# CIS152 Substitution Manager Final Report

# Final Project Proposal

In elementary basketball, it is important each kid gets the same amount of playing time during games to ensure everyone gets the same chances and experience. However, as a coach this could be challenging managing how long each player has played and who hasn't played enough. Coaches want a solution that can solve this very problem. Substitution Manager can help these coaches of elementary basketball create a fair environment for the kids.

Substitution manager will use a stack for players currently in the game and a queue for players waiting to enter the game. The coach sets the program up by entering all player names and setting his substitution intervals (2 minutes, 3 minutes, ect.). Then, the coach can select which players entered the game for who. The queue of players on the bench is then sorted based on who has the least amount of minutes.  
  
Sprint 1:

Define all classes and tests classes

Sprint 2:

Design and test the GUI

Sprint 3:

Add additional functionality for GUI and the data structures

Sprint 4:

Final testing of all aspects

# Substitution Manager Time Log

## Week 1

Designed structure for entire project and created java classes for Roster, Player, and GameSetup classes.

## Week 2

Began creating GUI as well as testing and enhancing classes to work with the program.

## Week 3

Further work on the GUI. Had to switch from a stack to a linked list for better functionality for players on the court.

## Week 4

Created substitution methods as well as input validation.

## Week 5

Tested and styled GUI.

# Lessons Learned

I would say the scope of my project stayed relatively close to how I imagined it. I wanted to be able to create your own roster and make substitutions while tracking the time played. I then decided to add target minutes for each player to know for sure how many minutes each player should play. The only major blocker I had was I wanted the first data structure to be a stack. I had to change it to a linked list so I could search through it to make substitutions. Other than that, I just had to learn some more elements of java fx.

# Substitution Manager User Manual

## Introduction

The purpose of this application is to track the number of minutes a player is in a basketball game. This is important for youth sports where players receiving equal playing time is important. Substitution Manager will also display how many minutes each player should play based on the total game time and the size of the roster.

## Before the Game Starts

When you start the application, you are met with a welcome screen. Select **Start Game** to go to the next screen. You will then be able to choose to **Create a New Roster** or **Select a Saved Roster**. There are three default rosters already available. If you create a new roster, you will be able to input up to 15 players. Note the first 5 players on the roster are default starters. Otherwise, you can select one of the saved rosters. Once you select a roster, you will have to enter the **Number of Quarters** and the **Quarter Length**. Now you are ready for the game to start. The players in cyan are currently in the game while the rest are on the bench.

## Making a Substitution

When you are ready to make a substitution, click **Make Substitution**. You will be asked to enter the current quarter and time shown on the scoreboard. Then you can see the five players on the court and how many minutes they have played. Select one and the player you are subbing in. You can then sub another player in/out or click cancel to return to the game screen.

## Ending the Game

At any point you can select **End Game** to be taken back to the start screen to start a new game.

# Conclusion

## Good Programming

Good programming includes creating code that is well tested and contains lots of comments to describe what is happening for another user to be able to easily read, understand, and change the code if needed. Creating good functions and variable names also help others as well as yourself understand what is going on. Programs should also be able to handle invalid inputs in all cases.

## Project Summarization

Substitution Manager is used to track the number of minutes a player is in a basketball game. This is important for youth sports where players receiving equal playing time is important. Substitution Manager will also display how many minutes each player should play based on the total game time and the size of the roster.

I believe my code is well written and documented. While there are some complex areas in the code, I think it can be understood well because of the documentation. I have also tested the GUI and classes to every possibility I could imagine.

## Future Versions

Possible future versions could include selecting five starters before the game even begins. This is possible by entering the maximum minute in quarter one, but it could be made easier. I could also make it so you can choose the number of players on the court. This way the application could be used for football, soccer, baseball, and any other sport that doesn’t use 5 players at a time. I would also have to change the rosters to accommodate for the size.