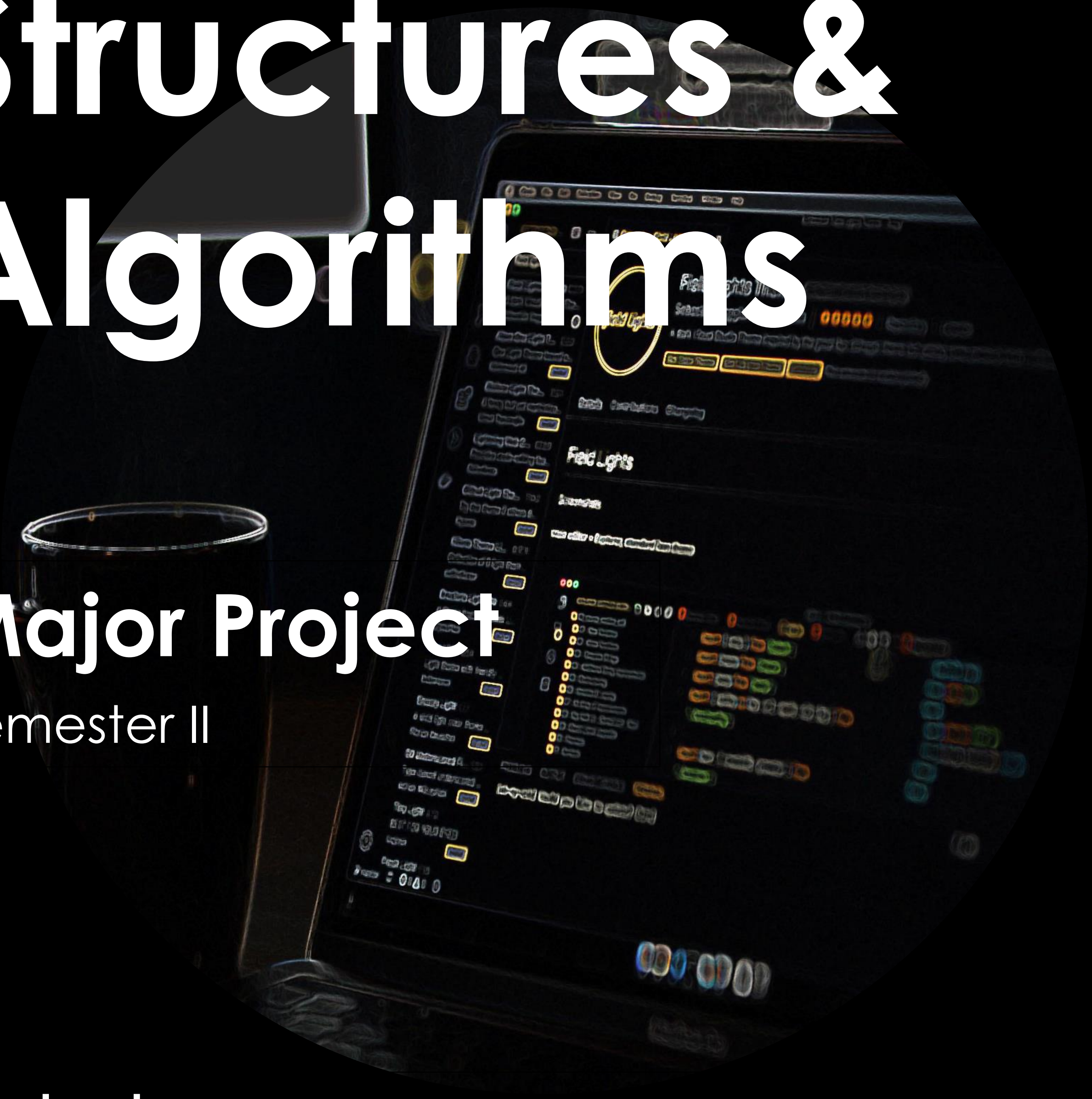
Data Structures & Algorithms



Major Project

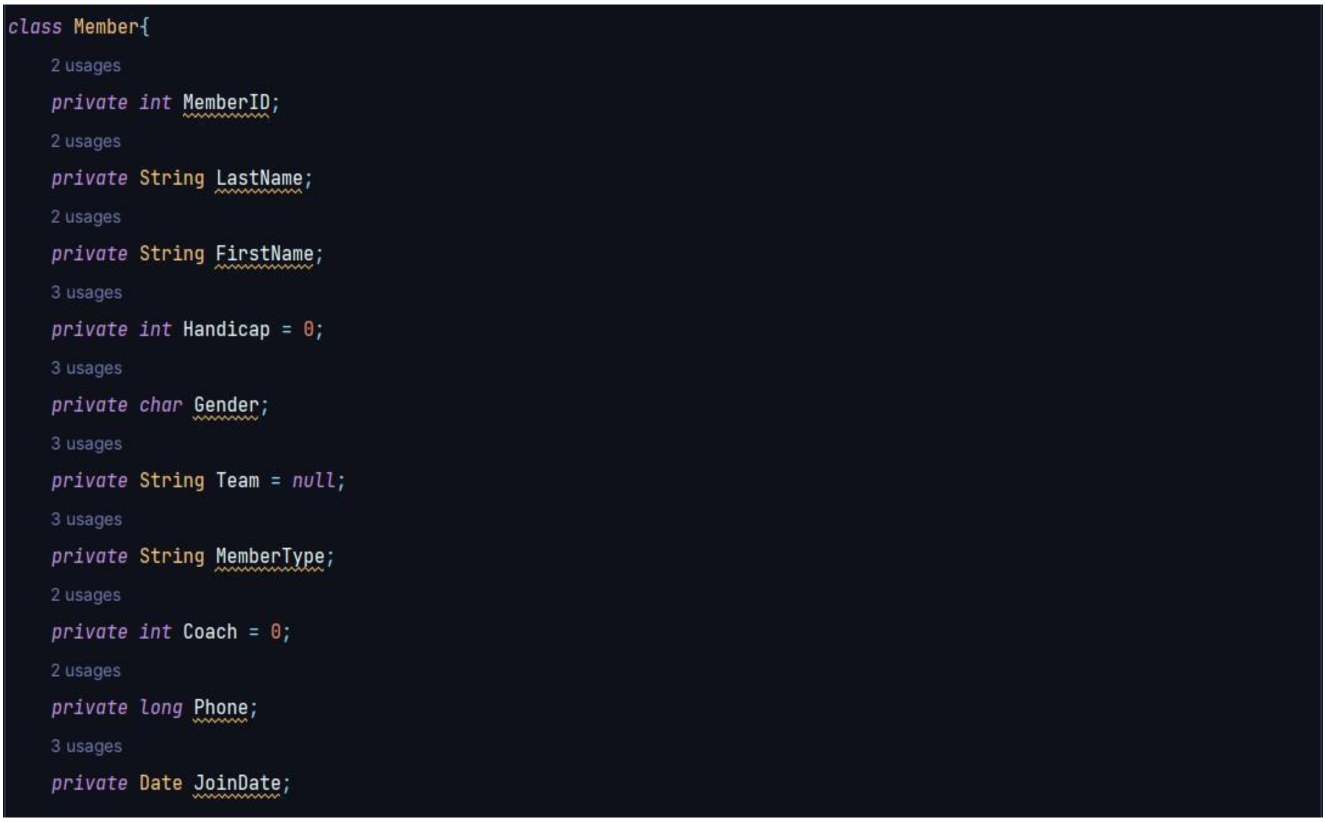
Semester II

Abstract

Applied Object Oriented Programming, exception handling, array manipulation, and loops to enhance computational efficiency and problem-solving in diverse scenarios.

Description

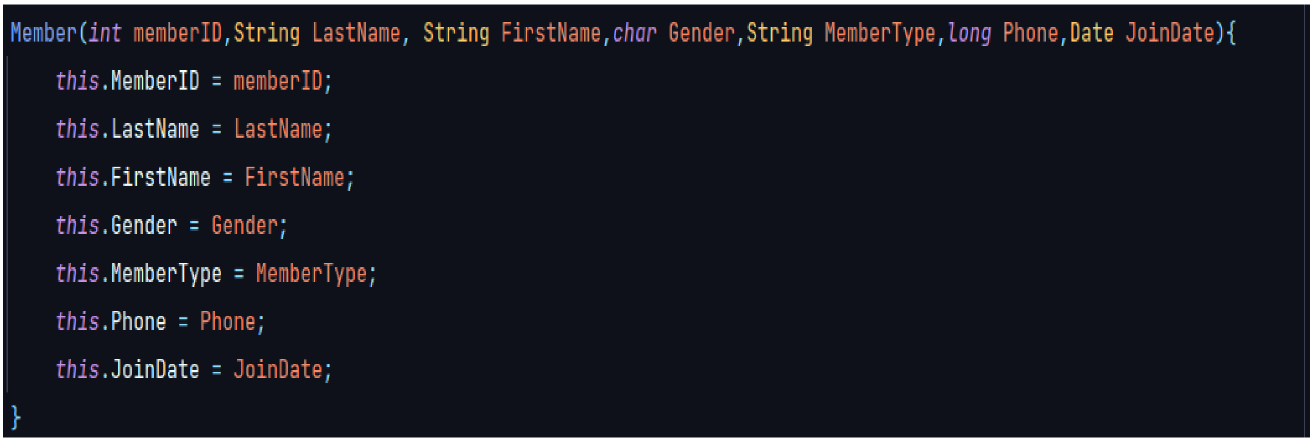
1. Creating Member class and instantiating class attributes.



```
class Member{
    2 usages
    private int MemberID;
    2 usages
    private String LastName;
    2 usages
    private String FirstName;
    3 usages
    private int Handicap = 0;
    3 usages
    private char Gender;
    3 usages
    private String Team = null;
    3 usages
    private String MemberType;
    2 usages
    private int Coach = 0;
    2 usages
    private long Phone;
    3 usages
    private Date JoinDate;
```

