

Five or More Group Analysis

Part Two

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Definitions

- Queue: List of marbles dropping on the board in the next turn.
- Group: A set of same-color marbles on the board that are in an unobstructed row of 5, but not necessarily touching.
- Attach: Moving a marble to a group's edge.
- Completed: When a group gets five marbles in a row and is taken off the board.
- k-Connected: There are k acyclical paths between a marble and an associated group.
- Blocked: There are no paths between this marble and an associated group.
- Region: Continuous unoccupied area on the board.

Group Selection

Ranked in order of highest priority. When multiple color groups match a rule, the use the list of tie breaking rules, or continue to the next rule if no rules break the tie.

- 1) Choose a group that has the possibility of being completed with one available move.
- 2) Group with the most marbles in it. Break ties by:
 - a) Has the most same-colored connected marbles on the board.
 - b) Has the most same-colored marbles in the queue.
- 3) If no groups have connected marbles, then we should start a new group, rules for which color and where to start it are discussed below.

Actual Marble Selection

After deciding which group to move, these are the rules on how to pick which marble should be moved to the group if there are multiple options. These rules also discuss which side of the group the marble should be attached to.

- 1) Pick the marble that would open up the most paths on the board when moved.
- 2) Prioritize marbles that open up paths to other large groups.
- 3) Pick marbles that have small k-connections. They are more likely to be blocked by incoming marbles from the queue.

How to Move a Selected Marble

- 1) Attach marbles to a space in a group that has the least paths to it. That position is more likely to become blocked by the incoming marbles.
- 2) Don't attach a marble to the side of a group if that move would divide a region (unless that move will complete the group).

Starting a group

These are guidelines about when no groups are ideal or available, so we need to start a new one.

- 1) Pick the color that has the most same-color connected marbles on the board that has sufficient room to be completed.
- 2) Pick a base marble which has the most connected marbles of the same color and has sufficient room to complete the group. Then pick the marble with smallest k-connection to move to it. This marble is the most likely to be blocked after the incoming marbles are dropped.
- 3) Avoid starting diagonal groups. The rectangular area occupied by a diagonal group is completely unavailable to other horizontal and vertical groups. While a vertical or horizontal group occupies at most 5 squares, a diagonal group occupies 25.