Constraint Optimization Write Up

Set Up:

I used the same set up as my bot from p2 as I was fairly sure I handled the constraint that no player has the same ID assigned. I didn’t use anything from P1 as I could not get my model to come close to beat my bot from P2. The way I calculated the probabilities was using combinations of Stream Builders and Collections to first find all the possible combinations. I then go through all the combinations and find the highest probabilities and assign that to the returned players ID. The new implementation I have tried doing was finding the KB with only one guess, this is a known impossible guess for the other players, and eliminating the guest ID from the other players. Then the second addition was while building the most probable list, I check the probability with the other players to make sure I only choose the highest probable guess for guess. My first bot had a small chance to assign the same guess ID to multiple players.

Problems:

I had minimal problems this project as I was going off of my P2 bot and had to only add not change anything. The largest problem was when dealing with multiple players having the same highest probable guess. I mainly hit null pointer and concurrent modification exceptions. This was due to me trying to find the other players key that shared the same top guess. I finally concluded the logic that solved all the edge cases. This was not found until regression testing of 1000 games. It was a hard one to reproduce and track as I couldn’t debug the code as it is randomized and happens around the 500th game.

Results:

I was able to improve my results very slightly from P2 which was already around twice as accurate as random choice. The change I added to remove impossible guesses from other players guess had no visible impact. I tried running 1000 games and compared the P2 and P3(removed impossible only) bot and noticed them varying with which one was better. Once I changed the way the probabilities are chosen and only one ID per player, I started seeing a small growing gap between the two bots.

PlayerName,GuessScore,GemScore,TotalScore,wins

bestPlayer2.class4,49434,11754,61188,567

bestPlayer.class5,49266,11677,60943,490

RBotRandom.class3,40705,11631,52336,210

RBotRandom.class0,40565,11701,52266,204

RBotRandom.class2,40614,11585,52199,190

RBotRandom.class1,40586,11623,52209,171

PlayerName,GuessScore,GemScore,TotalScore,wins

bestPlayer2.class4,26957,6328,33285,305

bestPlayer.class5,27167,6413,33580,256

RBotRandom.class1,22295,6363,28658,119

RBotRandom.class3,22148,6342,28490,110

RBotRandom.class0,22015,6464,28479,106

RBotRandom.class2,22428,6357,28785,104