Evolutionary and genetic algorithms are problem-solving methods designed according to a nature inspiration. They are used for solving hard problems that we cannot solve by any efficient specialized algorithm. The Monte Carlo method and its derivation the Monte Carlo Tree Search (MCTS) are based on sampling and are also commonly used for too complex problems, where we are dealing with enormous memory consumption and it is impossible to perform a complete searching. The goal of this thesis is to design a general problem solving method that is built from these two completely different approaches. We explain and implement the new method on one example problem: the Traveling salesman problem (TSP). Second part of this thesis contains various tests and experiments. We compare different settings and parametrizations of our method. The best performing variant is then compared with the classical evolutionary TSP solution or, for example, with greedy algorithms. Our method shows competitive results. The best results were achieved with the cooperation of our method and the classical evolutionary TSP solution. This union shows better results than any of its parts separately, which we find as a great success.