Historical Developments of Planning Research Review

This is a short review of major planning and search developments that highlights the relationships between the developments and their impact on the field of AI.

Stanford Research Institute Problem Solver (STRIPS)
STRIPS is an automated planner that had the goal of finding a series of operators in a space of models to alter an initial state into a model in which a given goal can be proven to be true [1]. Its general control structure was modeled on that of the General Problem Solver, a state-space search system that used means-ends analysis.

STRIPS was impactful to the field through the representation language it used. STRIPS was designed as the planning component of the software for the Shaky robot project at the Stanford Research Institute[2].

Distributed Multi-Agent Planning (DMAP)
Distributed multi-agent planning has many applications as there are many practical systems that use multiple planning agents to optimize resource use (e.g. transportation networks). Planning for distributed multiple agents involves planning for a common goal, an agent coordinating the plans (plan merging) or planning of others, or agents refining their own plans while negotiating over tasks or resources.
These methods distributed constraint satisfaction to coordinate between agents, and local planning to ensure the consistency of these coordination points. To solve the distributed constraint satisfaction problems efficiently, they modify existing methods to take advantage of the structure of the underlying planning problem.

WARPLAN
WARPLAN was the first planner to be written in logic programing and is a great example of how logic programing has economic advantages - it is only 100 lines of code! Early planning research was normally done with linear programming, which considers ordered action sequences - inefficient!
WARPLAN implements a solution known as goal-regression planning to the interleaving problem (a complete planner must allow for interleaving of actions from different sub-plans within a single sequence).

References
1. Fikes, R and Nilsson, N, (1971). STRIPS: A New Approach to the Application of Theorem Proving to Problem Solving.
2. Russell, S and Norvig, P, (2010). Artificial Intelligence: A Modern Approach (3rd Edition).
3. Nissim, R, et al. A General, Fully Distributed Multi-Agent Planning Algorithm.