OPERATING SYSTEMS PROJECT #1
CS 4328.004

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1. Introduction: Pair War

The project is designed to simulate the game of "Pair War", wherein there is one dealer, 3 players, and single deck of cards. The game is composed of three rounds. At the beginning of each round, the dealer shuffles the deck of cards, and deals one card to each player. At this point, the players each take turns drawing a single card. If the card drawn matches the one already in the player's hand, the player declares him/herself the winner and the round is over. If the cards do not match, the turn player discards one card at random, and the round continues with the next player.

The structure of the program is as follows: The `main` thread acts as the dealer, and creates and manages three different `player` threads through the use of messages sent via shared memory. Each round, the main thread sends a `PLAY` message to a single player thread at a time and waits for it to complete its turn. Depending on whether or not the card drawn is a match, the main thread either sends an `EXIT_ROUND` message to all three threads, one at a time, or sends a `PLAY` message to the next thread in the turn cycle.

2. A Brief Overview of the Design & Implementation of threadWar.cpp

First, we set `typedef std::size_t s_t;` such that we can identify types throughout the program. From there we were able to define `deque` for our deck of cards:

```
std::deque<s_t> deck =  {101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113,
                         201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213,
                         301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313,
                         401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413};
```

where the 100's place denotes the suite and to find a matching card in Card War we simply to reduce modulo (%) 100 the pair of cards to find a match in the 10's and 1's place (for example, 405 is match with 105 since $405 \% 100 = 105 \% 100 = 05$).

Further, we implemented an `enum ThreadState {WAIT, GO, DEAL, PLAY, NEXT_TURN, WIN, EXIT_ROUND, TERMINATE, ERROR};` to capture states of the game. Some states are addressed in `main()` while others are address in the `void* playerFunction(void* args)` function.

We implemented another deque, `std::deque<s_t> playerHand;` for the `showHand()` function, the `auto drawCard = [&playerHand, &id]() mutable` lambda function (which draws quickly from the top of the deck), and the `auto discardRandom = [&playerHand, &id]() mutable` lambda function. Since the `auto discardRandom = [&playerHand, &id]() mutable` lambda function is designed so that is discards one of the two non-winning cards at random (quickly to the bottom of the deck), this function relies heavily on the function `s_t randomCard()` which has a single line `return rand() % 2;`, where the `rand()` function depends on a random number generator (**rng**). The other function depending on the rng is the `shuffleDeck()` function, wherein it is understood that the dealer, `thread[0];` is shuffling the deck per round of Car War. Since the code is a simulation of Card War using POSIX pthreads, we naturally called our program `threadWar.cpp`.

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The critical data structure for managing these is `std::array<ThreadState, DEALER + NUM_PLAYERS>`
`threads;`. `threads` then have two key properties being an `std::array` container; each has an associated
`ThreadState`, derived from the `enum` discussed earlier, and a number = 4, where the number is DEALER +
NUM_PLAYERS indicating the size of the `std::array` called `threads`.

To get everything moving in the `ThreadStates` in both `main()` and `playerFunction()`, we invoke the
following `struct`:

```cpp
typedef struct Argument
{
    s_t ownID;
} Argument;
```

```cpp
//Initialize all player scores.
//scores[0] is unused.
std::array<s_t, NUM_PLAYERS + 1> scores;
scores.fill(0);

//We're in main thread; only need to allocate players.
//Storing them in an array will make the loop below work.
//To make id'ing them easier, threadIDs[0] will just be empty and unused.
std::array<pthread_t, NUM_PLAYERS + 1> threadIDs;

//Set all player thread states to WAIT
threads.fill(WAIT);

//After that, change main thread state to go.
threads[0] = GO;

//Create player threads, passing threadId and each player's starting card to them.
for (s_t targetID = 1; targetID <= NUM_PLAYERS; targetID++)
{
    currentArg = &argStructs[targetID];

    //Give target thread's id to its function as an argument.
    currentArg->ownID = targetID;

    rc = pthread_create(&threadIDs[targetID], NULL, playerFunction, (void *) currentArg);
    if (rc)
    {
        //Close output file and exit
        outdata.close();
        exit(-1);
    }
}
```

This allows us to create pthreads along with the `rc = pthread_create(threadIDs[targetID], NULL, playerFunction, (void *) currentArg);` function. Notice the `currentArg` argument. It's actually a pointer pointing to a `void *`. Its initialization `Argument* currentArg;` is in the code prior to thread creation. Note: `rc` = "return code" and there is some error handling following its generation. Notice `scores` are kept for each round in another `std::array` container as are `threadIDs`, which are of type `pthread_t` and size `NUM_PLAYERS + 1`.

Within `main()` in `switch(threads[0])`, where threads[0] is the main or dealer's thread, there are two cases: `NEXT_TURN` and `WIN`. In the `NEXT_TURN` case, the main functions is to define whose next turn it is. The code for doing so is as follows: `turnPlayer = (turnPlayer % NUM_PLAYERS) + 1;`, where turnPlayer has been initialized above to `turnPlayer = 1`, namely, the first player the *round-robin* dealing of cards. `turnPlayer = (turnPlayer % NUM_PLAYERS) + 1;` simply establishes whose next turn it is to be first after a round of Card Wars. The `WIN` case increments the score record with `scores[turnPlayer]++;` and sets `thread[0] = WAIT;` and sets the player threads equal to `EXIT_ROUND`.

At the start of the `playerFunction()`, we initialize `Argument* argStruct = (Argument*) args;`, where `argStruct` came from the global declaration `Argument argStructs[NUM_PLAYERS + 1];`. And we initialized `s_t id = argStruct->ownID;` and, as mentioned, the container `std::deque<s_t> playerHand;`, for the players hands per round.

Inside a large `while(keepPlaying)` loop, we have `enum ThreadStates`, i.e., switch cases: `DEAL`, `PLAY`, `EXIT_ROUND` and `TERMINATE`.

`DEAL` has the following sequence of **sloc**: `drawCard(); threads[id] = WAIT; threads[0] = GO; break;`. This is understood to mean the players are waiting to a receive a card from the dealer (`threads[0] = GO`, who is in a `Go` ThreadState of dealing cards). `break;` after dealing.

`PLAY` has the following crucial lines of code `drawCard();`. Then in an if-else control structure, we find: `if (playerHand[0] % 100 == playerHand[1] % 100)`, where in this if-condition a player is found to `WIN`. In the `else`-condition, we have the following **sloc**: `discardRandom(); threads[id] = WAIT; threads[0] = NEXT_TURN;`, where means no one has won the round, so he or she discards his or her card; then the players `WAIT` until the dealer (`threads[0] = NEXT_TURN` moves to the next round. A `break;` occurs under the `switch` just outside the `if-else` control flow.

`EXIT_ROUND` determines who wins with `if (playerHand.size() == 2` (only one person will have two cards at `EXIT_ROUND` meaning he or she has won. After which the players put their card(s) back in the deck with `while (playerHand.size() > 0) { deck.push_back(playerHand[0]); playerHand.pop_front();`
`}`.
Then the following **sloc** are: `threads[id] = WAIT; threads[0] = GO; break;` , where the players are to `WAIT` while the dealer is setting up another round.

`TERMINATE` exits the game. All cards are returned to the deck, as in the `while (playerHand.size() > 0)` actions above in `EXIT_ROUND`. `keepPlaying` is set to `false`. There is a `break;` out of the `switch`.

And at the end of the large outer `while`-loop the command `pthread_exit(NULL);`, returning all reusable resources.

3. Instructions on How to Compile & Run on the CS Linux Servers

In the `program1_a_f408.zip` or `program1_jah534.zip` files, there is a `makefile` which will allow you to compile the file. In the CS Linux command line interface (CLI), simply type `make`. This will compile a `threadWar` executable. To run the `threadWar` executable, simple type into CS Linux CLI `./threadWar`. This last command will run the program producing both a `log.txt` file and console output.

Finally, if you like, you can run `make clean` in the CS Linux CLI, and this will remove the `log.txt` file and the `threadWar` executable.

4. Console & log Output for 5 Independent Runs

The following are 5 console and 5 log outputs, each corresponding to the other (as can be see at the top of each page). Namely, `console1.txt` corresponds to the following pages, `log1.txt`, and so on for 5 trials.

SEE BELOW FOR ALL REQUESTED OUTPUT . . .

