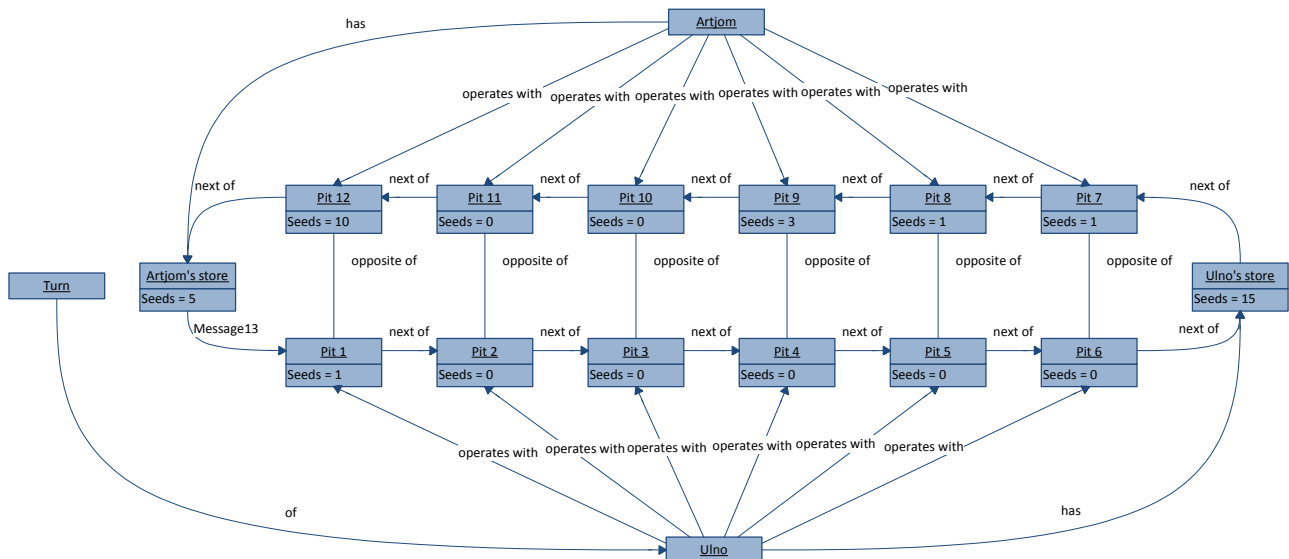


# Mancala: Object diagrams

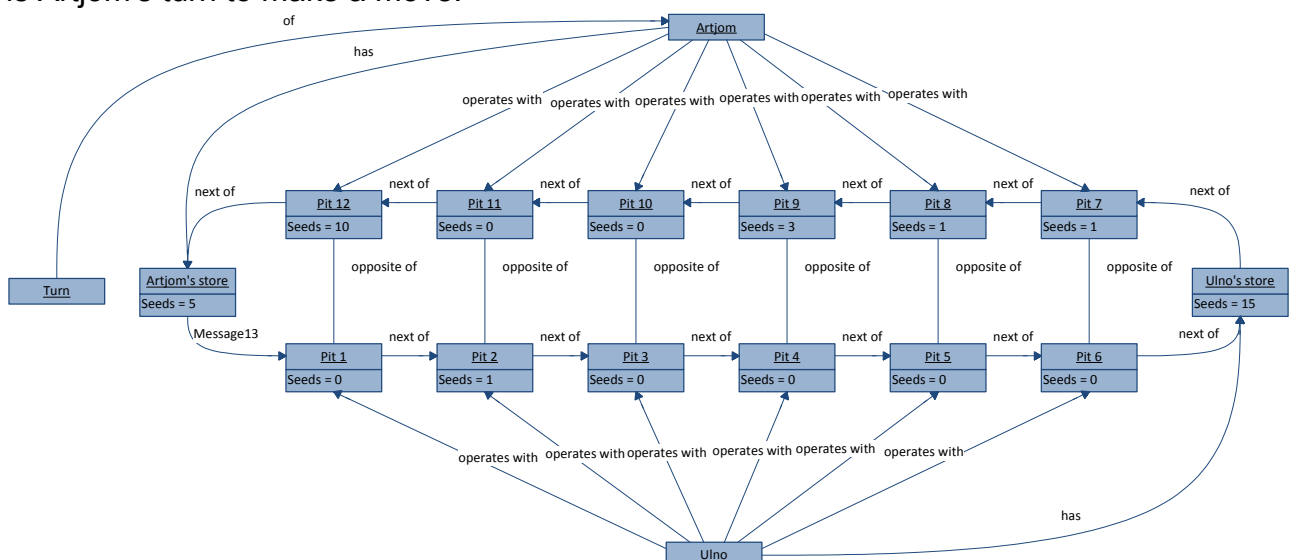
Object diagrams are based on user stories (numbers in brackets are representing the number of user story).

## Ulno makes a move from pit 1 (US1)

**Preconditions:** The pits on the gaming board contain the following amount of seeds: pit 1 – 1, pit 2 – 0, pit 3 – 0, pit 4 – 0, pit 5 – 0, pit 6 – 0, pit 7 – 1, pit 8 – 1, pit 9 – 3, pit 10 – 0, pit 11 – 0, pit 12 – 10. There are 15 seeds in Ulno's store and 5 seeds in Artjom's store. It is Ulno's turn to make a move.

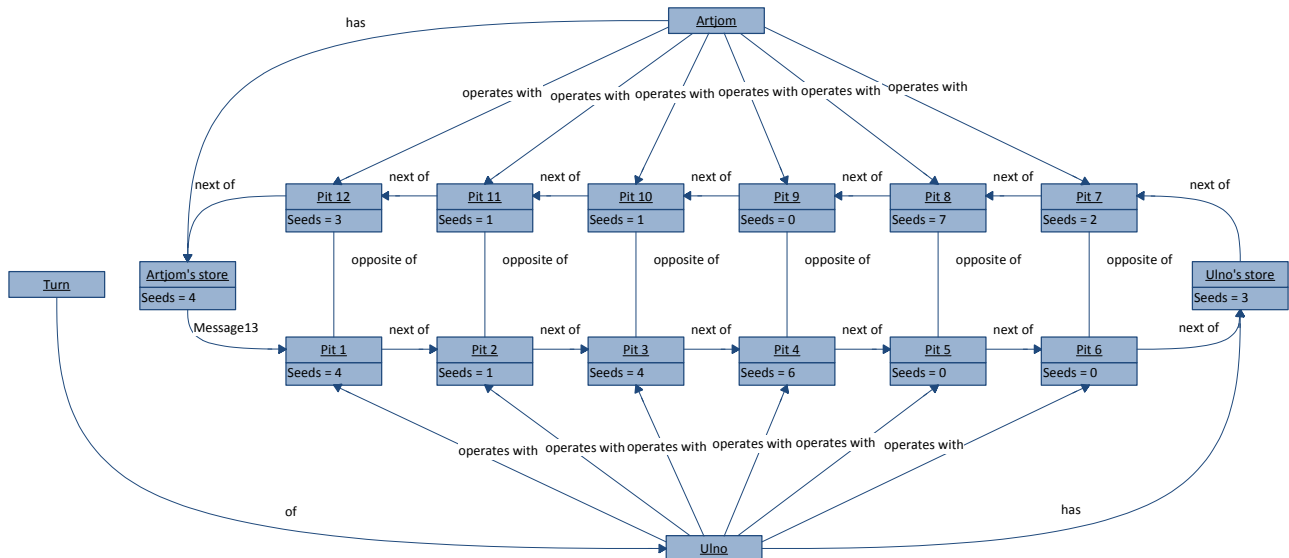


**Postcondition:** The pits on the gaming board contain the following amount of seeds: pit 1 – 0, pit 2 – 1, pit 3 – 0, pit 4 – 0, pit 5 – 0, pit 6 – 0, pit 7 – 1, pit 8 – 1, pit 9 – 3, pit 10 – 0, pit 11 – 0, pit 12 – 10. There are 15 seeds in Ulno's store and 5 seeds in Artjom's store. It is Artjom's turn to make a move.

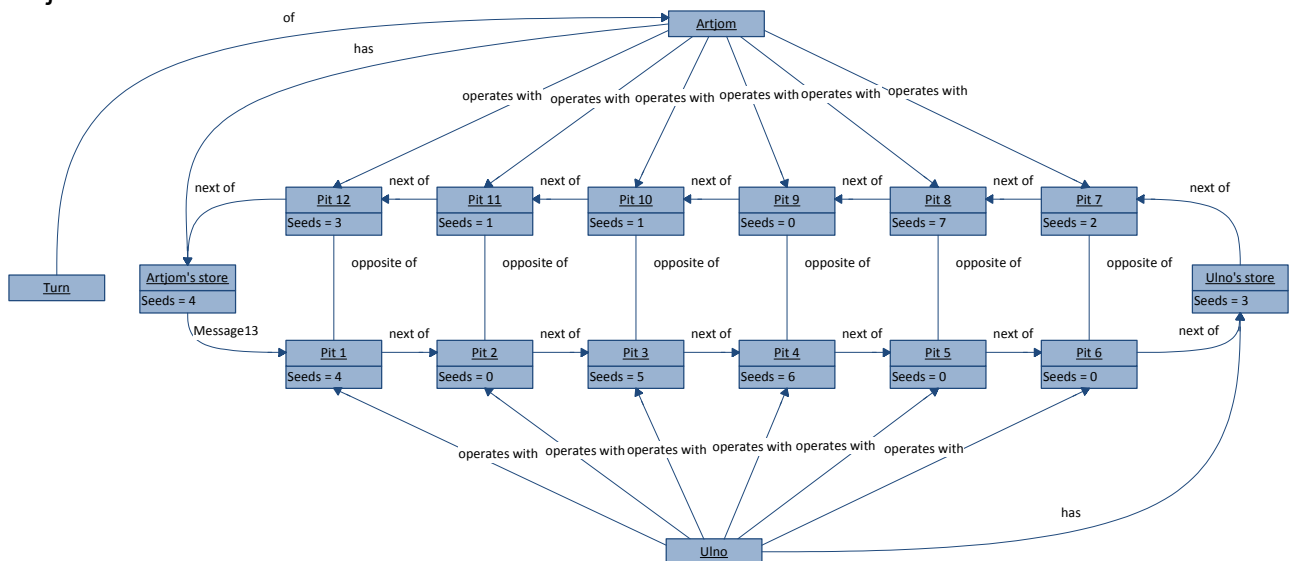


## Ulnu makes a move from pit 2 (US2)

**Preconditions:** The pits on the gaming board contain the following amount of seeds: pit 1 – 4, pit 2 – 1, pit 3 – 4, pit 4 – 6, pit 5 – 0, pit 6 – 0, pit 7 – 2, pit 8 – 7, pit 9 – 0, pit 10 – 1, pit 11 – 1, pit 12 – 3. There are 3 seeds in Ulnu's store and 4 seeds in Artjom's store. It is Ulnu's turn to make a move.

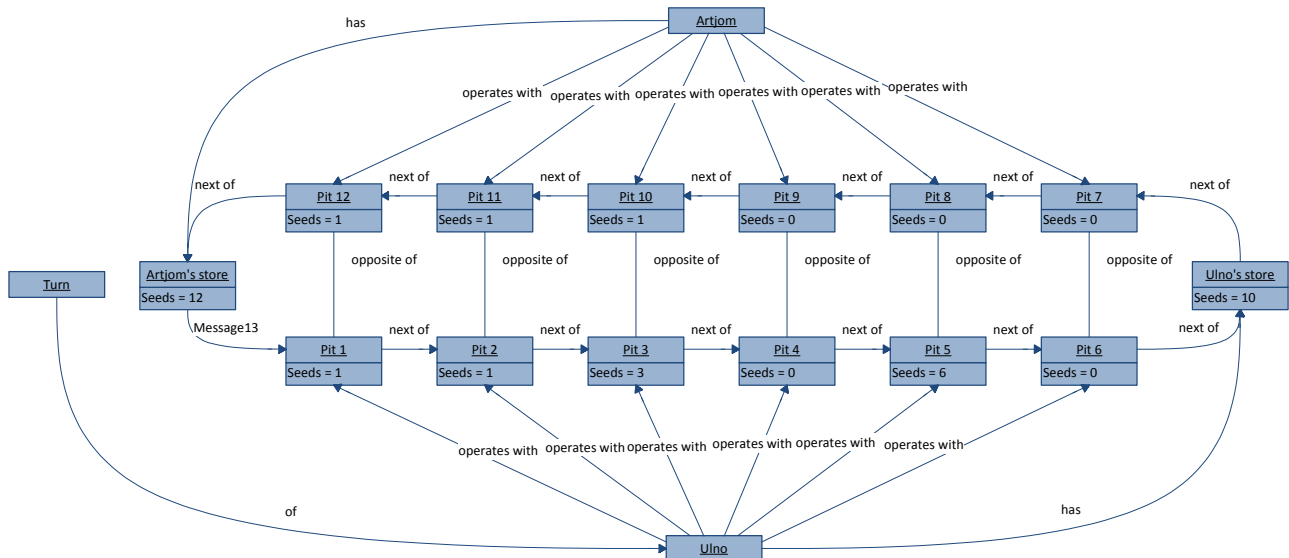


**Postcondition:** The pits on the gaming board contain the following amount of seeds: pit 1 – 4, pit 2 – 0, pit 3 – 5, pit 4 – 6, pit 5 – 0, pit 6 – 0, pit 7 – 2, pit 8 – 7, pit 9 – 0, pit 10 – 1, pit 11 – 1, pit 12 – 3. There are 3 seeds in Ulnu's store and 4 seeds in Artjom's store. It is Artjom's turn to make a move.

