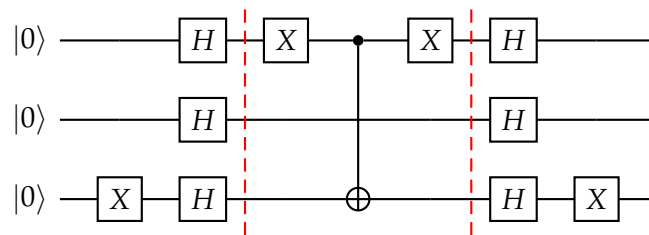# Week assignment 10 (Homework vault part)

Deadline: 18. 12. 2020

Upload scan, photograph, or a typesetted pdf of computation to the corresponding homework vault. Do not forget to include your name and personal ID number (učo) on the page(s).

Exercise 1. [2pts] Compute the state on the outcome of the following circuit

Exercise 2. [2pts] Compute the average value $\langle N \rangle_{|\psi\rangle}$ of *observable*

$$N = \begin{pmatrix} 3 & i & 1 \\ -i & 5 & -i \\ 1 & i & 3 \end{pmatrix}$$

when measured in state

$$|\psi\rangle = \frac{1}{\sqrt{5}}(2\,|0\rangle + i\,|1\rangle).$$

Exercise 3. [3pts] Consider again observable N and state $|\psi\rangle$ from the previous exercise. Find eigenvalues λ_j and corresponding eigenvectors $|\mu_j\rangle$ of N and cosider measurement of the state $|\psi\rangle$ in the basis $\{|\mu_j\rangle\}$. Compute probabilities p_j for particular measurement outcomes μ_j and compute

$$[N]_{|\psi\rangle} = \sum_j \lambda_j p_j.$$