New Game 1:
PLAYER 1:
HAND: 410
WIN: no
PLAYER 2:
HAND: 413
WIN: no
PLAYER 3:
HAND: 309
WIN: no
DECK: 310 411 311 101 408 113 303 405 403 209 313 213 106 207 409 301
404 412 402 305 302 111 212 103 205 407 202 206 312 204 110 102 308
208 304 104 307 105 401 406 201 109 107 306 203 112 108 211 210 410
413 309

Current scores:
PLAYER 1: 0
PLAYER 2: 0
PLAYER 3: 0

New Game 2:
PLAYER 1:
HAND: 108
WIN: no
PLAYER 2:
HAND: 209 409
WIN: yes
PLAYER 3:
HAND: 309
WIN: no
DECK: 310 207 405 107 313 205 308 102 211 202 210 407 305 307 203 304
408 213 103 412 303 104 306 403 111 401 204 101 413 406 109 402 206
106 410 201 311 301 411 312 212 112 110 404 302 105 208 113 108 209
409 309

Current scores:
PLAYER 1: 0
PLAYER 2: 1
PLAYER 3: 0

New Game 3:
PLAYER 1:
HAND: 209
WIN: no
PLAYER 2:
HAND: 313

WIN: no
PLAYER 3:
HAND: 305 405
WIN: yes
DECK: 212 413 310 111 205 311 406 309 304 109 213 409 104 107 403 102
402 410 101 312 411 306 208 103 110 204 303 105 106 404 203 207 401
112 301 108 408 412 206 407 211 302 210 202 201 308 113 307 209 313
305 405

Current scores:
PLAYER 1: 0
PLAYER 2: 1
PLAYER 3: 1

```
DEALER: shuffle
Player 1: draws 105
Player 2: draws 401
Player 3: draws 406

Begin drawing.
Player 1: draws 304
player 1: hand 105 304
PLAYER 1: discards 304
PLAYER 1: hand 105
DECK: 104 307 201 109 309 108 203 107 306 211 112 410 413 210 310 411
311 101 408 113 303 405 403 209 313 213 106 207 409 301 404 412 402
305 302 111 212 103 205 407 202 206 312 204 110 102 308 208 304

Player 2: draws 104
player 2: hand 401 104
PLAYER 2: discards 104
PLAYER 2: hand 401
DECK: 307 201 109 309 108 203 107 306 211 112 410 413 210 310 411 311
101 408 113 303 405 403 209 313 213 106 207 409 301 404 412 402 305
302 111 212 103 205 407 202 206 312 204 110 102 308 208 304 104

Player 3: draws 307
player 3: hand 406 307
PLAYER 3: discards 307
PLAYER 3: hand 406
DECK: 201 109 309 108 203 107 306 211 112 410 413 210 310 411 311 101
408 113 303 405 403 209 313 213 106 207 409 301 404 412 402 305 302
111 212 103 205 407 202 206 312 204 110 102 308 208 304 104 307

Player 1: draws 201
player 1: hand 105 201
PLAYER 1: discards 105
PLAYER 1: hand 201
DECK: 109 309 108 203 107 306 211 112 410 413 210 310 411 311 101 408
113 303 405 403 209 313 213 106 207 409 301 404 412 402 305 302 111
212 103 205 407 202 206 312 204 110 102 308 208 304 104 307 105

Player 2: draws 109
player 2: hand 401 109
PLAYER 2: discards 401
PLAYER 2: hand 109
DECK: 309 108 203 107 306 211 112 410 413 210 310 411 311 101 408 113
303 405 403 209 313 213 106 207 409 301 404 412 402 305 302 111 212
103 205 407 202 206 312 204 110 102 308 208 304 104 307 105 401

Player 3: draws 309
player 3: hand 406 309
```

PLAYER 3: discards 406
PLAYER 3: hand 309
DECK: 108 203 107 306 211 112 410 413 210 310 411 311 101 408 113 303
405 403 209 313 213 106 207 409 301 404 412 402 305 302 111 212 103
205 407 202 206 312 204 110 102 308 208 304 104 307 105 401 406

Player 1: draws 108
player 1: hand 201 108
PLAYER 1: discards 201
PLAYER 1: hand 108
DECK: 203 107 306 211 112 410 413 210 310 411 311 101 408 113 303 405
403 209 313 213 106 207 409 301 404 412 402 305 302 111 212 103 205
407 202 206 312 204 110 102 308 208 304 104 307 105 401 406 201

Player 2: draws 203
player 2: hand 109 203
PLAYER 2: discards 109
PLAYER 2: hand 203
DECK: 107 306 211 112 410 413 210 310 411 311 101 408 113 303 405 403
209 313 213 106 207 409 301 404 412 402 305 302 111 212 103 205 407
202 206 312 204 110 102 308 208 304 104 307 105 401 406 201 109

Player 3: draws 107
player 3: hand 309 107
PLAYER 3: discards 107
PLAYER 3: hand 309
DECK: 306 211 112 410 413 210 310 411 311 101 408 113 303 405 403 209
313 213 106 207 409 301 404 412 402 305 302 111 212 103 205 407 202
206 312 204 110 102 308 208 304 104 307 105 401 406 201 109 107

Player 1: draws 306
player 1: hand 108 306
PLAYER 1: discards 306
PLAYER 1: hand 108
DECK: 211 112 410 413 210 310 411 311 101 408 113 303 405 403 209 313
213 106 207 409 301 404 412 402 305 302 111 212 103 205 407 202 206
312 204 110 102 308 208 304 104 307 105 401 406 201 109 107 306

Player 2: draws 211
player 2: hand 203 211
PLAYER 2: discards 203
PLAYER 2: hand 211
DECK: 112 410 413 210 310 411 311 101 408 113 303 405 403 209 313 213
106 207 409 301 404 412 402 305 302 111 212 103 205 407 202 206 312
204 110 102 308 208 304 104 307 105 401 406 201 109 107 306 203

Player 3: draws 112
player 3: hand 309 112
PLAYER 3: discards 112
PLAYER 3: hand 309

DECK: 410 413 210 310 411 311 101 408 113 303 405 403 209 313 213 106
207 409 301 404 412 402 305 302 111 212 103 205 407 202 206 312 204
110 102 308 208 304 104 307 105 401 406 201 109 107 306 203 112

Player 1: draws 410
player 1: hand 108 410
PLAYER 1: discards 108
PLAYER 1: hand 410
DECK: 413 210 310 411 311 101 408 113 303 405 403 209 313 213 106 207
409 301 404 412 402 305 302 111 212 103 205 407 202 206 312 204 110
102 308 208 304 104 307 105 401 406 201 109 107 306 203 112 108

Player 2: draws 413
player 2: hand 211 413
PLAYER 2: discards 211
PLAYER 2: hand 413
DECK: 210 310 411 311 101 408 113 303 405 403 209 313 213 106 207 409
301 404 412 402 305 302 111 212 103 205 407 202 206 312 204 110 102
308 208 304 104 307 105 401 406 201 109 107 306 203 112 108 211

Player 3: draws 210
player 3: hand 309 210
PLAYER 3: discards 210
PLAYER 3: hand 309
DECK: 310 411 311 101 408 113 303 405 403 209 313 213 106 207 409 301
404 412 402 305 302 111 212 103 205 407 202 206 312 204 110 102 308
208 304 104 307 105 401 406 201 109 107 306 203 112 108 211 210

The round is a draw!
PLAYER 1: exits round
PLAYER 2: exits round
PLAYER 3: exits round

DEALER: shuffle
Player 1: draws 108
Player 2: draws 312
Player 3: draws 212

Begin drawing.
Player 2: draws 311
player 2: hand 312 311
PLAYER 2: discards 311
PLAYER 2: hand 312
DECK: 301 411 105 309 112 110 404 302 209 208 113 409 310 207 405 107
313 205 308 102 211 202 210 407 305 307 203 304 408 213 103 412 303
104 306 403 111 401 204 101 413 406 109 402 206 106 410 201 311

Player 3: draws 301
player 3: hand 212 301
PLAYER 3: discards 301

PLAYER 3: hand 212
DECK: 411 105 309 112 110 404 302 209 208 113 409 310 207 405 107 313
205 308 102 211 202 210 407 305 307 203 304 408 213 103 412 303 104
306 403 111 401 204 101 413 406 109 402 206 106 410 201 311 301

Player 1: draws 411
player 1: hand 108 411
PLAYER 1: discards 411
PLAYER 1: hand 108
DECK: 105 309 112 110 404 302 209 208 113 409 310 207 405 107 313 205
308 102 211 202 210 407 305 307 203 304 408 213 103 412 303 104 306
403 111 401 204 101 413 406 109 402 206 106 410 201 311 301 411

Player 2: draws 105
player 2: hand 312 105
PLAYER 2: discards 312
PLAYER 2: hand 105
DECK: 309 112 110 404 302 209 208 113 409 310 207 405 107 313 205 308
102 211 202 210 407 305 307 203 304 408 213 103 412 303 104 306 403
111 401 204 101 413 406 109 402 206 106 410 201 311 301 411 312

Player 3: draws 309
player 3: hand 212 309
PLAYER 3: discards 212
PLAYER 3: hand 309
DECK: 112 110 404 302 209 208 113 409 310 207 405 107 313 205 308 102
211 202 210 407 305 307 203 304 408 213 103 412 303 104 306 403 111
401 204 101 413 406 109 402 206 106 410 201 311 301 411 312 212

Player 1: draws 112
player 1: hand 108 112
PLAYER 1: discards 112
PLAYER 1: hand 108
DECK: 110 404 302 209 208 113 409 310 207 405 107 313 205 308 102 211
202 210 407 305 307 203 304 408 213 103 412 303 104 306 403 111 401
204 101 413 406 109 402 206 106 410 201 311 301 411 312 212 112

Player 2: draws 110
player 2: hand 105 110
PLAYER 2: discards 110
PLAYER 2: hand 105
DECK: 404 302 209 208 113 409 310 207 405 107 313 205 308 102 211 202
210 407 305 307 203 304 408 213 103 412 303 104 306 403 111 401 204
101 413 406 109 402 206 106 410 201 311 301 411 312 212 112 110

