Basketball Shooting Map

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# Abstract

This project is a Basketball Shooting Chart that I created to help players and coaches be able to analyze shooting performance from the different zones on the court. I created this using C++ for the code and QT Creator for the UI. The program takes user input for made and missed shots and displays a visual court map showing shooting percentages in each area. I built in features like an undo function using a stack and organized the shot data using a queue. To manage and display the statistics by court zone, I used an unordered\_map, which helped simplify the structure of the data. Most of the coding resources I relied on came from Geeks for Geeks, especially for understanding how to use stacks, queues, and unordered\_maps effectively.

# Introduction

My Project is going to be a Basketball Heat Map. In this program, the user will input the number of makes and misses from each section of the basketball court. After receiving the input, the program will print a diagram displaying the shooting percentages on a segmented map of the court. This program will help anyone that is trying to improve their basketball shooting or can help coaches and players create gameplans for both their own players and opposing players. This program uses stacks to allow an undo feature for the previous data entered. It uses queues to store the shot data and then display that data in the output.

# Literature Review

For this project the resources I used were mainly from a website called Geeks for Geeks, that provides tutorials for coding and other computer related topics, specifically articles on stacks, queues, and unordered maps. The stack was important for creating the undo feature, while the queue helped in organizing shot data. The unordered\_map resource helped with store the data by zone name. For QT Creator, I also used articles by Geeks for Geeks to help me format the layout of the UI. On the basketball side, I referred to **FastModel Sports**, a platform used by coaches for designing plays and analyzing shot data. This helped me make the final layout for the project.

# Methodolgy

##### This project was built using C++ along with Qt Creator to create a basketball heat map that helps track shooting performance. The program takes user input for made and missed shots in different parts of the court, calculates shooting percentages, and displays a court map.

### Tools and Setup

I used Visual Studio to write the C++ code and Qt Creator to design the interface and visuals. The court is shown using Qt’s graphics tools, with each zone updating as data is entered.

### How it works

* A stack is used for the undo button, so you can go back a step if you mess up.
* A queue keeps track of the order you enter shots.

### Storing and Display

The shot data is stored into a stack, to allow for undoing if there is a mistake, and the final output is given once the completion button is pressed. The program saves the makes and misses for each shot zone. When all of the data has been entered, the program pushes the shot data to the assigned court zone and then displays the pushed data. If impossible data, like having more makes than attempts, is entered the program will display and error message and allow the user to re-enter that portion.

Conclusion  
This project helped me actually be able to apply the concepts that I have learned throughout this semester. I used stacks and queues to manage user input and added an undo feature to make the app more user-friendly. Learning how unordered\_maps work really helped me format and organize the shot data more clearly. Using Qt Creator also helped me be better at creating more user friendly programs. Overall, this project improved my C++ skills, gave me hands-on practice with useful data structures, and showed me how to bring an idea to life through code. It was a big step in my growth as a Computer Science student.

##### References

1. GeeksforGeeks, "Stack in C++ STL," GeeksforGeeks, Available: https://www.geeksforgeeks.org/stack-in-cpp-stl/.
2. GeeksforGeeks, "Queue in C++ STL," GeeksforGeeks, Available: https://www.geeksforgeeks.org/queue-cpp-stl/.
3. GeeksforGeeks, "unordered\_map in C++ STL," GeeksforGeeks, Available: https://www.geeksforgeeks.org/unordered\_map-in-cpp-stl/.
4. FastModel Sports, "All About Shot Charts in FastScout," FastModel Sports Support, https://support.fastmodelsports.com/support/solutions/articles/9000231646-all-about-shot-charts-in-fastscout.
5. Qt Project, Qt for Beginners. [Online]. Available: https://wiki.qt.io/Qt\_for\_Beginners