Swiss Pairings System

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1 Introduction

As a regular tournament chess player, I am fairly accustomed to the *Swiss* pairing system. For this project, I learned exactly how the *Swiss* system works and implemented my own pairing system based on this knowledge. This system could serve as an open-source replacement for *SwissSys*, the already exisiting Swiss pairing system used in tournaments.

2 Explanation of the Swiss System

According to *Wikipedia*("Swiss-system tournament"), the original Swiss pairing system works as follows:

1. In the first round, competitors are paired either randomly or according to some pattern chosen by the arbiter.
2. In subsequent rounds, competitors are sorted according to their cumulative scores and are assigned opponents with the same or similar score up to that point.

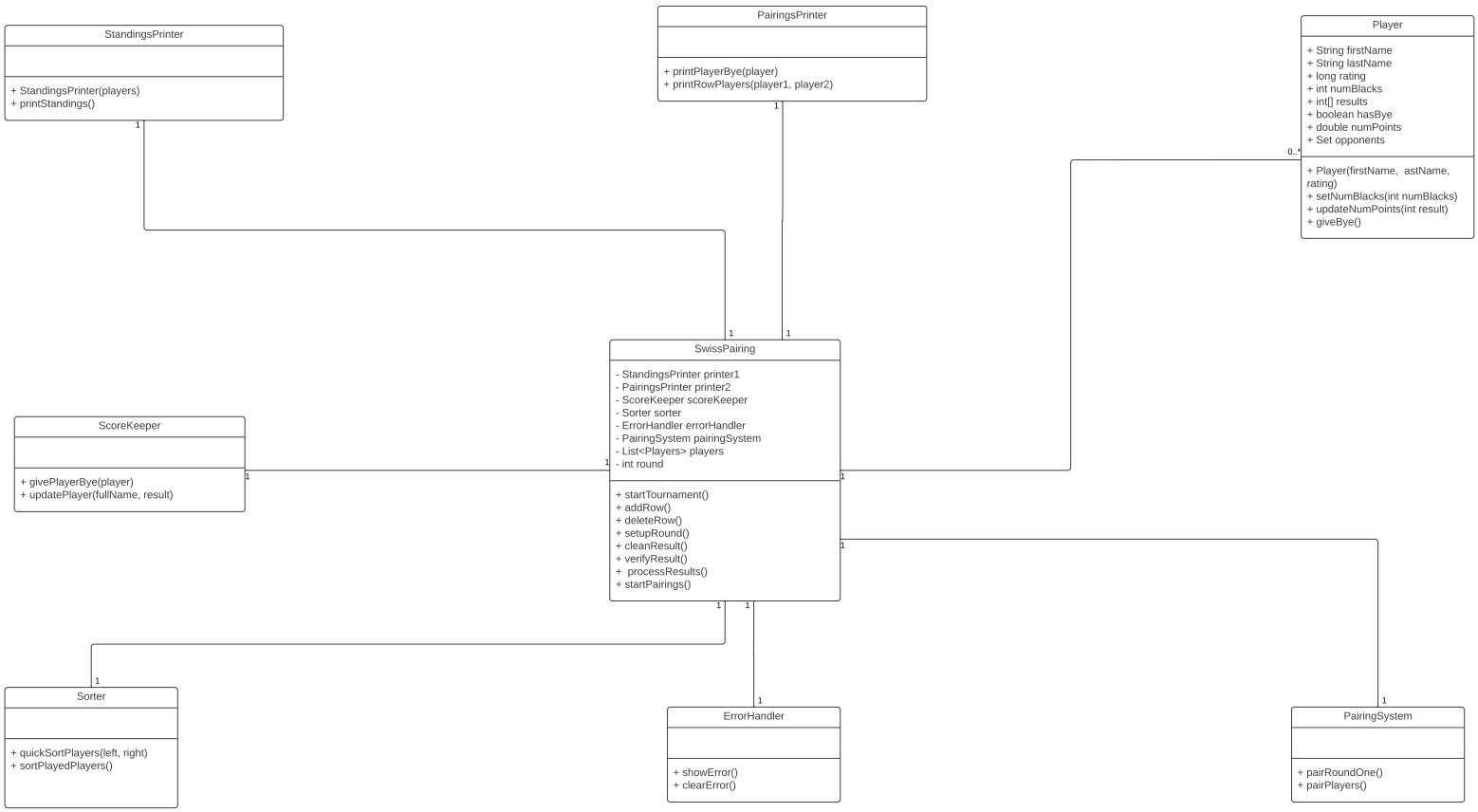
Step 2 is very complicated, however, because the system needs to ensure that two given players do not play twice and that colors are distributed evenly.

3 My implementation of the Swiss System

My implementation of the Swiss System was similar to that of mentioned above, with a few simplifications for step 2. Namely,

1. Players are paired with the closest player in points who they haven't played yet.
2. Colors are assigned by assigning black to the player who has had the least blacks.

In order to implement a straightforward system to pair players, I divided the system into modular components, each of which has their own job. To better explain my design, the UML diagram for my implementation is given below:


StandingsPrinter
+ StandingsPrinter(players)
+ printStandings()
PairingsPrinter
+ printPlayerBye(player)
+ printRowPlayers(player1, player2)
Player
+ String firstName
+ String lastName
+ long rating
+ int numBlacks
+ int[] results
+ boolean hasBye
+ double numPoints
+ Set opponents
+ Player(firstName, astName, rating)
+ setNumBlacks(int numBlacks)
+ updateNumPoints(int result)
+ giveBye()
SwissPairing
- StandingsPrinter printer1
- PairingsPrinter printer2
- ScoreKeeper scoreKeeper
- Sorter sorter
- ErrorHandler errorHandler
- PairingSystem pairingSystem
- List<Players> players
- int round
+ startTournament()
+ addRow()
+ deleteRow()
+ setupRound()
+ cleanResult()
+ verifyResult()
+ processResults()
+ startPairings()
ScoreKeeper
+ givePlayerBye(player)
+ updatePlayer(fullName, result)
Sorter
+ quickSortPlayers(left, right)
+ sortPlayedPlayers()
ErrorHandler
+ showError()
+ clearError()
PairingSystem
+ pairRoundOne()
+ pairPlayers()
1
0..*

4 References

"Swiss-system tournament". *Wikipedia*, Wikimedia Foundation, 6 August 2022, https://en.wikipedia.org/wiki/Swiss-system_tournament.