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Class: CS 3270

Subject: Reef Encounter Rules

For this assignment, we were required to summarize the rules and exceptions involved in playing the game of Reef Encounter (RE). We were also to provide suggestions for possible functions and data structures that could be implemented in our future design of RE online.

RE is a game consisting of 2 to 4 players where each player’s goal is to grow the largest and strongest corals on the reef and then have their parrot fish eat these corals within the time allotted. Points are awarded at game’s end based on number and types of corals consumed by players’ parrot fishes, and the game of RE is usually over once the hierarchy for all corals is established or a player’s parrot fish has eaten 4 corals.

RE consist of Larva Cubes which allows players to set their polyp tiles onto the board; one or more of these polyp tiles forms a coral. Larger sized corals can attack smaller or weaker type corals to obtain polyp, and these can either be transformed to new polyps or retrieved as alga cylinders or larva cubes. Alga cylinders are used to strengthen several types of corals relative to others. Players can place a shrimp on a coral to protect it from attack.

For contents, RE consists of a maximum 4 player colors (red, yellow, purple, green), 4 alga colors (blue, green, purple, red) and 5 coral colors (grey, orange, pink, white, yellow), and it also consists of 16 shrimps (4 for each player’s color), 20 alga cylinders (5 in each of the 4 alga colors), 50 larva cubes (10 in each of the 5 coral colors), 200 polyp tiles (40 in each of the 5 coral colors), 10 unique coral tiles (each tile displays 2 of the 5 coral colors and 2 of the 4 alga colors), 4 parrotfish (each in a player’s color), 4 coral reef boards (each displaying different rocks, sandy areas, ‘extra growth’ areas, and polyp specific areas), 4 player screens (in our case it’s the different monitors), and 4 action turn cards (each in player’s color and summarizes actions available to player).

For RE game setup boards are selected at random based on the number of players, and these boards can be used by any player. Polyp tiles are placed in spaces relative to their color. Place 5 ‘bonus’ polyp tiles, of each color, at the side of the open-sea board (OSB), and these tiles serve as bonus tiles when filling the light colored ‘extra-growth’ space and can be replenished during the game. Next, take one of the coral tiles and flip it onto playing surface, and depending on which side it landed place coral tiles on the 10 small spaces on the OSB facing the side which the tile landed on, either with the small starfish or not (tiles should be placed with ‘double coral’ on top), and these coral tiles determine which color polyp tiles are able to consume others (the ‘double coral’ on top is able to consume the ‘single coral’ on the bottom right, irrespective of coral size). To continue, fill each colored square in each of the large 5 spaces on the OSB with a larva cube of the respective color, and draw one polyp from the bag. The color of this polyp tile decides which of the large spaces in the seaboard will be filled first, and to conclude the setup stage, each player is awarded 4 shrimps, one turn action card, 6-9 polyp tiles (depending on the number of players and who starts the game) and gets to choose two larva cubes, which will be shown to the other players.

During gameplay, each player can perform one of 10 actions during their turn, and these actions are as follows:

1. **Eat one coral and a shrimp with the parrotfish**: Once a coral consists of at least 5 polyp tiles and is guarded by a player’s shrimp, that player can have the parrotfish eat the coral along with the shrimp. When this happens a polyp tile counter is used to show how many corals the player’s parrotfish has consumed, and if this was the first coral consumed by the player’s parrotfish, a shrimp is placed on the OSB to show that the player is now able to place alga cylinders onto the coral tiles. An important note is that a player can’t feed their coral fish during a turn where they’ve first performed another action, and they’ll have to wait for another turn.
2. **Play a larva cube and polyp tiles**: The player may play one larva cube of any color by placing it on the side of the OSB. Following this, a player may then set 4 polyp tiles, with the same color as the selected larva cube, from behind their screen. The player can also play any number of consumed polyp tiles in front of their screen either by playing them as new polyp tiles on the board, exchanging them for larva cubes of the same color, or exchanging them for alga cylinders of any color.
3. **Play a second larva cube and more polyp tiles**: Basically repeating action two for the second time. Something extra to note is that polyp tile can’t be placed in space that would connect two corals of the same color that are guarded by shrimps as shrimps prevent this action, and polyp tile can only expand coral of the same color by being placed orthogonally next to current polyp tile. Also, whenever a polyp tile is placed orthogonally next to an ‘extra growth’ space the coral automatically grows into the extra space, and if an additional polyp is added to a coral adjacent to the polyp of another coral which is unguarded by a shrimp, that polyp is devoured if the size of the attacked coral is smaller than that of the attacking or if the coral tile on the OSB shows that the color of the attacking coral is currently stronger than the attacked.
4. **Introduce a new shrimp**: Player may introduce a new shrimp from behind their screen onto any coral that currently doesn’t have a shrimp on it. A shrimp protect the polyp tile it's on and those adjacent to that current polyp that's of the same coral, and two shrimps can’t be on the same coral.
5. **Move shrimp**: Player may move shrimp currently on a polyp tile to another polyp tile of same or different coral, to a bare rock space, or back to behind the screen (and off the board). Under no circumstances can more than two of player’s shrimps be on the same rock, and a shrimp can be moved at any time between actions one and nine, even during another action.
6. **Exchange a consumed polyp tile for a larva cube of the same color**: Swap a consumed polyp for a larva cube of the same color which is then placed behind the player’s screen.
7. **Acquire and play an alga cylinder**: Swap a consumed polyp for an alga cylinder which can then be played on the alga cylinder space on the OSB or, assuming player’s parrotfish has already consumed at least one coral, onto a coral tile. If placed on a coral tile (the alga cylinder must be of the same color as large alga displayed on bottom left of coral tile), all coral tiles displaying the same color of alga as alga cylinder are flipped and the current coral tile is locked in position by alga cylinder for rest of the game (this is key to winning the game and can only be done once per turn), and a player may not place an alga cylinder on last uncovered coral tile, thereby ending the game, unless his/ her parrotfish has consumed at least 2 polyp tiles. However, if placed on the OSB, all coral tiles which display a large alga of the same color as alga cylinder and which do not support an alga cylinder are flipped over, and any alga cylinder already on the space is removed and placed with other unused alga cylinders to be used later in the game. Any number of alga cylinder may be played onto OSB during one turn.
8. **Exchange a larva cube for a polyp tile of the same color**: Player places a larva cube at the side of OSB and then retrieves polyp tile of the same color.
9. **Do none of the above**: Player may choose not to perform any of the above actions.
10. **Collect a larva cube and polyp tiles**: After performing all possible actions from one to nine, player collects one larva cube from the OSB and any accompanying polyp tiles on same space, and these are then replaced with another larva cube, for the one already collected, and, for each diversely colored larva cube on the OSB with fewer than 3 polyp tiles, add one polyp to the space containing that larva cube. Play then passes to next player, and the game ends if there is an insufficient number of polyp tiles or larva cubes to replace those taken by a player at the end of the turn.

The game ends when either of the following occurs: all coral tiles are covered by alga cylinders; all four of one player’s shrimps are devoured by their parrotfish; there’s nowhere left to play a polyp tile; insufficient polyp tiles or larva cubes remaining during end of turn. The final action available to other player in the case of the first 2 game end scenarios is to consume their existing coral with their parrotfish. Points are awarded based on polyp consumed by parrotfish, and each polyp is worth one point plus one point for each coral tile which displays the color of that polyp. Therefore, each polyp is worth between ‘1’ to ‘5’ points.

It would be prudent to have a function read in the start and setup states of the game as these are abstract areas of the game. However, classes need to be created for each player as the state of the player’s game information changes continuously throughout the game, and the OSB should be a class of its own, with all the coral tiles and the alga cylinders, due to the numerous operations that occur within it.