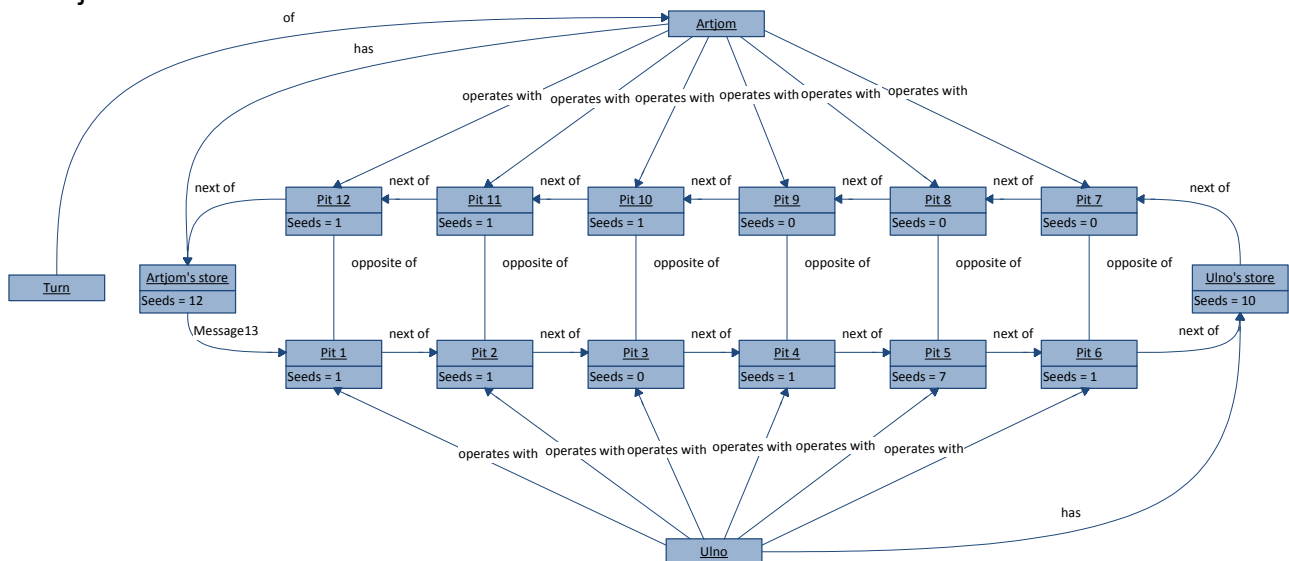


## Ulno makes a move from pit 3 (US3)

**Preconditions:** The pits on the gaming board contain the following amount of seeds: pit 1 – 1, pit 2 – 1, pit 3 – 3, pit 4 – 0, pit 5 – 6, pit 6 – 0, pit 7 – 0, pit 8 – 0, pit 9 – 0, pit 10 – 1, pit 11 – 1, pit 12 – 1. There are 10 seeds in Ulno's store and 12 seeds in Artjom's store. It is Ulno's turn to make a move.

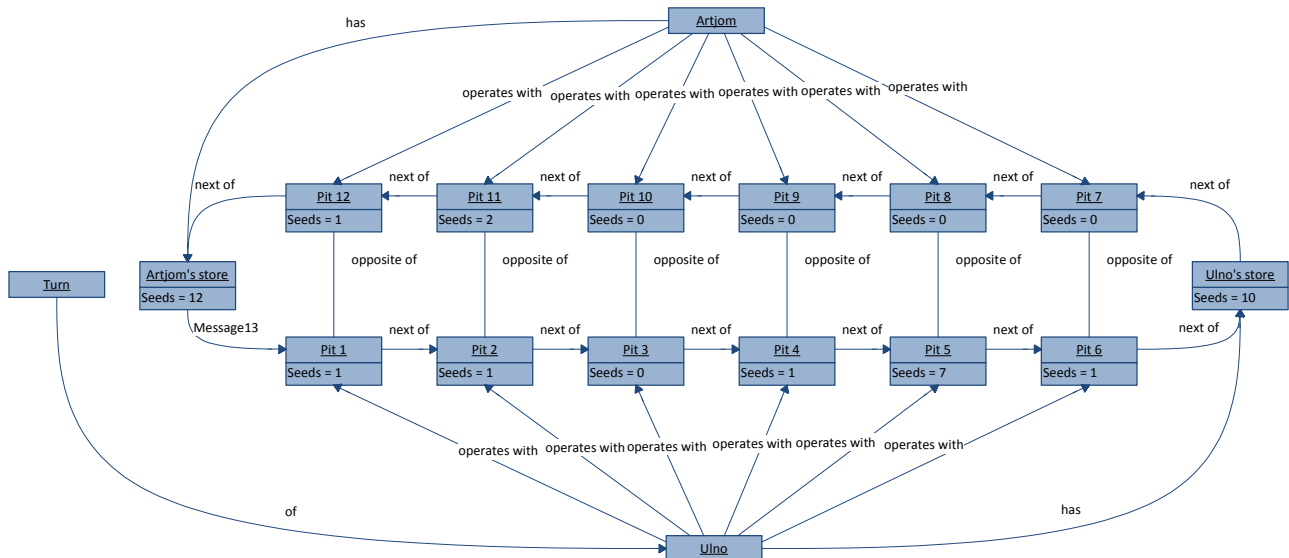


**Postcondition:** The pits on the gaming board contain the following amount of seeds: pit 1 – 1, pit 2 – 1, pit 3 – 0, pit 4 – 1, pit 5 – 7, pit 6 – 1, pit 7 – 0, pit 8 – 0, pit 9 – 0, pit 10 – 1, pit 11 – 1, pit 12 – 1. There are 10 seeds in Ulno's store and 12 seeds in Artjom's store. It is Artjom's turn to make a move.

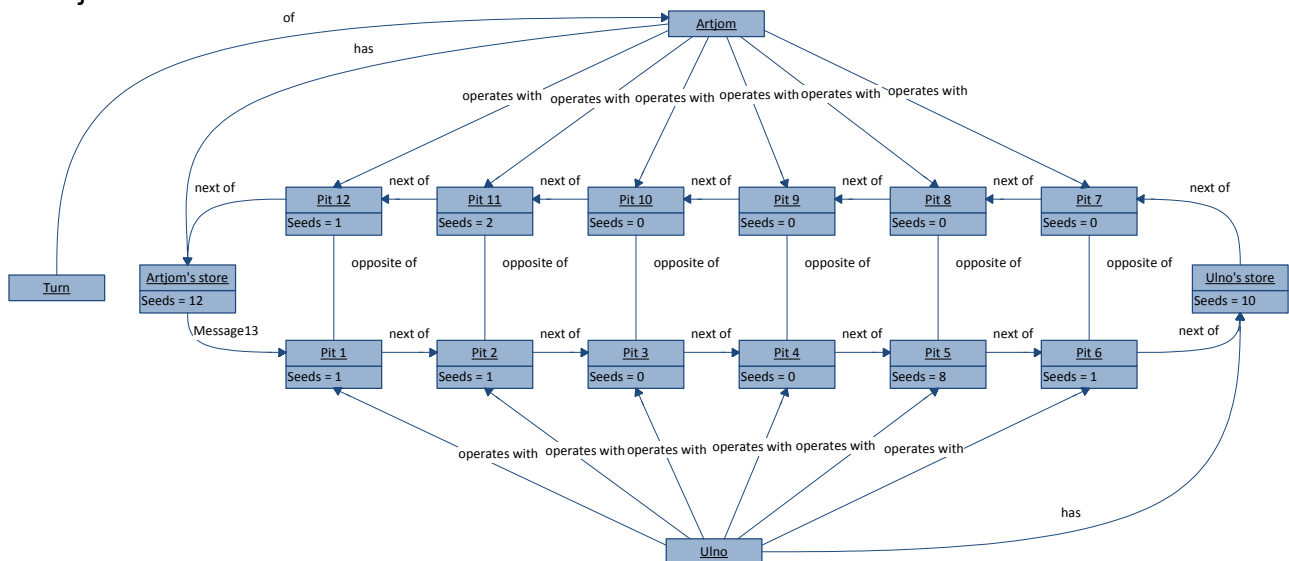


## Ulno makes a move from pit 4 (US4)

**Preconditions:** The pits on the gaming board contain the following amount of seeds: pit 1 – 1, pit 2 – 1, pit 3 – 0, pit 4 – 1, pit 5 – 7, pit 6 – 1, pit 7 – 0, pit 8 – 0, pit 9 – 0, pit 10 – 0, pit 11 – 2, pit 12 – 1. There are 10 seeds in Ulno's store and 12 seeds in Artjom's store. It is Ulno's turn to make a move.

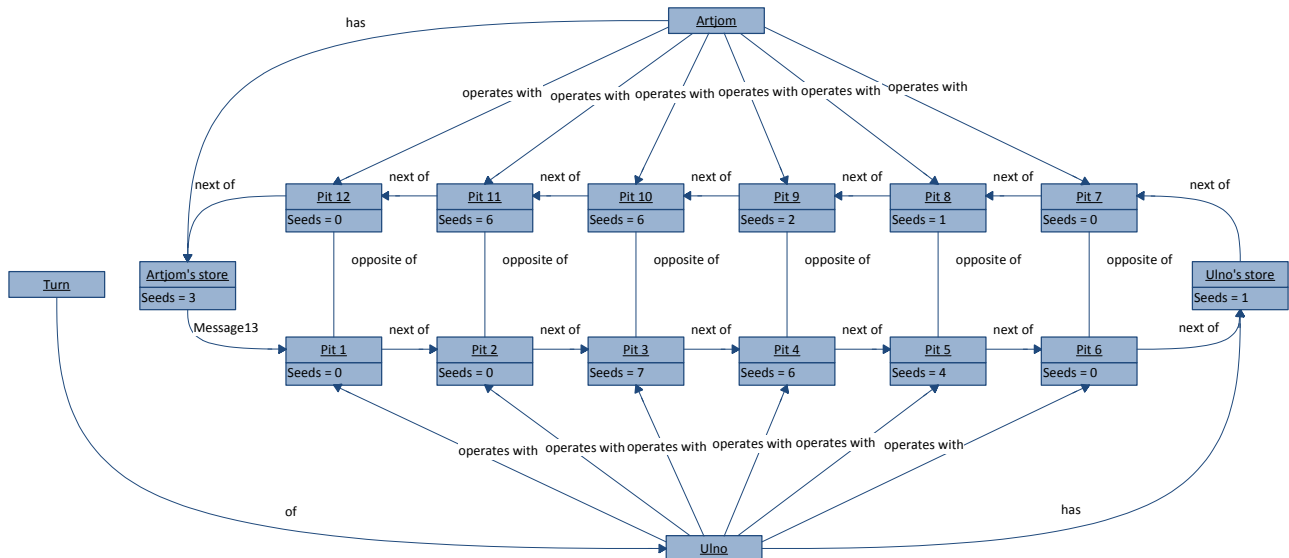


**Postcondition:** The pits on the gaming board contain the following amount of seeds: pit 1 – 1, pit 2 – 1, pit 3 – 0, pit 4 – 0, pit 5 – 8, pit 6 – 1, pit 7 – 0, pit 8 – 0, pit 9 – 0, pit 10 – 0, pit 11 – 2, pit 12 – 1. There are 10 seeds in Ulno's store and 12 seeds in Artjom's store. It is Artjom's turn to make a move.

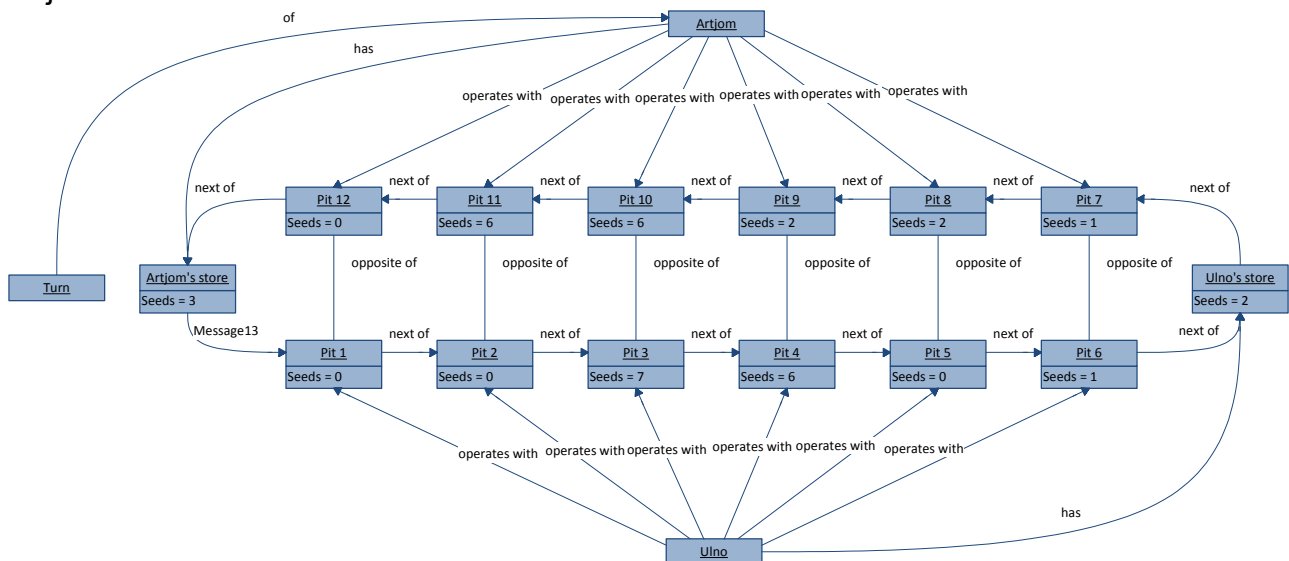


## Ulnu makes a move from pit 5 (US5)

**Preconditions:** The pits on the gaming board contain the following amount of seeds: pit 1 – 0, pit 2 – 0, pit 3 – 7, pit 4 – 6, pit 5 – 4, pit 6 – 0, pit 7 – 0, pit 8 – 1, pit 9 – 2, pit 10 – 6, pit 11 – 6, pit 12 – 0. There are 1 seeds in Ulnu's store and 3 seeds in Artjom's store. It is Ulnu's turn to make a move.

