Second homework assignment, due 2. 5. 2024 (prior to the lecture as a zip file in Brute)

In the fourth lecture, we have seen that a simulator of a Turing machine can be written in a couple of lines of Python. In this homework assignment, you can get 10 points for all of:

- implementing a simulator in Python of one of the model of quantum computing, which we have seen so far.
- implementing one or more sample circuit (e.g. Hadamard on 2 qubits followed by a CNOT), again in Python, on top,
- preparing a short document illustrating the circuit and the outputs (e.g. in PDF).

For inspiration, you may want to consider `https://github.com/Qiskit/qiskit-aer/tree/main/src/simulators/statevector`, which is a simulator of quantum circuits. Please do use the combination of the model of quantum computing and programming language chosen in class or in the online poll.

You can also get 10 additional points, if you complete one of the following:

- develop your own simulator for the stabilizer formalism (cf. `https://arxiv.org/pdf/2103.02202.pdf`) in as few lines of Python as possible, perhaps taking inspiration from `https://www.scottaaronson.com/chp/`
- develop a method for taking a unitary matrix and estimating how few Clifford circuits and non-Clifford circuits you need to implement it and producing the corresponding Clifford circuits.

These points are optional, in that you can collect 100 points without collecting these 10.