In this work, we study the cache-oblivious computation model, which is inspired by the behaviour of the memory hierarchy of current computers. We study several graph algorithms and techniques of their design in this model. We consider graph searching, identifying connected components and computing maximal matching. We also study sorting and matrix multiplication as subproblems of many graph algorithms. In addition to previously known algorithms, we present several new ones. We study their efficiency both by the means of asymptotic complexity and by benchmarking them on real hardware and we compare them with classical algorithms.