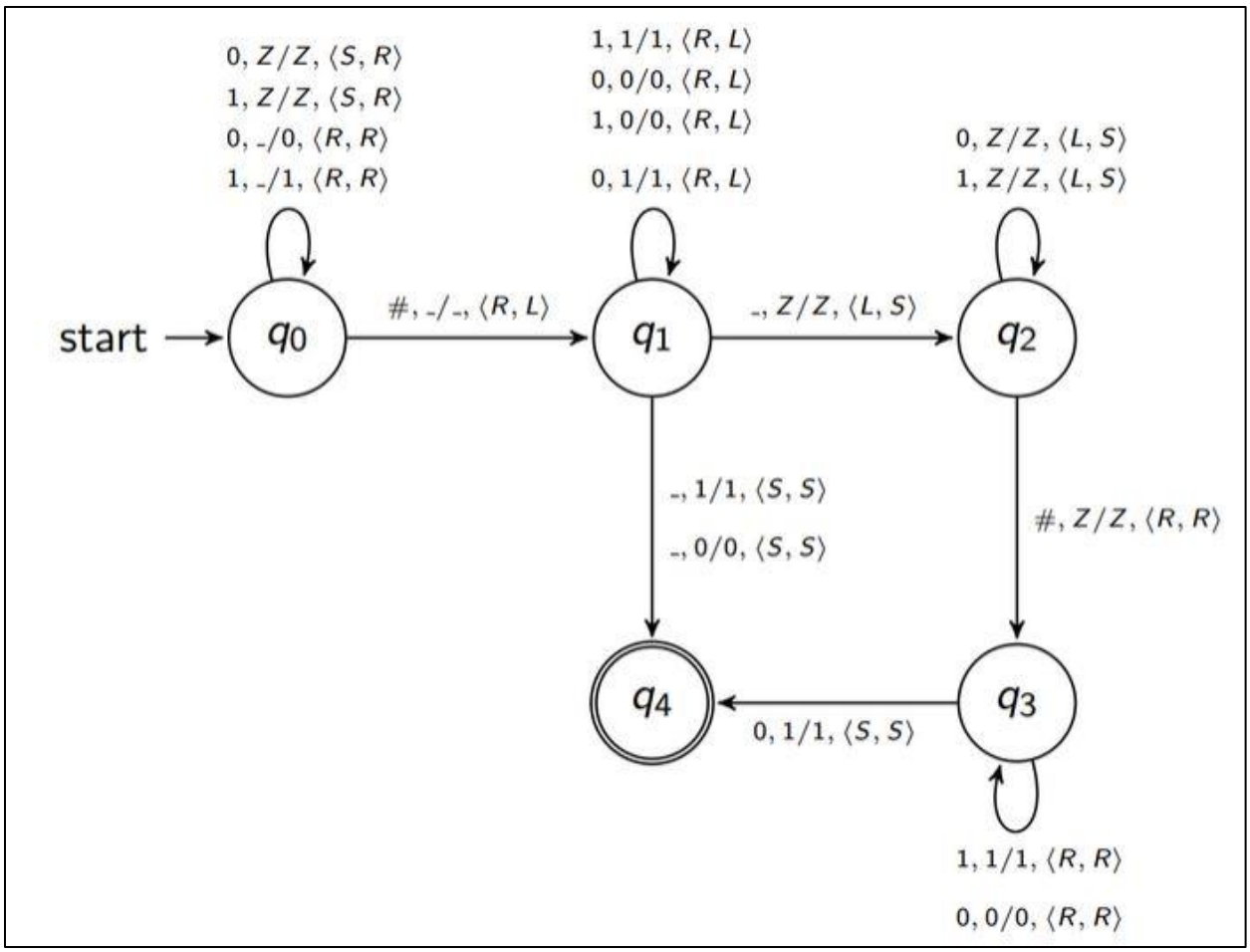
Task:

Implement a Turing machine according to the graphical representation:



Expected input: 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”, “1011101#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", "α^β",
where q – state of the control device,
x^y - string and the head position on the input tape (^ stands for ↑ in the course material),
α^β - string and the head position on the memory tape.

Example 1

input.txt

```
1100#1001
```

output.txt

```
q0, ^1100#1001, ^Z
q0, ^1100#1001, Z^
q0, 1^100#1001, Z1^
q0, 11^00#1001, Z11^
q0, 110^0#1001, Z110^
q0, 1100^#1001, Z1100^
q1, 1100#^1001, Z110^0
q1, 1100#1^001, Z11^00
q1, 1100#10^01, Z1^100
q1, 1100#100^1, Z^1100
q1, 1100#1001^, ^Z1100
q2, 1100#100^1, ^Z1100
q2, 1100#10^01, ^Z1100
q2, 1100#1^001, ^Z1100
q2, 1100#^1001, ^Z1100
q2, 1100^#1001, ^Z1100
q3, 1100#^1001, Z^1100
q3, 1100#1^001, Z1^100
q4, 1100#1^001, Z1^100
YES
```

Example 2

input.txt

```
100#101
```

output.txt

```
q0, ^100#101, ^Z
q0, ^100#101, Z^
q0, 1^00#101, Z1^
q0, 10^0#101, Z10^
q0, 100^#101, Z100^
q1, 100#^101, Z10^0
q1, 100#1^01, Z1^00
q1, 100#10^1, Z^100
q1, 100#101^, ^Z100
q2, 100#10^1, ^Z100
q2, 100#1^01, ^Z100
q2, 100#^101, ^Z100
q2, 100^#101, ^Z100
q3, 100#^101, Z^100
q3, 100#1^01, Z1^00
q3, 100#10^1, Z10^0
q3, 100#10^1, Z10^0
NO
```