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AI Planning History Developments

This article is writeup about 3 major developments in the field of **AI Planning Research.**

Development 1: STRIPS(1971)

STRIPS (Stanford Research Institute Problem Solver) is an automated planner developed by Richard Fikes and Nils Nilsson at Stanford research institute.In STRIPS, you first describe the world.You can do this by proveding actions, preconditions and effects etc.

Next you give it a problem.A problem basically contains initials state and goal condition.What STRIPS does is it will search all possible states, starting from initial state by executing possible actions until it reaches the goal.

A common language for writing STRIPS domains and problem sets is the **PDDL.**
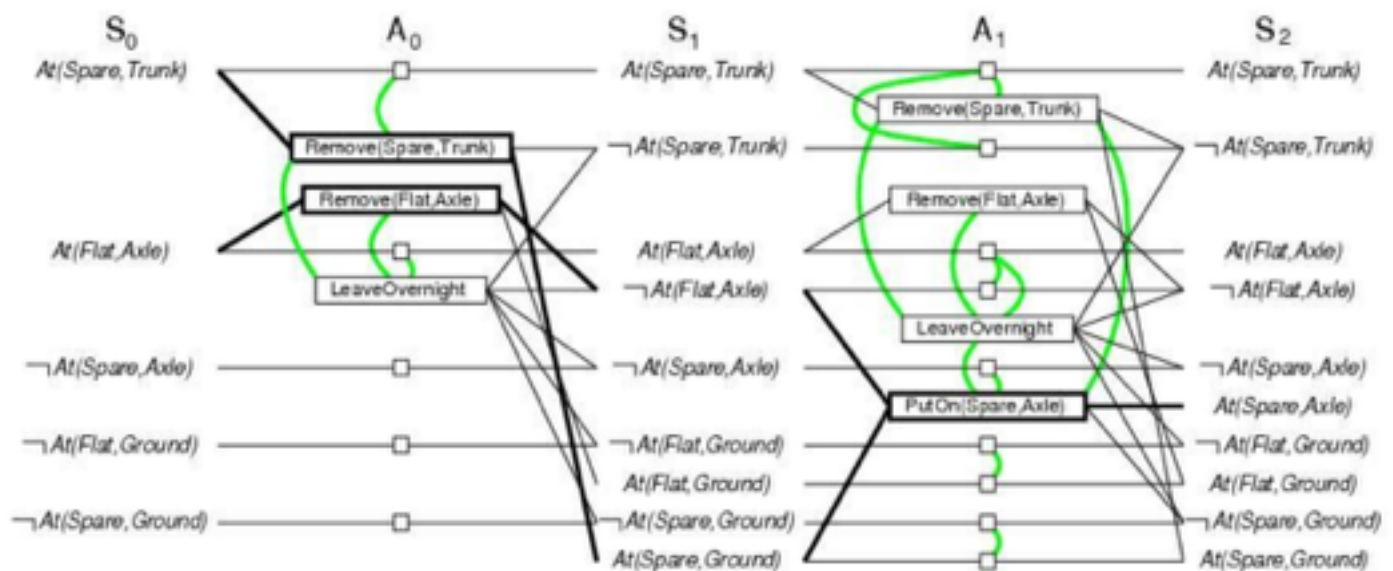
Development 1: Planning Graphs(1997)

Planning graphs are an efficient way to create a representation of a planning problem that can be used to achieve better heuristic estimates and directly construct plans.

They work for propositional logic problems.It consists of sequence of levels that correspond to time steps in plan.

The first level i.e Level 0 is the initial state that we start with.Each level consists of set of literals and a set of actions that represent what might be possible at that step in the plan.It records only restricted subset of possible negative interactions among actions.

Planning graph literals and actions increase monotonically where as mutexes decrease monotonically.Planning graph always terminate.

A planning graph looks something like this.The green lines here indicate mutexes.

Development 3: Heuristic Search Planner(1998)

Just an year after the development of Planning graphs **HSP i.e Heuristic Search Planner** was evolved.Its just the heuristic search.A heuristic is something which tell how far or distant are we now in a state to our goal state.

In a domain independent dent problem, we need to create heuristics based on actions and goals.We can easily derive some heuristics by realxing our problem.But the thing is ,then the problem becomes NP-hard i.e we don't know the exact efficient answer or solution.

The HSP algorithm instead estimates the optimal value of the relaxed problem. The algorithm transforms the problem into a heuristic search by automatically extracting heuristics from the STRIPS encodings.HSP method is useful because it allows us to generalize a heuristic computation to any general STRIPS problem formulation.

Note: For this article , i referred various blogs, websites etc.