

Lab 2 – Classes and Objects

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The objective of this lab was learning about classes and how to access their attributes and public/private member functions. The creation of objects is fundamental in Object-Oriented Programming, which allows us to model real world concepts in code. We were able to create an interactive basketball game simulation that applied these objectives. We created a class called player which included Name, ShotsTaken, ShotsMade, PassesAttempted, PassesMade, PassBall, TakeShot, Display, and ReceiveBall. This class had private and public members. By using public/private access specifiers we demonstrated the importance of encapsulation. Hiding details of a class and exposing only the necessary variables results in better code organization and maintenance. Code organization, encapsulation, and the creation of objects are important skills to this course and our careers in CS/Engineering because they are necessary in OOP and the integrity of our code. Also, the use of vectors and arrays for data management is a key skill that will build upon moving forward in this course specifically.

The public members in our source code include the functions PassBall, TakeShot, etc. etc. These members were made public because these are actions that the user will need to call, by making them publicly available this allows the user to interact with them.

The private variables include variables PassesAttempted, PassesMade, ShotsTaken, and PassesAttempted. These variables are private because the information contained does not need to be accessed by the user. This increases the data integrity since unintentional changes are blocked. To access and modify these members we used public accessor and mutator functions.

<https://github.com/emberskyee/lab-2/blob/main/Lab%20%20Basketball%20Game.cpp>

```
cd "/Users/maggielyon/Desktop/Spring 2023/Data Structures/Lab 2 - Classes and Objects/" && g++ lab2.cpp -o lab2 && "/Users/maggielyon/Desktop/Spring 2023/Data Structures/Lab 2 - Classes and Objects/"Lab2
(base) maggielyon@Maggies-MacBook-Air:~/Data Structures % cd "/Users/maggielyon/Desktop/Spring 2023/Data Structures/Lab 2 - Classes and Objects/" && g++ lab2.cpp -o lab2 && "/Users/maggielyon/Desktop/Spring 2023/Data Structures/Lab 2 - Classes and Objects/"Lab2
*****
New game has been started.

Kobe currently has the ball.

Choose an Action:
1. Shoot
2. Pass
3. See Player Stats
4. See score
1
Choose number of points to attempt: 1, 2, 3
2
Shot Chance: 50 Shooting percentage: 0

Shot unsuccessful.

You lost possession of the ball!
*****
Opposing team attempting shot...

Opposing team made the shot! (2 Points) It's Your ball!
*****
Possessions Remaining: User - 29 Opponent - 29
*****
Lebron currently has the ball.

Choose an Action:
1. Shoot
2. Pass
3. See Player Stats
4. See score
1
Choose number of points to attempt: 1, 2, 3
3
Shot Chance: 23 Shooting percentage: 0

Shot successful.

*****
Opposing team attempting shot...

Opposing team made the shot! (2 Points) It's Your ball!
*****
Possessions Remaining: User - 28 Opponent - 28
*****
```

Shown to the left are screenshots from our code's output. This only shows a few possessions, however, all features of the code are conveyed.

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*****
Steph currently has the ball.

Choose an Action:
1. Shoot
2. Pass
3. See Player Stats
4. See score
2
Choose a player to pass the ball to: 1. Lebron , 2. MJ , 3. Kobe, 4, Steph , 5. Jokic
1
Pass successful.

Lebron currently has the ball.

Choose an Action:
1. Shoot
2. Pass
3. See Player Stats
4. See score
3
*****
Player Name: Lebron
Shots Taken: 1
Shots Made: 1
Passes Attempted: 0
Passes Made: 0
*****
Lebron currently has the ball.

Choose an Action:
1. Shoot
2. Pass
3. See Player Stats
4. See score
1
Choose number of points to attempt: 1, 2, 3
3
Shot Chance: 85 Shooting percentage: 100

Shot successful.

*****
Opposing team attempting shot...

Opposing team made the shot! (2 Points) It's Your ball!
*****
Possessions Remaining: User - 27 Opponent - 27
*****
*****
Opposing team attempting shot...

Opposing team made the shot! (2 Points) It's Your ball!
*****
Possessions Remaining: User - 26 Opponent - 26
*****
Kobe currently has the ball.

Choose an Action:
1. Shoot
2. Pass
3. See Player Stats
4. See score
2
Choose a player to pass the ball to: 1. Lebron , 2. MJ , 3. Kobe, 4, Steph , 5. Jokic
5
Pass successful.

Jokic currently has the ball.

Choose an Action:
1. Shoot
2. Pass
3. See Player Stats
4. See score
2
Choose a player to pass the ball to: 1. Lebron , 2. MJ , 3. Kobe, 4, Steph , 5. Jokic
1
Pass successful.

Lebron currently has the ball.

Choose an Action:
1. Shoot
2. Pass
3. See Player Stats
4. See score
3
*****
Player Name: Lebron
Shots Taken: 3
Shots Made: 3
Passes Attempted: 0
Passes Made: 0
*****
Lebron currently has the ball.

Choose an Action:
1. Shoot
2. Pass
3. See Player Stats
4. See score

```