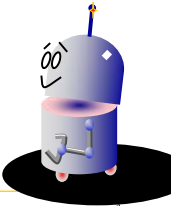


UNIVERSITY OF CALGARY  
Computer Science

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**Search Paradigms:  
Search Summary**



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**Search Models**

A:(S,T)	Set-based	And-tree-based	Or-tree-based
S:possible states	$S \subseteq 2^F$ ; F:set of facts	$S_n \subseteq \text{Atree}$ ; Atree: (pr, sol:{yes,?}, b <sub>1</sub> ;Atree,...,b <sub>n</sub> ;Atree), n ≥ 0	$S_n \subseteq \text{Otree}$ ; Otree: (pr, sol:{yes,?,no}, b <sub>1</sub> ;Otree,...,b <sub>n</sub> ;Otree), n ≥ 0
T:SxS = possible Transitions	T: {(s,s')   ∃ A → B ∈ Ext • A ⊆ s ∧ s' = (s-A) ∪ B}; Ext ⊆ {A → B   A, B ⊆ F}	T <sub>n</sub> = {(s <sub>1</sub> ;S <sub>1</sub> ;s <sub>2</sub> ;S)   $\text{Erw}_n(s_1, s_2) \vee \text{Erw}_n(s_2, s_1)$ }; ✓ $\text{Erw}_n((pr, ?), (pr, yes))$ ; ⊕ $\text{Erw}_n((pr, ?), (pr, ?), (pr_1, ?), \dots, (pr_n, ?))$ ; ⊙ $\text{Erw}_n((pr, ?), b_1, \dots, b_n), (pr, ?), b_1, \dots, b_n$ ); ⊖ $\text{Erw}_n^*((pr, ?), b_1, \dots, b_n), (pr, ?), b_1, \dots, b_n$ )	T <sub>v</sub> = {(s <sub>1</sub> ;s <sub>2</sub> )   s <sub>1</sub> , s <sub>2</sub> ∈ S <sub>v</sub> }; ✓ $\text{Erw}_v((pr, ?), (pr, yes))$ ; ⊗ $\text{Erw}_v((pr, ?), (pr, no))$ ; ⊕ $\text{Erw}_v((pr, ?), (pr, ?), (pr_1, ?), \dots, (pr_n, ?))$ ; ⊙ $\text{Erw}_v((pr, ?), b_1, \dots, b_n), (pr, ?), b_1, \dots, b_n$ ); ⊖ $\text{Erw}_v^*((pr, ?), b_1, \dots, b_n), (pr, ?), b_1, \dots, b_n$ )

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**Search Processes**

P:(A,Env,K)	Set-based	And-tree-based	Or-tree-based
K:SxEnv → S	K(s,e) = (s-A) ∪ B		
Utility: SxSxEnv → Nat	$\forall A' \rightarrow B' \in \text{Ext} \mid A' \subseteq s \bullet f_{\text{Wert}}(A, B, e) \leq f_{\text{Wert}}(A', B', e)$ ; $f_{\text{Wert}}: 2^F \times 2^F \times \text{Env} \rightarrow \text{Nat}$	f <sub>leaf</sub>	f <sub>leaf</sub>
Select: 2 <sup>SxS</sup> xEnv → SxS	A → B = f <sub>select</sub> (({A' → B'   ∃ A'' → B'' ∈ Ext   A'' ⊆ s • f <sub>Wert}(A', B', e) ≤ f<sub>Wert}(A'', B'', e)}); <math>f_{\text{select}}: 2^{2^F \times 2^F} \times \text{Env} \rightarrow 2^F \times 2^F</math></sub></sub>	f <sub>trans</sub>	f <sub>trans</sub>

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**Instances and Goals**

	Set-based	And-tree-based	Or-tree-based
Ins=(s <sub>0</sub> ,G)			
G: s → {yes,no}	S <sub>goal</sub> ⊆ S ∨ no more expansions possible	s = (pr', yes) ∨ ((pr', ?, b <sub>1</sub> ..b <sub>n</sub> ) ∧ G <sub>n</sub> (b <sub>1</sub> ) = .. = G <sub>n</sub> (b <sub>n</sub> ) = yes ∧ the sols are compatible) ∨ no more solutions	s = (pr', yes) ∨ ((pr', ?, b <sub>1</sub> ..b <sub>n</sub> ) ∧ G <sub>n</sub> (b <sub>1</sub> ) = yes) ∨ can't process any leaves

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