Thesis covers the problem of finding non-colliding paths in automated warehouses for a group of agents - so called Multi-agent pickup and delivery (MAPD) problem. Agents in the warehouses are constantly engaged with new tasks which require picking up the object on certain coordinates and transporting it to another place in the warehouse. Thesis describes a hierarchical algorithm for MAPD problems that plans paths in two levels - global and local. The algorithm works with a warehouse environment manually divided into sectors. Planning on the global level consists of assigning tasks to free agents and selecting a sequence of sectors to go through. The task is always assigned to the closest free agent. On the local level, the actual path through the sector is planned using modified Multi-agent path finding (MAPF) algorithms. The proposed algorithm was tested in a simulated environment. We showed that the hierarchical algorithm with Conflict-based search (CBS) on the local level has a smaller runtime and finds a solution with a lower makespan than the algorithm using reduction to SAT. Further, we showed that the hierarchical approach for MAPD significantly lowers the runtime of the algorithm, meanwhile, the outputted solutions are not much worse than for non-hierarchical approaches.