Player 3: draws 404
player 3: hand 309 404
PLAYER 3: discards 404
PLAYER 3: hand 309
DECK: 302 209 208 113 409 310 207 405 107 313 205 308 102 211 202 210

```
407 305 307 203 304 408 213 103 412 303 104 306 403 111 401 204 101
413 406 109 402 206 106 410 201 311 301 411 312 212 112 110 404

Player 1: draws 302
player 1: hand 108 302
PLAYER 1: discards 302
PLAYER 1: hand 108
DECK: 209 208 113 409 310 207 405 107 313 205 308 102 211 202 210 407
305 307 203 304 408 213 103 412 303 104 306 403 111 401 204 101 413
406 109 402 206 106 410 201 311 301 411 312 212 112 110 404 302

Player 2: draws 209
player 2: hand 105 209
PLAYER 2: discards 105
PLAYER 2: hand 209
DECK: 208 113 409 310 207 405 107 313 205 308 102 211 202 210 407 305
307 203 304 408 213 103 412 303 104 306 403 111 401 204 101 413 406
109 402 206 106 410 201 311 301 411 312 212 112 110 404 302 105

Player 3: draws 208
player 3: hand 309 208
PLAYER 3: discards 208
PLAYER 3: hand 309
DECK: 113 409 310 207 405 107 313 205 308 102 211 202 210 407 305 307
203 304 408 213 103 412 303 104 306 403 111 401 204 101 413 406 109
402 206 106 410 201 311 301 411 312 212 112 110 404 302 105 208

Player 1: draws 113
player 1: hand 108 113
PLAYER 1: discards 113
PLAYER 1: hand 108
DECK: 409 310 207 405 107 313 205 308 102 211 202 210 407 305 307 203
304 408 213 103 412 303 104 306 403 111 401 204 101 413 406 109 402
206 106 410 201 311 301 411 312 212 112 110 404 302 105 208 113

Player 2: draws 409
player 2: hand 209 409
PLAYER 2: wins
PLAYER 1: exits round
PLAYER 2: exits round
PLAYER 3: exits round

DEALER: shuffle
Player 1: draws 113
Player 2: draws 313
Player 3: draws 308

Begin drawing.
Player 3: draws 305
player 3: hand 308 305
```

```
PLAYER 3: discards 308
PLAYER 3: hand 305
DECK: 209 307 405 212 413 310 111 205 311 406 309 304 109 213 409 104
107 403 102 402 410 101 312 411 306 208 103 110 204 303 105 106 404
203 207 401 112 301 108 408 412 206 407 211 302 210 202 201 308

Player 1: draws 209
player 1: hand 113 209
PLAYER 1: discards 113
PLAYER 1: hand 209
DECK: 307 405 212 413 310 111 205 311 406 309 304 109 213 409 104 107
403 102 402 410 101 312 411 306 208 103 110 204 303 105 106 404 203
207 401 112 301 108 408 412 206 407 211 302 210 202 201 308 113

Player 2: draws 307
player 2: hand 313 307
PLAYER 2: discards 307
PLAYER 2: hand 313
DECK: 405 212 413 310 111 205 311 406 309 304 109 213 409 104 107 403
102 402 410 101 312 411 306 208 103 110 204 303 105 106 404 203 207
401 112 301 108 408 412 206 407 211 302 210 202 201 308 113 307

Player 3: draws 405
player 3: hand 305 405
PLAYER 3: wins
PLAYER 1: exits round
PLAYER 2: exits round
PLAYER 3: exits round

PLAYER 1: terminates
PLAYER 2: terminates
PLAYER 3: terminates
```

New Game 1:
PLAYER 1:
HAND: 210 310
WIN: yes
PLAYER 2:
HAND: 104
WIN: no
PLAYER 3:
HAND: 408
WIN: no
DECK: 413 305 412 107 302 306 204 307 108 105 311 205 208 409 209 202
402 405 109 203 304 113 406 404 101 411 206 111 301 309 103 403 308
211 313 213 410 110 312 102 401 303 112 207 106 201 212 407 210 310
104 408

Current scores:
PLAYER 1: 1
PLAYER 2: 0
PLAYER 3: 0

New Game 2:
PLAYER 1:
HAND: 108 408
WIN: yes
PLAYER 2:
HAND: 405
WIN: no
PLAYER 3:
HAND: 213
WIN: no
DECK: 412 110 410 302 109 107 313 310 208 409 102 201 401 307 304 209
305 402 312 306 301 309 101 103 207 106 308 406 404 105 403 411 210
113 111 202 303 413 407 205 211 212 203 104 204 311 206 112 108 408
405 213

Current scores:
PLAYER 1: 2
PLAYER 2: 0
PLAYER 3: 0

New Game 3:
PLAYER 1:
HAND: 205
WIN: no
PLAYER 2:
HAND: 213

WIN: no
PLAYER 3:
HAND: 212
WIN: no
DECK: 101 405 410 210 411 209 105 408 107 305 302 104 206 208 312 203
311 103 109 303 106 404 403 406 313 401 304 308 202 102 201 207 310
309 108 113 112 407 211 413 111 307 110 402 301 306 204 409 412 205
213 212

Current scores:
PLAYER 1: 2
PLAYER 2: 0
PLAYER 3: 0

DEALER: shuffle
Player 1: draws 201
Player 2: draws 212
Player 3: draws 407

Begin drawing.
Player 1: draws 112
player 1: hand 201 112
PLAYER 1: discards 112
PLAYER 1: hand 201
DECK: 207 106 210 104 408 310 413 305 412 107 302 306 204 307 108 105
311 205 208 409 209 202 402 405 109 203 304 113 406 404 101 411 206
111 301 309 103 403 308 211 313 213 410 110 312 102 401 303 112

Player 2: draws 207
player 2: hand 212 207
PLAYER 2: discards 207
PLAYER 2: hand 212
DECK: 106 210 104 408 310 413 305 412 107 302 306 204 307 108 105 311
205 208 409 209 202 402 405 109 203 304 113 406 404 101 411 206 111
301 309 103 403 308 211 313 213 410 110 312 102 401 303 112 207

Player 3: draws 106
player 3: hand 407 106
PLAYER 3: discards 106
PLAYER 3: hand 407
DECK: 210 104 408 310 413 305 412 107 302 306 204 307 108 105 311 205
208 409 209 202 402 405 109 203 304 113 406 404 101 411 206 111 301
309 103 403 308 211 313 213 410 110 312 102 401 303 112 207 106

Player 1: draws 210
player 1: hand 201 210
PLAYER 1: discards 201
PLAYER 1: hand 210
DECK: 104 408 310 413 305 412 107 302 306 204 307 108 105 311 205 208
409 209 202 402 405 109 203 304 113 406 404 101 411 206 111 301 309
103 403 308 211 313 213 410 110 312 102 401 303 112 207 106 201

Player 2: draws 104
player 2: hand 212 104
PLAYER 2: discards 212
PLAYER 2: hand 104
DECK: 408 310 413 305 412 107 302 306 204 307 108 105 311 205 208 409
209 202 402 405 109 203 304 113 406 404 101 411 206 111 301 309 103
403 308 211 313 213 410 110 312 102 401 303 112 207 106 201 212

Player 3: draws 408
player 3: hand 407 408

PLAYER 3: discards 407
PLAYER 3: hand 408
DECK: 310 413 305 412 107 302 306 204 307 108 105 311 205 208 409 209
202 402 405 109 203 304 113 406 404 101 411 206 111 301 309 103 403
308 211 313 213 410 110 312 102 401 303 112 207 106 201 212 407

Player 1: draws 310
player 1: hand 210 310
PLAYER 1: wins
PLAYER 1: exits round
PLAYER 2: exits round
PLAYER 3: exits round

DEALER: shuffle
Player 1: draws 108
Player 2: draws 206
Player 3: draws 112

Begin drawing.
Player 2: draws 405
player 2: hand 206 405
PLAYER 2: discards 206
PLAYER 2: hand 405
DECK: 213 408 412 110 410 302 109 107 313 310 208 409 102 201 401 307
304 209 305 402 312 306 301 309 101 103 207 106 308 406 404 105 403
411 210 113 111 202 303 413 407 205 211 212 203 104 204 311 206

Player 3: draws 213
player 3: hand 112 213
PLAYER 3: discards 112
PLAYER 3: hand 213
DECK: 408 412 110 410 302 109 107 313 310 208 409 102 201 401 307 304
209 305 402 312 306 301 309 101 103 207 106 308 406 404 105 403 411
210 113 111 202 303 413 407 205 211 212 203 104 204 311 206 112

Player 1: draws 408
player 1: hand 108 408
PLAYER 1: wins
PLAYER 1: exits round
PLAYER 2: exits round
PLAYER 3: exits round

DEALER: shuffle
Player 1: draws 211
Player 2: draws 112
Player 3: draws 212

Begin drawing.
Player 3: draws 108
player 3: hand 212 108

PLAYER 3: discards 108
PLAYER 3: hand 212
DECK: 113 413 407 301 306 111 307 110 402 205 213 204 409 412 101 405
410 210 411 209 105 408 107 305 302 104 206 208 312 203 311 103 109
303 106 404 403 406 313 401 304 308 202 102 201 207 310 309 108

Player 1: draws 113
player 1: hand 211 113
PLAYER 1: discards 113
PLAYER 1: hand 211
DECK: 413 407 301 306 111 307 110 402 205 213 204 409 412 101 405 410
210 411 209 105 408 107 305 302 104 206 208 312 203 311 103 109 303
106 404 403 406 313 401 304 308 202 102 201 207 310 309 108 113

Player 2: draws 413
player 2: hand 112 413
PLAYER 2: discards 112
PLAYER 2: hand 413
DECK: 407 301 306 111 307 110 402 205 213 204 409 412 101 405 410 210
411 209 105 408 107 305 302 104 206 208 312 203 311 103 109 303 106
404 403 406 313 401 304 308 202 102 201 207 310 309 108 113 112

Player 3: draws 407
player 3: hand 212 407
PLAYER 3: discards 407
PLAYER 3: hand 212
DECK: 301 306 111 307 110 402 205 213 204 409 412 101 405 410 210 411
209 105 408 107 305 302 104 206 208 312 203 311 103 109 303 106 404
403 406 313 401 304 308 202 102 201 207 310 309 108 113 112 407

