PROPOSITION DE STAGE – L3 INFORMATIQUE – ENS LYON

Quantum algorithms and dynamic data structures

Dynamic data structures play a key role in the fastest algorithms for problems in optimization, statistics and string processing. At their core, these data structures maintain a clever sketch of data that continually undergoes changes (e.g., when edges are added or removed in a graph). As quantum algorithms are known to provide speedups over many data processing tasks, it is anticipated that quantum algorithms can also improve over the best dynamic data structures. A recent example is a faster quantum algorithm for zero-sum games [BGJST23].

The purpose of this internship is to study the relevants concepts in quantum computing and dynamic data structures, and to try and combine these to obtain faster quantum data structures for dynamic data.

Supervised by Simon Apers and Frédéric Magniez.

[BGJST23] Adam Bouland, Yosheb Getatchew, Yujia Jin, Aaron Sidford, Kevin Tian. "Quantum Speedups for Zero-Sum Games via Improved Dynamic Gibbs Sampling". <u>arXiv:2301.03763</u>