1. Write a Turing machine (i.e., give states and transition function) to check whether a number given in binary – in the alphabet $\Sigma = \{0, 1\}$ – is divisible by 4.

2. Write a Turing machine to check whether a number given in binary contains – looked at as a string of 0s and 1s – a number of 1s which is divisible by 4.

Would the answer to (a) be simpler or harder if I had asked for the question with ‘3’ instead of ‘4’? What about (b)?