Player 1: draws 301
player 1: hand 211 301
PLAYER 1: discards 211
PLAYER 1: hand 301
DECK: 306 111 307 110 402 205 213 204 409 412 101 405 410 210 411 209
105 408 107 305 302 104 206 208 312 203 311 103 109 303 106 404 403
406 313 401 304 308 202 102 201 207 310 309 108 113 112 407 211

Player 2: draws 306
player 2: hand 413 306
PLAYER 2: discards 413
PLAYER 2: hand 306
DECK: 111 307 110 402 205 213 204 409 412 101 405 410 210 411 209 105
408 107 305 302 104 206 208 312 203 311 103 109 303 106 404 403 406
313 401 304 308 202 102 201 207 310 309 108 113 112 407 211 413

Player 3: draws 111
player 3: hand 212 111
PLAYER 3: discards 111
PLAYER 3: hand 212

DECK: 307 110 402 205 213 204 409 412 101 405 410 210 411 209 105 408
107 305 302 104 206 208 312 203 311 103 109 303 106 404 403 406 313
401 304 308 202 102 201 207 310 309 108 113 112 407 211 413 111

Player 1: draws 307
player 1: hand 301 307
PLAYER 1: discards 307
PLAYER 1: hand 301
DECK: 110 402 205 213 204 409 412 101 405 410 210 411 209 105 408 107
305 302 104 206 208 312 203 311 103 109 303 106 404 403 406 313 401
304 308 202 102 201 207 310 309 108 113 112 407 211 413 111 307

Player 2: draws 110
player 2: hand 306 110
PLAYER 2: discards 110
PLAYER 2: hand 306
DECK: 402 205 213 204 409 412 101 405 410 210 411 209 105 408 107 305
302 104 206 208 312 203 311 103 109 303 106 404 403 406 313 401 304
308 202 102 201 207 310 309 108 113 112 407 211 413 111 307 110

Player 3: draws 402
player 3: hand 212 402
PLAYER 3: discards 402
PLAYER 3: hand 212
DECK: 205 213 204 409 412 101 405 410 210 411 209 105 408 107 305 302
104 206 208 312 203 311 103 109 303 106 404 403 406 313 401 304 308
202 102 201 207 310 309 108 113 112 407 211 413 111 307 110 402

Player 1: draws 205
player 1: hand 301 205
PLAYER 1: discards 301
PLAYER 1: hand 205
DECK: 213 204 409 412 101 405 410 210 411 209 105 408 107 305 302 104
206 208 312 203 311 103 109 303 106 404 403 406 313 401 304 308 202
102 201 207 310 309 108 113 112 407 211 413 111 307 110 402 301

Player 2: draws 213
player 2: hand 306 213
PLAYER 2: discards 306
PLAYER 2: hand 213
DECK: 204 409 412 101 405 410 210 411 209 105 408 107 305 302 104 206
208 312 203 311 103 109 303 106 404 403 406 313 401 304 308 202 102
201 207 310 309 108 113 112 407 211 413 111 307 110 402 301 306

Player 3: draws 204
player 3: hand 212 204
PLAYER 3: discards 204
PLAYER 3: hand 212
DECK: 409 412 101 405 410 210 411 209 105 408 107 305 302 104 206 208
312 203 311 103 109 303 106 404 403 406 313 401 304 308 202 102 201

207 310 309 108 113 112 407 211 413 111 307 110 402 301 306 204

Player 1: draws 409
player 1: hand 205 409
PLAYER 1: discards 409
PLAYER 1: hand 205
DECK: 412 101 405 410 210 411 209 105 408 107 305 302 104 206 208 312
203 311 103 109 303 106 404 403 406 313 401 304 308 202 102 201 207
310 309 108 113 112 407 211 413 111 307 110 402 301 306 204 409

Player 2: draws 412
player 2: hand 213 412
PLAYER 2: discards 412
PLAYER 2: hand 213
DECK: 101 405 410 210 411 209 105 408 107 305 302 104 206 208 312 203
311 103 109 303 106 404 403 406 313 401 304 308 202 102 201 207 310
309 108 113 112 407 211 413 111 307 110 402 301 306 204 409 412

The round is a draw!
PLAYER 1: exits round
PLAYER 2: exits round
PLAYER 3: exits round

PLAYER 1: terminates
PLAYER 2: terminates
PLAYER 3: terminates

New Game 1:
PLAYER 1:
HAND: 302
WIN: no
PLAYER 2:
HAND: 104
WIN: no
PLAYER 3:
HAND: 102
WIN: no
DECK: 111 402 308 313 305 110 413 311 112 101 103 310 312 406 107 407
108 203 105 208 409 411 304 405 204 201 306 301 109 303 403 213 212
412 408 202 404 209 401 211 206 106 207 309 210 307 113 205 410 302
104 102

Current scores:
PLAYER 1: 0
PLAYER 2: 0
PLAYER 3: 0

New Game 2:
PLAYER 1:
HAND: 306
WIN: no
PLAYER 2:
HAND: 204
WIN: no
PLAYER 3:
HAND: 206
WIN: no
DECK: 301 112 106 202 209 103 313 305 401 110 405 107 409 210 108 413
212 109 406 407 402 311 213 304 302 309 113 411 211 205 307 312 203
404 208 408 201 403 410 101 412 207 303 310 102 104 105 308 111 306
204 206

Current scores:
PLAYER 1: 0
PLAYER 2: 0
PLAYER 3: 0

New Game 3:
PLAYER 1:
HAND: 111
WIN: no
PLAYER 2:
HAND: 405 105

WIN: yes
PLAYER 3:
HAND: 308
WIN: no
DECK: 303 109 212 412 403 112 104 410 313 409 108 408 110 102 406 204
309 107 210 302 101 401 404 207 113 307 202 209 103 311 205 411 213
206 301 304 402 413 312 407 106 208 201 211 305 203 310 306 111 405
105 308

Current scores:
PLAYER 1: 0
PLAYER 2: 1
PLAYER 3: 0

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DEALER: shuffle
Player 1: draws 209
Player 2: draws 401
Player 3: draws 211

Begin drawing.
Player 1: draws 408
player 1: hand 209 408
PLAYER 1: discards 408
PLAYER 1: hand 209
DECK: 202 404 206 106 102 113 210 207 309 205 307 302 104 410 111 402
308 313 305 110 413 311 112 101 103 310 312 406 107 407 108 203 105
208 409 411 304 405 204 201 306 301 109 303 403 213 212 412 408

Player 2: draws 202
player 2: hand 401 202
PLAYER 2: discards 202
PLAYER 2: hand 401
DECK: 404 206 106 102 113 210 207 309 205 307 302 104 410 111 402 308
313 305 110 413 311 112 101 103 310 312 406 107 407 108 203 105 208
409 411 304 405 204 201 306 301 109 303 403 213 212 412 408 202

Player 3: draws 404
player 3: hand 211 404
PLAYER 3: discards 404
PLAYER 3: hand 211
DECK: 206 106 102 113 210 207 309 205 307 302 104 410 111 402 308 313
305 110 413 311 112 101 103 310 312 406 107 407 108 203 105 208 409
411 304 405 204 201 306 301 109 303 403 213 212 412 408 202 404

Player 1: draws 206
player 1: hand 209 206
PLAYER 1: discards 209
PLAYER 1: hand 206
DECK: 106 102 113 210 207 309 205 307 302 104 410 111 402 308 313 305
110 413 311 112 101 103 310 312 406 107 407 108 203 105 208 409 411
304 405 204 201 306 301 109 303 403 213 212 412 408 202 404 209

Player 2: draws 106
player 2: hand 401 106
PLAYER 2: discards 401
PLAYER 2: hand 106
DECK: 102 113 210 207 309 205 307 302 104 410 111 402 308 313 305 110
413 311 112 101 103 310 312 406 107 407 108 203 105 208 409 411 304
405 204 201 306 301 109 303 403 213 212 412 408 202 404 209 401

Player 3: draws 102
player 3: hand 211 102

PLAYER 3: discards 211
PLAYER 3: hand 102
DECK: 113 210 207 309 205 307 302 104 410 111 402 308 313 305 110 413
311 112 101 103 310 312 406 107 407 108 203 105 208 409 411 304 405
204 201 306 301 109 303 403 213 212 412 408 202 404 209 401 211

Player 1: draws 113
player 1: hand 206 113
PLAYER 1: discards 206
PLAYER 1: hand 113
DECK: 210 207 309 205 307 302 104 410 111 402 308 313 305 110 413 311
112 101 103 310 312 406 107 407 108 203 105 208 409 411 304 405 204
201 306 301 109 303 403 213 212 412 408 202 404 209 401 211 206

Player 2: draws 210
player 2: hand 106 210
PLAYER 2: discards 106
PLAYER 2: hand 210
DECK: 207 309 205 307 302 104 410 111 402 308 313 305 110 413 311 112
101 103 310 312 406 107 407 108 203 105 208 409 411 304 405 204 201
306 301 109 303 403 213 212 412 408 202 404 209 401 211 206 106

Player 3: draws 207
player 3: hand 102 207
PLAYER 3: discards 207
PLAYER 3: hand 102
DECK: 309 205 307 302 104 410 111 402 308 313 305 110 413 311 112 101
103 310 312 406 107 407 108 203 105 208 409 411 304 405 204 201 306
301 109 303 403 213 212 412 408 202 404 209 401 211 206 106 207

