

### **STRIPS (Stanford Research Institute Problem Solver):**

A new approach to the application of the theorem proving to problem solving.

*Impact in the field of AI:* Was the first major planning system [1], the system encodes information about the world states in order to find a solution of a problem. The domain is encoded to provide information of the problem. Such information includes the objects, states and actions to be taken in the problem, a initial state and a goal state is also given. A lot of problems can be solved using STRIPS as long as the world domain and problem is described with a set of actions, preconditions and effects [2].

*Relation with the other two:* STRIPS was the first main framework for planners from which the two following methods are extended on problems in STRIPS-like domain.

### **Fast planning through planning graph analysis.**

Planning Graph was a new approach to planning in domains like STRIPS. The algorithm starts by constructing a compact structure, encoding the planning problem keeping useful constraints and reducing the amount of search needed.

*Impact in the field of AI:* Unlike STRIPS Graphplan always returns the shortest possible partial-order plan. The authors provided [3] empirical evidence on different domains showing that Planning Graph Analysis is able to improve in running time.

*Relation with the other two:* Graphplan is very close to STRIPS since it is applied to STRIPS-like planning domains. It is an improving of the STRIPS planner that always finds the shortest possible plan. In relation to the Fast-Forward search, Graphplan was the first approach to significant increase the efficiency in planning systems, and was a base for further research, which then FF was developed.

### **The FF planning system: Fast plan generation through heuristic search.**

*Impact in the field of AI:* The FF planning system is a search strategy that combines hill-climbing with systematic search [4]. It is a heuristic-search planning because a heuristic function is derived from the specification of the planning and used for guiding the search along the state space. The FF short for Fast-Forward. FF generates solutions extremely fast in a large range of planning benchmarks domains.

*Relation with the other two:* Instead of using a Graph, FF uses a heuristic search approach in the state space, which can be a STRIPS-like domain.

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2. Fikes, R. E., & Nilsson, N. J. (1971). STRIPS: A new approach to the application of theorem proving to problem solving. *Artificial intelligence*, 2(3-4), 189-208.
3. Blum, A. L., & Furst, M. L. (1997). Fast planning through planning graph analysis. *Artificial intelligence*, 90(1-2), 281-300.
4. Hoffmann, J., & Nebel, B. (2001). The FF planning system: Fast plan generation through heuristic search. *Journal of Artificial Intelligence Research*, 14, 253-302.