P5A Document

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Objective: To collect as many seeds in your store as possible. The player with the most seeds in his/her store at the end of the game wins.

Set Up: Place four seeds in each of the six pits on your side of the game board. Your opponent should do the same. The colors of the seeds don’t matter. (For a shorter game, you can play with three seeds in each pit.)

Basic Rules:

• Play always moves around the board in a counterclockwise circle (to the right)

• The store on your right belongs to you. That is where you keep the seeds you win.

• The six pits near you are your pits.

• Only use one hand to pick up and put down seeds.

• Once you touch the seeds in a pit, you must move those seeds.

• Only put seeds in your own store, not your opponent’s store.

Starting the Game:

On a turn, a player picks up all the seeds in one pit and “sows” them to the right, placing one seed in each of the pits along the way. If you come to your store, then add a seed to your store and continue. You may end up putting seeds in your opponent’s pits along the way.

Play alternates back and forth, with opponents picking up the seeds in one of their pits and distributing them one at a time into the pits on the right, beginning in the pit immediately to the right.

Special Rules:

• When the last seed in your hand lands in your store, take another turn.

• When the last seed in your hand lands in one of your own pits, if that pit had been empty you get to keep all of the seeds in your opponents pit on the opposite side. Put those captured seeds, as well as the last seed that you just played on your side, into the store.

Ending the Game:

The game is over when one player’s pits are completely empty. The other player takes the seeds remaining in her pits and puts those seeds in her store. Count up the seeds. Whoever has the most seeds wins.

Nouns: seed, store, player, end, game, win, place, pit, side, game, board, opponent, color, circle, right, hand, time, turn

**Domain Model for Mancala game**

**A diagram of a game

Description automatically generated**

**Use Case**

1. place 4 seeds in each pit

2. player picks up all seeds in one pit on their side of board.

3. player adds one seed in each pit counterclockwise (and their store) beginning with the pit to the right.

4. if last seed during turn lands in empty pit on players side, all seeds on opposite side and last seed are moved to player's store.

5. if last seed during turn lands in player's store, goto 2.

6. if all pits on one side are completely empty, game over and player on opposite side takes remaining seeds to their store. player with most seeds in their store wins.

7. if both sides have seeds, it’s the other player’s turn. goto 2.

**Use Case Diagram**

|  |  |
| --- | --- |
| User | System |
| 1. starts new game | 2. displays new game board |
| 3. selects pit | 4. adds one seed to each pit to the right |
|  | 5a. check if last seed lands in empty pit on player’s side [ALT-1] |
|  | 6a. check if last seed lands on player’s store [ALT-2] |
|  | 7a. check if one side of board is empty [ALT-3] |
|  | 8. Switch player, GOTO 3 |
|  | [ALT-1] empty pit on player’s side –  5b. move last seed and seeds in opposite pit to player’s store |
|  | [ALT-2] last seed lands on player’s store –  6b. GOTO 3 |
|  | [ALT-3] side of board empty –  7b. move all remaining seeds to opponent’s store, count each player’s seeds in store, declare winner |

**Robustness Model**

A diagram of a game

Description automatically generated

**Test Cases**

Check if the number of seeds in each pit after a move is correct; Check if after the last seed is dropped in an empty pit, the seeds on opposite side and last pit are moved to store; Check if the last seed is dropped in a store and the game controller allows player to go again; Check if the game ends when all pits on one side are empty; Check the seed count is accurate when game ends. And Zombie test cases: Zero players, one player, two players, many players, null players; Zero board, one board, two boards, many boards, null boards; Zero sides, one side, two sides, many sides, null sides; Zero pits, one pit, two pits, many pits, null pits, twelve pits; Zero stores, one store, two stores, many stores, null stores; Zero seeds, one seed, two seeds, many seeds null seeds, 48 seeds Pick up zero seeds, pick up one seed, pick up two seeds, pick up many seeds, pick up null seeds, pick up all seeds; Drop zero seeds, drop one seed, drop two seeds, drop many seeds, drop null seeds, drop all seeds, drop seed clockwise, drop seed counter clockwise; Pit receive zero seeds, pit receive one seed, pit receive two seeds, pit receives many seeds, pit receive null seeds, pit receives all seeds; Pick up from one pit, pick up from two pits, pick up from many pits, pick up from null pits, pick up from opposite side; Store receive one seed, store receive two seeds, store receive multiple seeds, store receive null seeds; Pick up from store one seed, pick up from store two seeds, pick up from store multiple seeds; Drop last seed in empty pit, drop last seed in store, drop last seed in opposite side, drop seeds in opposite side, drop null seeds in opposite side; Count seeds in each store, check if side is empty.

**24 seed game play example**

A table with numbers and symbols

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