# Research Review

In this report we will investigate three key developments in planning and search for artificial intelligence and discuss their important in the field.

1. STRIPS
2. GRAPHPLAN
3. UNPOP

## STRIPS

STRIPS, the first major planning system, emerged from Stanford Research Institute (SRI) due to need to formalize the mobility and task assignment/management of a robot in the lab. It solves planning problems by searching a space of "world models" to achieve a given goal (Nilsson and Fikes, 1970). State-space search algorithms for robotics, scheduling and similar domains helped AI planning research to be prioritized. Rather than its algorithm, STRIPS gained more attention by its proposed representation language (Russell and Norvig, 2010)

## GRAPHPLAN

GRAPHPLAN was introduced by Blum and Furst's (1997, 1995). They proposed creating a Planning Graph, a compact structure, followed by running a search algorithm using it. This simple idea achieved orders of magnitude speeds than prior work such as SNLP, PRODIGY, and UCPOP (Weld, 1999). NASA's 1998 use of AI planning system proved maturity of such systems and motivated for faster algorithms in the field.

Planning Graph is composed of two types of levels as shown in the picture: Proposition (even numbered levels) and action (odd numbered levels).
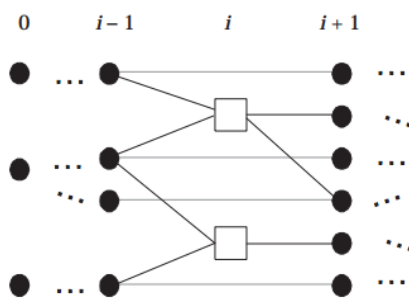


## UNPOP

Drew McDermott proposed UNPOP program for the state-space planning program in 1996, where he suggested the ignore-delete-list heuristic for the first time (Drew McDermott, 1996) at a time where partial-order plan was getting the most attention. In mid 2000s, Haslum et al introduced derivatives that enables handling large planning problems (Russel and Norvig, 2010)

## References:

Blum, A., and Furst, M. 1997. Fast Planning through Planning Graph Analysis. Journal of Artificial Intelligence 90(1–2): 281–300.

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Russell S., and Norwig P. 2010. Artificial Intelligence: A Modern Approach. Third Edition. Prentice Hall Series.

Weld, D. S. 1999. Recent advances in AI planning. AI magazine, 20(2), 93.