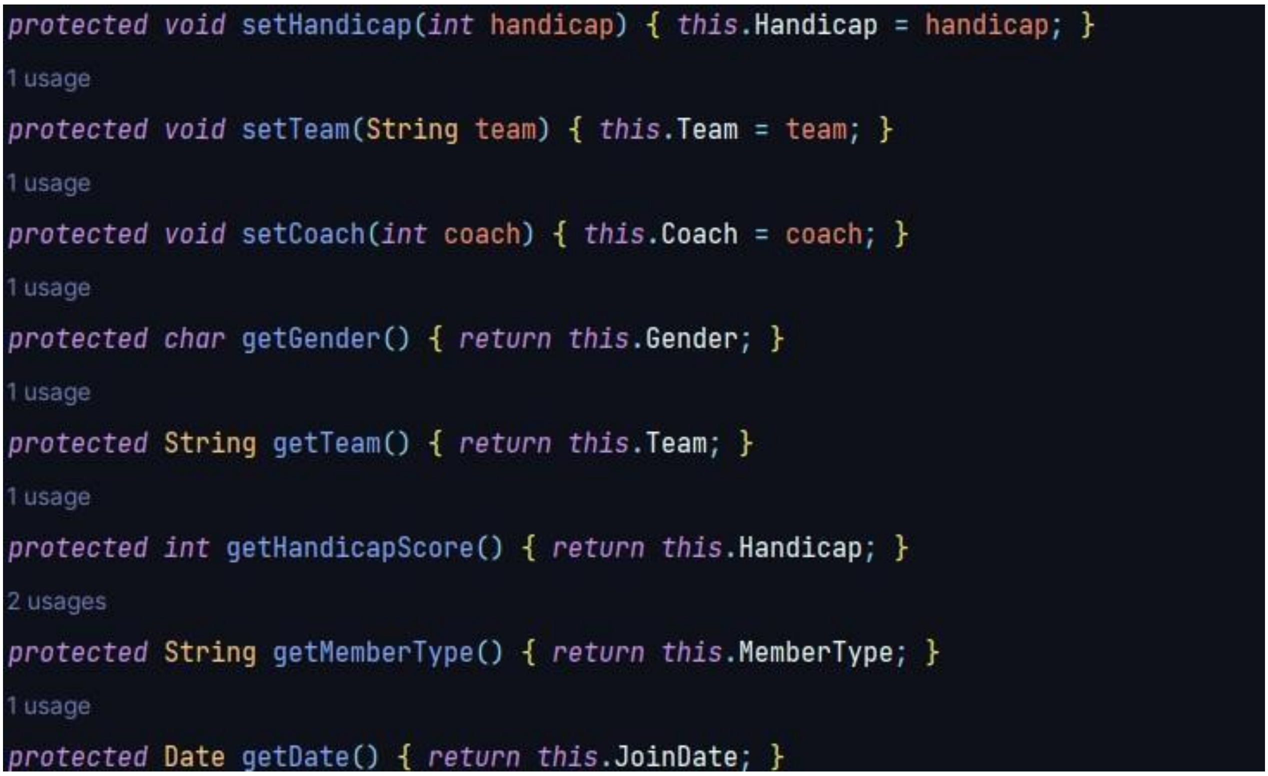
2. Creating a constructor for member class.

3. Assigning values to the member class attributes through parameterized constructor.



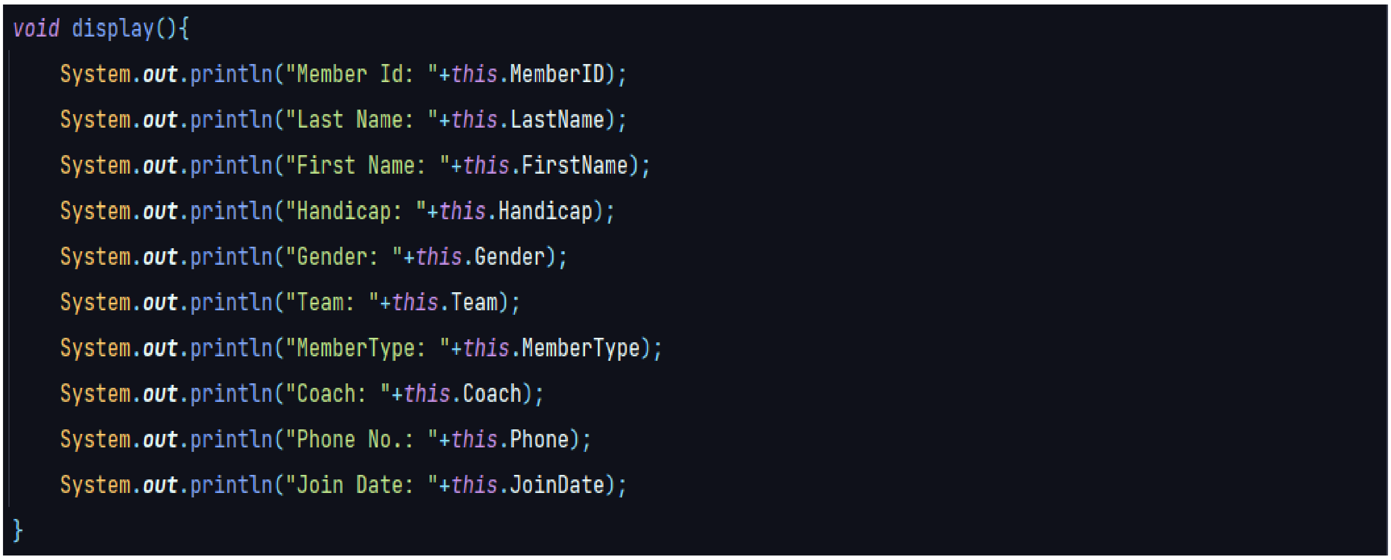
```
Member(int memberID,String LastName, String FirstName,char Gender,String MemberType,long Phone,Date JoinDate){
    this.MemberID = memberID;
    this.LastName = LastName;
    this.FirstName = FirstName;
    this.Gender = Gender;
    this.MemberType = MemberType;
    this.Phone = Phone;
    this.JoinDate = JoinDate;
}
```

4. Creating getters & setters to retrieve attributes of the class member.



```
protected void setHandicap(int handicap) { this.Handicap = handicap; }
1 usage
protected void setTeam(String team) { this.Team = team; }
1 usage
protected void setCoach(int coach) { this.Coach = coach; }
1 usage
protected char getGender() { return this.Gender; }
1 usage
protected String getTeam() { return this.Team; }
1 usage
protected int getHandicapScore() { return this.Handicap; }
2 usages
protected String getMemberType() { return this.MemberType; }
1 usage
protected Date getDate() { return this.JoinDate; }
```

