

## Stripping down the STRIPS language

The SRI (Stanford Research Institute) International group is a research institute based out of America, that focuses on biomedical sciences, chemistry, economic development and computing by create world changing solutions to make people safer, healthier and more productive. SRI has received more than 4000 patents and patent applications across the world.

In 1971, two computer scientists Richard Fikes and Nils Nilsson created an automated planning language known as STRIPS (Stanford Research Institute Problem Solver) at the SRI. This language is used to solve planning problems and was a breakthrough due to it's power and expressivity. STRIPS falls under a category of computer languages called Action Languages, which are used to specify state transition systems and to create formal models of the effects of actions on the world. Action languages are used in many domains of artificial intelligence such as game playing, robotics and also automated planning.

### How is STRIPS used?

1. First describe the world – include the definiiton of the models, states, the actions and also their effects
2. Next, you define the problem statement – a problem statement consists of a pre-existing initial state and a goal.
3. STRIPS then searches through all possible states, runs various actions, going through a series of actions and their effects, until it manages to reach the goal state.

A language that's commonly used for writing problem statements in STRIPS is the Planning Domain Definition Language (PDDL). Using this language, you can clearly define the following:

- 1. States:** These are literals that cannot contain variables. States can invoke functions, like this – At(C1, JFK) which indicates that a piece of Cargo C1 is at Airport JFK.
- 2. Goals:** Goals are again similar to states, but with no variables and no functions
- 3. Actions:** Actions are literals which include pre-conditions and post-conditions (effects). Example – Fly(P1, JFK, SFO) would mean that this action has the effect of Plane P1 flying from Airport JFK to Airport SFO.

Various heuristics are used along with the language, to find the best optimum plan for reaching a goal state. Some of the commony used techniques are Breadth first search, Uniform Cost Search and the A\* Search.

### Significance:

Planning Algorithms can be used to solve a wide reange of AI problems including:

1. Travelling salesman problem
2. Rubix cube
3. Game playing agents – where the characters can roam around a free world, with objectives to accomplish
4. Real world scenarios where autonomous robots could be deployed - for example, shipping cargo from one place to another
5. Self driving cars

**References and further reading:**

1. <http://www.primaryobjects.com/2015/11/06/artificial-intelligence-planning-with-strips-a-gentle-introduction/>
2. <https://en.wikipedia.org/wiki/STRIPS>
3. [https://en.wikipedia.org/wiki/SRI\\_International](https://en.wikipedia.org/wiki/SRI_International)