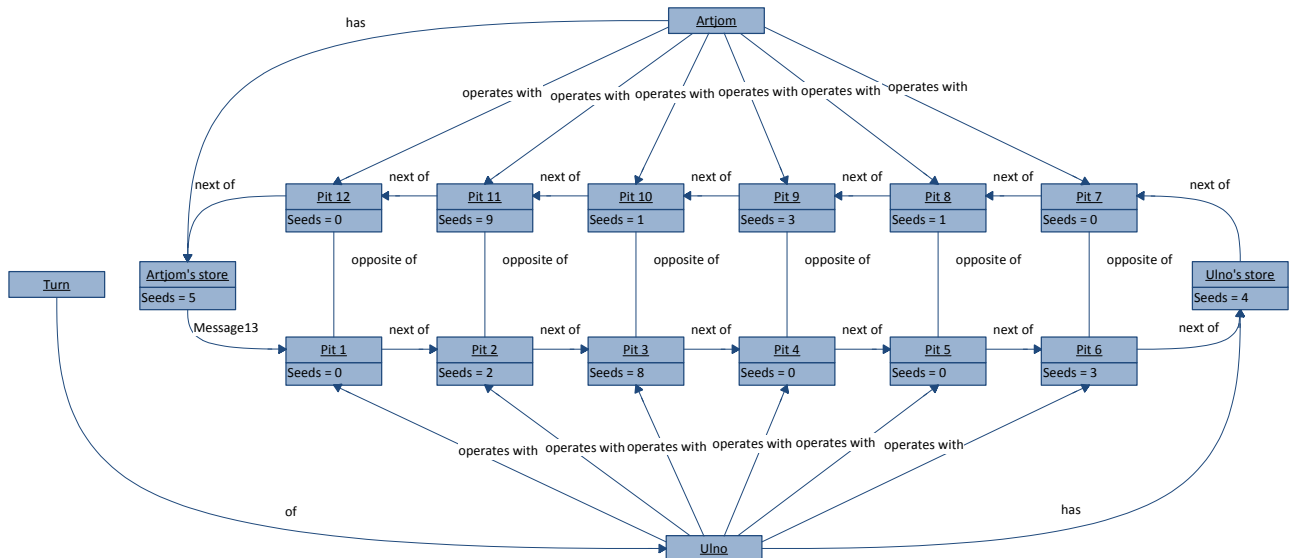


**Postcondition:** The pits on the gaming board contain the following amount of seeds: pit 1 – 0, pit 2 – 0, pit 3 – 7, pit 4 – 6, pit 5 – 0, pit 6 – 1, pit 7 – 1, pit 8 – 2, pit 9 – 2, pit 10 – 6, pit 11 – 6, pit 12 – 0. There are 2 seeds in Ulnu's store and 3 seeds in Artjom's store. It is Artjom's turn to make a move.

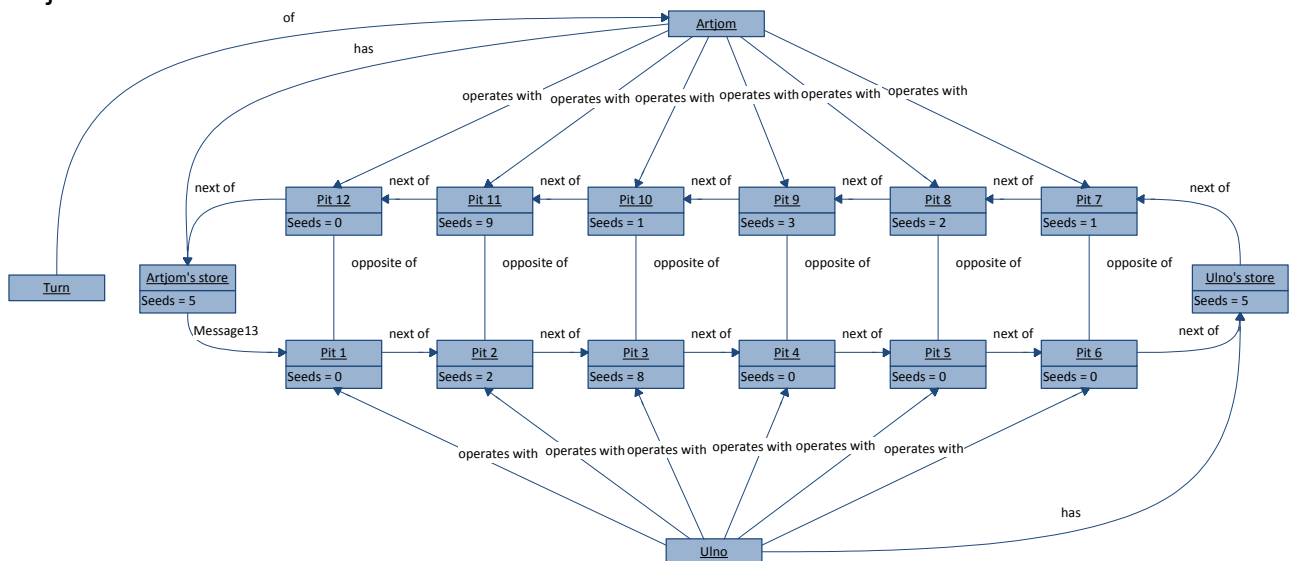


## Ulnu makes a move from pit 6 (US6)

**Preconditions:** The pits on the gaming board contain the following amount of seeds: pit 1 – 0, pit 2 – 2, pit 3 – 8, pit 4 – 0, pit 5 – 0, pit 6 – 3, pit 7 – 0, pit 8 – 1, pit 9 – 3, pit 10 – 1, pit 11 – 9, pit 12 – 0. There are 4 seeds in Ulnu's store and 5 seeds in Artjom's store. It is Ulnu's turn to make a move.

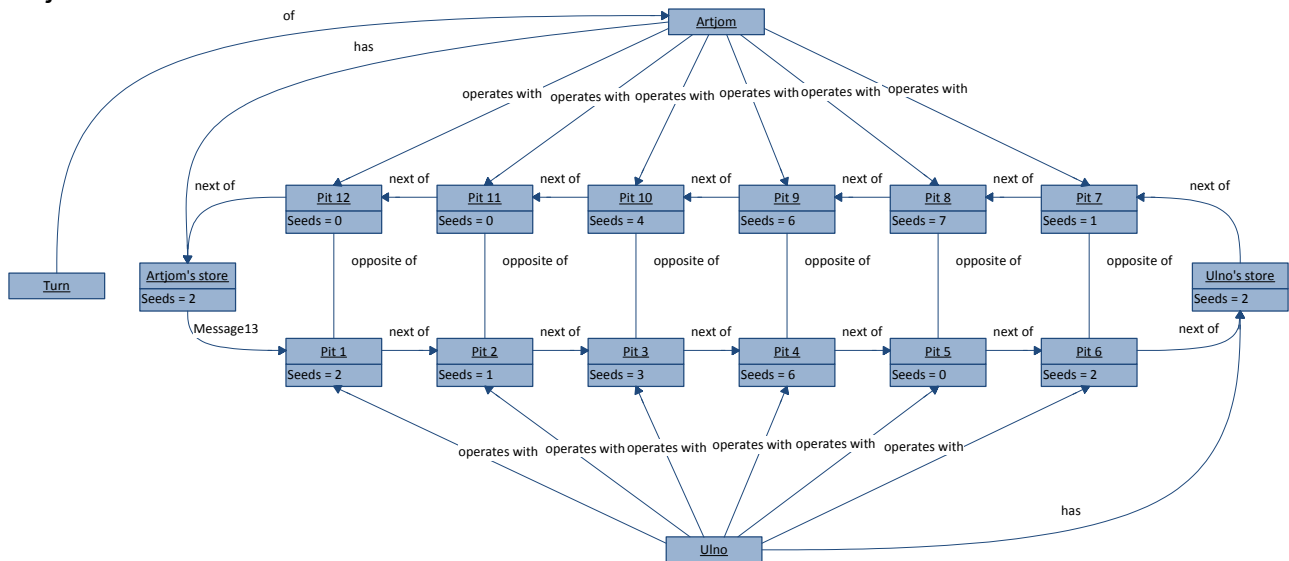


**Postcondition:** The pits on the gaming board contain the following amount of seeds: pit 1 – 0, pit 2 – 2, pit 3 – 8, pit 4 – 0, pit 5 – 0, pit 6 – 0, pit 7 – 1, pit 8 – 2, pit 9 – 3, pit 10 – 1, pit 11 – 9, pit 12 – 0. There are 5 seeds in Ulnu's store and 5 seeds in Artjom's store. It is Artjom's turn to make a move.

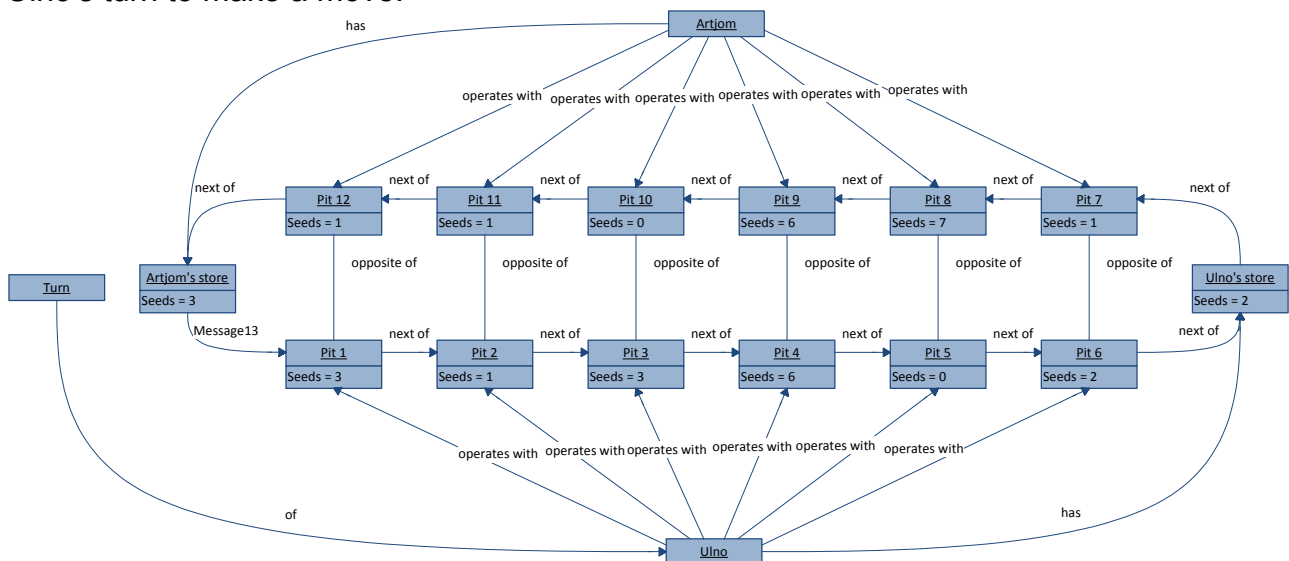


## Artjom makes a move from pit 10 (US10)

**Preconditions:** The pits on the gaming board contain the following amount of seeds: pit 1 – 2, pit 2 – 1, pit 3 – 3, pit 4 – 6, pit 5 – 0, pit 6 – 2, pit 7 – 1, pit 8 – 7, pit 9 – 6, pit 10 – 4, pit 11 – 0, pit 12 – 0. There are 2 seeds in Ulno's store and 2 seeds in Artjom's store. It is Artjom's turn to make a move.

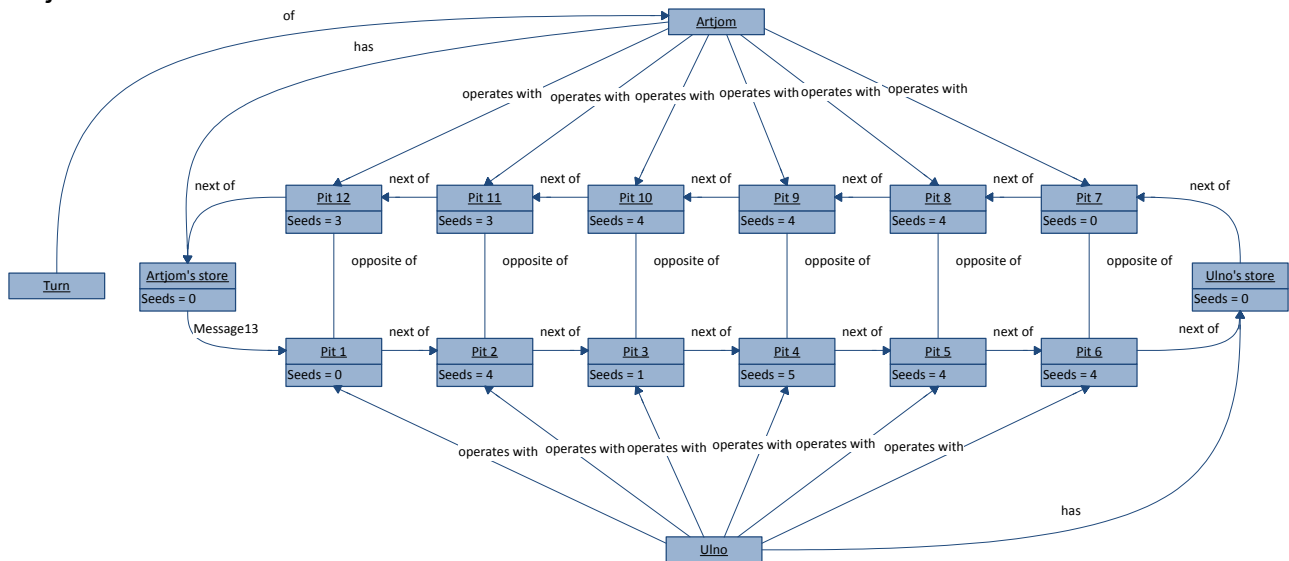


**Postcondition:** The pits on the gaming board contain the following amount of seeds: pit 1 – 3, pit 2 – 1, pit 3 – 3, pit 4 – 6, pit 5 – 0, pit 6 – 2, pit 7 – 1, pit 8 – 7, pit 9 – 6, pit 10 – 0, pit 11 – 1, pit 12 – 1. There are 2 seeds in Ulno's store and 3 seeds in Artjom's store. It is Ulno's turn to make a move.