5. Creating a display method within member class to display the data stored by the user.



```
void display(){
    System.out.println("Member Id: "+this.MemberID);
    System.out.println("Last Name: "+this.LastName);
    System.out.println("First Name: "+this.FirstName);
    System.out.println("Handicap: "+this.Handicap);
    System.out.println("Gender: "+this.Gender);
    System.out.println("Team: "+this.Team);
    System.out.println("MemberType: "+this.MemberType);
    System.out.println("Coach: "+this.Coach);
    System.out.println("Phone No.: "+this.Phone);
    System.out.println("Join Date: "+this.JoinDate);
}
```

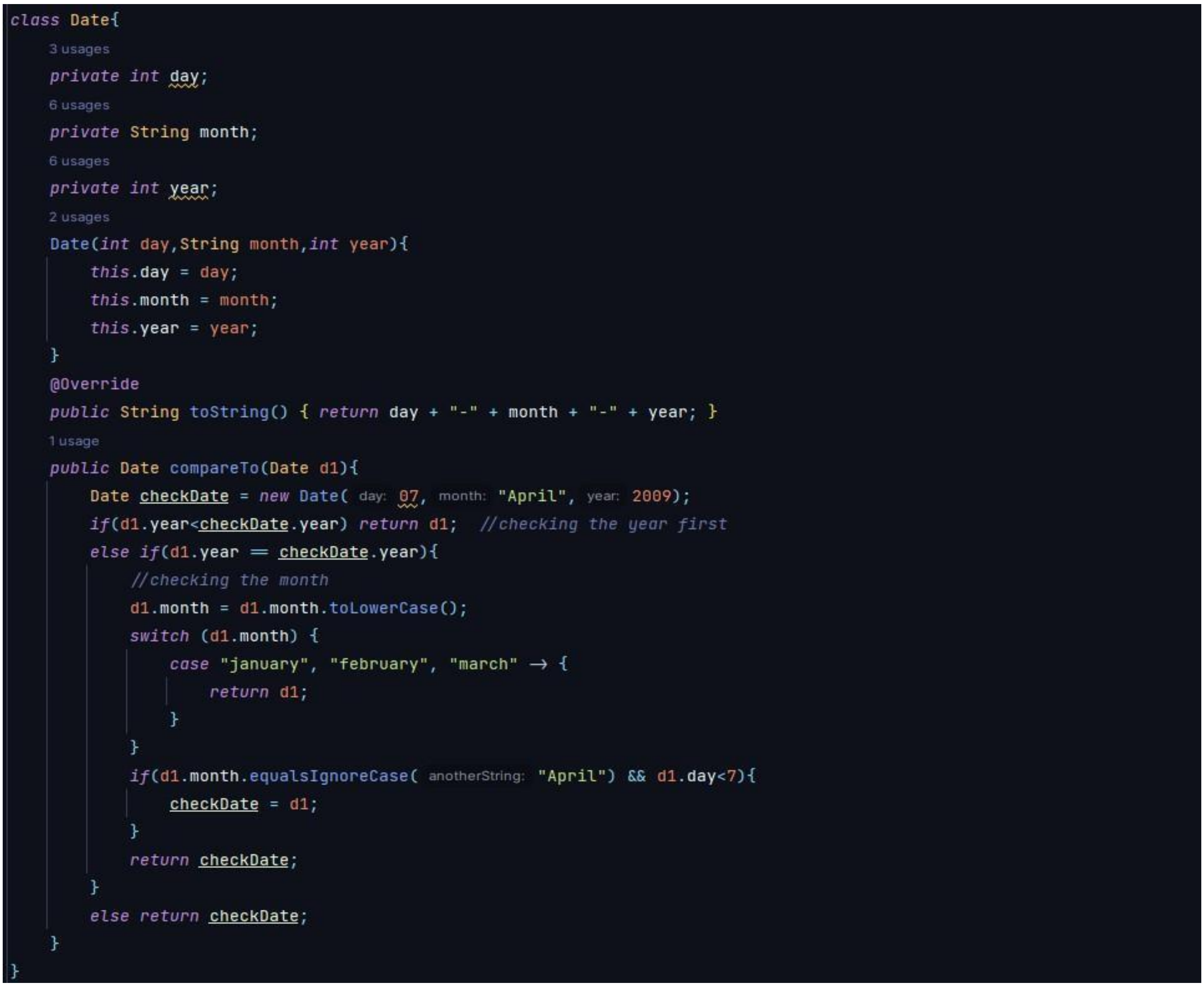
6. Creating a class named Date outside the class member.

7. Instantiating attributes for class Date.

8. Creating a parameterized constructor to set the date.

9. Overriding method toString() to concate the date and convert the date format to string.

10. Creating a method within the class Date named compareTo(), which will compare the date entered by the user to the given checkDate and returns the date to the main class.



```
class Date{
    3 usages
    private int day;
    6 usages
    private String month;
    6 usages
    private int year;
    2 usages
    Date(int day,String month,int year){
        this.day = day;
        this.month = month;
        this.year = year;
    }
    @Override
    public String toString() { return day + "-" + month + "-" + year; }
    1 usage
    public Date compareTo(Date d1){
        Date checkDate = new Date( day: 07, month: "April", year: 2009);
        if(d1.year<checkDate.year) return d1;  //checking the year first
        else if(d1.year == checkDate.year){
            //checking the month
            d1.month = d1.month.toLowerCase();
            switch (d1.month) {
                case "january", "february", "march" -> {
                    return d1;
                }
            }
            if(d1.month.equalsIgnoreCase( anotherString: "April") && d1.day<7){
                checkDate = d1;
            }
            return checkDate;
        }
        else return checkDate;
    }
}
```

