CS-C2160 - Theory of Computation, Lecture, 11.1.2022-11.4.2022

This course space end date is set to 16.12.2022 **Search Courses: CS-C2160**

6. Voluntary problem set: Some small brain teasers

These problems are completely **voluntary** (no bonus points given, either) that may require more time to solve. Try with your own responsibility.

« 5. Compulsory problem set: Context-free grammars Course overview 6.2 Grammar for a language »

Exercise description My submissions **3 / 50**

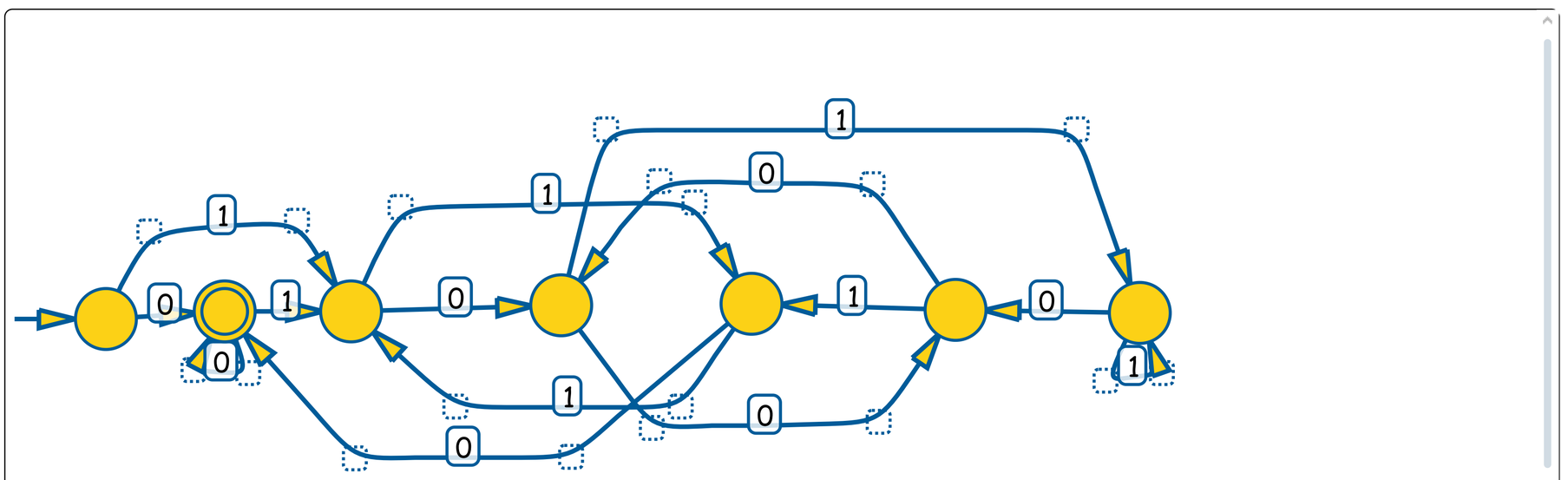
DFA for a language

Consider the language $L = \{w \in \{0,1\}* \mid \text{the most-significant-bit-first binary number } w \text{ is divisible by } 6\}$.

Design a deterministic finite automaton (DFA) that recognises the language.

For example, the strings 0, 00, 110, 0110, 1100, 10010, and so on belong to the language. The empty string does not belong to the language.
Hints that may be useful:

- Recall the sum presentation $b_n 2^n + b_{n-1} 2^{n-1} + \ldots + b_0 2^0$ of a *least-significant-bit-first binary number* $b_0 b_1 \ldots b_n$
- Apply some fundamental rules of modular arithmetic to see how the sum presentation evolves modulo 6
- Design an automaton that accepts all the least-significant-bit-first binary numbers that are divisible by 6
- Reverse the automaton



Reset Deterministic: yes

- Click on the canvas to add new states.
- You can also move existing states by dragging them.
- Click on transition labels to edit them.

Submit!

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Earned points

1 / 1

Exercise info

Exercise category
Voluntary exercises

Your submissions
3 / 50

Deadline
Sat, 31 Dec 2022 23:59:00 +0200

Total number of submitters
10

Previous activity
◄ 5. Compulsory problem set: Context-free grammars

Next activity
7. Voluntary problem set: Finite automata ►