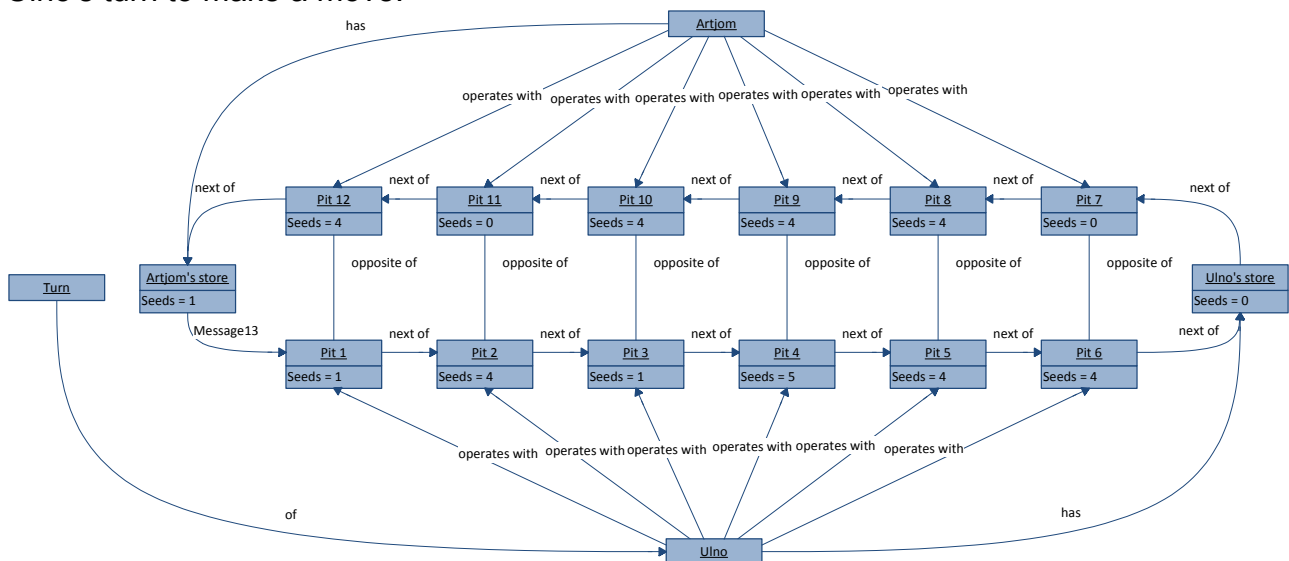


## Artjom makes a move from pit 11 (US11)

**Preconditions:** The pits on the gaming board contain the following amount of seeds: pit 1 – 0, pit 2 – 4, pit 3 – 1, pit 4 – 5, pit 5 – 4, pit 6 – 4, pit 7 – 0, pit 8 – 4, pit 9 – 4, pit 10 – 4, pit 11 – 3, pit 12 – 3. There are 0 seeds in Ulno's store and 0 seeds in Artjom's store. It is Artjom's turn to make a move.



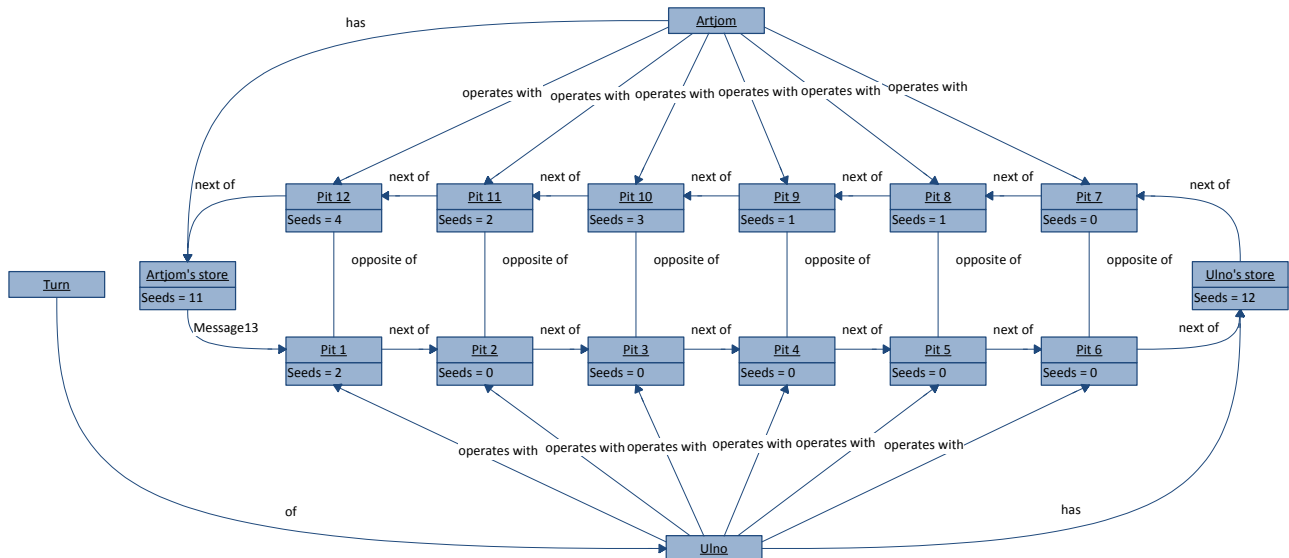
**Postcondition:** The pits on the gaming board contain the following amount of seeds: pit 1 – 1, pit 2 – 4, pit 3 – 1, pit 4 – 5, pit 5 – 4, pit 6 – 4, pit 7 – 0, pit 8 – 4, pit 9 – 4, pit 10 – 4, pit 11 – 0, pit 12 – 4. There are 0 seeds in Ulno's store and 1 seeds in Artjom's store. It is Ulno's turn to make a move.



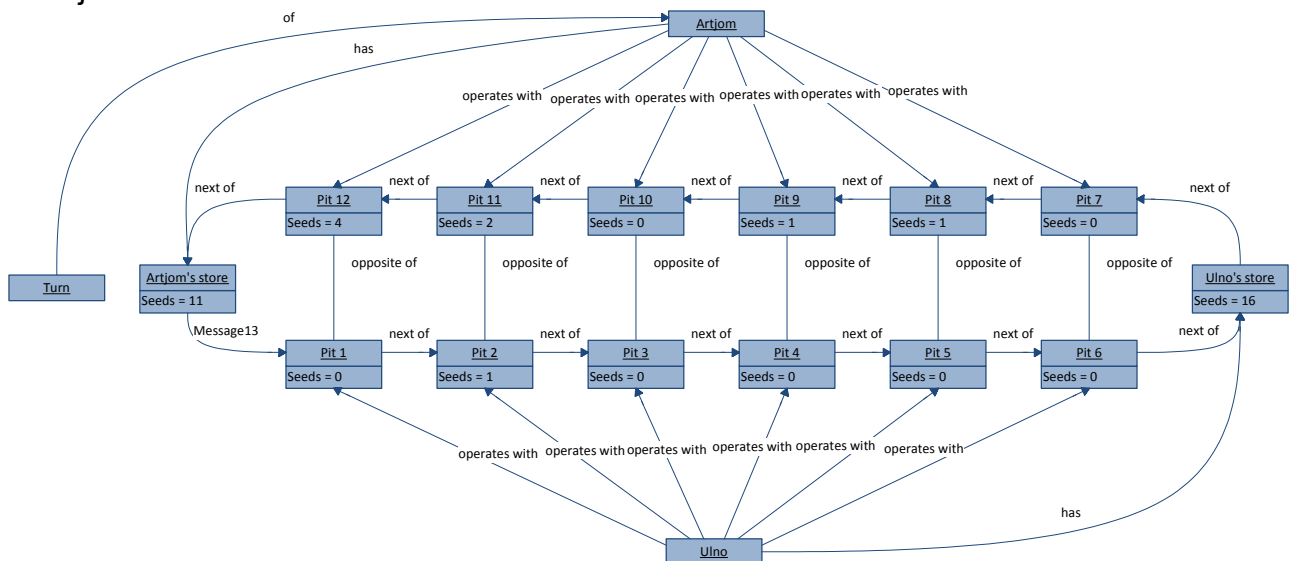


## Ulno makes a move from pit 1 and steals opponent's seeds (US22)

**Preconditions:** The pits on the gaming board contain the following amount of seeds: pit 1 – 2, pit 2 – 0, pit 3 – 0, pit 4 – 0, pit 5 – 0, pit 6 – 0, pit 7 – 0, pit 8 – 1, pit 9 – 1, pit 10 – 3, pit 11 – 2, pit 12 – 4. There are 12 seeds in Ulno's store and 11 seeds in Artjom's store. It is Ulno's turn to make a move.

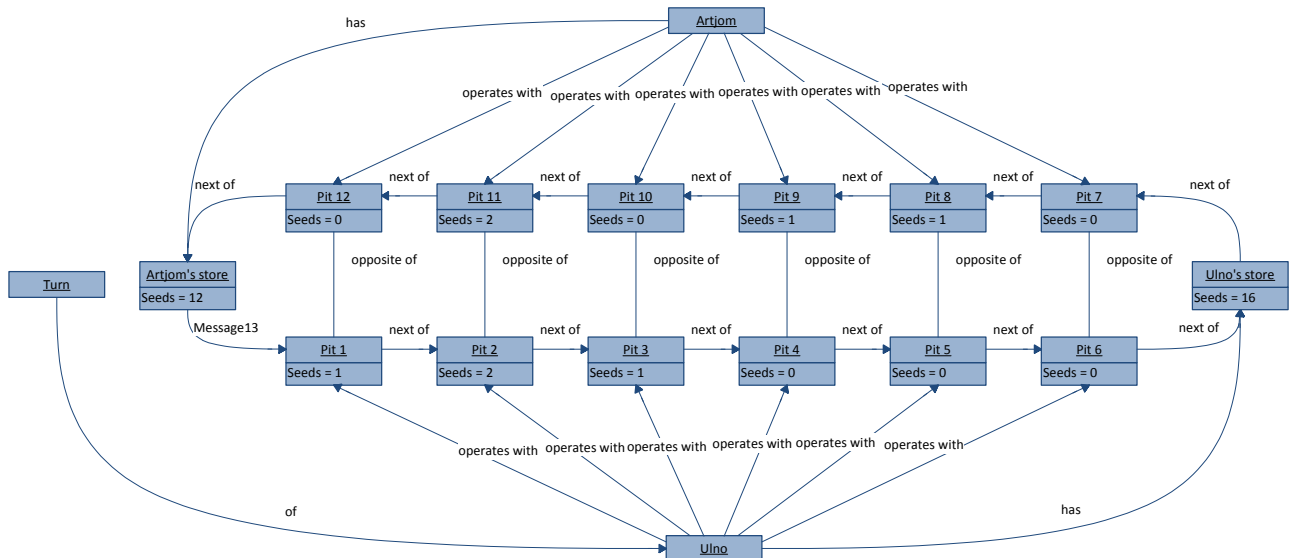


**Postcondition:** The pits on the gaming board contain the following amount of seeds: pit 1 – 0, pit 2 – 1, pit 3 – 0, pit 4 – 0, pit 5 – 0, pit 6 – 0, pit 7 – 0, pit 8 – 1, pit 9 – 1, pit 10 – 0, pit 11 – 2, pit 12 – 4. There are 16 seeds in Ulno's store and 11 seeds in Artjom's store. It is Artjom's turn to make a move.

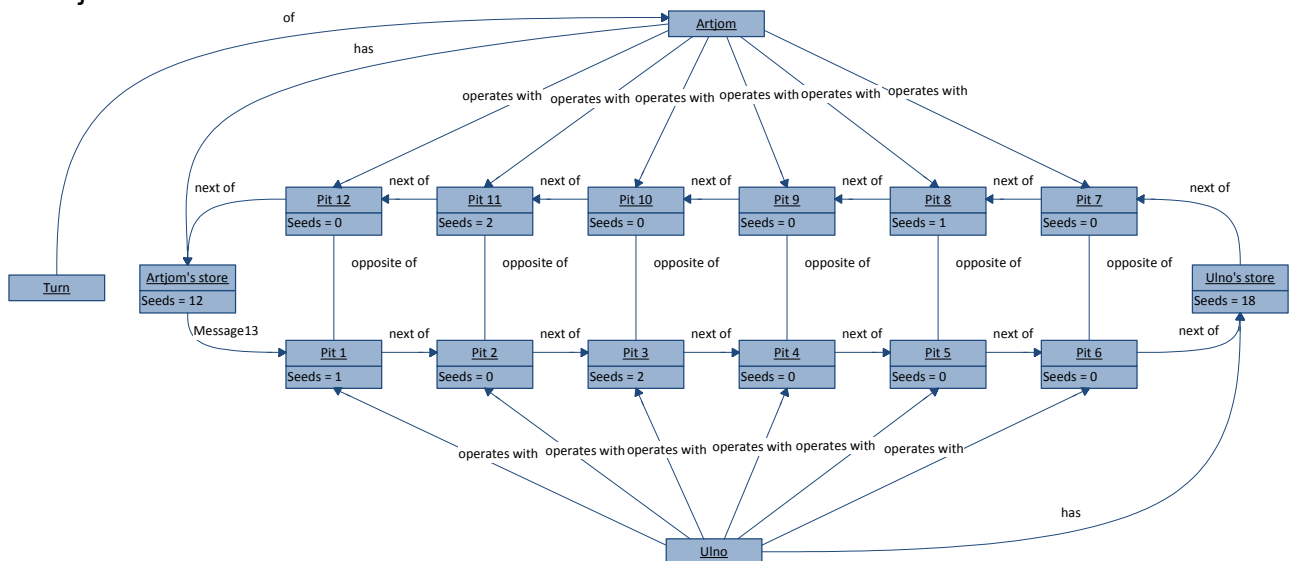


## Ulno makes a move from pit 2 and steals opponent's seeds (US23)

**Preconditions:** The pits on the gaming board contain the following amount of seeds: pit 1 – 1, pit 2 – 2, pit 3 – 1, pit 4 – 0, pit 5 – 0, pit 6 – 0, pit 7 – 0, pit 8 – 1, pit 9 – 1, pit 10 – 0, pit 11 – 2, pit 12 – 0. There are 16 seeds in Ulno's store and 12 seeds in Artjom's store. It is Ulno's turn to make a move.