11. Creating the main class within the class Database(name of the java file).

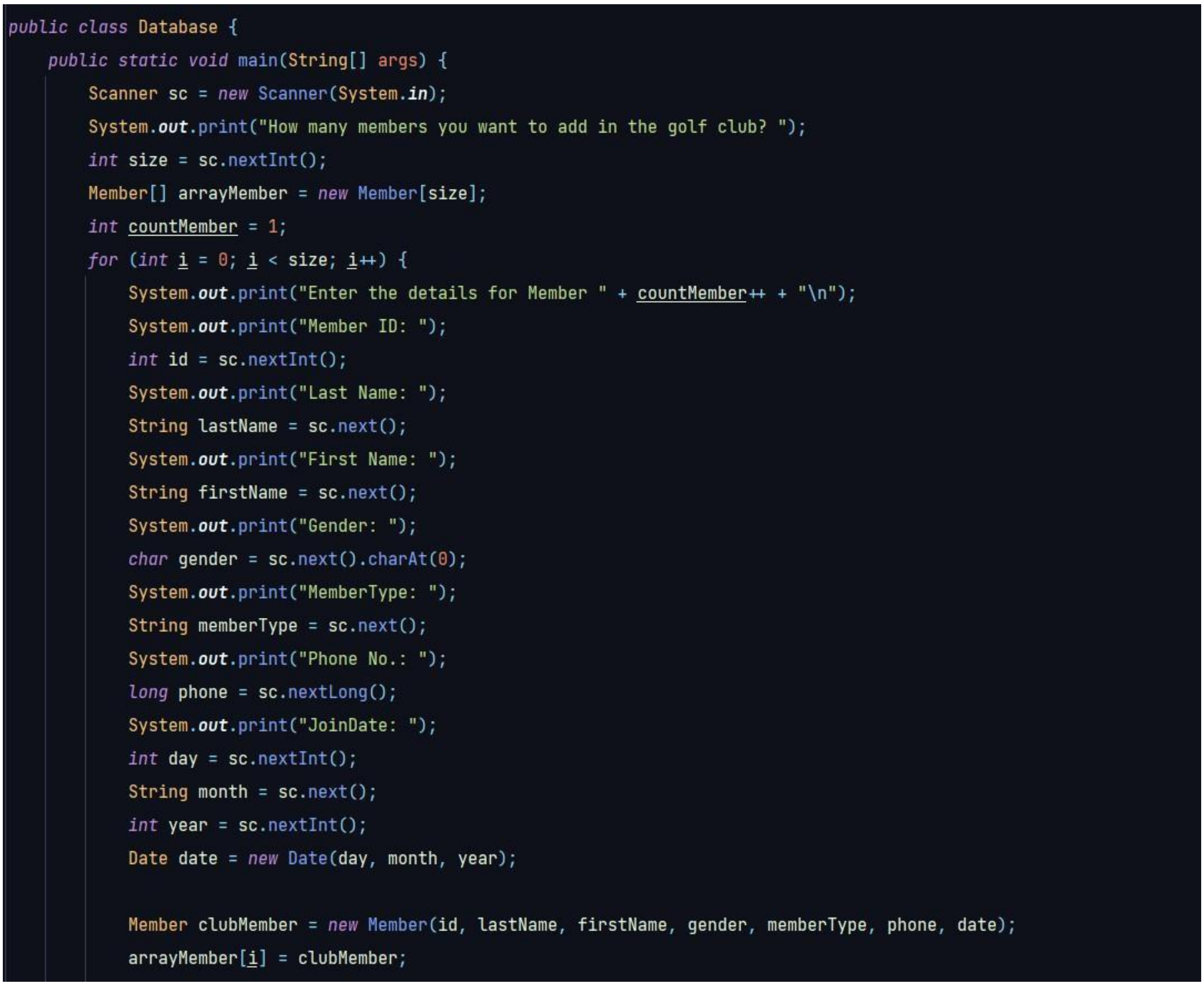
12. Instantiating an array to store member type object of size ‘size’.

13. Using for loop to take input from the admin to add new members.

14. Creating an object date after taking the input to concate the day-month-year by calling the Date constructor through passing arguments.

15. Now, making an object for the class member and passing the arguments by member constructor built in the class member.

16. Assigning the object reference of the class member to the array index at i.



```java
public class Database {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("How many members you want to add in the golf club? ");
        int size = sc.nextInt();
        Member[] arrayMember = new Member[size];
        int countMember = 1;
        for (int i = 0; i < size; i++) {
            System.out.print("Enter the details for Member " + countMember++ + "\n");
            System.out.print("Member ID: ");
            int id = sc.nextInt();
            System.out.print("Last Name: ");
            String lastName = sc.next();
            System.out.print("First Name: ");
            String firstName = sc.next();
            System.out.print("Gender: ");
            char gender = sc.next().charAt(0);
            System.out.print("MemberType: ");
            String memberType = sc.next();
            System.out.print("Phone No.: ");
            long phone = sc.nextLong();
            System.out.print("JoinDate: ");
            int day = sc.nextInt();
            String month = sc.next();
            int year = sc.nextInt();
            Date date = new Date(day, month, year);

            Member clubMember = new Member(id, lastName, firstName, gender, memberType, phone, date);
            arrayMember[i] = clubMember;
```

