

Homework Sheet 4

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Task 1

Lets first construct the DFA like this:

We know that if the sum of even indexed digits minus the sum of odd indexed digits is zero modulo three then the number is zero modulo three. And thats what i will use to construct the DFA.

The machine needs to know what modulo of three we are currently at and also the index of the current digit. $3 \cdot 2 = 6$ states the machine needs.

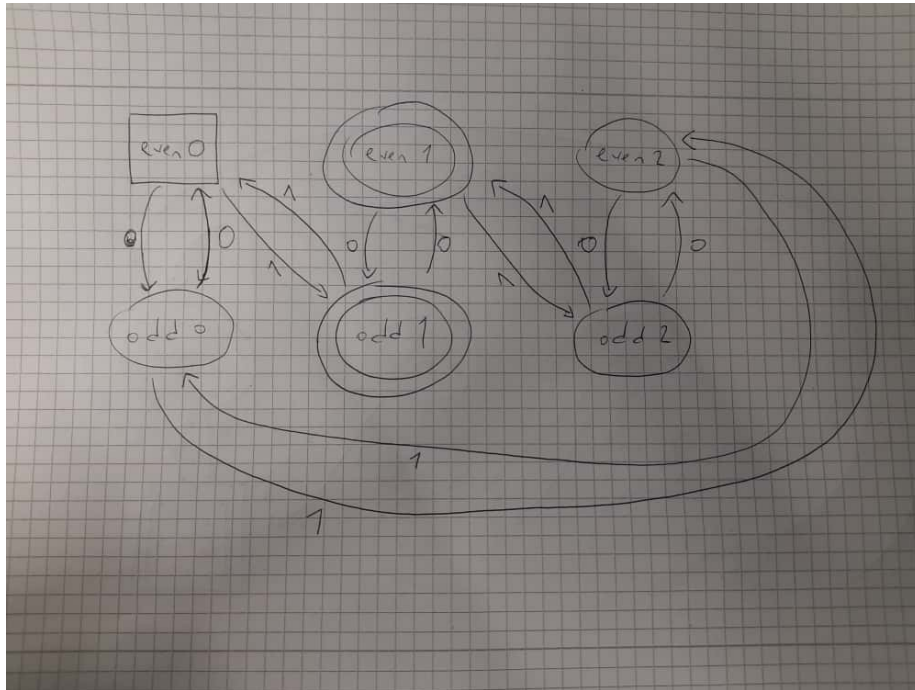


Figure 1: DFA

Accepting states are "even 1" and "odd 1" and the starting state is "even 0"

The regular expression would be: $(0^*1(01^*0)^*1)^*0^*1(01^*0)^*$

This regular expression works because it is generated from the DFA above and they accept the same language.