## STRIPS

STRIPS is one of the first real world implementations of planning system. It was developed by SRI in 1971 for its Shakey robot[1].
It is more known for its planning problem definition language that became the basis for most planning languages like ADL and PDDL.

Planning problem in STRIPS is defined by:

- An initial state;
- The goal state;
- Actions with defined preconditions and postconditions

Later in 1987 Action Description language was built atop of STRIPS[2]. It was improved by allowing the effects of an action to be conditional, not specified literals are considered to be unknown instead of false and negative literals along with disjunctions were allowed.
Finally in 1998 the Problem Domain Description Language or PDDL was introduced as a computer-parsable, standardized syntax for representing STRIPS, ADL, and other languages.[3]

## GRAPHLAN

In 1995 the planning field was revitalized with introduction of Graphplan algorithm , which was orders of magnitude faster than the partial-order planners of the time[4]. Graphplan takes as input a planning problem expressed in STRIPS and produces, if one is possible, a sequence of operations for reaching a goal state. It works based on planning graph. This graph has the property that useful information for constraining search can quickly be propagated through the graph as it is being built. Graphplan then exploits this information in the search for a plan[5]. Planning graphs are also used for finding good heuristics for state-space and partial-order planners as we implemented in Project 3.

## UNPOP

At the time where the most popular planning approach was partial ordering planning, Drew McDermott's introduced UNPOP program (1996).[6] He suggested state space planners with a

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[1] Richard E. Fikes, Nils J. Nilsson (Winter 1971). "STRIPS: A New Approach to the Application of Theorem Proving to Problem Solving"
[2] Pednault. Formulating multi-agent dynamic-world problems in the classical planning framework. In Michael Georgeff and Amy Lansky, editors, Reasoning about actions and plans pages 47-82. Morgan Kaufmann, San Mateo, CA, 1987
[3] Russell, Stuart J.; Norvig, Peter (2009). Artificial Intelligence: A Modern Approach (3rd ed.). Upper Saddle River, New Jersey: Prentice Hall.
[4] Russell, Stuart J.; Norvig, Peter (2009). Artificial Intelligence: A Modern Approach (3rd ed.). Upper Saddle River, New Jersey: Prentice Hall.
[5] A. Blum and M. Furst (1997). Fast planning through planning graph analysis. Artificial intelligence.
[6] Russell, Stuart J.; Norvig, Peter (2009). Artificial Intelligence: A Modern Approach (3rd ed.). Upper Saddle River, New Jersey: Prentice Hall.

distance heuristic based on a relaxed problem with delete lists ignored. McDermott suspected that other approaches were not getting the attention they deserved. The most successful state-space searcher to date is Hoffmann's (2000) FASTFORWARD or FF, winner of the AIPS 2000 planning competition. FF uses a simplified planning graph heuristic with a very fast search algorithm that combines forward and local search in a novel way[7].

[7] Russell, Stuart J.; Norvig, Peter (2009). Artificial Intelligence: A Modern Approach (3rd ed.). Upper Saddle River, New Jersey: Prentice Hall.