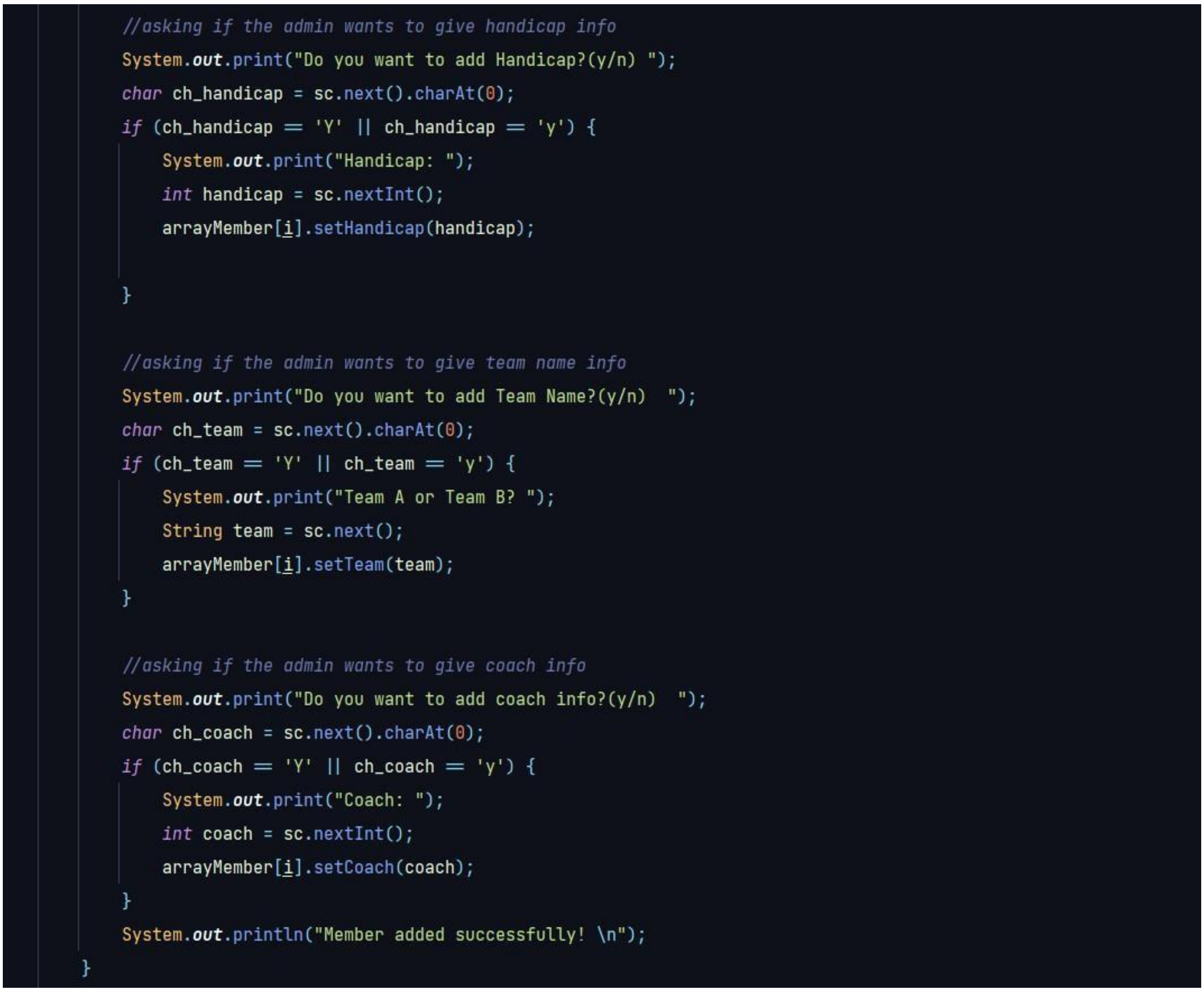
17. Asking the admin if he wants to add details for

- Handicap
- Team Name
- Coach

18. If admin choses ‘Y’ or ‘y’ then the setter for the respective variable will be called & will assign the values of the info given to the class member attribute.

19. If admin choses any other choice then the program will move forward.

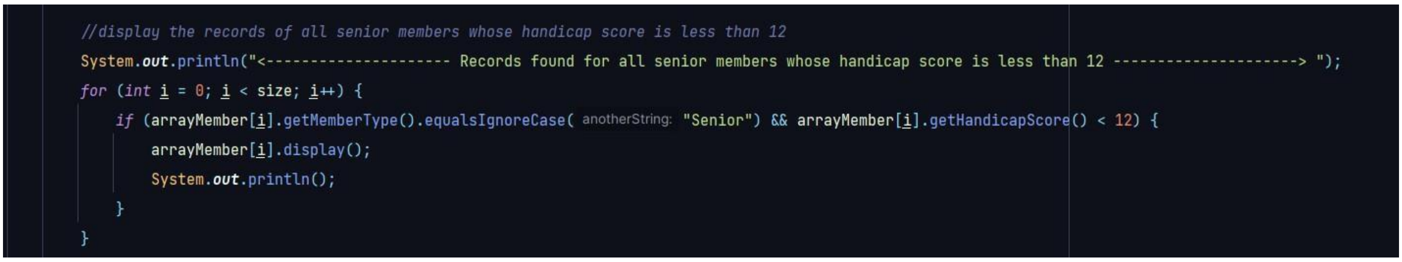
20. After asking for all the three data, a message will be shown saying: Member added successfully!



```
        //asking if the admin wants to give handicap info
        System.out.print("Do you want to add Handicap?(y/n) ");
        char ch_handicap = sc.next().charAt(0);
        if (ch_handicap == 'Y' || ch_handicap == 'y') {
            System.out.print("Handicap: ");
            int handicap = sc.nextInt();
            arrayMember[i].setHandicap(handicap);

        }

        //asking if the admin wants to give team name info
        System.out.print("Do you want to add Team Name?(y/n)  ");
        char ch_team = sc.next().charAt(0);
        if (ch_team == 'Y' || ch_team == 'y') {
            System.out.print("Team A or Team B? ");
            String team = sc.next();
            arrayMember[i].setTeam(team);
        }

        //asking if the admin wants to give coach info
        System.out.print("Do you want to add coach info?(y/n)  ");
        char ch_coach = sc.next().charAt(0);
        if (ch_coach == 'Y' || ch_coach == 'y') {
            System.out.print("Coach: ");
            int coach = sc.nextInt();
            arrayMember[i].setCoach(coach);
        }
        System.out.println("Member added successfully! \n");
    }
```

