

The Town of Bool

Boolean logic is based on two values: TRUE and FALSE (or alternatively ON and OFF for physical transistors). Complex logical expressions can be formed by using a few simple operations, such as AND, OR, and NOT. These expressions allow computers to perform logic such as adding binary digits, determining whether an IF statement executes, or controlling when a loop terminates.



THE TOWN OF BOOL was home to one of the kingdom's most respected logicians, Ellis Conjunctione. Ann had decided to visit the kingdom's scholars in the hope that they would provide insights into her quest. Unfortunately, upon arrival, Ann was informed that Dr. Conjunctione wouldn't be seeing anyone.

"I am sorry, but Dr. Conjunctione is busy at the current time," stated one of Dr. Conjunctione's graduate students. His voice projected a rare combination of formality and boredom. It reminded Ann of a over-practiced lecture, during which the teacher struggles to maintain his own interest in the material.

The graduate student stood in front of the university's doors, physically blocking Ann's path. He crossed his arms. Ann wondered if the student thought that pose would make him look menacing. In reality, he just looked uncomfortable.

"I'm on an important quest," insisted Ann.

The student appeared unswayed. "Dr. Conjunctione is already working on the single most important problem facing the

kingdom: a logic problem called 3-SAT. Your quest will have to wait. He gave me explicit instructions not to be interrupted by anyone.”

Despite arguing her case for two hours, Ann couldn’t convince the student. He refused to compromise at all. Finally, she admitted defeat and resolved to move on to the next name on her list. She decided to stay the night in Bool before continuing.

Ann found her short stay in the town of Bool most annoying. She had always heard that the Booleans were strict believers in binary logic—everything was either true or false. She had naturally assumed that this simply meant that they were opinionated. For example, she wouldn’t expect anyone in Bool to state “Jazz is *okay*.” Opinions would be definite. However, she hadn’t expected this philosophy to apply to absolutely every single aspect of life.

The first surprise came at a local restaurant.

“May I get more water, please?” Ann asked a waiter.

“No,” he replied. “I only refill a glass if it is empty AND you’re still eating.”

“I *am* still eating,” Ann assured him.

“But your glass is NOT empty,” he responded as he moved off to the next table.

Ann looked down at her glass. It contained at most three drops of water. Ann sighed and finished those drops in preparation for the waiter’s return. She decided that in this case she was going to embrace the Boolean philosophy and NOT give him a tip.

Luckily, Ann was well equipped for her stay. She had studied Boolean logic as an elective in kindergarten. It all came down to a few simple rules:

- There are only two options: TRUE and FALSE,
- A AND B evaluates to TRUE if and only if both A and B are TRUE,
- A OR B evaluates to TRUE if either A or B (or both) is TRUE,
- NOT A evaluates to TRUE if and only if A is FALSE.

The logic matched how people used the terms in everyday life. Unfortunately, though, the laws of Boolean logic weren’t

designed for living everyday life.

Over the course of her 16-hour stay, Ann continued to experience the frustration of dealing with the Booleans' world. She found that when the park "closed at sunset," the patrons would stay until the second the sun dropped below the horizon and then run out of the park. Similarly, getting directions turned out to be extremely aggravating.

"Is the hotel in that direction?" she asked, pointing approximately southeast.

"It is NOT in that direction," proclaimed a Boolean on the street. "It is in *that* direction." The Boolean pointed in almost, but not exactly, the same direction. Ann sighed and walked in approximately the correct direction.

"You are NOT going in the correct direction," the Boolean shouted after her. Ann ignored him.

She also resolved to program Marcus's compass to guide her back to the hotel. That way, if she went out, she could avoid having to ask for directions again.

Even the signage in Bool was overly logical. The crosswalk light actually said "Cross when the WALK light is on AND there are no cars speeding toward you." Did they really need to clarify that? Ann wondered what would happen if someone misprinted the sign to use an OR. Would it be chaos?

Ann only fully understood the Booleans' true adherence to this logical formulation when she reached the hotel. There, on the back of her hotel door, was a fire escape plan like you would find at any hotel—except, in this case, all of the conditions were specified as long Boolean logic statements. "Use the south stairs if (they are NOT on fire AND the north stairs are on fire) OR (there is an obstruction in the hall toward the north stairs) OR..."

After reading the sign four times, Ann decided that in the event of a fire she would be too confused to escape. She promptly resolved to leave Bool as soon as she could.