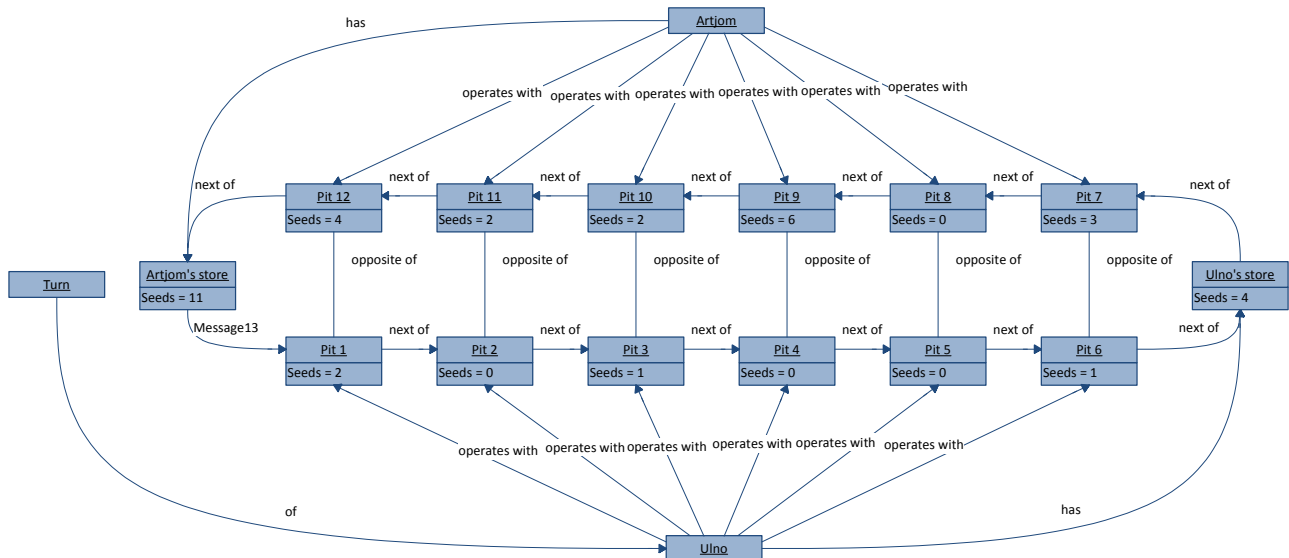


**Postcondition:** The pits on the gaming board contain the following amount of seeds: pit 1 – 1, pit 2 – 0, pit 3 – 2, pit 4 – 0, pit 5 – 0, pit 6 – 0, pit 7 – 0, pit 8 – 1, pit 9 – 0, pit 10 – 0, pit 11 – 2, pit 12 – 0. There are 18 seeds in Ulno's store and 12 seeds in Artjom's store. It is Artjom's turn to make a move.

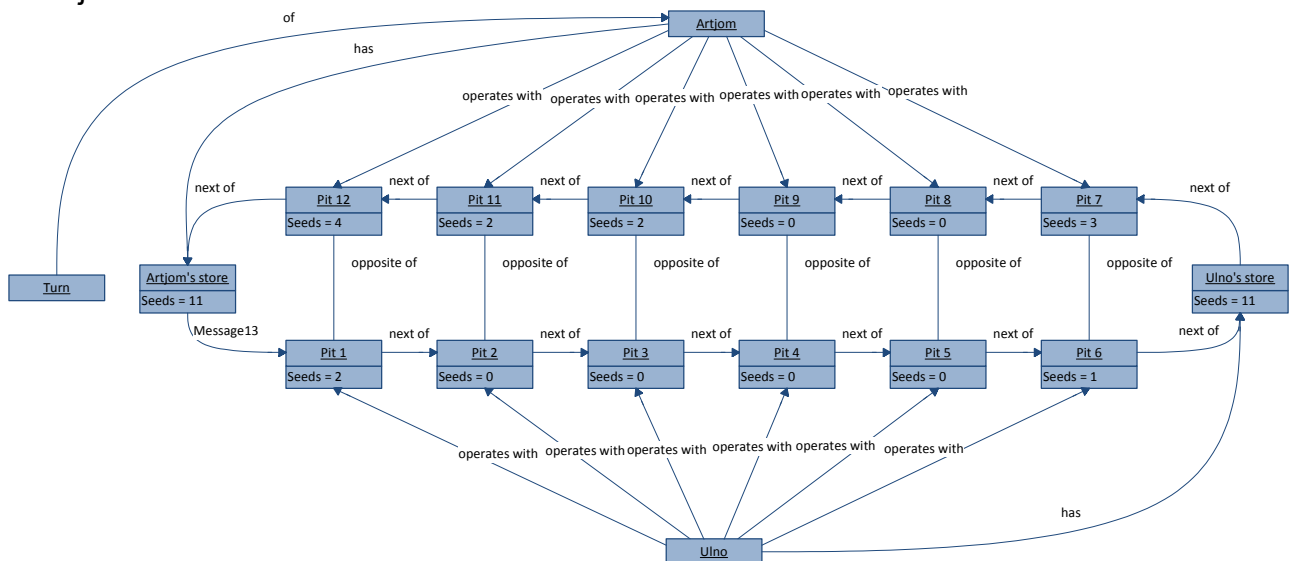


## Ulno makes a move from pit 3 and steals opponent's seeds (US24)

**Preconditions:** The pits on the gaming board contain the following amount of seeds: pit 1 – 2, pit 2 – 0, pit 3 – 1, pit 4 – 0, pit 5 – 0, pit 6 – 1, pit 7 – 3, pit 8 – 0, pit 9 – 6, pit 10 – 2, pit 11 – 2, pit 12 – 4. There are 4 seeds in Ulno's store and 11 seeds in Artjom's store. It is Ulno's turn to make a move.

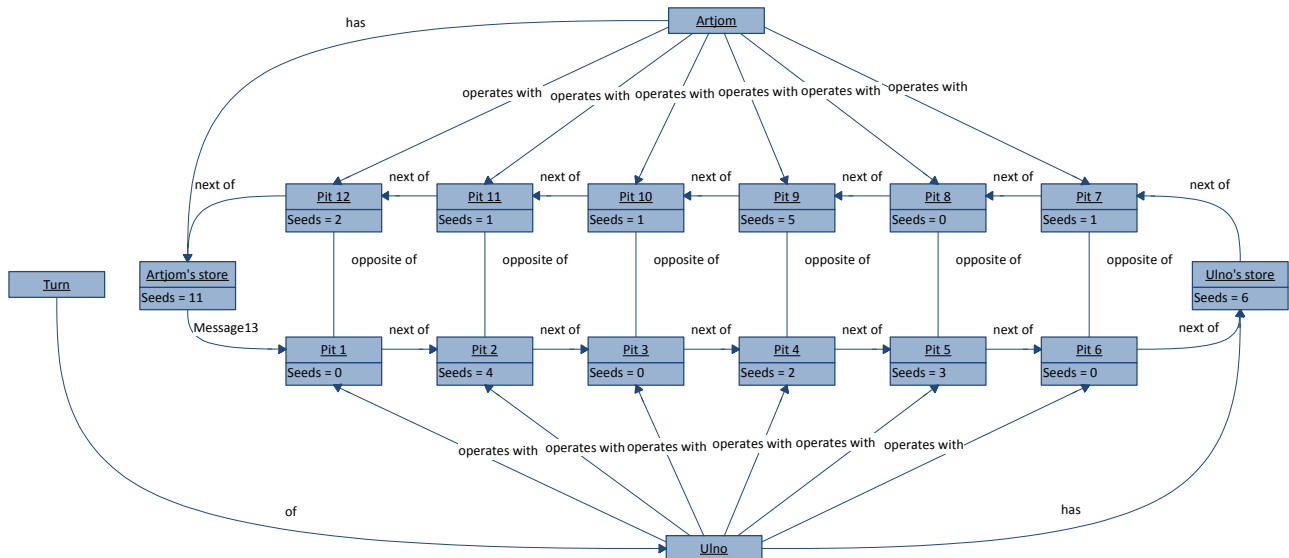


**Postcondition:** The pits on the gaming board contain the following amount of seeds: pit 1 – 2, pit 2 – 0, pit 3 – 0, pit 4 – 0, pit 5 – 0, pit 6 – 1, pit 7 – 3, pit 8 – 0, pit 9 – 0, pit 10 – 2, pit 11 – 2, pit 12 – 4. There are 11 seeds in Ulno's store and 11 seeds in Artjom's store. It is Artjom's turn to make a move.

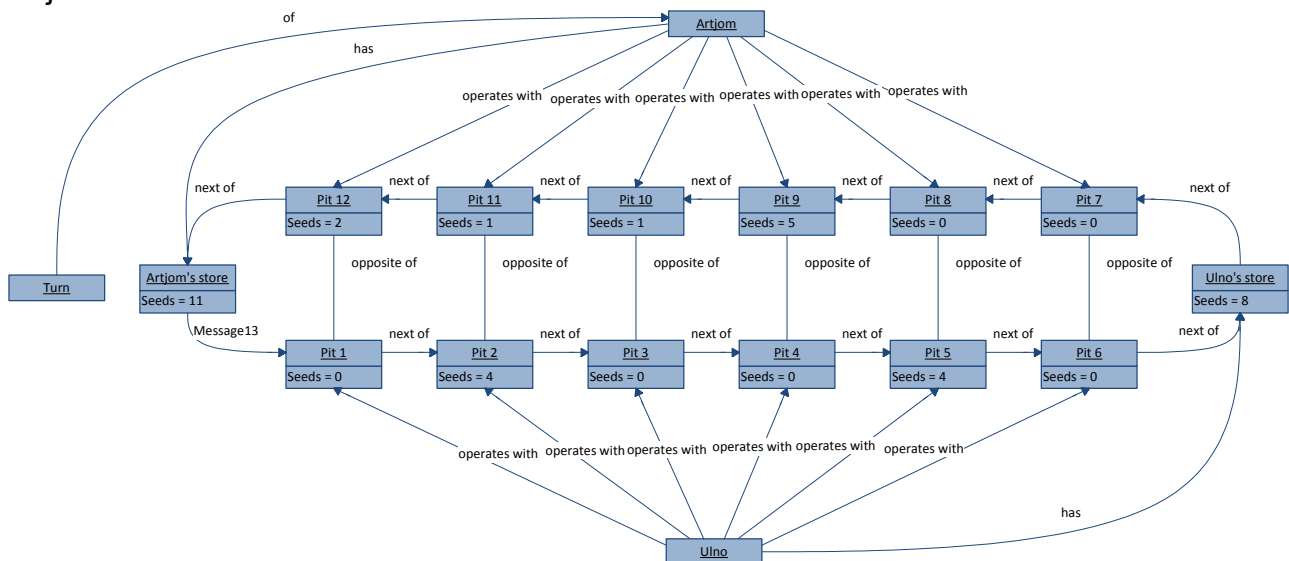


## Ulnu makes a move from pit 4 and steals opponent's seeds (US25)

**Preconditions:** The pits on the gaming board contain the following amount of seeds: pit 1 – 0, pit 2 – 4, pit 3 – 0, pit 4 – 2, pit 5 – 3, pit 6 – 0, pit 7 – 1, pit 8 – 0, pit 9 – 5, pit 10 – 1, pit 11 – 1, pit 12 – 2. There are 6 seeds in Ulnu's store and 11 seeds in Artjom's store. It is Ulnu's turn to make a move.

