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Our project deals with the study of Chomp game, is associated with a group of impartial games.

An ***impartial game*** is a two-player game in which both players have complete information, no chance is involved, and the legal moves from each position are the same for both players. We will deal with the normal play rule, in which the last player to move is the winner.

Chomp is a two-player strategy game played on a rectangular grid made up of smaller square cells. The players take it in turns to choose one block and "eat it" (remove from the board), together with those that are above it and to its right. The bottom left block is "poisoned" and the player who eats this loses.

Previous studies have shown that for any rectangular starting position, except 1 × 1, the first player can win. Computers can easily calculate winning moves for this game on two-dimensional boards of reasonable size.

Whereas for large or infinite dimensions such as 3 * N certain situations were found or patterns were identified for in-game victory strategy, denoted by P, N:

We can classify each position in the game according to whether it is a first- or a second-player win, if both players play optimally starting from that position. A first-player-win position is known as an ***N-position*** (because the ***n***ext player is to win), while a second-player-win position is known as a ***P-position*** (because the ***p***revious player is to win).

Knowledge of the *P*- and *N*-positions of a game provides the winning strategy for it: If it is our turn and the game is in an *N*-position, we should move into a *P*-position. Then our opponent will be forced to move into an *N*-position, and so on. Eventually we will move into a sink and win.

We tried to think of a change in the rules of the game that we can study its effect, and that was not done in previous studies. After checking several directions we chose to focus on a game with two poisons, i.e. two squares on the board that represent the end of the game - loss.

Project goals

- Explore different locations of poisons and the effect of changing the position of poisons on the winning strategy in the game
- Identify patterns in P-position for the new game we created.
- Implement the game as an interface where you can play in front of the computer or another player

Planning work stages in the project:

Search for locations for poisons and implement an algorithm to find P-position for the selected locations. After receiving all P-position, we will investigate the results - which moves lead to victory, identifying patterns, etc ...

At the end of the project we will draw conclusions and create game software.

Bibliography:

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