Sorting is one of the fundamental problems in computer science. In this thesis we present three individual results.

Asymptotically optimal sorting networks have been created by Ajtai et al. [1983]. But Asharov et al. [2021] have observed that boolean circuits based on sorting networks are not optimal for sorting short integers. We present a construction of even smaller boolean circuits for sorting short integers.

Lower bounds for offline Oblivious RAM have been connected to lower bounds for sorting circuits by Boyle and Naor [2016]. Larsen and Nielsen [2018] have shown a lower bound for online Oblivious RAM. We provide a lower bound for online Oblivious RAM in a more general model.

Finally we provide an algorithm with expected running time $\mathcal{O}(n \log \log(n))$ for sorting integers on random access machine with word length between $\log(n)$ and $\log(n)$ cubed. This algorithm does not match the expected running time of the algorithm of Han and Thorup [2002], but our algorithm is much easier to implement and analyse.