Mystery Turing Machine Problem #5 (for 10/2/17)

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Try to figure out what this machine does. Assume that the tape has only 0’s on it; that there are at least 2 0’s total; that they come in a single cluster; and that the tape starts to the left of the cluster.

Here’s the table:

(I’ve listed this in a different format, but it works the same way the previous ones did. The only difference is that the states are now numbered 0/1/2/3 instead of A/B/C/D. Why did I do this? Because, having just made it up from scratch on paper, I wanted to double-check that it worked before posting it for you. So, I went to a TM simulator — such as the ones linked on our website! — and I typed it in like this, and then ran it on some sample strings. You could try this too, if you’re having any trouble figuring out what it does!)

**Bonus question:** Assuming that the tape is infinitely long in both directions, this TM is dumb and overly complicated (if not downright tricky and annoying). Why? How could it be made much simpler?