Consolidating LAMA with Best-First Width Search

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LAMA

FF \quad [ s_1, s_3, s_{42}, s_{91}, s_{17}, \ldots ]

FF-pref \quad [ s_{91}, s_{17}, \ldots ]

LMC \quad [ s_3, s_{42}, s_{91}, s_1, s_{17}, \ldots ]

LMC-pref \quad [ s_{91}, s_1, s_{17}, \ldots ]
LAMA

FF
FF-pref
LMC
LMC-pref

\[
\begin{array}{c}
\text{FF} & [s_1, s_3, s_{42}, s_{91}, s_{17}, \ldots ] \\
\text{FF-pref} & [s_{91}, s_{17}, \ldots ] \\
\text{LMC} & [s_3, s_{42}, s_{91}, s_1, s_{17}, \ldots ] \\
\text{LMC-pref} & [s_{91}, s_1, s_{17}, \ldots ] \\
\end{array}
\]
LAMA

FF  \[ s_1, s_3, s_{42}, s_{91}, s_{17}, \ldots \]  
FF-pref \[ s_{91}, s_{17}, \ldots \]  
LMC \[ s_3, s_{42}, s_{91}, s_1, s_{17}, \ldots \]  
LMC-pref \[ s_{91}, s_1, s_{17}, \ldots \]  

expand \( s_1 \)
LAMA

FF \[ s_3, s_{42}, s_{91}, s_{17}, \ldots \] 
FF-pref \[ s_{91}, s_{17}, \ldots \] 
LMC \[ s_3, s_{42}, s_{91}, s_1, s_{17}, \ldots \] 
LMC-pref \[ s_{91}, s_1, s_{17}, \ldots \] 

expand \( s_{91} \)
LAMA

FF  \[ s_3, s_{42}, s_{91}, s_{17}, \ldots \]  
FF-pref \[ s_{17}, \ldots \]  
LMC \[ s_3, s_{42}, s_{91}, s_1, s_{17}, \ldots \]  
LMC-pref \[ s_{91}, s_1, s_{17}, \ldots \]  

expand \( s_3 \)
LAMA

FF  \[ s_3, s_{42}, s_{91}, s_{17}, \ldots \]  

FF-pref  \[ s_{17}, \ldots \]  

LMC  \[ s_{42}, s_{91}, s_1, s_{17}, \ldots \]  

LMC-pref  \[ s_{91}, s_1, s_{17}, \ldots \]  

and so on...
BFWS

**novelty** of a state = size of smallest unseen tuple

**partition state space**: check novelty only for states in the same partition

**partition** = set of functions
## Our Contribution

<table>
<thead>
<tr>
<th>Method</th>
<th>Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>FF</td>
<td>$[s_3, s_{42}, s_{91}, s_{17}, \ldots]$</td>
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<td>$[s_{91}, s_1, s_{17}, \ldots]$</td>
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<tr>
<td>BFWS</td>
<td>$[\ldots]$</td>
</tr>
</tbody>
</table>
Motivation

LAMA and BFWS dominated the agile track in the last IPCs

what if we combine both?
Agile Planning

find a plan as fast as possible

quality does not matter

in IPC: 5 minutes; 8 GiB
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<td>LAMA</td>
<td>2081</td>
<td>1737.43</td>
</tr>
<tr>
<td>BFWS($f_6$)</td>
<td>2042</td>
<td>1581.45</td>
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Total 2426 tasks in the benchmark set

**BFWS($f_6$):**

1. novelty partitioned on LMC and FF
2. state is preferred
3. LMC
4. novelty partitioned on FF
5. FF
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**LAMA-W($f_6$):**

LAMA + BFWS($f_6$) open list
BFWS($f_6$) :

1. novelty partitioned on LMC and FF
2. state is preferred
3. LMC
4. novelty partitioned on FF
5. FF
BFWS\left(f_2^{LM}\right):\hspace{1em}1.\text{ novelty partitioned on LMC} \\
2.\text{ LMC}
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Do we need all LAMA?
simpler BFWS worked better
can we simplify LAMA open lists?
LAMA Revisited

FF
FF-pref
LMC
LMC-pref
BFWS\left(f_2^{LM}\right)
LAMA Revisited

FF
FF-pref
LMC
LMC-pref
BFWS($f_2^{LM}$)
LAMA Revisited

We call this planner NOLAN
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<tr>
<td><strong>NOLAN</strong></td>
<td>2120</td>
<td>1756.30</td>
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<tr>
<td>LAMA-(W(f_2^{LM}))</td>
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Conclusion

combining LAMA + BFWS works

need to use simpler BFWS

simplifying LAMA also helps