Prodigy

• A classical STRIPS-style planner
  – Domain Representation: objects, operators
  – Problem Representation: initial state, goal state

• Operators have preconditions and effects
Example – Blocksworld

(On A B)
(On B Table)
(On C Table)
(Clear A)
(Clear C)
(Clear Table)
(Arm–empty)

Initial State

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
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</tbody>
</table>

Goal State

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>C</th>
<th>A</th>
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</thead>
</table>

Operators:

(Pickup x)
- preconds: (Clear x)
- (Arm–empty)
- adds: (Holding x)
  - if (On x y), (Clear y)
- dels: (Arm–empty)
  - if (On x y), (On x y)

(Putdown x y)
- preconds: (Holding x)
  - (Clear y)
- adds: (On x y)
  - (Arm–empty)
- dels: (Holding x)
  - if (y != Table), (Clear y)
Prodigy/Blocksworld (cont.)

Putdown C A
(Holding C)
(Clear A)

C

A

B

C

A

(On C A)
(On B C)
Prodigy/Blocksworld (cont.)

- A
- B
- C

- A
- B
- C

Pickup A

C  B

Pickup B

C  B

(Clear C)  (Holding B)
Prodigy/Blocksworld (cont.)

Pickup A
(Check A)
Pickup B
(Arm-empty)
Putdown A Table
Prodigy/Blocksworld (cont.)

Putdown A Table
Prodigy/Blocksworld (cont.)
Issues in Planning

- Representations
- Algorithms
- Conditional effects
- Dynamic worlds
- Mixing planning and execution
- Learning
- Large-scale applications

Fairly mature field
Example – Blocksworld

(On A B)
(On B Table)
(On C Table)
(Clear A)
(Clear C)
(Clear Table)
(Arm–empty)

**Initial State**

<table>
<thead>
<tr>
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<th>C</th>
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<tbody>
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**Goal State**

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**Operators:**

**Pickup** x

- **preconds:** (Clear x)
  - (Arm–empty)
- **adds:** (Holding x)
  - if (On x y), (Clear y)
- **dels:** (Arm–empty)
  - if (On x y), (On x y)

**Putdown** x y

- **preconds:** (Holding x)
  - (Clear y)
- **adds:** (On x y)
  - (Arm–empty)
- **dels:** (Holding x)
  - if (y != Table), (Clear y)