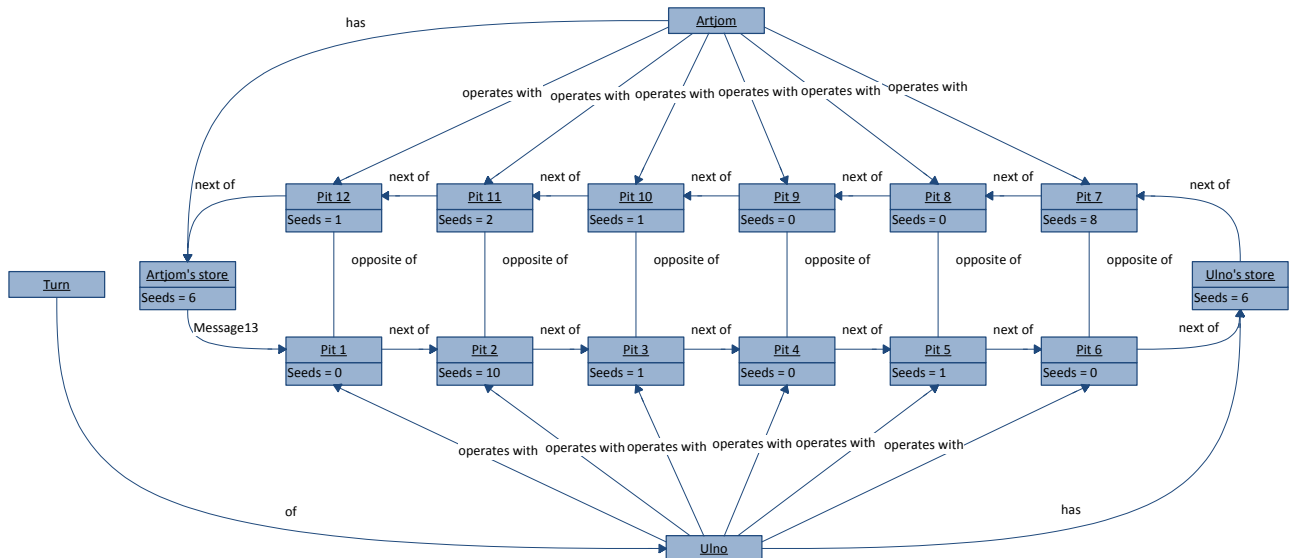


**Postcondition:** The pits on the gaming board contain the following amount of seeds: pit 1 – 0, pit 2 – 4, pit 3 – 0, pit 4 – 0, pit 5 – 4, pit 6 – 0, pit 7 – 0, pit 8 – 0, pit 9 – 5, pit 10 – 1, pit 11 – 1, pit 12 – 2. There are 8 seeds in Ulnu's store and 11 seeds in Artjom's store. It is Artjom's turn to make a move.

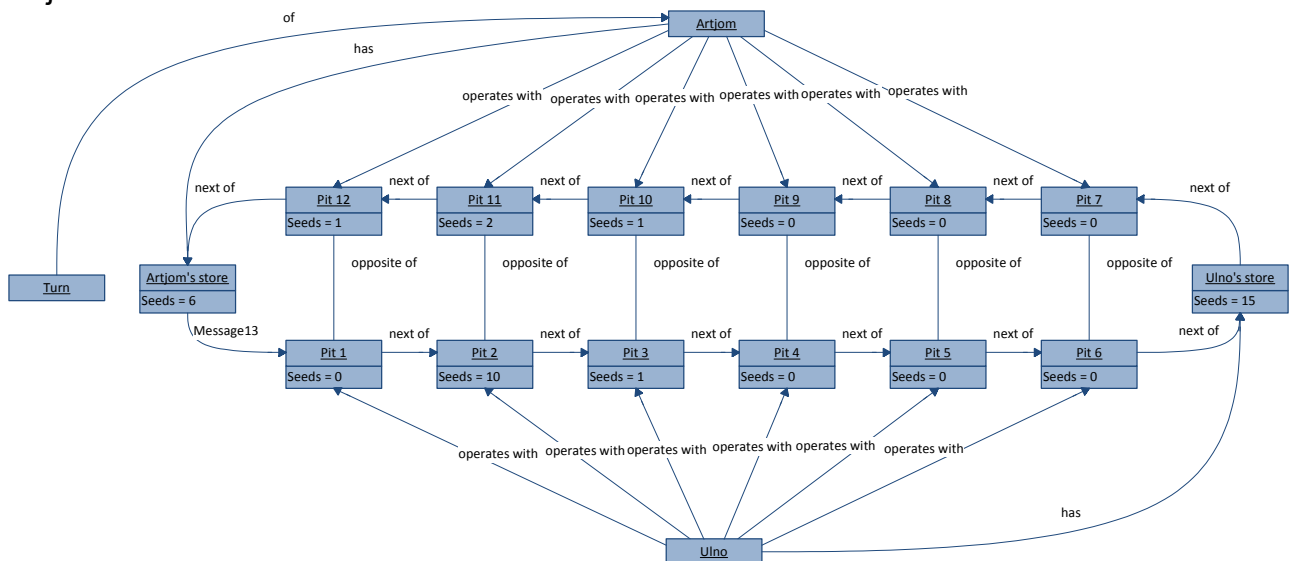


## Ulno makes a move from pit 5 and steals opponent's seeds (US26)

**Preconditions:** The pits on the gaming board contain the following amount of seeds: pit 1 – 0, pit 2 – 10, pit 3 – 1, pit 4 – 0, pit 5 – 1, pit 6 – 0, pit 7 – 8, pit 8 – 0, pit 9 – 0, pit 10 – 1, pit 11 – 2, pit 12 – 1. There are 6 seeds in Ulno's store and 6 seeds in Artjom's store. It is Ulno's turn to make a move.

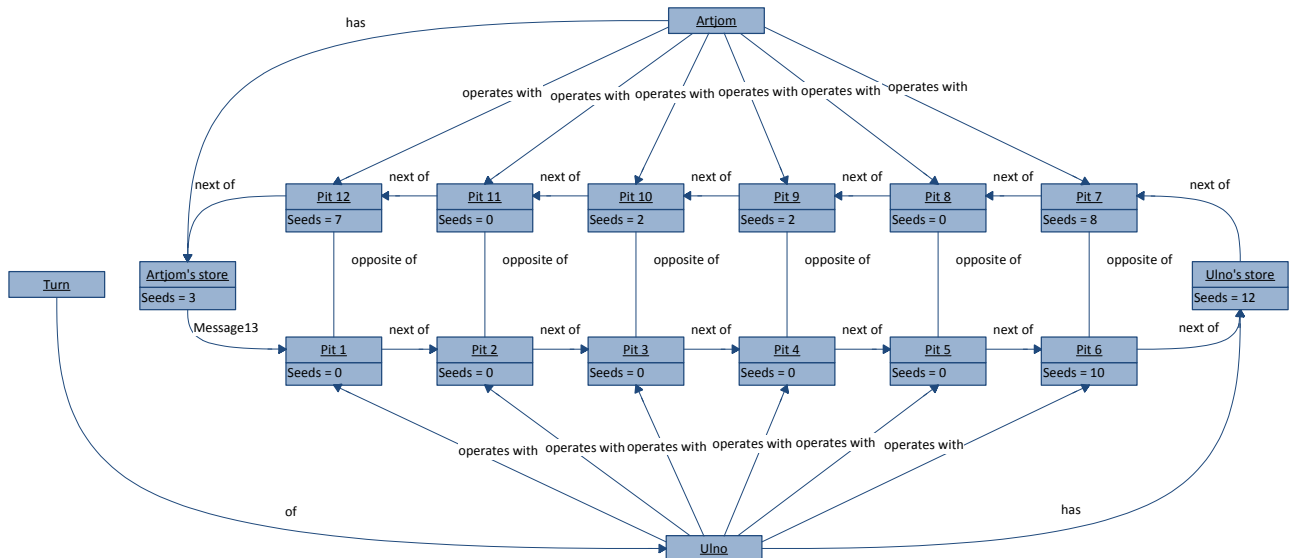


**Postcondition:** The pits on the gaming board contain the following amount of seeds: pit 1 – 0, pit 2 – 10, pit 3 – 1, pit 4 – 0, pit 5 – 0, pit 6 – 0, pit 7 – 0, pit 8 – 0, pit 9 – 0, pit 10 – 1, pit 11 – 2, pit 12 – 1. There are 15 seeds in Ulno's store and 6 seeds in Artjom's store. It is Artjom's turn to make a move.

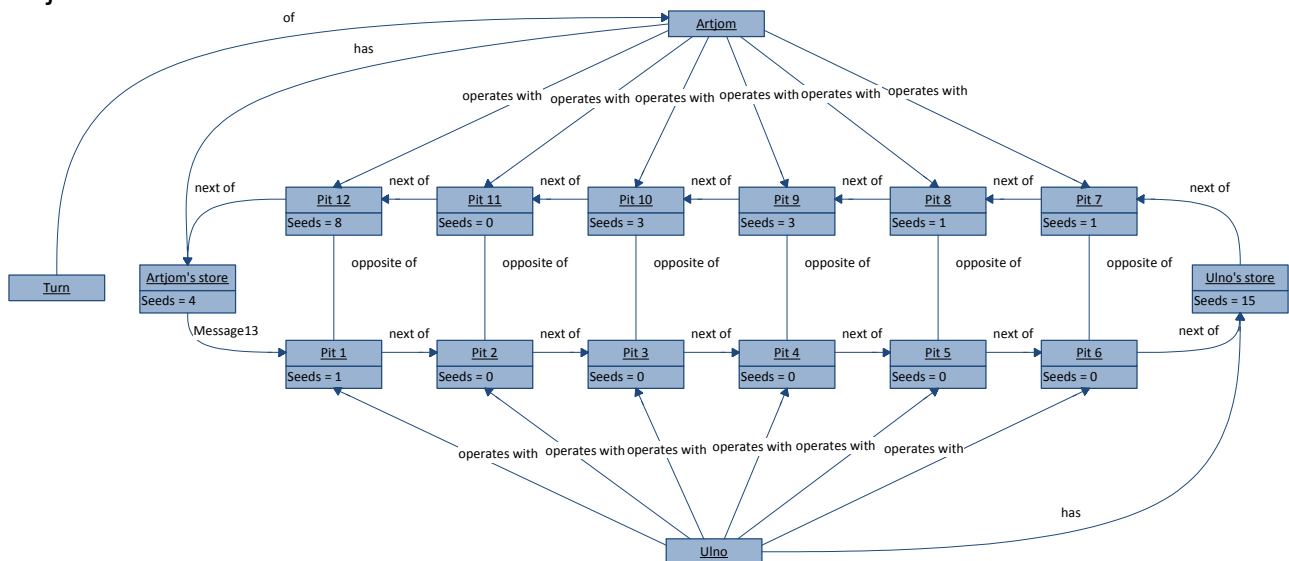


## Ulnu makes a move from pit 6 and steals opponent's seeds (US27)

**Preconditions:** The pits on the gaming board contain the following amount of seeds: pit 1 – 0, pit 2 – 0, pit 3 – 0, pit 4 – 0, pit 5 – 0, pit 6 – 10, pit 7 – 0, pit 8 – 0, pit 9 – 2, pit 10 – 2, pit 11 – 0, pit 12 – 7. There are 12 seeds in Ulnu's store and 3 seeds in Artjom's store. It is Ulnu's turn to make a move.

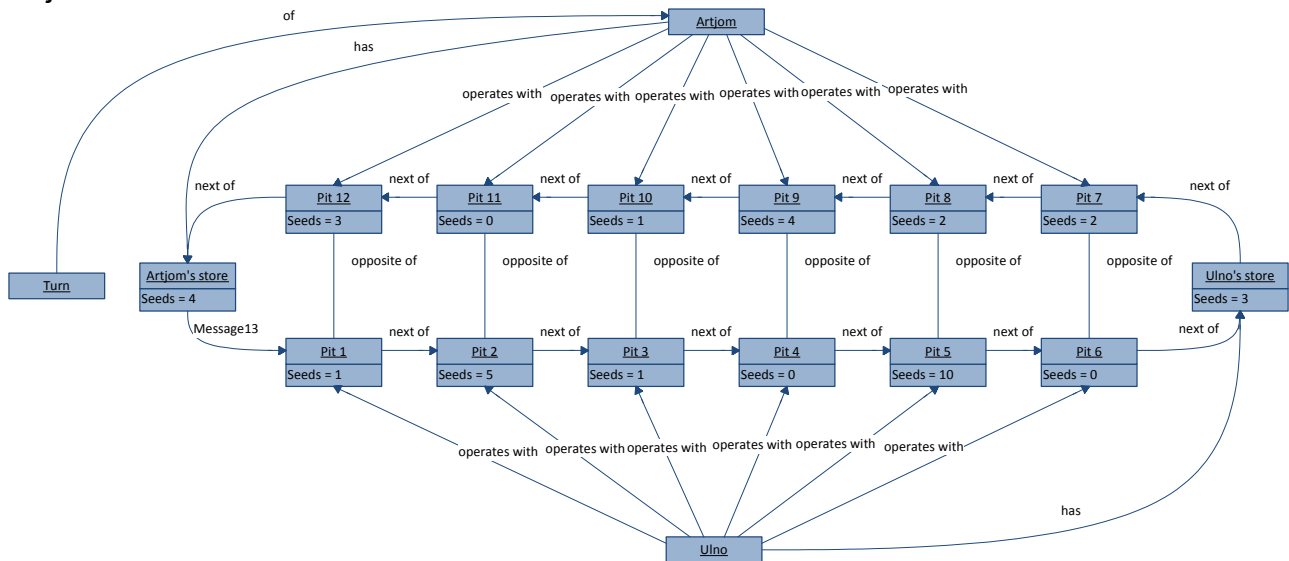


**Postcondition:** The pits on the gaming board contain the following amount of seeds: pit 1 – 1, pit 2 – 0, pit 3 – 0, pit 4 – 0, pit 5 – 0, pit 6 – 0, pit 7 – 1, pit 8 – 1, pit 9 – 3, pit 10 – 3, pit 11 – 0, pit 12 – 8. There are 15 seeds in Ulnu's store and 4 seeds in Artjom's store. It is Artjom's turn to make a move.

