1100^#1001, Z110^ q0, 100^#101, Z100^ q0, 1100*1001, Z1100^ q1, 100#^101, Z10^0 q1, 1100#1^001, Z11^00 q1, 100#10^1, Z^100 q1, 1100#10^01, Z1^100 q1, 100#101^, ^Z100 q1, 1100#100^1, Z^1100 q2, 100#10^1, ^Z100 q2, 1100#100^1, ^Z1100 q2, 100*101, ^Z100 q2, 1100#1^001, ^Z1100 q3, 100#^101, Z1^00 q2, 1100*1001, ^Z1100 q3, 100#1^01, Z1^00 q2, 1100*1001, ^Z1100 q3, 100#1^01, Z1^00 q2, 1100*1001, ^Z1100 q3, 100#1^01, Z1^00	output.txt	
q0, 1^100#1001, Z1^ q0, 1^00#101, Z1^ q0, 11^00#1001, Z11^ q0, 10^0#101, Z10^ q0, 110^0#1001, Z110^ q0, 100^#101, Z100^ q0, 1100*#1001, Z1100^ q1, 100#^101, Z10^0 q1, 1100#1^001, Z11^00 q1, 100#10^1, Z^100 q1, 1100#10^01, Z1^100 q1, 100#101^*, ^Z100 q1, 1100#100^1, Z^1100 q2, 100#10^1, ^Z100 q2, 1100#100^1, ^Z1100 q2, 100#^101, ^Z100 q2, 1100#1^001, ^Z1100 q3, 100#^101, Z100 q2, 1100#1^001, ^Z1100 q3, 100#1^01, Z100 q2, 1100*1001, ^Z1100 q3, 100#1^01, Z100 q2, 1100*1001, ^Z1100 q3, 100#1^01, Z100 q2, 1100*1001, ^Z1100 q3, 100#1^01, Z100	q0, ^1100#1001, ^Z	• -
q0, 11^00#1001, Z11^ q0, 10^0#101, Z10^ q0, 110^0#1001, Z110^ q0, 100^#101, Z100^ q0, 1100*1001, Z1100^ q1, 100#^101, Z10^0 q1, 1100#1^001, Z11^00 q1, 100#10^1, Z^100 q1, 1100#10^01, Z1^100 q1, 100#101^1, ^Z100 q1, 1100#100^1, Z^1100 q2, 100#10^1, ^Z100 q1, 1100#1001^1, ^Z1100 q2, 100#1^01, ^Z100 q2, 1100#10^01, ^Z1100 q2, 100*101, ^Z100 q2, 1100#1^001, ^Z1100 q3, 100#^101, Z^100 q2, 1100*1001, ^Z1100 q3, 100#1^01, Z1^00 q2, 1100*1001, ^Z1100 q3, 100#10^1, Z1^00 q2, 1100*1001, ^Z1100 q3, 100#10^1, Z1^00	q0, ^1100#1001, Z^	
q0, 110^0#1001, Z110^ q0, 100^#101, Z100^ q0, 1100#1001, Z1100^ q1, 100#^101, Z10^0 q1, 1100#1^001, Z110^0 q1, 100#10^1, Z100 q1, 1100#10^01, Z1100 q1, 100#10^1, Z100 q1, 1100#100^1, Z1100 q1, 100#101^1, Z100 q1, 1100#100^1, Z1100 q2, 100#101, Z100 q2, 1100#100^1, Z1100 q2, 100#^101, Z100 q2, 1100#1001, Z1100 q3, 100#^101, Z100 q2, 1100#1001, Z1100 q3, 100#^101, Z100 q2, 1100*1001, Z1100 q3, 100#101, Z100 q2, 1100*1001, Z1100 q3, 100#101, Z100 q3, 100#101, Z100 q3, 100#101, Z100	q0, 1^100#1001, Z1^	q0, 1^00#101, Z1^
q0, 1100*#1001, Z1100^ q1, 100#^101, Z10^0 q1, 1100#^1001, Z110^0 q1, 100#1^01, Z1^00 q1, 1100#10^01, Z1^100 q1, 100#10^1, Z^100 q1, 1100#100^1, Z1100 q1, 100#101^1, ^Z100 q1, 1100#1001, Z1100 q2, 100#1^01, ^Z100 q2, 1100#100^1, ^Z1100 q2, 100#^101, ^Z100 q2, 1100#1^001, ^Z1100 q3, 100#^101, Z100 q2, 1100#1^001, ^Z1100 q3, 100#1^01, Z1^00 q2, 1100*1001, ^Z1100 q3, 100#10^1, Z1^00 q2, 1100*1001, ^Z1100 q3, 100#10^1, Z1^00	q0, 11^00#1001, Z11^	
q1, 1100#^1001, Z110^0 q1, 100#1^01, Z1^00 q1, 1100#1^001, Z11^00 q1, 100#10^1, Z^100 q1, 1100#100^1, Z1^100 q1, 100#101^, ^Z100 q1, 1100#100^1, Z^1100 q2, 100#1^01, ^Z100 q2, 1100#100^1, ^Z1100 q2, 100#^101, ^Z100 q2, 1100#1^001, ^Z1100 q2, 100#^101, Z100 q2, 1100#1^001, Z1100 q3, 100#^101, Z100 q2, 1100*1001, Z1100 q3, 100#1^01, Z100 q2, 1100*1001, Z1100 q3, 100#10^1, Z100	q0, 110^0#1001, Z110^	q0, 100^#101, Z100^