Player 1: draws 309
player 1: hand 113 309
PLAYER 1: discards 309
PLAYER 1: hand 113
DECK: 205 307 302 104 410 111 402 308 313 305 110 413 311 112 101 103
310 312 406 107 407 108 203 105 208 409 411 304 405 204 201 306 301
109 303 403 213 212 412 408 202 404 209 401 211 206 106 207 309

Player 2: draws 205
player 2: hand 210 205
PLAYER 2: discards 210
PLAYER 2: hand 205
DECK: 307 302 104 410 111 402 308 313 305 110 413 311 112 101 103 310
312 406 107 407 108 203 105 208 409 411 304 405 204 201 306 301 109
303 403 213 212 412 408 202 404 209 401 211 206 106 207 309 210

Player 3: draws 307
player 3: hand 102 307
PLAYER 3: discards 307
PLAYER 3: hand 102

DECK: 302 104 410 111 402 308 313 305 110 413 311 112 101 103 310 312
406 107 407 108 203 105 208 409 411 304 405 204 201 306 301 109 303
403 213 212 412 408 202 404 209 401 211 206 106 207 309 210 307

Player 1: draws 302
player 1: hand 113 302
PLAYER 1: discards 113
PLAYER 1: hand 302
DECK: 104 410 111 402 308 313 305 110 413 311 112 101 103 310 312 406
107 407 108 203 105 208 409 411 304 405 204 201 306 301 109 303 403
213 212 412 408 202 404 209 401 211 206 106 207 309 210 307 113

Player 2: draws 104
player 2: hand 205 104
PLAYER 2: discards 205
PLAYER 2: hand 104
DECK: 410 111 402 308 313 305 110 413 311 112 101 103 310 312 406 107
407 108 203 105 208 409 411 304 405 204 201 306 301 109 303 403 213
212 412 408 202 404 209 401 211 206 106 207 309 210 307 113 205

Player 3: draws 410
player 3: hand 102 410
PLAYER 3: discards 410
PLAYER 3: hand 102
DECK: 111 402 308 313 305 110 413 311 112 101 103 310 312 406 107 407
108 203 105 208 409 411 304 405 204 201 306 301 109 303 403 213 212
412 408 202 404 209 401 211 206 106 207 309 210 307 113 205 410

The round is a draw!
PLAYER 1: exits round
PLAYER 2: exits round
PLAYER 3: exits round

DEALER: shuffle
Player 1: draws 306
Player 2: draws 403
Player 3: draws 410

Begin drawing.
Player 2: draws 208
player 2: hand 403 208
PLAYER 2: discards 208
PLAYER 2: hand 403
DECK: 408 201 310 308 101 412 207 303 105 102 104 204 206 111 301 112
106 202 209 103 313 305 401 110 405 107 409 210 108 413 212 109 406
407 402 311 213 304 302 309 113 411 211 205 307 312 203 404 208

Player 3: draws 408
player 3: hand 410 408
PLAYER 3: discards 408

PLAYER 3: hand 410
DECK: 201 310 308 101 412 207 303 105 102 104 204 206 111 301 112 106
202 209 103 313 305 401 110 405 107 409 210 108 413 212 109 406 407
402 311 213 304 302 309 113 411 211 205 307 312 203 404 208 408

Player 1: draws 201
player 1: hand 306 201
PLAYER 1: discards 201
PLAYER 1: hand 306
DECK: 310 308 101 412 207 303 105 102 104 204 206 111 301 112 106 202
209 103 313 305 401 110 405 107 409 210 108 413 212 109 406 407 402
311 213 304 302 309 113 411 211 205 307 312 203 404 208 408 201

Player 2: draws 310
player 2: hand 403 310
PLAYER 2: discards 403
PLAYER 2: hand 310
DECK: 308 101 412 207 303 105 102 104 204 206 111 301 112 106 202 209
103 313 305 401 110 405 107 409 210 108 413 212 109 406 407 402 311
213 304 302 309 113 411 211 205 307 312 203 404 208 408 201 403

Player 3: draws 308
player 3: hand 410 308
PLAYER 3: discards 410
PLAYER 3: hand 308
DECK: 101 412 207 303 105 102 104 204 206 111 301 112 106 202 209 103
313 305 401 110 405 107 409 210 108 413 212 109 406 407 402 311 213
304 302 309 113 411 211 205 307 312 203 404 208 408 201 403 410

Player 1: draws 101
player 1: hand 306 101
PLAYER 1: discards 101
PLAYER 1: hand 306
DECK: 412 207 303 105 102 104 204 206 111 301 112 106 202 209 103 313
305 401 110 405 107 409 210 108 413 212 109 406 407 402 311 213 304
302 309 113 411 211 205 307 312 203 404 208 408 201 403 410 101

Player 2: draws 412
player 2: hand 310 412
PLAYER 2: discards 412
PLAYER 2: hand 310
DECK: 207 303 105 102 104 204 206 111 301 112 106 202 209 103 313 305
401 110 405 107 409 210 108 413 212 109 406 407 402 311 213 304 302
309 113 411 211 205 307 312 203 404 208 408 201 403 410 101 412

Player 3: draws 207
player 3: hand 308 207
PLAYER 3: discards 207
PLAYER 3: hand 308
DECK: 303 105 102 104 204 206 111 301 112 106 202 209 103 313 305 401

110 405 107 409 210 108 413 212 109 406 407 402 311 213 304 302 309
113 411 211 205 307 312 203 404 208 408 201 403 410 101 412 207

Player 1: draws 303
player 1: hand 306 303
PLAYER 1: discards 303
PLAYER 1: hand 306
DECK: 105 102 104 204 206 111 301 112 106 202 209 103 313 305 401 110
405 107 409 210 108 413 212 109 406 407 402 311 213 304 302 309 113
411 211 205 307 312 203 404 208 408 201 403 410 101 412 207 303

Player 2: draws 105
player 2: hand 310 105
PLAYER 2: discards 310
PLAYER 2: hand 105
DECK: 102 104 204 206 111 301 112 106 202 209 103 313 305 401 110 405
107 409 210 108 413 212 109 406 407 402 311 213 304 302 309 113 411
211 205 307 312 203 404 208 408 201 403 410 101 412 207 303 310

Player 3: draws 102
player 3: hand 308 102
PLAYER 3: discards 102
PLAYER 3: hand 308
DECK: 104 204 206 111 301 112 106 202 209 103 313 305 401 110 405 107
409 210 108 413 212 109 406 407 402 311 213 304 302 309 113 411 211
205 307 312 203 404 208 408 201 403 410 101 412 207 303 310 102

Player 1: draws 104
player 1: hand 306 104
PLAYER 1: discards 104
PLAYER 1: hand 306
DECK: 204 206 111 301 112 106 202 209 103 313 305 401 110 405 107 409
210 108 413 212 109 406 407 402 311 213 304 302 309 113 411 211 205
307 312 203 404 208 408 201 403 410 101 412 207 303 310 102 104

Player 2: draws 204
player 2: hand 105 204
PLAYER 2: discards 105
PLAYER 2: hand 204
DECK: 206 111 301 112 106 202 209 103 313 305 401 110 405 107 409 210
108 413 212 109 406 407 402 311 213 304 302 309 113 411 211 205 307
312 203 404 208 408 201 403 410 101 412 207 303 310 102 104 105

Player 3: draws 206
player 3: hand 308 206
PLAYER 3: discards 308
PLAYER 3: hand 206
DECK: 111 301 112 106 202 209 103 313 305 401 110 405 107 409 210 108
413 212 109 406 407 402 311 213 304 302 309 113 411 211 205 307 312
203 404 208 408 201 403 410 101 412 207 303 310 102 104 105 308

Player 1: draws 111
player 1: hand 306 111
PLAYER 1: discards 111
PLAYER 1: hand 306
DECK: 301 112 106 202 209 103 313 305 401 110 405 107 409 210 108 413
212 109 406 407 402 311 213 304 302 309 113 411 211 205 307 312 203
404 208 408 201 403 410 101 412 207 303 310 102 104 105 308 111

The round is a draw!
PLAYER 1: exits round
PLAYER 2: exits round
PLAYER 3: exits round

DEALER: shuffle
Player 1: draws 208
Player 2: draws 201
Player 3: draws 308

Begin drawing.
Player 3: draws 106
player 3: hand 308 106
PLAYER 3: discards 106
PLAYER 3: hand 308
DECK: 305 405 211 111 203 310 306 105 303 109 212 412 403 112 104 410
313 409 108 408 110 102 406 204 309 107 210 302 101 401 404 207 113
307 202 209 103 311 205 411 213 206 301 304 402 413 312 407 106

Player 1: draws 305
player 1: hand 208 305
PLAYER 1: discards 208
PLAYER 1: hand 305
DECK: 405 211 111 203 310 306 105 303 109 212 412 403 112 104 410 313
409 108 408 110 102 406 204 309 107 210 302 101 401 404 207 113 307
202 209 103 311 205 411 213 206 301 304 402 413 312 407 106 208

Player 2: draws 405
player 2: hand 201 405
PLAYER 2: discards 201
PLAYER 2: hand 405
DECK: 211 111 203 310 306 105 303 109 212 412 403 112 104 410 313 409
108 408 110 102 406 204 309 107 210 302 101 401 404 207 113 307 202
209 103 311 205 411 213 206 301 304 402 413 312 407 106 208 201

Player 3: draws 211
player 3: hand 308 211
PLAYER 3: discards 211
PLAYER 3: hand 308
DECK: 111 203 310 306 105 303 109 212 412 403 112 104 410 313 409 108
408 110 102 406 204 309 107 210 302 101 401 404 207 113 307 202 209

