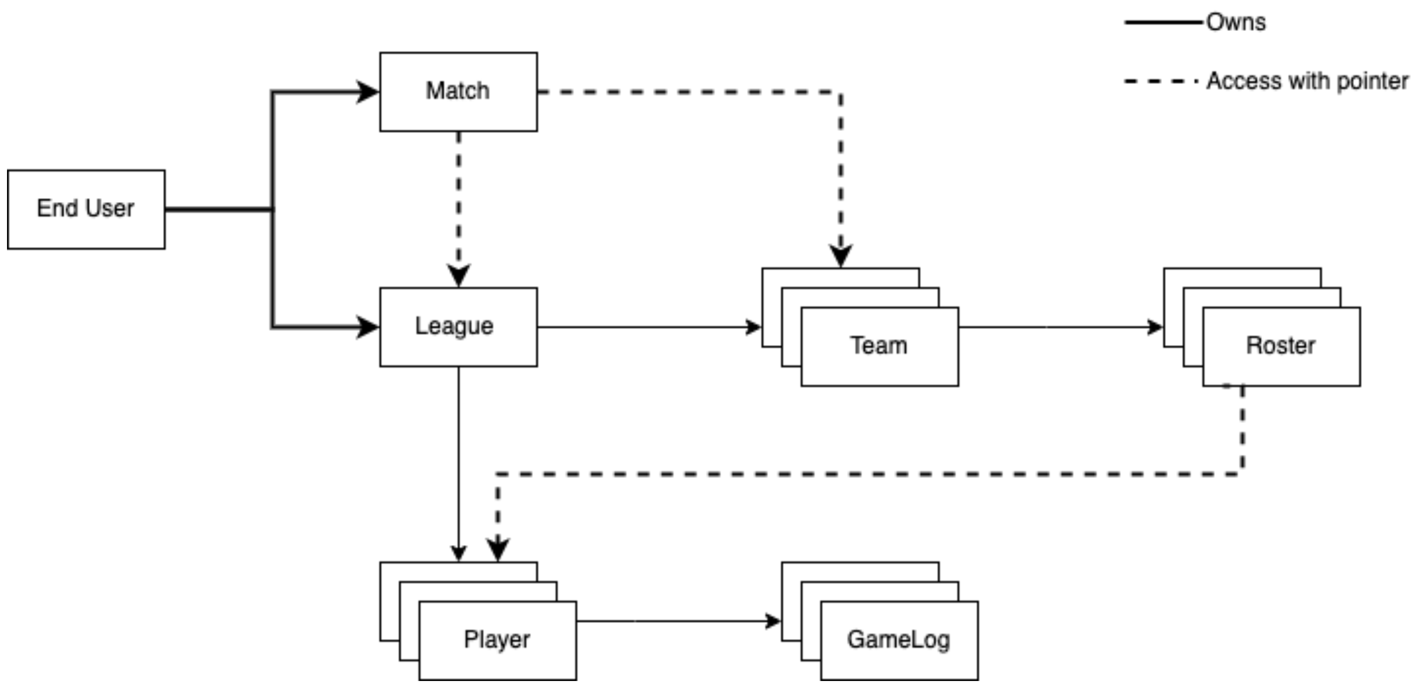
Fantasy Optimizer Manual

Class Diagram



Tutorial

The file `test.cpp` is the best example of how to use our Fantasy Optimizer.

Choose the date and create a league

```
League::League(std::string dateString);
```

Arguments:

- `dateString`: the current date of the league, in the format of YYYY-MM-DD

```
std::string currDate = "2022-10-24";
League::League testLeague(currDate);
```

Add teams

```
void League::addTeam(std::string teamName);
```

Arguments:

- `teamName`: team name

```
testLeague.addTeam("Frank's Team");
testLeague.addTeam("Figo");
```

Add players to a team's roster

```
bool League::teamSetPlayerPlacement(int teamNo, std::unordered_map<std::string,
std::unordered_set<std::string>> newPlacementId);
```

Arguments:

- `teamNo`: team id
- `newPlacementId`: a mapping of position strings to sets of player id's

