PART VII

Conclusion

A simplified view of the evolution of automated planning consists of three overlapping phases and two primary orientations. Each of these had its merits and made essential contributions to the field, and each also had weak points.

The phases include the early work on classical planning, more recent work on neoclassical planning, and work on extended planning and scheduling representation and problems. The first and especially the second phase were characterized by a strong focus on search issues and by the evaluation and comparison of algorithms on simple "toy domains" and benchmarks. The third phase started as early as the first one but aimed at solving more ambitious problems; today it is becoming capable of addressing realistic applications.

The two primary orientations are toward theoretical work and application-oriented work. The former tended to remain quite narrow in scope, while publications of the latter type often tended to involve rather *ad hoc* programming efforts and search techniques. It is only recently that a significant amount of synergy between the theory and practice of automated planning has built up.

In this book, we deliberately chose not to focus solely on classical planning. Instead, we devoted large parts of the book to extended classes of automated planning that relaxed the various assumptions discussed in Chapter 1.

We also devoted a large part of the book to descriptions of application-oriented work. Unfortunately, however, these chapters remain only case studies. It is not yet possible to present a comprehensive mapping from the features of an application domain to the planning techniques that best address these features.

The published literature related to automated planning is quite large, and it is not feasible in a single book to give detailed discussions of it all. Chapter 24 gives brief summaries of several topics that we did not discuss in the previous chapters. These topics can be classified into other planning algorithms and approaches that were not covered earlier; techniques that help improve the performance of planners;

and problems that are related to planning or the use of planning representations and/or algorithms, although they do not directly aim at synthesizing plans.

Thus the following chapter discusses case-based planning, planning with linear and integer programming, multiagent planning, plan merging and plan rewriting, abstraction hierarchies, domain analysis, planning and learning, planning and acting, and plan recognition.

Several other issues—such as mixed-initiative and interactive planning [187, 412] and domain modeling and knowledge acquisition for planning [384, 385]—would certainly have deserved additional sections.