103 311 205 411 213 206 301 304 402 413 312 407 106 208 201 211

Player 1: draws 111
player 1: hand 305 111
PLAYER 1: discards 305
PLAYER 1: hand 111
DECK: 203 310 306 105 303 109 212 412 403 112 104 410 313 409 108 408
110 102 406 204 309 107 210 302 101 401 404 207 113 307 202 209 103
311 205 411 213 206 301 304 402 413 312 407 106 208 201 211 305

Player 2: draws 203
player 2: hand 405 203
PLAYER 2: discards 203
PLAYER 2: hand 405
DECK: 310 306 105 303 109 212 412 403 112 104 410 313 409 108 408 110
102 406 204 309 107 210 302 101 401 404 207 113 307 202 209 103 311
205 411 213 206 301 304 402 413 312 407 106 208 201 211 305 203

Player 3: draws 310
player 3: hand 308 310
PLAYER 3: discards 310
PLAYER 3: hand 308
DECK: 306 105 303 109 212 412 403 112 104 410 313 409 108 408 110 102
406 204 309 107 210 302 101 401 404 207 113 307 202 209 103 311 205
411 213 206 301 304 402 413 312 407 106 208 201 211 305 203 310

Player 1: draws 306
player 1: hand 111 306
PLAYER 1: discards 306
PLAYER 1: hand 111
DECK: 105 303 109 212 412 403 112 104 410 313 409 108 408 110 102 406
204 309 107 210 302 101 401 404 207 113 307 202 209 103 311 205 411
213 206 301 304 402 413 312 407 106 208 201 211 305 203 310 306

Player 2: draws 105
player 2: hand 405 105
PLAYER 2: wins
PLAYER 1: exits round
PLAYER 2: exits round
PLAYER 3: exits round

PLAYER 1: terminates
PLAYER 2: terminates
PLAYER 3: terminates

New Game 1:
PLAYER 1:
HAND: 202
WIN: no
PLAYER 2:
HAND: 302 102
WIN: yes
PLAYER 3:
HAND: 107
WIN: no
DECK: 104 304 105 203 412 206 103 312 404 113 310 311 411 409 306 413
301 205 402 201 309 109 211 307 210 112 208 405 305 403 204 108 111
401 410 212 106 213 406 209 303 101 207 110 308 313 408 407 202 302
102 107

Current scores:
PLAYER 1: 0
PLAYER 2: 1
PLAYER 3: 0

New Game 2:
PLAYER 1:
HAND: 409
WIN: no
PLAYER 2:
HAND: 213 113
WIN: yes
PLAYER 3:
HAND: 408
WIN: no
DECK: 405 310 110 403 302 303 202 402 210 304 413 406 201 411 209 311
212 407 101 306 401 103 207 109 104 308 301 105 204 211 108 313 112
111 412 102 312 107 410 305 106 206 404 205 307 208 309 203 409 213
113 408

Current scores:
PLAYER 1: 0
PLAYER 2: 2
PLAYER 3: 0

New Game 3:
PLAYER 1:
HAND: 208
WIN: no
PLAYER 2:
HAND: 211

WIN: no
PLAYER 3:
HAND: 206
WIN: no
DECK: 407 111 402 212 112 210 213 205 311 412 113 406 310 411 202 209
405 104 303 103 408 201 109 403 108 413 401 106 308 312 304 101 203
204 107 306 102 301 302 313 409 105 307 305 309 410 110 207 404 208
211 206

Current scores:
PLAYER 1: 0
PLAYER 2: 2
PLAYER 3: 0

DEALER: shuffle
Player 1: draws 407
Player 2: draws 302
Player 3: draws 107

Begin drawing.
Player 1: draws 308
player 1: hand 407 308
PLAYER 1: discards 308
PLAYER 1: hand 407
DECK: 313 408 202 102 104 304 105 203 412 206 103 312 404 113 310 311
411 409 306 413 301 205 402 201 309 109 211 307 210 112 208 405 305
403 204 108 111 401 410 212 106 213 406 209 303 101 207 110 308

Player 2: draws 313
player 2: hand 302 313
PLAYER 2: discards 313
PLAYER 2: hand 302
DECK: 408 202 102 104 304 105 203 412 206 103 312 404 113 310 311 411
409 306 413 301 205 402 201 309 109 211 307 210 112 208 405 305 403
204 108 111 401 410 212 106 213 406 209 303 101 207 110 308 313

Player 3: draws 408
player 3: hand 107 408
PLAYER 3: discards 408
PLAYER 3: hand 107
DECK: 202 102 104 304 105 203 412 206 103 312 404 113 310 311 411 409
306 413 301 205 402 201 309 109 211 307 210 112 208 405 305 403 204
108 111 401 410 212 106 213 406 209 303 101 207 110 308 313 408

Player 1: draws 202
player 1: hand 407 202
PLAYER 1: discards 407
PLAYER 1: hand 202
DECK: 102 104 304 105 203 412 206 103 312 404 113 310 311 411 409 306
413 301 205 402 201 309 109 211 307 210 112 208 405 305 403 204 108
111 401 410 212 106 213 406 209 303 101 207 110 308 313 408 407

Player 2: draws 102
player 2: hand 302 102
PLAYER 2: wins
PLAYER 1: exits round
PLAYER 2: exits round
PLAYER 3: exits round

DEALER: shuffle
Player 1: draws 307
Player 2: draws 404

Player 3: draws 205

Begin drawing.
Player 2: draws 208
player 2: hand 404 208
PLAYER 2: discards 404
PLAYER 2: hand 208
DECK: 408 409 213 309 203 113 405 310 110 403 302 303 202 402 210 304
413 406 201 411 209 311 212 407 101 306 401 103 207 109 104 308 301
105 204 211 108 313 112 111 412 102 312 107 410 305 106 206 404

Player 3: draws 408
player 3: hand 205 408
PLAYER 3: discards 205
PLAYER 3: hand 408
DECK: 409 213 309 203 113 405 310 110 403 302 303 202 402 210 304 413
406 201 411 209 311 212 407 101 306 401 103 207 109 104 308 301 105
204 211 108 313 112 111 412 102 312 107 410 305 106 206 404 205

Player 1: draws 409
player 1: hand 307 409
PLAYER 1: discards 307
PLAYER 1: hand 409
DECK: 213 309 203 113 405 310 110 403 302 303 202 402 210 304 413 406
201 411 209 311 212 407 101 306 401 103 207 109 104 308 301 105 204
211 108 313 112 111 412 102 312 107 410 305 106 206 404 205 307

Player 2: draws 213
player 2: hand 208 213
PLAYER 2: discards 208
PLAYER 2: hand 213
DECK: 309 203 113 405 310 110 403 302 303 202 402 210 304 413 406 201
411 209 311 212 407 101 306 401 103 207 109 104 308 301 105 204 211
108 313 112 111 412 102 312 107 410 305 106 206 404 205 307 208

Player 3: draws 309
player 3: hand 408 309
PLAYER 3: discards 309
PLAYER 3: hand 408
DECK: 203 113 405 310 110 403 302 303 202 402 210 304 413 406 201 411
209 311 212 407 101 306 401 103 207 109 104 308 301 105 204 211 108
313 112 111 412 102 312 107 410 305 106 206 404 205 307 208 309

Player 1: draws 203
player 1: hand 409 203
PLAYER 1: discards 203
PLAYER 1: hand 409
DECK: 113 405 310 110 403 302 303 202 402 210 304 413 406 201 411 209
311 212 407 101 306 401 103 207 109 104 308 301 105 204 211 108 313
112 111 412 102 312 107 410 305 106 206 404 205 307 208 309 203

Player 2: draws 113
player 2: hand 213 113
PLAYER 2: wins
PLAYER 1: exits round
PLAYER 2: exits round
PLAYER 3: exits round

DEALER: shuffle
Player 1: draws 208
Player 2: draws 102
Player 3: draws 107

Begin drawing.
Player 3: draws 301
player 3: hand 107 301
PLAYER 3: discards 107
PLAYER 3: hand 301
DECK: 306 307 305 302 313 409 105 404 206 309 410 110 207 211 407 111
402 212 112 210 213 205 311 412 113 406 310 411 202 209 405 104 303
103 408 201 109 403 108 413 401 106 308 312 304 101 203 204 107

Player 1: draws 306
player 1: hand 208 306
PLAYER 1: discards 306
PLAYER 1: hand 208
DECK: 307 305 302 313 409 105 404 206 309 410 110 207 211 407 111 402
212 112 210 213 205 311 412 113 406 310 411 202 209 405 104 303 103
408 201 109 403 108 413 401 106 308 312 304 101 203 204 107 306

Player 2: draws 307
player 2: hand 102 307
PLAYER 2: discards 102
PLAYER 2: hand 307
DECK: 305 302 313 409 105 404 206 309 410 110 207 211 407 111 402 212
112 210 213 205 311 412 113 406 310 411 202 209 405 104 303 103 408
201 109 403 108 413 401 106 308 312 304 101 203 204 107 306 102

Player 3: draws 305
player 3: hand 301 305
PLAYER 3: discards 301
PLAYER 3: hand 305
DECK: 302 313 409 105 404 206 309 410 110 207 211 407 111 402 212 112
210 213 205 311 412 113 406 310 411 202 209 405 104 303 103 408 201
109 403 108 413 401 106 308 312 304 101 203 204 107 306 102 301

Player 1: draws 302
player 1: hand 208 302
PLAYER 1: discards 302
PLAYER 1: hand 208

DECK: 313 409 105 404 206 309 410 110 207 211 407 111 402 212 112 210
213 205 311 412 113 406 310 411 202 209 405 104 303 103 408 201 109
403 108 413 401 106 308 312 304 101 203 204 107 306 102 301 302