21. Displaying the records found for the senior member whose handicap score is less than 12.

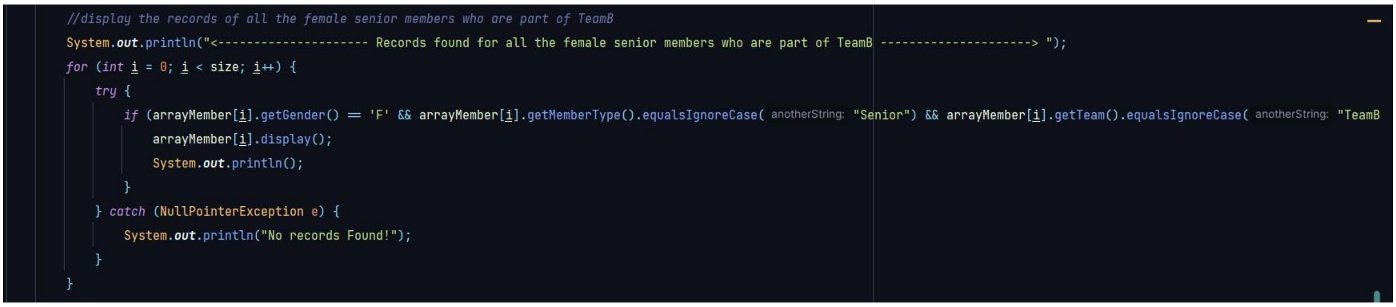
- Using for loop to iterate through the array storing the records of member.
- Checking the condition if it matches with the given statement. If it does then the display method will be called to display the details of the member.



```java
//display the records of all senior members whose handicap score is less than 12
System.out.println("<-------------------- Records found for all senior members whose handicap score is less than 12 --------------------> ");
for (int i = 0; i < size; i++) {
    if (arrayMember[i].getMemberType().equalsIgnoreCase( anotherString: "Senior") && arrayMember[i].getHandicapScore() < 12) {
        arrayMember[i].display();
        System.out.println();
    }
}
```

22. Displaying the records found for al the female senior members who are part of TeamB. Using for loop to iterate through the array storing the records of member.

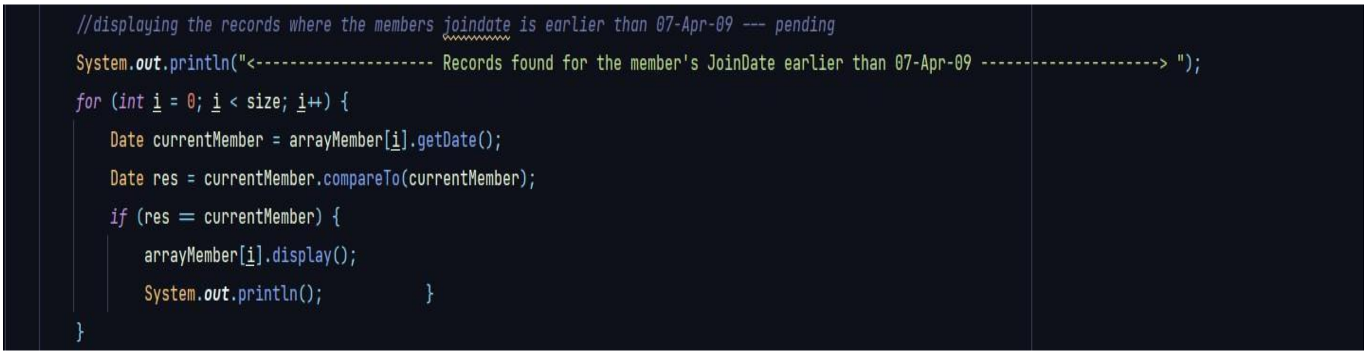
- Checking the condition if it matches with the given statement. If it does then the display method will be called to display the details of the member.
- Surrounding the condition by try-catch.
- If an error occurred for team name when the team's name is nu l then the catch exception will handle the error.



```java
//display the records of all the female senior members who are part of TeamB
System.out.println("<-------------------- Records found for all the female senior members who are part of TeamB --------------------> ");
for (int i = 0; i < size; i++) {
    try {
        if (arrayMember[i].getGender() == 'F' && arrayMember[i].getMemberType().equalsIgnoreCase( anotherString: "Senior") && arrayMember[i].getTeam().equalsIgnoreCase( anotherString: "TeamB
            arrayMember[i].display();
            System.out.println();
        }
    } catch (NullPointerException e) {
        System.out.println("No records Found!");
    }
}
```

23. Displaying the records found where the members join date is earlier than 07-April-09. Using for loop to iterate through the array storing the records of member.

