**FIBA Player Statistics Mock-up Application: Engineering Method**

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09687: Algorithms and Data Structures

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Basketball is a worldwide known game, and it has a rich history of player, rules, and events. And even though the essence of the game itself has remained untouched, several rules and traditions have been added, modified, or removed from the game altogether. This evolutionary trend of the game has made necessary a broader reach in the data it produces, including more and more details into them, which is why a close follow-up of this data is a real necessity by institutions and organisms that regulate and promote the sport. Under this premise, we have been tasked with the development of a desktop app that is able to showcase the storage, management, and retrieval of this data, by the International Basketball Federation Association, or FIBA for short. Next up, an engineering approach to solve the problem using the Engineering Method.

## Context of the Problem

FIBA requires a desktop application that can handle worldwide basketball players’ statistics, including management, retrieval, and adding of said statistics and players. The search and storage of data must be fast and efficient.

## Development of the Solution

Based on the description of the engineering method given in the book Introduction to Engineering by Paul Wright, the following flowchart was drawn, and will be followed according to the steps shown in it during the development of the solution.



Figure 1. Flowchart representing The Engineering Method proposed by Paul Wright.

The steps shown in figure 1 are elaborated in detail following up.

## Identifying the Problem

*Identifying symptoms and necessities*

* The app should be able to show each player’s most relevant information
* The app should be able to quickly fetch and store data from search queries
* The app should be able to store large amount of data in one action effectively timewise and memory-wise
* The app should be GUI based, but should also be able to take file input such as CSV files

*Definition of the Problem*

FIBA requires a desktop GUI based application to effectively store large amount of basketball player related statistics data, and allow its management, sorting, and searching; being able to take GUI and file input of large quantities.

## Information Gathering

Given the technological context of the solutions to be proposed, the following terms must be defined prior to anything:

*Software*: Software is every application program and operative system that allow the computer can run smart tasks, directing the physical components or hardware with instructions and data through several different kinds of programs.

*Simulation Software*: A simulation software has the objective of facilitating or automating the modelling process for a real-world phenomenon, using mathematical formulas through programming. At its core, it is a program that allows the user to see what will happen after doing a specific action or set of actions, without having to do it in the real world.

*Graphical User Interface (GUI)*: A graphical user interface (GUI by its English acronym) is a program or environment that manages the interaction with the user basing itself on visual relations such as icons, menus, or pointers.

Now, we need to define the terms relevant to the context of the problem: Basketball. Alas, related terms are defined:

*Basketball:* A game played by two teams of 5 players each whose objective is to throw a ball through a hoop called basket (attack) and prevent the opponent’s team from achieving this goal on the team’s own basket (defence). The game is played in a rectangular flat hard floored field divided by halves (backcourt / frontcourt) of dimensions 28m by 15m, measured from the inner edge of the boundary line (FIBA Central Board, 2021).

Diagram, engineering drawing

Description automatically generated

Figure 2. Full Size Playing Court

As stated by the definition above, a player scores when they make the ball go through the basket of the other team. Depending on the zone from which they lose contact with the ball right before it scores into the hoop, a number of points is given. The number of points depends on the zones shown in the following figure:

Diagram

Description automatically generated

Figure 3. 2-point/3-point field goal area

In case a player inflicts an illegal move on a player, a free throw may be given with either 1, 2, or 3 shots, depending on the severity of the fault determined by the referee. This free throw is executed by locating the players in around the restricted area, in the marks designated for this purpose, as shown in the following figure:

Diagram

Description automatically generated

Figure 4. Restricted Area

For the statistics that are of high relevancy, we have the following:

*Points per Game*: The average points scored per game by a player.