Position strings:

- "BN": Bench
- "PG": Point Guard
- "SG": Sooting Guard
- "SF": Small Forward
- "PF": Power Forward
- "C": Center
- "G": Guard
- "F": Forward
- "UTIL": Utility

```
// place every player to the bench
std::unordered_map<std::string, std::unordered_set<std::string>> myPlacement {
    {"BN", std::unordered_set<std::string>{"poolejo01", "maxeyty01", "claxtni01",
                                           "antetgi01", "butleji01", "huntede01",
                                           "brookdi01", "portemi01", "willigr01",
                                           "adebaba01", "westbru01", "anunoog01",
                                           "strusma01",
                                           }}
};

std::unordered_map<std::string, std::unordered_set<std::string>> figoPlacement {
    {"BN", std::unordered_set<std::string>{"paulch01", "jacksre01", "simonan01",
                                           "georgpa01", "haywago01", "valanjo01",
                                           "herroty01", "hartjo01", "carusal01",
                                           "porteke02", "robinmi01", "garubus01",
                                           "embiijo01"
                                           }}
};
```

```
testLeague.teamSetPlayerPlacement(0, myPlacement);
testLeague.teamSetPlayerPlacement(1, figoPlacement);
```

Create a matchup and duplicate Monday's roster for the whole week

```
Match::Match(std::string myTeamName, std::string oppoTeamName, League::League* league);
```

Arguments:

- `myTeamName`: my team name
- `oppoTeamName`: opponent's team name
- `league`: pointer to the league

```
Match::Match newMatch("Frank's Team", "Figo", &testLeague);
newMatch.createWeekRosterBaseOnMonday();
```

Add free agents to my watchlist

```
void League::teamAddPlayerToWatchList(int teamNo, std::string playerId);
```

Arguments:

- `teamNo`: team id
- `playerId`: player id

```
testLeague.teamAddPlayerToWatchList(0, "nesmiaa01");
testLeague.teamAddPlayerToWatchList(0, "jacksis01");
testLeague.teamAddPlayerToWatchList(0, "kesslwa01");
```

Find the best roster using optimizers

```
void Match::applyOptimizer(std::chrono::sys_days startDate, Optimizer::BaseOptimizer*
optimizer);
void Match::applyOptimizer(std::chrono::sys_days startDate, Optimizer::BaseOptimizer*
myOptimizer, Optimizer::BaseOptimizer* oppoOptimizer);
```

Arguments:

- `startDate`: starting date of the week's game
- `optimizer`: pointer to an optimizer

- `myOptimizer`: pointer to an optimizer used to optimize my team's roster
- `oppoOptimizer`: pointer to an optimizer used to optimize opponent team's roster

The first function doesn't do optimization for the opponent; the second one takes an additional argument of opponent's optimizer against which we optimize for.

Currently there are three optimizers available:

- StupidOptimizer: place as many players as possible
- GreedyOptimizer: only consider players playing today and place best players first (based on scoring system)
- StreamOptimizer: drop the worst player (based on our prediction) and pick the best substitution from our watchlist

```
// print daily roster suggestion and add/drop suggestion
Optimizer::GreedyOptimizer greedyOptimizer(&newMatch); // my optimizer
Optimizer::StreamOptimizer streamOptimzer(&newMatch); // opponent's optimizer
newMatch.applyOptimizer(currDate, &streamOptimzer, &greedyOptimizer);
// suppose opponent's strategy is greedy, optimize our roster against it
```

Show result

```
// print the final result
newMatch.showResults();
```

Category strings:

- "fgm": Field Goal Made
- "fgpct": Field Goal Percentage
- "ftm": Free Throw Made
- "ftpct": Free Throw Percentage
- "3pm": Three-point Field Goal Made
- "3pmpct": Three-point Field Goal Percentage
- "pts": Point
- "astor": Assist to Turnover Ratio
- "drb": Defensive Rebound
- "orb": Offence Rebound
- "trb": Total Rebound
- "ast": Assist
- "stl": Steal
- "blk": Block
- "tov": Turnover
- "dd": Double Double