

Objectives

Conditional Statements and Logic Inference

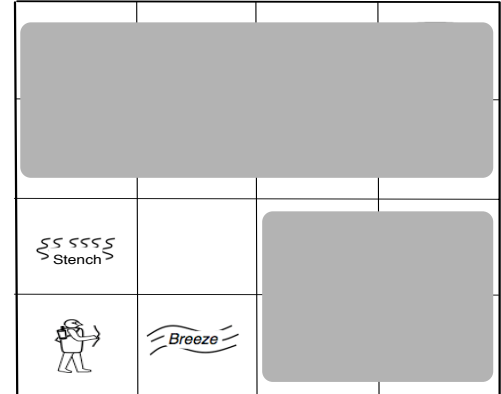
Instruction: See team-assignment-01

Logic Formulation of the Wumpus World (Cont'd)

In this assignment, your task is to construct a logic argument to conclude that **“the wumpus is in Room (1, 3)”** in the wumpus world as shown in the picture below.

Recall that the following propositions have been defined in Team Assignment 01: for a particular pair of numbers (i, j) ,

- ▷ $p_{i,j}$ = “there is a pit in Room (i, j) ”,
- ▷ $w_{i,j}$ = “the wumpus is in Room (i, j) ”,
- ▷ $s_{i,j}$ = “Room (i, j) is smelly”,
- ▷ $b_{i,j}$ = “Room (i, j) is breezy”



Let assume further that the following “game rules” are true for all possible wumpus worlds:

- R_1) A room is breezy if and only if a neighboring room has a pit
- R_2) A room is smelly if and only if the wumpus is in a neighboring room

Part A. Game Rules and Hunter’s Observations

To construct the argument, you will find game rules for specific rooms and hunter’s observations useful, such as those given below. Write each of the following statements symbolically.

Game Rules

1. Room $(1, 2)$ is smelly if and only if the wumpus is in Room $(1, 1)$, Room $(2, 2)$, or Room $(1, 3)$
2. Room $(2, 1)$ is breezy if and only if there is a pit in Room $(1, 1)$, Room $(2, 2)$, or Room $(3, 1)$

Hunter’s Observations

- ▷ room $(1, 1)$ is neither smelly nor breezy.
- ▷ the wumpus is not in room $(1, 1)$,
- ▷ room $(1, 1)$ has no pit,
- ▷ room $(1, 2)$ is smelly but not breezy, and
- ▷ room $(2, 1)$ is breezy but not smelly.

Part B. Use Inference Rules to Explore the Wumpus World

Construct a sound logic argument to conclude that

- The wumpus is in room (1, 3)

For each inference step, indicate the inference rule used and for each statement in the argument, indicate whether it is a game rule, a hunter's observation, or a proposition deduced in previous steps.

Session: _____

Team Number: _____

- | | |
|------------------------|------------------|
| 1. Name (Print): _____ | Signature: _____ |
| 2. Name (Print): _____ | Signature: _____ |
| 3. Name (Print): _____ | Signature: _____ |
| 4. Name (Print): _____ | Signature: _____ |
| 5. Name (Print): _____ | Signature: _____ |