Jason and the Dragon’s Teeth

Cadmus handed Jason the sack of old dragon's teeth and the Greeks stomped and cheered.

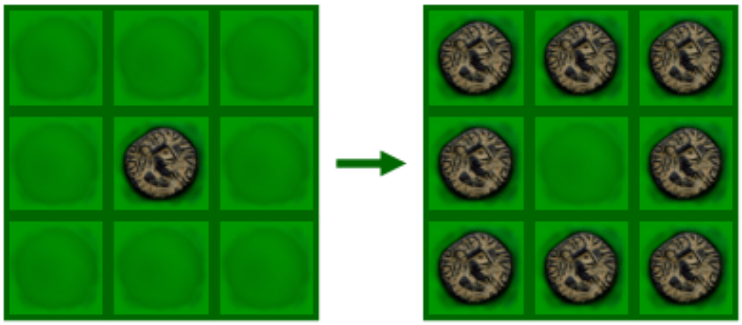
Jason opened the sack and turned a tooth over in his hands. It was like a white serrated knife, with a yellow handle. Some of the teeth had charcoal black stains where they had been burnt by belching flames. Although they looked dead, lifeless things, everyone knew what would happen when they were plowed into the earth. The plow was yoked-up and ready.

A yoke was placed around the head of the beasts and the plow was attached to the iron ring in the centre.

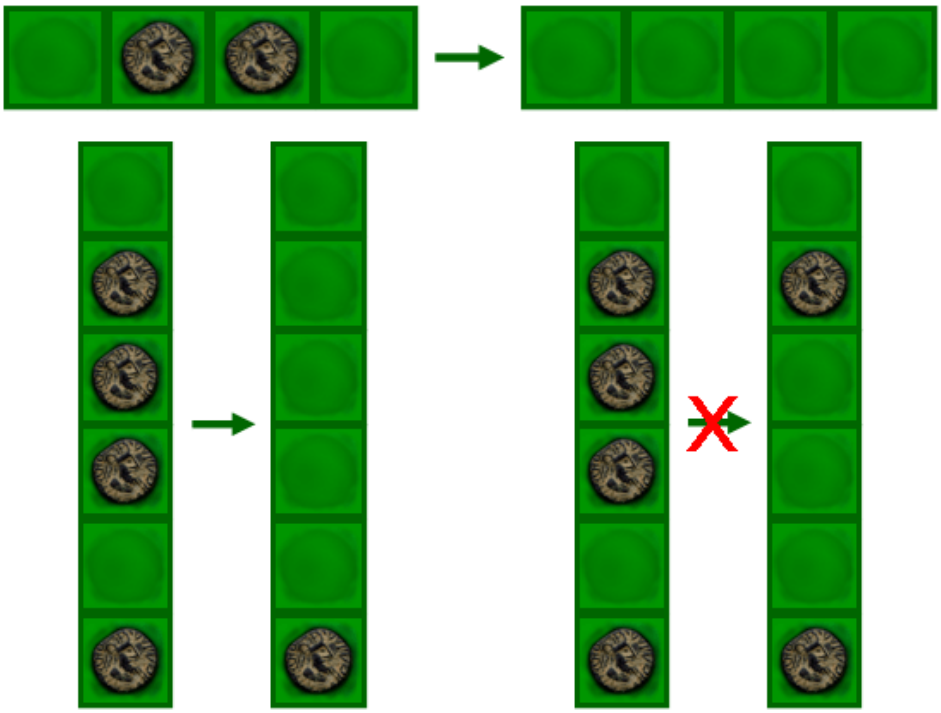
Jason put on his armor, threw the sack of dragon teeth over his shoulder, and strode over to the plow. With his right hand he held his shield and directed the plow, and with his left hand he held his gripped his sword. He shook the sack and a single dragon tooth fell to the plowed earth. Nothing happened. The Greeks stood in hushed expectation. Jason turned to them half apologetically, but then he heard a scream from the earth and when he turned back, an expressionless dragon-tooth-warrior was climbing out of the plowed earth where the tooth had fallen.

Jason barely had time to prepare his shield when the dragon-tooth-warrior's sword came crashing down. The sack of dragon teeth fell off his shoulder and, as Jason was recovering, the dragon-tooth-warrior grabbed some of the teeth and strew them about. It was the last move he would make. Jason's blade found its way up and through the armor and the dragon-tooth-warrior slumped and then dissolved into the plowed earth. The Greeks cheered, but before Jason could recover the sack, eight more screams were heard...

The fighting raged. Jason soon learned two strategies:

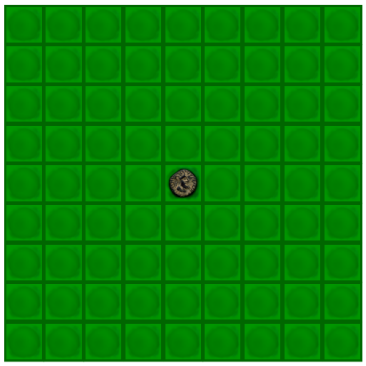


1) He could cut down a dragon-tooth-warrior in the middle of an otherwise empty 3x3 region, but when he did this, 8 dragon-tooth-warriors would spring up.



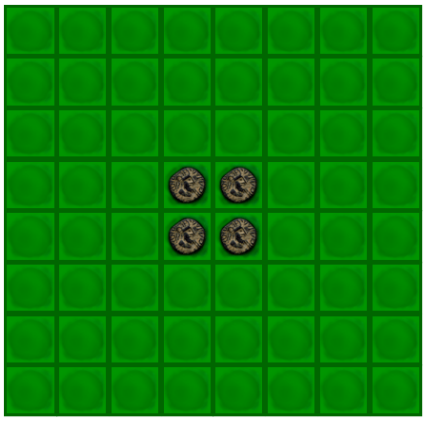
2) He could plow over ALL consecutive dragon-tooth-warriors in a row or column.

Using just these two rules help Jason defeat the dragon-tooth-warriors from the starting position*:

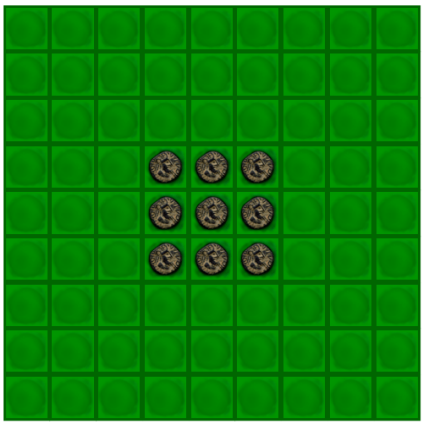


Extensions:

- Jason managed to defeat all the dragon-tooth-warriors, but when he left the battlefield, weary and bruised, he forgot to check the sack. A single dragon tooth remained at the bottom of that sack, and when Jason and all the Greeks went off to party, a lone spy crept into the field and stole that remaining tooth and carried it back to his enchantress.
- The enchantress could use her magical spells on the dragon-tooth-warriors when they were in square formations. Using the same starting point, and the same rules as above, find out a way for the enchantress to create a 2x2 bodyguard:



- Using the same starting point and the same rules, find a way for the enchantress to create a 3x3 square of dragon-tooth-warriors:



* For all of these puzzles assume the field is as large as needed.

The Math in this Problem:

Given rules and restrictions like many other board games, this math puzzle challenges students to experiment with various strategies and tactics to reach the main objective: to help Jason defeat the dragon-tooth-warriors.