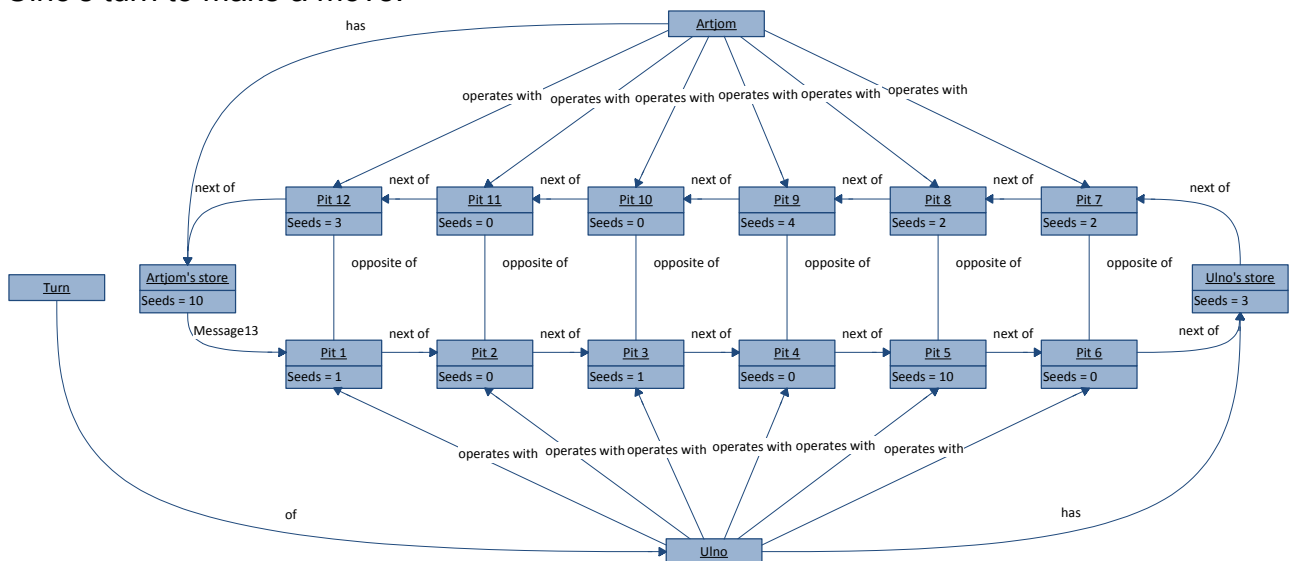


## Artjom makes a move from pit 10 and steals opponent's seeds (US30)

**Preconditions:** The pits on the gaming board contain the following amount of seeds: pit 1 – 1, pit 2 – 5, pit 3 – 1, pit 4 – 0, pit 5 – 10, pit 6 – 0, pit 7 – 2, pit 8 – 2, pit 9 – 4, pit 10 – 1, pit 11 – 0, pit 12 – 3. There are 3 seeds in Ulno's store and 4 seeds in Artjom's store. It is Artjom's turn to make a move.

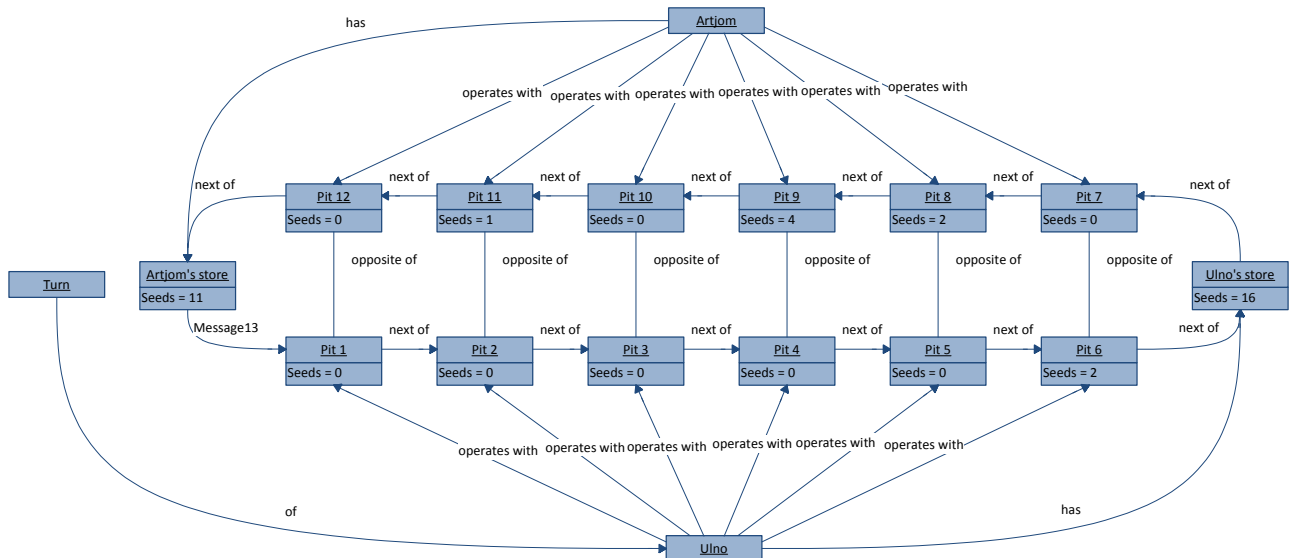


**Postcondition:** The pits on the gaming board contain the following amount of seeds: pit 1 – 1, pit 2 – 0, pit 3 – 1, pit 4 – 0, pit 5 – 10, pit 6 – 0, pit 7 – 2, pit 8 – 2, pit 9 – 4, pit 10 – 0, pit 11 – 0, pit 12 – 3. There are 3 seeds in Ulno's store and 10 seeds in Artjom's store. It is Ulno's turn to make a move.

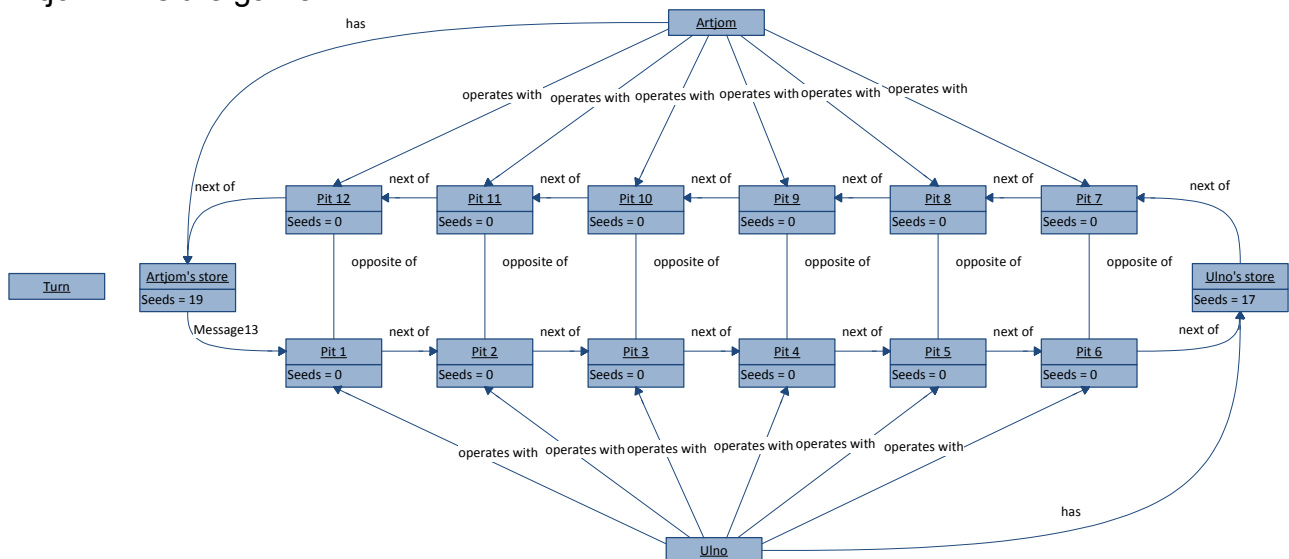


## Artjom wins the game (US33)

**Preconditions:** The pits on the gaming board contain the following amount of seeds: pit 1 – 0, pit 2 – 0, pit 3 – 0, pit 4 – 0, pit 5 – 0, pit 6 – 2, pit 7 – 0, pit 8 – 2, pit 9 – 4, pit 10 – 0, pit 11 – 1, pit 12 – 0. There are 16 seeds in Ulno's store and 11 seeds in Artjom's store. It is Ulno's turn to make a move.



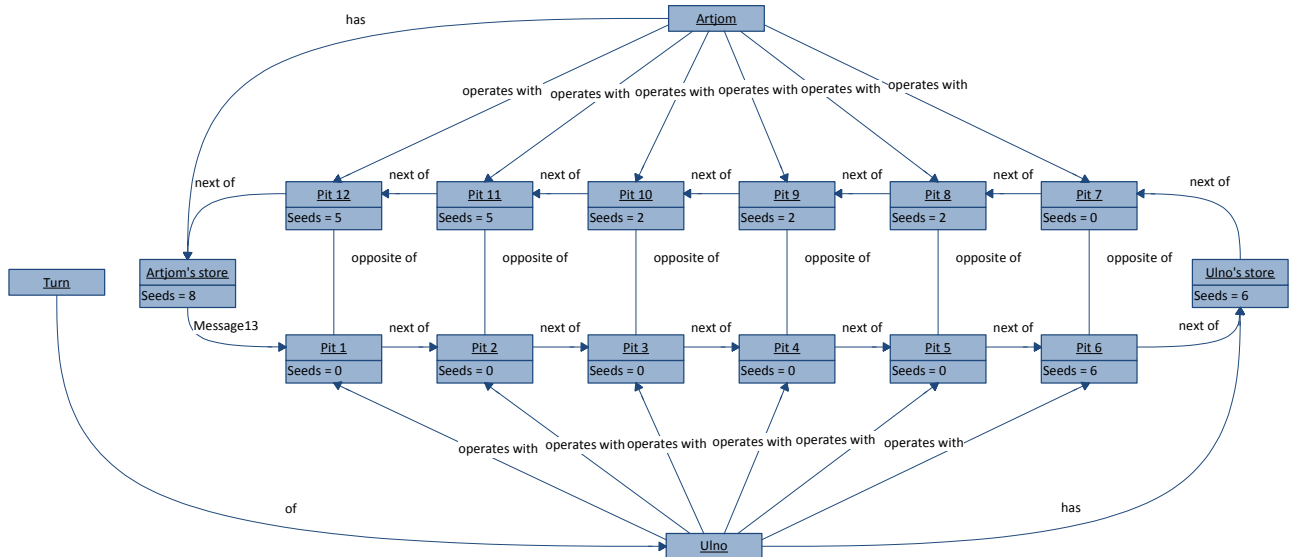
**Postcondition:** The pits on the gaming board contain the following amount of seeds: pit 1 – 0, pit 2 – 0, pit 3 – 0, pit 4 – 0, pit 5 – 0, pit 6 – 0, pit 7 – 0, pit 8 – 0, pit 9 – 0, pit 10 – 0, pit 11 – 0, pit 12 – 0. There are 17 seeds in Ulno's store and 19 seeds in Artjom's store. Artjom wins the game.



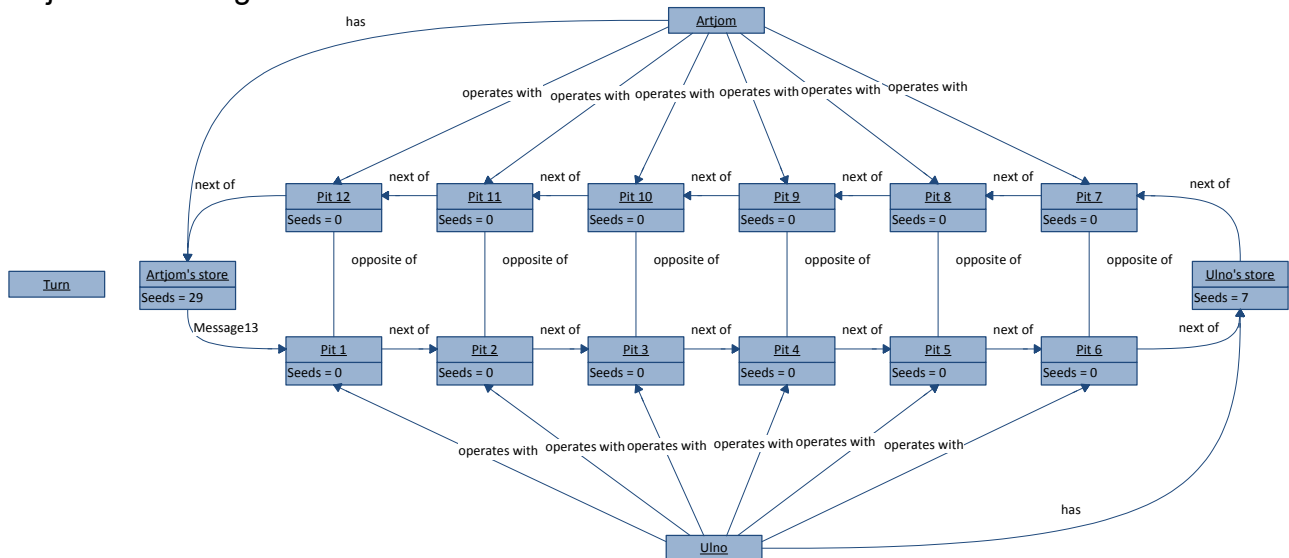


## Artjom wins the game (US34)

**Preconditions:** The pits on the gaming board contain the following amount of seeds: pit 1 – 0, pit 2 – 0, pit 3 – 0, pit 4 – 0, pit 5 – 0, pit 6 – 6, pit 7 – 0, pit 8 – 2, pit 9 – 2, pit 10 – 2, pit 11 – 5, pit 12 – 5. There are 6 seeds in Ulno's store and 8 seeds in Artjom's store. It is Ulno's turn to make a move.