Player 2: draws 313
player 2: hand 307 313
PLAYER 2: discards 313
PLAYER 2: hand 307
DECK: 409 105 404 206 309 410 110 207 211 407 111 402 212 112 210 213
205 311 412 113 406 310 411 202 209 405 104 303 103 408 201 109 403
108 413 401 106 308 312 304 101 203 204 107 306 102 301 302 313

Player 3: draws 409
player 3: hand 305 409
PLAYER 3: discards 409
PLAYER 3: hand 305
DECK: 105 404 206 309 410 110 207 211 407 111 402 212 112 210 213 205
311 412 113 406 310 411 202 209 405 104 303 103 408 201 109 403 108
413 401 106 308 312 304 101 203 204 107 306 102 301 302 313 409

Player 1: draws 105
player 1: hand 208 105
PLAYER 1: discards 105
PLAYER 1: hand 208
DECK: 404 206 309 410 110 207 211 407 111 402 212 112 210 213 205 311
412 113 406 310 411 202 209 405 104 303 103 408 201 109 403 108 413
401 106 308 312 304 101 203 204 107 306 102 301 302 313 409 105

Player 2: draws 404
player 2: hand 307 404
PLAYER 2: discards 307
PLAYER 2: hand 404
DECK: 206 309 410 110 207 211 407 111 402 212 112 210 213 205 311 412
113 406 310 411 202 209 405 104 303 103 408 201 109 403 108 413 401
106 308 312 304 101 203 204 107 306 102 301 302 313 409 105 307

Player 3: draws 206
player 3: hand 305 206
PLAYER 3: discards 305
PLAYER 3: hand 206
DECK: 309 410 110 207 211 407 111 402 212 112 210 213 205 311 412 113
406 310 411 202 209 405 104 303 103 408 201 109 403 108 413 401 106
308 312 304 101 203 204 107 306 102 301 302 313 409 105 307 305

Player 1: draws 309
player 1: hand 208 309
PLAYER 1: discards 309
PLAYER 1: hand 208
DECK: 410 110 207 211 407 111 402 212 112 210 213 205 311 412 113 406
310 411 202 209 405 104 303 103 408 201 109 403 108 413 401 106 308

312 304 101 203 204 107 306 102 301 302 313 409 105 307 305 309

Player 2: draws 410
player 2: hand 404 410
PLAYER 2: discards 410
PLAYER 2: hand 404
DECK: 110 207 211 407 111 402 212 112 210 213 205 311 412 113 406 310
411 202 209 405 104 303 103 408 201 109 403 108 413 401 106 308 312
304 101 203 204 107 306 102 301 302 313 409 105 307 305 309 410

Player 3: draws 110
player 3: hand 206 110
PLAYER 3: discards 110
PLAYER 3: hand 206
DECK: 207 211 407 111 402 212 112 210 213 205 311 412 113 406 310 411
202 209 405 104 303 103 408 201 109 403 108 413 401 106 308 312 304
101 203 204 107 306 102 301 302 313 409 105 307 305 309 410 110

Player 1: draws 207
player 1: hand 208 207
PLAYER 1: discards 207
PLAYER 1: hand 208
DECK: 211 407 111 402 212 112 210 213 205 311 412 113 406 310 411 202
209 405 104 303 103 408 201 109 403 108 413 401 106 308 312 304 101
203 204 107 306 102 301 302 313 409 105 307 305 309 410 110 207

Player 2: draws 211
player 2: hand 404 211
PLAYER 2: discards 404
PLAYER 2: hand 211
DECK: 407 111 402 212 112 210 213 205 311 412 113 406 310 411 202 209
405 104 303 103 408 201 109 403 108 413 401 106 308 312 304 101 203
204 107 306 102 301 302 313 409 105 307 305 309 410 110 207 404

The round is a draw!
PLAYER 1: exits round
PLAYER 2: exits round
PLAYER 3: exits round

PLAYER 1: terminates
PLAYER 2: terminates
PLAYER 3: terminates

New Game 1:
PLAYER 1:
HAND: 106
WIN: no
PLAYER 2:
HAND: 112
WIN: no
PLAYER 3:
HAND: 110
WIN: no
DECK: 211 213 203 305 408 304 404 210 412 104 413 313 205 301 410 103
212 208 411 406 207 204 109 113 407 105 312 206 202 405 310 309 308
303 101 402 409 209 201 306 102 311 107 108 403 302 401 307 111 106
112 110

Current scores:
PLAYER 1: 0
PLAYER 2: 0
PLAYER 3: 0

New Game 2:
PLAYER 1:
HAND: 402
WIN: no
PLAYER 2:
HAND: 301 201
WIN: yes
PLAYER 3:
HAND: 404
WIN: no
DECK: 104 403 409 105 410 206 101 203 411 401 312 405 211 202 102 109
208 302 307 304 113 212 303 311 305 310 213 108 313 107 110 112 111
209 406 308 413 204 106 408 306 207 210 103 205 407 309 412 402 301
201 404

Current scores:
PLAYER 1: 0
PLAYER 2: 1
PLAYER 3: 0

New Game 3:
PLAYER 1:
HAND: 202 102
WIN: yes
PLAYER 2:
HAND: 404

```
WIN: no
PLAYER 3:
HAND: 201
WIN: no
DECK: 204 413 104 310 205 309 306 105 206 106 410 311 212 210 203 209
302 103 412 101 408 111 107 109 303 405 411 307 213 313 304 113 112
312 409 308 403 402 301 207 208 407 108 406 305 110 401 211 202 102
404 201


Current scores:
PLAYER 1: 1
PLAYER 2: 1
PLAYER 3: 0
```

DEALER: shuffle
Player 1: draws 209
Player 2: draws 201
Player 3: draws 306

Begin drawing.
Player 1: draws 101
player 1: hand 209 101
PLAYER 1: discards 101
PLAYER 1: hand 209
DECK: 402 409 102 311 110 401 403 107 108 307 302 106 112 111 211 213
203 305 408 304 404 210 412 104 413 313 205 301 410 103 212 208 411
406 207 204 109 113 407 105 312 206 202 405 310 309 308 303 101

Player 2: draws 402
player 2: hand 201 402
PLAYER 2: discards 402
PLAYER 2: hand 201
DECK: 409 102 311 110 401 403 107 108 307 302 106 112 111 211 213 203
305 408 304 404 210 412 104 413 313 205 301 410 103 212 208 411 406
207 204 109 113 407 105 312 206 202 405 310 309 308 303 101 402

Player 3: draws 409
player 3: hand 306 409
PLAYER 3: discards 409
PLAYER 3: hand 306
DECK: 102 311 110 401 403 107 108 307 302 106 112 111 211 213 203 305
408 304 404 210 412 104 413 313 205 301 410 103 212 208 411 406 207
204 109 113 407 105 312 206 202 405 310 309 308 303 101 402 409

Player 1: draws 102
player 1: hand 209 102
PLAYER 1: discards 209
PLAYER 1: hand 102
DECK: 311 110 401 403 107 108 307 302 106 112 111 211 213 203 305 408
304 404 210 412 104 413 313 205 301 410 103 212 208 411 406 207 204
109 113 407 105 312 206 202 405 310 309 308 303 101 402 409 209

Player 2: draws 311
player 2: hand 201 311
PLAYER 2: discards 201
PLAYER 2: hand 311
DECK: 110 401 403 107 108 307 302 106 112 111 211 213 203 305 408 304
404 210 412 104 413 313 205 301 410 103 212 208 411 406 207 204 109
113 407 105 312 206 202 405 310 309 308 303 101 402 409 209 201

Player 3: draws 110
player 3: hand 306 110

PLAYER 3: discards 306
PLAYER 3: hand 110
DECK: 401 403 107 108 307 302 106 112 111 211 213 203 305 408 304 404
210 412 104 413 313 205 301 410 103 212 208 411 406 207 204 109 113
407 105 312 206 202 405 310 309 308 303 101 402 409 209 201 306

Player 1: draws 401
player 1: hand 102 401
PLAYER 1: discards 102
PLAYER 1: hand 401
DECK: 403 107 108 307 302 106 112 111 211 213 203 305 408 304 404 210
412 104 413 313 205 301 410 103 212 208 411 406 207 204 109 113 407
105 312 206 202 405 310 309 308 303 101 402 409 209 201 306 102

Player 2: draws 403
player 2: hand 311 403
PLAYER 2: discards 311
PLAYER 2: hand 403
DECK: 107 108 307 302 106 112 111 211 213 203 305 408 304 404 210 412
104 413 313 205 301 410 103 212 208 411 406 207 204 109 113 407 105
312 206 202 405 310 309 308 303 101 402 409 209 201 306 102 311

Player 3: draws 107
player 3: hand 110 107
PLAYER 3: discards 107
PLAYER 3: hand 110
DECK: 108 307 302 106 112 111 211 213 203 305 408 304 404 210 412 104
413 313 205 301 410 103 212 208 411 406 207 204 109 113 407 105 312
206 202 405 310 309 308 303 101 402 409 209 201 306 102 311 107

Player 1: draws 108
player 1: hand 401 108
PLAYER 1: discards 108
PLAYER 1: hand 401
DECK: 307 302 106 112 111 211 213 203 305 408 304 404 210 412 104 413
313 205 301 410 103 212 208 411 406 207 204 109 113 407 105 312 206
202 405 310 309 308 303 101 402 409 209 201 306 102 311 107 108

