**General Idea(My first idea):**

4 players compete each using their own side of the four face cube. Acrylic squares will light up in a specific pattern on each of the sides. While the pattern is being displayed all user interaction with the squares will be locked. After the pattern finishes being displayed on each of the sides their will be a short pause before allowing each of the players to reenter the pattern on their side. If a player enters the pattern incorrectly or does not enter the pattern in the allotted time frame they will be eliminated. The players that complete each pattern correctly will receive 1-4 points depending on how many players are left and how fast they completed the pattern. The first person to complete the pattern received 4 points, the second 3 points and so on. These points will come into play at the very end of the game if more than 1 player makes it to the end and passes every round. As the rounds progress the patterns will become more complicated and the time allotted to reenter the pattern will decrease.

**Alternative Ideas:**

**1: Game progression type**

**Round based progression:** Each player will have the same pattern displayed to them at the same time. After the pattern finishes being displayed all players will have the same amount of time to re enter that pattern.

Options:

*Points System*: Have a points system that would be used at the end of full game that would be used if multiple players make it through every round.

* **Points system 1**: After the alloted time for the pattern to be reentered or after all players have finished entering the pattern, each player will be given 1-4 points based on how many players remain in the game and how long it took them to complete the pattern. 1st person to complete it gets awarded 4 points, 2nd gets 3 points and so on.
* ~~Points system 2~~: Similar to point system 1, but instead of given points to all players based on the time it took them to complete the round, only give the player that completed the round first a point. The scores then would be tracked based on how many rounds each player won.
* ~~No Points System~~: If we had no points system then there are three options for how the game could be played.
  + Nonstop rounds: The rounds continue to increase in difficulty but continue forever until all either:
    - All but one person fails
    - Everyone fails. If we continued until everyone fails we could take the round count that the person in first place makes it to before they fail and use it as a high score to display.
  + Ties: Keep a set amount of rounds, but if multiple players make it to the end of the game they simply tie and there is no winner.
  + Tie breaker round: If multiple players make it to the end have one final round in which the person who completes it first is the winner.

*Rounds:* Should we have a set amount of rounds or have the rounds continue forever until only a single player remains.

~~Self paced progression:~~ Rather then having rounds, each player will move at their own pace and not be required to stop and wait for other players to complete there's.

Options:

* ~~Nonstop Rounds~~: Continue displaying increasingly difficult patterns until all players are eliminated.
  + This might be kind of cool because then we could add a “high score” system that new players could try to beat while also competing against the players in their current game.
* Set Round Count: Have a set number of rounds that all players race at their own pace to complete all of. The person to finish first wins. If no player finishes then the person who made it the farthest wins.

**2. Same or Different Patterns for Each Player**

Same pattern: Display the same pattern to each player. If we decide to use round based progression the pattern for each round will simply be the same. If we do self based progression then we will need to keep track of each pattern that is displayed to the person in first place. These patterns will be displayed in the same order to all players lagging the person in first.

* Benefits:
  1. There will be no easier or harder patterns because all players will have the same.
* Detriments:
  1. Potential for cheating, but really only possible if we stick with round based progression.

~~Different pattern:~~ Displaying different patterns to each player.

* Benefits:
  + Cheating is impossible
* Detriments:
  + Some patterns may be easier to solve.
  + Even if the difficulty to solve 2 different patterns is the same, placement of the pattern on the tiles may require more time to solve then another pattern leaving someone at a disadvantage.
  + Coding is more difficult.

1. Center square on each face is lit up.
2. Each player presses the center square to show they are ready.
3. When all 4 players are ready each face will fully light up.
4. The tiles will then start to turn off one by one until all are off signifying the start of the game.
5. Pattern is displayed on each face.
6. Wait some small amount of time.
7. Pattern disappears and player need to begin reentering pattern
8. As each player reenters the pattern the selected squares will be stored in a new array on each slave that will be compared to the original pattern list after each press.
9. If a player enters an incorrect square they are immediately eliminated.
10. If the player failed to enter the pattern in the allotted time frame they will be eliminated.
11. If they succeed in entering the pattern correctly the time it took them to enter it is then sent back to the master and the round is over for that player.
12. All the LED strips on that players face will light up green if they passed. If they failed their face will turn red and remain red for the entire duration of the game.
13. Before the next round starts the green tiles will turn off and the players respective color will flash signifying the start of a new round.
14. This process repeats until the set round amount is met or 3 of the 4 players are eliminated.
15. The players that do not get eliminated have their points compared for placement and the players that were eliminated compare points for remaining placements.
16. Display 4 different colors(DBT) that signify 1st through 4th place.