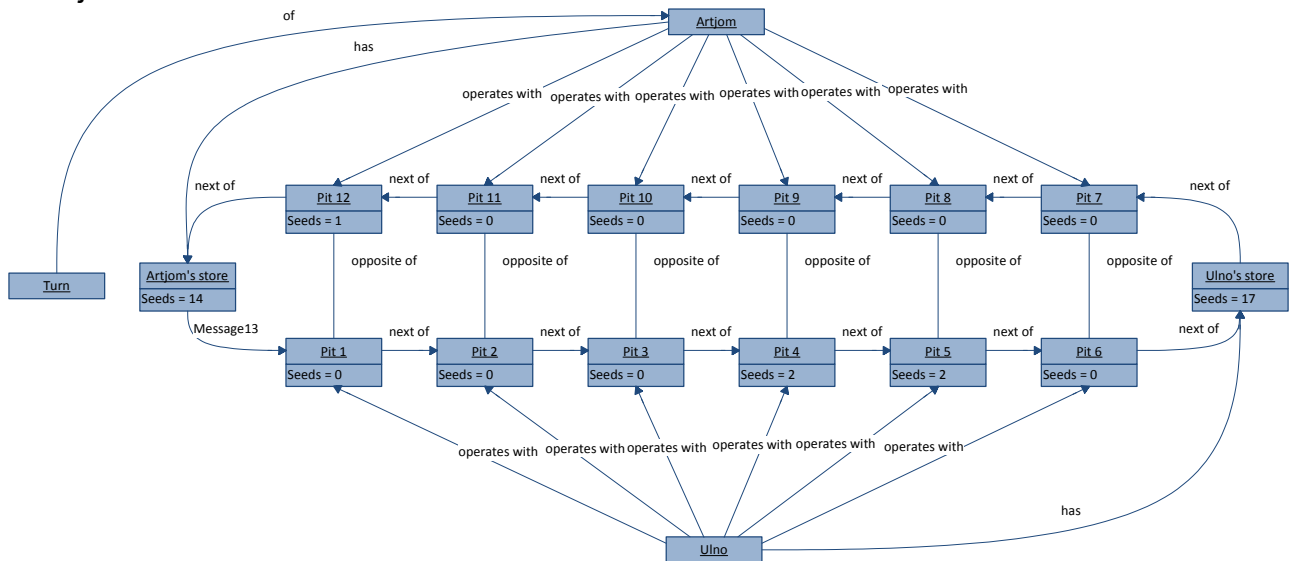


**Postcondition:** The pits on the gaming board contain the following amount of seeds: pit 1 – 0, pit 2 – 0, pit 3 – 0, pit 4 – 0, pit 5 – 0, pit 6 – 0, pit 7 – 0, pit 8 – 0, pit 9 – 0, pit 10 – 0, pit 11 – 0, pit 12 – 0. There are 7 seeds in Ulno's store and 29 seeds in Artjom's store. Artjom wins the game.

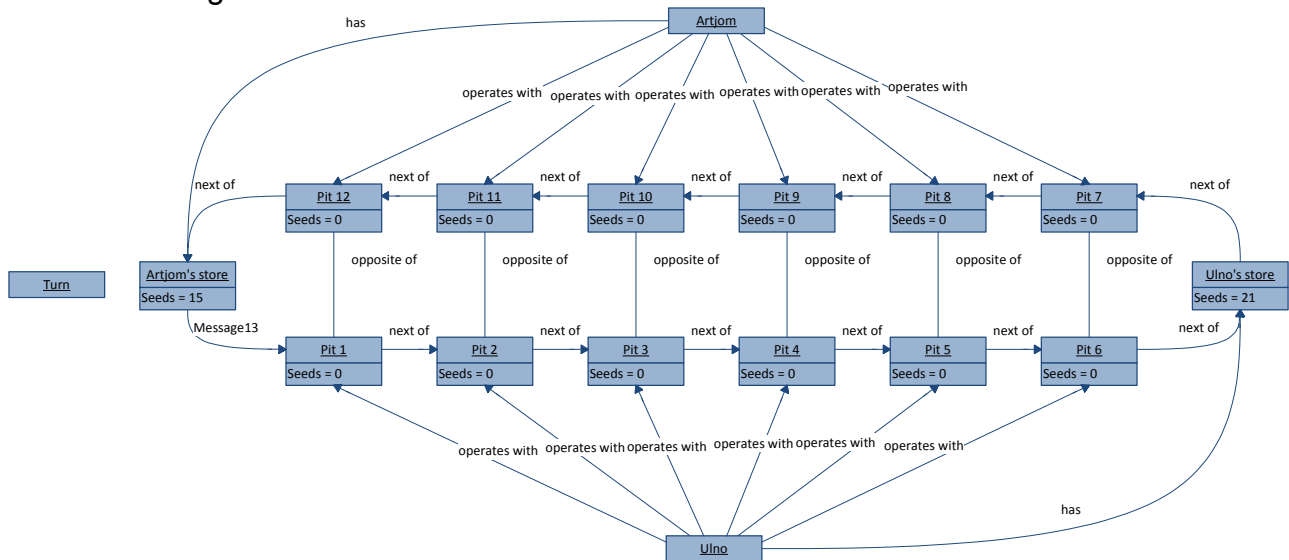


## Ulno wins the game (US38)

**Preconditions:** The pits on the gaming board contain the following amount of seeds: pit 1 – 0, pit 2 – 0, pit 3 – 0, pit 4 – 2, pit 5 – 2, pit 6 – 0, pit 7 – 0, pit 8 – 0, pit 9 – 0, pit 10 – 0, pit 11 – 0, pit 12 – 1. There are 17 seeds in Ulno's store and 14 seeds in Artjom's store. It is Artjom's turn to make a move.

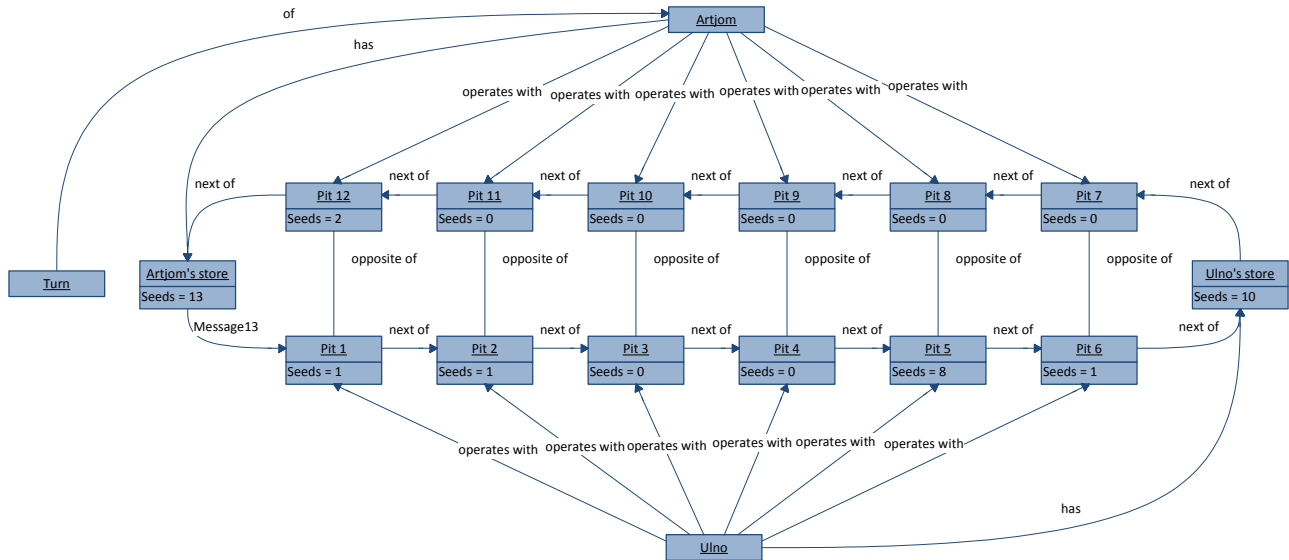


**Postcondition:** The pits on the gaming board contain the following amount of seeds: pit 1 – 0, pit 2 – 0, pit 3 – 0, pit 4 – 0, pit 5 – 0, pit 6 – 0, pit 7 – 0, pit 8 – 0, pit 9 – 0, pit 10 – 0, pit 11 – 0, pit 12 – 0. There are 21 seeds in Ulno's store and 15 seeds in Artjom's store. Ulno wins the game.

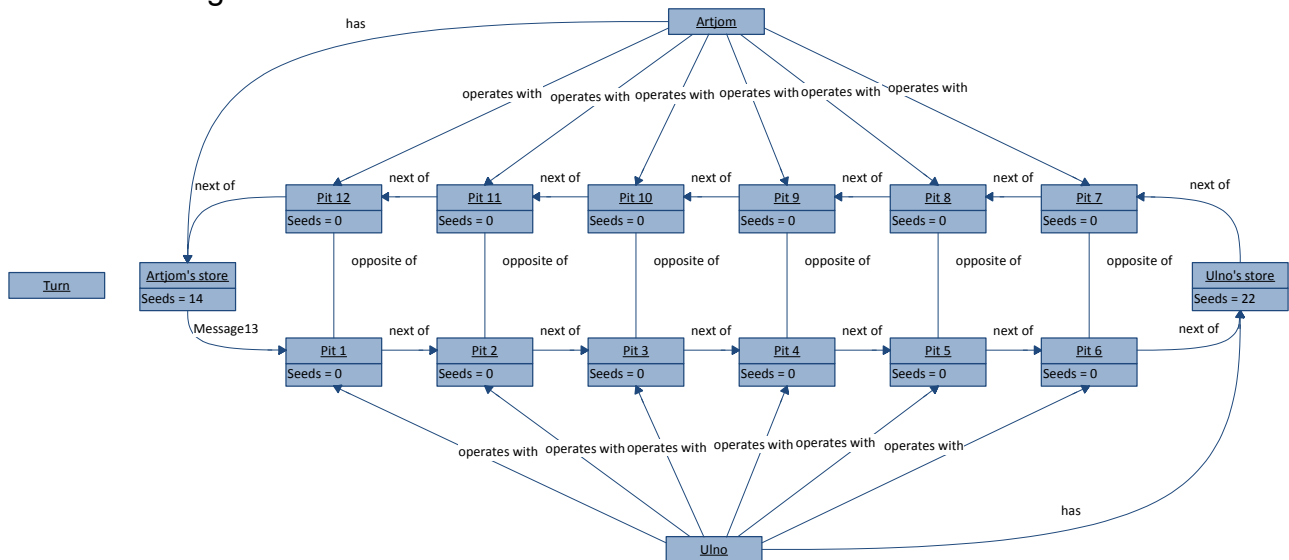


## Ulno wins the game (US39)

**Preconditions:** The pits on the gaming board contain the following amount of seeds: pit 1 – 1, pit 2 – 1, pit 3 – 0, pit 4 – 0, pit 5 – 8, pit 6 – 1, pit 7 – 0, pit 8 – 0, pit 9 – 0, pit 10 – 0, pit 11 – 0, pit 12 – 2. There are 10 seeds in Ulno's store and 13 seeds in Artjom's store. It is Artjom's turn to make a move.

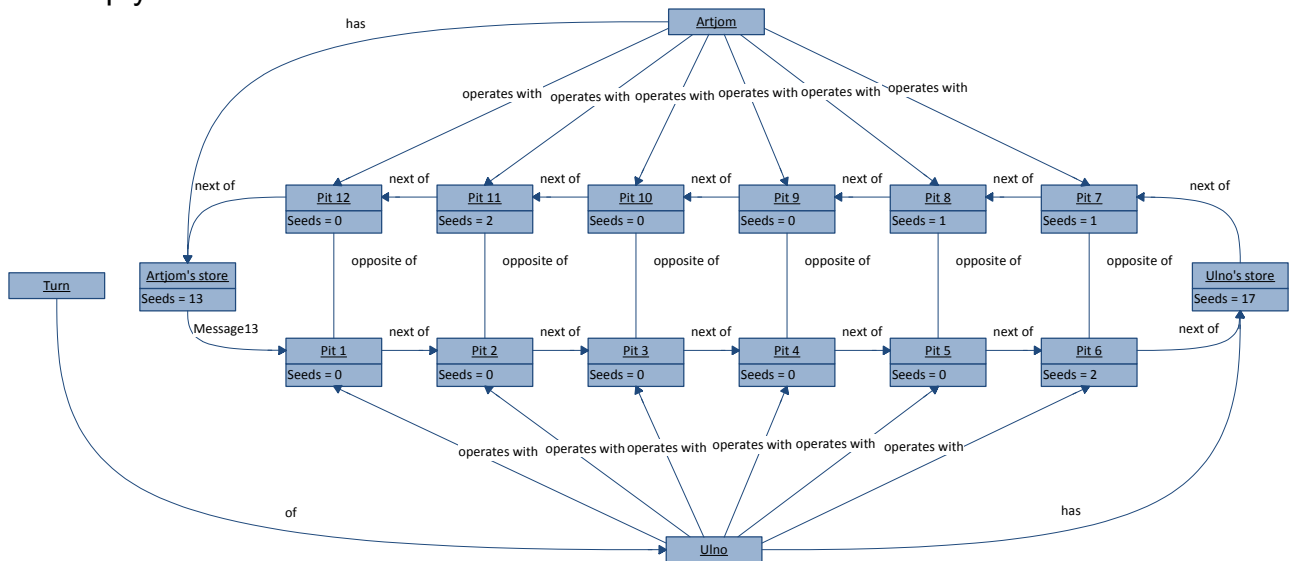


**Postcondition:** The pits on the gaming board contain the following amount of seeds: pit 1 – 0, pit 2 – 0, pit 3 – 0, pit 4 – 0, pit 5 – 0, pit 6 – 0, pit 7 – 0, pit 8 – 0, pit 9 – 0, pit 10 – 0, pit 11 – 0, pit 12 – 0. There are 22 seeds in Ulno's store and 14 seeds in Artjom's store. Ulno wins the game.



## Making a draw (US41)

**Precondition:** Ulno has two seeds in pit nr. 6 and 17 seeds in his store, Artjom has got one seed in pits nr. 7 and 8, 2 seeds in pit 11 and 13 seeds in his store. All the other pits are empty. It is Ulno's turn to move.



**Postcondition:** All the pits are empty and both players' stores contain 18 seeds - the game ends in a draw.