q1, 1100#1^001, Z11^00 q1, 100#10^1, Z^100 q1, 1100#10^01, Z1^100 q1, 100#101^, ^Z100 q1, 1100#100^1, Z^1100 q2, 100#10^1, ^Z100 q1, 1100#1001^, ^Z1100 q2, 100#1^01, ^Z100 q2, 1100#10^01, ^Z1100 q2, 100*101, ^Z100 q2, 1100#1^001, ^Z1100 q3, 100#^101, Z^100 q2, 1100*1001, ^Z1100 q3, 100#1^01, Z1^00 q2, 1100*1001, ^Z1100 q3, 100#10^1, Z1^00	q0, 1100^#1001, Z1100^	, ,
q1, 1100#10^01, Z1^100 q1, 100#101^, ^Z100 q1, 1100#100^1, Z^1100 q2, 100#10^1, ^Z100 q1, 1100#1001^, ^Z1100 q2, 100#1^01, ^Z100 q2, 1100#10^01, ^Z1100 q2, 100*101, ^Z100 q2, 1100#1^001, ^Z1100 q3, 100#^101, Z^100 q2, 1100*1001, ^Z1100 q3, 100#1^01, Z1^00 q2, 1100*1001, ^Z1100 q3, 100#10^1, Z1^00	q1, 1100#^1001, Z110^0	q1, 100#1^01, Z1^00
q1, 1100#100^1, Z^1100 q2, 100#10^1, ^Z100 q1, 1100#1001^, ^Z1100 q2, 100#1^01, ^Z100 q2, 1100#100^1, ^Z1100 q2, 100#^101, ^Z100 q2, 1100#1^001, ^Z1100 q3, 100#^101, Z^100 q2, 1100#^1001, ^Z1100 q3, 100#1^01, Z1^00 q2, 1100*#1001, ^Z1100 q3, 100#10^1, Z1^00	q1, 1100#1^001, Z11^00	q1, 100#10^1, Z^100
q1, 1100#1001^, ^Z1100 q2, 100#1^01, ^Z100 q2, 1100#100^1, ^Z1100 q2, 100#^101, ^Z100 q2, 1100#1^001, ^Z1100 q2, 100^#101, ^Z100 q2, 1100#^1001, ^Z1100 q3, 100#^101, Z^100 q2, 1100**1001, ^Z1100 q3, 100#1^01, Z1^00 q2, 1100**1001, ^Z1100 q3, 100#10^1, Z10^0	q1, 1100#10^01, Z1^100	
q2, 1100#100^1, ^Z1100 q2, 100#^101, ^Z100 q2, 1100#10^01, ^Z1100 q2, 100**101, ^Z100 q2, 1100#1^001, ^Z1100 q3, 100#^101, Z^100 q2, 1100**1001, ^Z1100 q3, 100#1^01, Z1^00 q2, 1100**1001, ^Z1100 q3, 100#10^1, Z10^0	q1, 1100#100^1, Z^1100	q2, 100#10^1, ^Z100
q2, 1100#10^01, ^Z1100 q2, 100^#101, ^Z100 q2, 1100#1^001, ^Z1100 q3, 100#^101, Z^100 q2, 1100#^1001, ^Z1100 q3, 100#1^01, Z1^00 q2, 1100^#1001, ^Z1100 q3, 100#10^1, Z10^0	q1, 1100#1001^, ^Z1100	q2, 100#1^01, ^Z100
q2, 1100#1^001, ^Z1100 q3, 100#^101, Z^100 q2, 1100#^1001, ^Z1100 q3, 100#1^01, Z1^00 q2, 1100^#1001, ^Z1100 q3, 100#10^1, Z10^0	q2, 1100#100^1, ^Z1100	q2, 100#^101, ^Z100
q2, 1100#^1001, ^Z1100 q3, 100#1^01, Z1^00 q2, 1100^#1001, ^Z1100 q3, 100#10^1, Z10^0	q2, 1100#10^01, ^Z1100	q2, 100^#101, ^Z100
q2, 1100^#1001, ^Z1100 q3, 100#10^1, Z10^0	q2, 1100#1^001, ^Z1100	q3, 100#^101, Z^100
q2, 1100^#1001, ^Z1100 q3, 100#10^1, Z10^0	q2, 1100#^1001, ^Z1100	q3, 100#1^01, Z1^00
~2 1100#11001 711100 g3 100#10^1 710^0	q2, 1100^#1001, ^Z1100	q3, 100#10^1, Z10^0
43, 1100#^1001, 2^1100 43, 100m10 1, 210 0	q3, 1100#^1001, Z^1100	q3, 100#10^1, Z10^0
q3, 1100#1^001, Z1^100 NO	q3, 1100#1^001, Z1^100	NO
q4, 1100#1^001, Z1^100	q4, 1100#1^001, Z1^100	
YES	YES	