

X		O
O	X	
	O	X

adversarial search

↳ Minimax.

Max (X) aims to maximum score

Min (O) aims to minimum score

S_0 : initial state

Player(s): returns which player to move in state s.

Action(s): return legal moves in state s

Result(s, a): return state after action a taken in state s

Terminal(s): checks if state s is a terminal state.

utility(s): final numerical value for terminal state s.

< Knowledge >

Knowledge-based agent →

↳ agents that reason by operating on internal representations of knowledge.

Sentence

↳ an assertion about the world in a knowledge representation language.

propositional logic

- proposition symbols, ie. P, Q, R,

logical connectives [T - True F - False]

← "→ not" "∧ and" "∨ or" "→ implication" "↔ biconditional"
if [P], then will be [Q] if/only if [P], then will be [Q]

P	→	P
T		F
F		T

P	Q	P ∧ Q	P ∨ Q	P → Q	P ↔ Q
T	T	T	T	T	T
T	F	F	T	F	F
F	T	F	T	T	F
F	F	F	F	T	T

前提是错误的, 此句并无任何意义. → True

model - assignment of a truth value to every propositional symbol (a possible world)

↳ P : it is raining, Q : it is a Tuesday.

$\{P: \text{True}, Q: \text{False}\}$

Knowledge base - a set of sentences known by a knowledge-based agent.

Entailment ~~the~~ \models

$$\alpha \models \beta$$

called: "Entail"

In every model in which sentence α is true, sentence β is also true.

inference - the process of deriving new sentences from old ones.

R : Harry will go for a run

KB: $(P \wedge \neg Q) \rightarrow R$

↳ It's Tuesday and It's not raining, then Harry will go for a run

$P: \text{True} \quad \neg Q: \text{True} \Rightarrow R: \text{True}$

Inference: R

Does $KB \models \alpha$??

Model checking -

• To determine if $KB \models \alpha$:

• Enumerate all possible models.

• If in every model where KB is true, α is true, then KB entails α .

• Otherwise, KB does not entail α .

KB: $(P \wedge \neg Q) \rightarrow R$ P $\neg Q$

Query: R .

P	Q	R	KB.
F	F	F	F
F	F	T	F
F	T	F	F
F	T	T	F
T	F	F	F
T	F	T	T
T	T	F	F
T	T	T	F