

First-Order Logic

Chapter 8

Problem of Propositional Logic

☹ Propositional logic has very limited expressive power

– E.g., cannot say "pits cause breezes in adjacent squares" except by writing one sentence for each square.

– We want to be able to say this in one single sentence: "for all squares and pits, pits cause breezes in adjacent squares.

– First order logic will provide this flexibility.

First-order logic

- Propositional logic assumes the world contains **facts** that are true or false.
- First-order logic assumes the world contains
 - **Objects**: people, houses, numbers, colors, baseball games, wars, ...
 - **Relations between objects**: red, round, prime, brother of, bigger than, part of, comes between, ...