Data Structures and Java, Assignment 5

Collections

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# Assignment objectives

* Java Collections Framework
* Sorting, Comparable, Comparators
* Abstract classes

# Requirements

Import the template for this assignment and “Refactor” (using the NetBeans “Refactor” feature) to A5FirstLastName.

## Overview

In the template provided, you’ll find an application that a hockey coach can use to manage players during a game.

The application loads available players from a .csv file into Player objects. These Player objects are put into an ArrayList of available players.

Next, the application chooses a strategy (SimpleCoachingStrategy) for the coach to execute line changes during the game. Line changes involve changing all five players on the ice for five players on the bench.

Once the players are loaded into the strategy object a series of line changes are made at different score margins according to the given strategy. A score margin is the difference in goals between the coach’s team and the opposing team. For example, a score margin of zero means the game is tied. A score margin of -1 mean’s the coach’s team is trailing by one goal. A score margin of 1 means the coach’s team is leading by 1 goal.

## Part 1: Implement class AdvancedCoachingStrategy

Important: to create this class use the class SimpleCoachingStrategy as a guideline.

1. Create a new class in the strategy package called AdvancedCoachingStrategy that extends the class AbstractCoachingStrategy.
2. Create a private static final member that holds the following strategy description, “Play best 5 players given the score margin”
3. Create a private final ArrayList of Player objects called onBenchPlayerList that will be used to manage the players on the bench. Note that this data structure is different in this class as compared to the SimpleCoachingStrategy which uses a Queue.
4. Implement the constructor for AdvancedCoachingStrategy. It will be similar to that in SimpleCoachingStrategy but since we’re using an ArrayList instead of a Queue, removing players from the ArrayList will be slightly different.
5. Implement the method changeFullLine(int scoreMargin) according to the following requirements:
   1. If trailing, sort the onBenchPlayerList to get the best offensive players at the front of the list. Then substitute the first five players in this list for those on the ice. You will need to create a comparator called PlayerOffensiveQualityComparator and call Collections.sort to meet this requirement. Note that a high number for the offensive quality score is best.
   2. If leading, sort the onBenchPlayerList to get the best defensive players at the front of the list. Then substitute the first five players in this list for those on the ice. You will need to create a comparator called PlayerDefensiveQualityComparator and call Collections.sort to meet this requirement. Note that a low number for the defensive quality score is best.
   3. If tied, sort the onBenchPlayerList to get the best “balanced” players at the front of the list. Then substitute the first five players in this list for those on the ice. Note: examine the compareTo method on the Player class. It can be used with Collections.sort as is for this requirement.

## Part 2: Final submission

Turn in a single zip file for the project called A5FirstLastName.zip.

# Sample Output

size of available player list: 15

Name: ABDELKADER,JUSTIN; Offensive Quality: 33.34702; Defensive Quality: 32.621056; Balanced Quality: 0.7259636

Name: ANDERSSON,JOAKIM; Offensive Quality: 30.067587; Defensive Quality: 31.48518; Balanced Quality: -1.417593

Name: ANDERSON,JOSH; Offensive Quality: 32.283173; Defensive Quality: 50.905903; Balanced Quality: -18.62273

Name: BARBERIO,MARK; Offensive Quality: 46.800274; Defensive Quality: 22.37766; Balanced Quality: 24.422613

Name: ALZNER,KARL; Offensive Quality: 32.125298; Defensive Quality: 31.156172; Balanced Quality: 0.96912575

Name: ANGELIDIS,MIKE; Offensive Quality: 32.357143; Defensive Quality: 32.883675; Balanced Quality: -0.5265312

Name: ANDREOFF,ANDY; Offensive Quality: 31.601501; Defensive Quality: 40.801144; Balanced Quality: -9.199642

Name: ANDRIGHETTO,SVEN; Offensive Quality: 31.305492; Defensive Quality: 28.455236; Balanced Quality: 2.850256

Name: BARRIE,TYSON; Offensive Quality: 30.131027; Defensive Quality: 38.094913; Balanced Quality: -7.9638863

Name: BARTKOWSKI,MATT; Offensive Quality: 31.36794; Defensive Quality: 42.636063; Balanced Quality: -11.268122

Name: ARVIDSSON,VIKTOR; Offensive Quality: 29.306446; Defensive Quality: 30.639414; Balanced Quality: -1.3329678

Name: ANISIMOV,ARTEM; Offensive Quality: 33.605755; Defensive Quality: 38.387035; Balanced Quality: -4.7812805

Name: ARCOBELLO,MARK; Offensive Quality: 40.211338; Defensive Quality: 38.96982; Balanced Quality: 1.2415199

Name: BARTLEY,VICTOR; Offensive Quality: 51.923252; Defensive Quality: 49.337185; Balanced Quality: 2.5860672

Name: BEAUCHEMIN,FRANCOIS; Offensive Quality: 26.23158; Defensive Quality: 35.92888; Balanced Quality: -9.697298