Player 2: draws 307
player 2: hand 403 307
PLAYER 2: discards 403
PLAYER 2: hand 307
DECK: 302 106 112 111 211 213 203 305 408 304 404 210 412 104 413 313
205 301 410 103 212 208 411 406 207 204 109 113 407 105 312 206 202
405 310 309 308 303 101 402 409 209 201 306 102 311 107 108 403

Player 3: draws 302
player 3: hand 110 302
PLAYER 3: discards 302
PLAYER 3: hand 110

DECK: 106 112 111 211 213 203 305 408 304 404 210 412 104 413 313 205
301 410 103 212 208 411 406 207 204 109 113 407 105 312 206 202 405
310 309 308 303 101 402 409 209 201 306 102 311 107 108 403 302

Player 1: draws 106
player 1: hand 401 106
PLAYER 1: discards 401
PLAYER 1: hand 106
DECK: 112 111 211 213 203 305 408 304 404 210 412 104 413 313 205 301
410 103 212 208 411 406 207 204 109 113 407 105 312 206 202 405 310
309 308 303 101 402 409 209 201 306 102 311 107 108 403 302 401

Player 2: draws 112
player 2: hand 307 112
PLAYER 2: discards 307
PLAYER 2: hand 112
DECK: 111 211 213 203 305 408 304 404 210 412 104 413 313 205 301 410
103 212 208 411 406 207 204 109 113 407 105 312 206 202 405 310 309
308 303 101 402 409 209 201 306 102 311 107 108 403 302 401 307

Player 3: draws 111
player 3: hand 110 111
PLAYER 3: discards 111
PLAYER 3: hand 110
DECK: 211 213 203 305 408 304 404 210 412 104 413 313 205 301 410 103
212 208 411 406 207 204 109 113 407 105 312 206 202 405 310 309 308
303 101 402 409 209 201 306 102 311 107 108 403 302 401 307 111

The round is a draw!
PLAYER 1: exits round
PLAYER 2: exits round
PLAYER 3: exits round

DEALER: shuffle
Player 1: draws 402
Player 2: draws 408
Player 3: draws 306

Begin drawing.
Player 2: draws 413
player 2: hand 408 413
PLAYER 2: discards 413
PLAYER 2: hand 408
DECK: 204 106 407 404 207 210 103 205 301 309 412 201 104 403 409 105
410 206 101 203 411 401 312 405 211 202 102 109 208 302 307 304 113
212 303 311 305 310 213 108 313 107 110 112 111 209 406 308 413

Player 3: draws 204
player 3: hand 306 204
PLAYER 3: discards 204

PLAYER 3: hand 306
DECK: 106 407 404 207 210 103 205 301 309 412 201 104 403 409 105 410
206 101 203 411 401 312 405 211 202 102 109 208 302 307 304 113 212
303 311 305 310 213 108 313 107 110 112 111 209 406 308 413 204

Player 1: draws 106
player 1: hand 402 106
PLAYER 1: discards 106
PLAYER 1: hand 402
DECK: 407 404 207 210 103 205 301 309 412 201 104 403 409 105 410 206
101 203 411 401 312 405 211 202 102 109 208 302 307 304 113 212 303
311 305 310 213 108 313 107 110 112 111 209 406 308 413 204 106

Player 2: draws 407
player 2: hand 408 407
PLAYER 2: discards 408
PLAYER 2: hand 407
DECK: 404 207 210 103 205 301 309 412 201 104 403 409 105 410 206 101
203 411 401 312 405 211 202 102 109 208 302 307 304 113 212 303 311
305 310 213 108 313 107 110 112 111 209 406 308 413 204 106 408

Player 3: draws 404
player 3: hand 306 404
PLAYER 3: discards 306
PLAYER 3: hand 404
DECK: 207 210 103 205 301 309 412 201 104 403 409 105 410 206 101 203
411 401 312 405 211 202 102 109 208 302 307 304 113 212 303 311 305
310 213 108 313 107 110 112 111 209 406 308 413 204 106 408 306

Player 1: draws 207
player 1: hand 402 207
PLAYER 1: discards 207
PLAYER 1: hand 402
DECK: 210 103 205 301 309 412 201 104 403 409 105 410 206 101 203 411
401 312 405 211 202 102 109 208 302 307 304 113 212 303 311 305 310
213 108 313 107 110 112 111 209 406 308 413 204 106 408 306 207

Player 2: draws 210
player 2: hand 407 210
PLAYER 2: discards 210
PLAYER 2: hand 407
DECK: 103 205 301 309 412 201 104 403 409 105 410 206 101 203 411 401
312 405 211 202 102 109 208 302 307 304 113 212 303 311 305 310 213
108 313 107 110 112 111 209 406 308 413 204 106 408 306 207 210

Player 3: draws 103
player 3: hand 404 103
PLAYER 3: discards 103
PLAYER 3: hand 404
DECK: 205 301 309 412 201 104 403 409 105 410 206 101 203 411 401 312

405 211 202 102 109 208 302 307 304 113 212 303 311 305 310 213 108
313 107 110 112 111 209 406 308 413 204 106 408 306 207 210 103

Player 1: draws 205
player 1: hand 402 205
PLAYER 1: discards 205
PLAYER 1: hand 402
DECK: 301 309 412 201 104 403 409 105 410 206 101 203 411 401 312 405
211 202 102 109 208 302 307 304 113 212 303 311 305 310 213 108 313
107 110 112 111 209 406 308 413 204 106 408 306 207 210 103 205

Player 2: draws 301
player 2: hand 407 301
PLAYER 2: discards 407
PLAYER 2: hand 301
DECK: 309 412 201 104 403 409 105 410 206 101 203 411 401 312 405 211
202 102 109 208 302 307 304 113 212 303 311 305 310 213 108 313 107
110 112 111 209 406 308 413 204 106 408 306 207 210 103 205 407

Player 3: draws 309
player 3: hand 404 309
PLAYER 3: discards 309
PLAYER 3: hand 404
DECK: 412 201 104 403 409 105 410 206 101 203 411 401 312 405 211 202
102 109 208 302 307 304 113 212 303 311 305 310 213 108 313 107 110
112 111 209 406 308 413 204 106 408 306 207 210 103 205 407 309

Player 1: draws 412
player 1: hand 402 412
PLAYER 1: discards 412
PLAYER 1: hand 402
DECK: 201 104 403 409 105 410 206 101 203 411 401 312 405 211 202 102
109 208 302 307 304 113 212 303 311 305 310 213 108 313 107 110 112
111 209 406 308 413 204 106 408 306 207 210 103 205 407 309 412

Player 2: draws 201
player 2: hand 301 201
PLAYER 2: wins
PLAYER 1: exits round
PLAYER 2: exits round
PLAYER 3: exits round

DEALER: shuffle
Player 1: draws 108
Player 2: draws 401
Player 3: draws 407

Begin drawing.
Player 3: draws 201
player 3: hand 407 201

PLAYER 3: discards 407
PLAYER 3: hand 201
DECK: 110 406 305 202 404 211 102 204 413 104 310 205 309 306 105 206
106 410 311 212 210 203 209 302 103 412 101 408 111 107 109 303 405
411 307 213 313 304 113 112 312 409 308 403 402 301 207 208 407

Player 1: draws 110
player 1: hand 108 110
PLAYER 1: discards 108
PLAYER 1: hand 110
DECK: 406 305 202 404 211 102 204 413 104 310 205 309 306 105 206 106
410 311 212 210 203 209 302 103 412 101 408 111 107 109 303 405 411
307 213 313 304 113 112 312 409 308 403 402 301 207 208 407 108

Player 2: draws 406
player 2: hand 401 406
PLAYER 2: discards 406
PLAYER 2: hand 401
DECK: 305 202 404 211 102 204 413 104 310 205 309 306 105 206 106 410
311 212 210 203 209 302 103 412 101 408 111 107 109 303 405 411 307
213 313 304 113 112 312 409 308 403 402 301 207 208 407 108 406

Player 3: draws 305
player 3: hand 201 305
PLAYER 3: discards 305
PLAYER 3: hand 201
DECK: 202 404 211 102 204 413 104 310 205 309 306 105 206 106 410 311
212 210 203 209 302 103 412 101 408 111 107 109 303 405 411 307 213
313 304 113 112 312 409 308 403 402 301 207 208 407 108 406 305

Player 1: draws 202
player 1: hand 110 202
PLAYER 1: discards 110
PLAYER 1: hand 202
DECK: 404 211 102 204 413 104 310 205 309 306 105 206 106 410 311 212
210 203 209 302 103 412 101 408 111 107 109 303 405 411 307 213 313
304 113 112 312 409 308 403 402 301 207 208 407 108 406 305 110

Player 2: draws 404
player 2: hand 401 404
PLAYER 2: discards 401
PLAYER 2: hand 404
DECK: 211 102 204 413 104 310 205 309 306 105 206 106 410 311 212 210
203 209 302 103 412 101 408 111 107 109 303 405 411 307 213 313 304
113 112 312 409 308 403 402 301 207 208 407 108 406 305 110 401

Player 3: draws 211
player 3: hand 201 211
PLAYER 3: discards 211
PLAYER 3: hand 201

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DECK: 102 204 413 104 310 205 309 306 105 206 106 410 311 212 210 203
209 302 103 412 101 408 111 107 109 303 405 411 307 213 313 304 113
112 312 409 308 403 402 301 207 208 407 108 406 305 110 401 211

Player 1: draws 102
player 1: hand 202 102
PLAYER 1: wins
PLAYER 1: exits round
PLAYER 2: exits round
PLAYER 3: exits round

PLAYER 1: terminates
PLAYER 2: terminates
PLAYER 3: terminates
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