The following problem comes from Douglas Hofstadter's book *Gödel, Escher, Bach* [1]. Take the time to try to solve this problem yourself. The problem concerns strings of characters. The only characters allowed/available are M, U and I.

Question

You start with the string MI and the goal is to use the four rules below to convert it into the string MU. In the rules, the letter x denotes any string. You can use the rules any number of times and in any order, just so long as you get to MU [2].

	Rule	Example	Explanation
1	xI to xIU	MI to MIU	Append U to the end of a string ending in I.
2	Mx to Mxx	MIU to MIUIU	Double the string after the M.
3	xIIIy to xUy	MUIIIU to MUUU	Replace any III with a U.
4	xUUy to xy	MUUU to MU	Remove any UU.

References

[1] Douglas R. Hofstadter. *Godel, Escher, Bach: An Eternal Golden Braid.* Basic Books, Inc., New York, NY, USA, 1979.

[2] Wikipedia. Mu puzzle.