Heuristic searches such as A* search are a popular means of finding least-cost plans due to their generality, strong theoretical guarantees on completeness and optimality, simplicity in implementation and consistent behavior. In planning for robotic manipulation, however, these techniques are commonly thought of as impractical due to the high-dimensionality of the planning problem. As part of this thesis work, we have developed a heuristic search-based approach to motion planning for manipulation that does deal effectively with the high-dimensionality of the problem. In this thesis, I will present the approach together with its theoretical properties and show how to apply it to single-arm and dual-arm motion planning with upright constraints on a PR2 robot operating in non-trivial cluttered spaces. Then I will explain how we extended our approach to manipulation planning for n-arms with regrasping. In this work, the planner itself makes all of the discrete decisions such as which arm to use for the pickup, the putdown, whether handoffs are necessary and how the object should be grasped at each step along the way. An extensive experimental analysis in both simulation and on a physical PR2 shows that, in terms of runtime, our approach is on par with some of the most common sampling-based approaches. In addition, the experimental analysis shows that due to its deterministic cost-minimization, the approach generates motions that are of good quality and are consistent, i.e. the resulting plans tend to be similar for similar tasks.