Starting single player:ABDELKADER,JUSTIN

Starting single player:ANDERSSON,JOAKIM

Starting single player:ANDERSON,JOSH

Starting single player:BARBERIO,MARK

Starting single player:ALZNER,KARL

Current player playing the position LW is: Name: ABDELKADER,JUSTIN; Offensive Quality: 33.34702; Defensive Quality: 32.621056; Balanced Quality: 0.7259636

Current player playing the position RD is: Name: ALZNER,KARL; Offensive Quality: 32.125298; Defensive Quality: 31.156172; Balanced Quality: 0.96912575

Current player playing the position RW is: Name: ANDERSON,JOSH; Offensive Quality: 32.283173; Defensive Quality: 50.905903; Balanced Quality: -18.62273

Current player playing the position C is: Name: ANDERSSON,JOAKIM; Offensive Quality: 30.067587; Defensive Quality: 31.48518; Balanced Quality: -1.417593

Current player playing the position LD is: Name: BARBERIO,MARK; Offensive Quality: 46.800274; Defensive Quality: 22.37766; Balanced Quality: 24.422613

Doing a full line change.

Play best 5 players given the score margin.

Trailing so play the top 5 offensive players.

Substituting single player: BARTLEY,VICTOR

Substituting single player: ARCOBELLO,MARK

Substituting single player: ANISIMOV,ARTEM

Substituting single player: ANGELIDIS,MIKE

Substituting single player: ANDREOFF,ANDY

Current player playing the position LW is: Name: BARTLEY,VICTOR; Offensive Quality: 51.923252; Defensive Quality: 49.337185; Balanced Quality: 2.5860672

Current player playing the position RD is: Name: ARCOBELLO,MARK; Offensive Quality: 40.211338; Defensive Quality: 38.96982; Balanced Quality: 1.2415199

Current player playing the position RW is: Name: ANISIMOV,ARTEM; Offensive Quality: 33.605755; Defensive Quality: 38.387035; Balanced Quality: -4.7812805

Current player playing the position C is: Name: ANGELIDIS,MIKE; Offensive Quality: 32.357143; Defensive Quality: 32.883675; Balanced Quality: -0.5265312

Current player playing the position LD is: Name: ANDREOFF,ANDY; Offensive Quality: 31.601501; Defensive Quality: 40.801144; Balanced Quality: -9.199642

Doing a full line change.

Play best 5 players given the score margin.

Leading so play the top 5 defensive players.

Substituting single player: BARBERIO,MARK

Substituting single player: ANDRIGHETTO,SVEN

Substituting single player: ARVIDSSON,VIKTOR

Substituting single player: ALZNER,KARL

Substituting single player: ANDERSSON,JOAKIM

Current player playing the position LW is: Name: BARBERIO,MARK; Offensive Quality: 46.800274; Defensive Quality: 22.37766; Balanced Quality: 24.422613

Current player playing the position RD is: Name: ANDRIGHETTO,SVEN; Offensive Quality: 31.305492; Defensive Quality: 28.455236; Balanced Quality: 2.850256

Current player playing the position RW is: Name: ARVIDSSON,VIKTOR; Offensive Quality: 29.306446; Defensive Quality: 30.639414; Balanced Quality: -1.3329678

Current player playing the position C is: Name: ALZNER,KARL; Offensive Quality: 32.125298; Defensive Quality: 31.156172; Balanced Quality: 0.96912575

Current player playing the position LD is: Name: ANDERSSON,JOAKIM; Offensive Quality: 30.067587; Defensive Quality: 31.48518; Balanced Quality: -1.417593

Doing a full line change.

Play best 5 players given the score margin.

Tied so play the top 5 balanced players.

Substituting single player: BARTLEY,VICTOR

Substituting single player: ARCOBELLO,MARK

Substituting single player: ABDELKADER,JUSTIN

Substituting single player: ANGELIDIS,MIKE

Substituting single player: ANISIMOV,ARTEM

Current player playing the position LW is: Name: BARTLEY,VICTOR; Offensive Quality: 51.923252; Defensive Quality: 49.337185; Balanced Quality: 2.5860672

Current player playing the position RD is: Name: ARCOBELLO,MARK; Offensive Quality: 40.211338; Defensive Quality: 38.96982; Balanced Quality: 1.2415199

Current player playing the position RW is: Name: ABDELKADER,JUSTIN; Offensive Quality: 33.34702; Defensive Quality: 32.621056; Balanced Quality: 0.7259636

Current player playing the position C is: Name: ANGELIDIS,MIKE; Offensive Quality: 32.357143; Defensive Quality: 32.883675; Balanced Quality: -0.5265312

Current player playing the position LD is: Name: ANISIMOV,ARTEM; Offensive Quality: 33.605755; Defensive Quality: 38.387035; Balanced Quality: -4.7812805