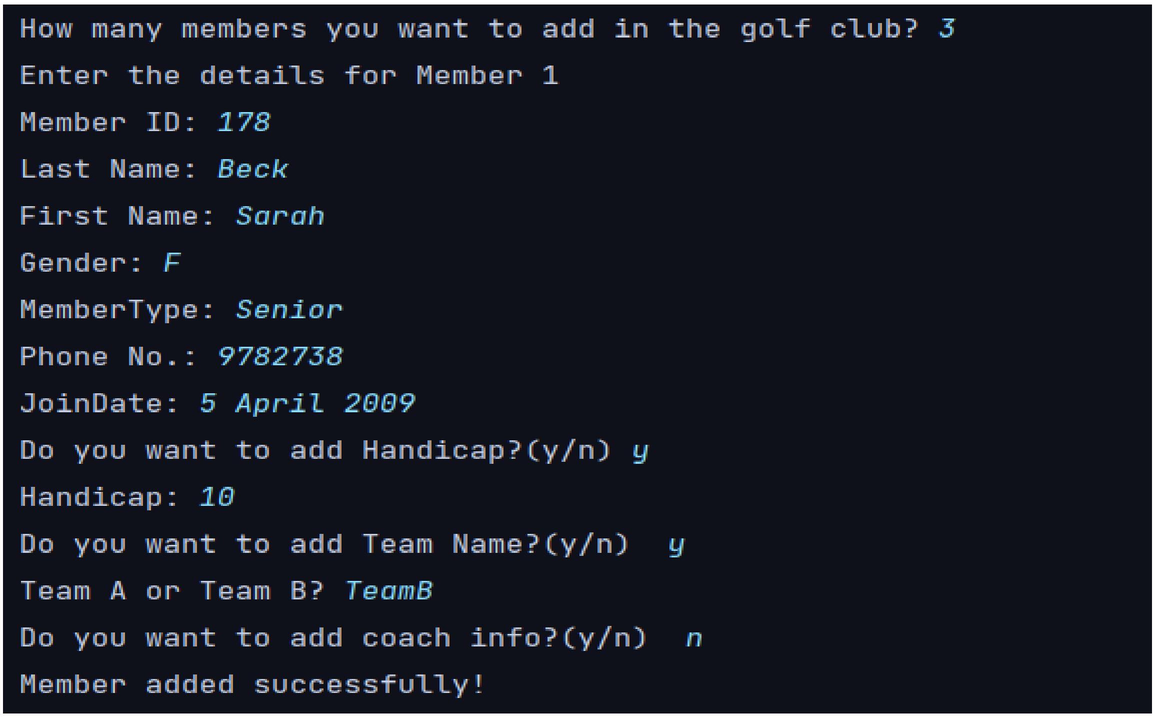
- Checking the condition if it matches with the given statement. If it does then the display method will be called to display the details of the member.



```java
//displaying the records where the members joindate is earlier than 07-Apr-09 --- pending
System.out.println("<-------------------- Records found for the member's JoinDate earlier than 07-Apr-09 --------------------> ");
for (int i = 0; i < size; i++) {
    Date currentMember = arrayMember[i].getDate();
    Date res = currentMember.compareTo(currentMember);
    if (res == currentMember) {
        arrayMember[i].display();
        System.out.println();          }
}
```

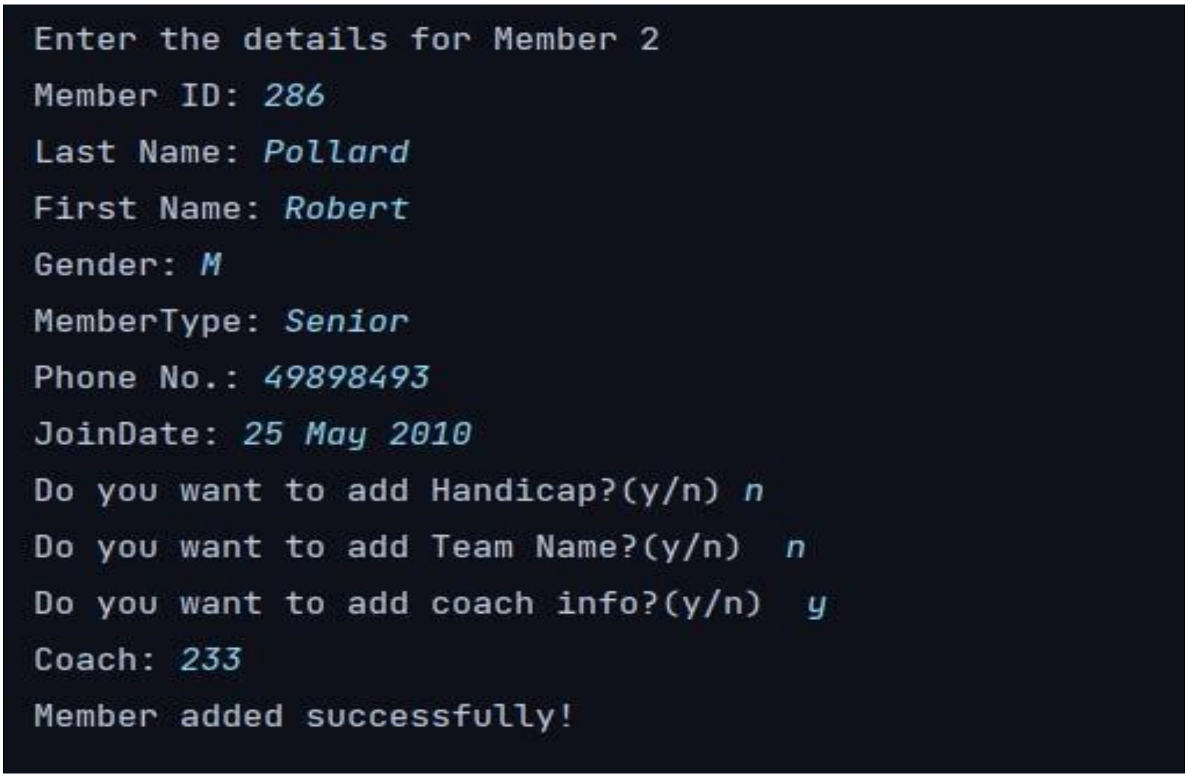
Output

Input for Member1



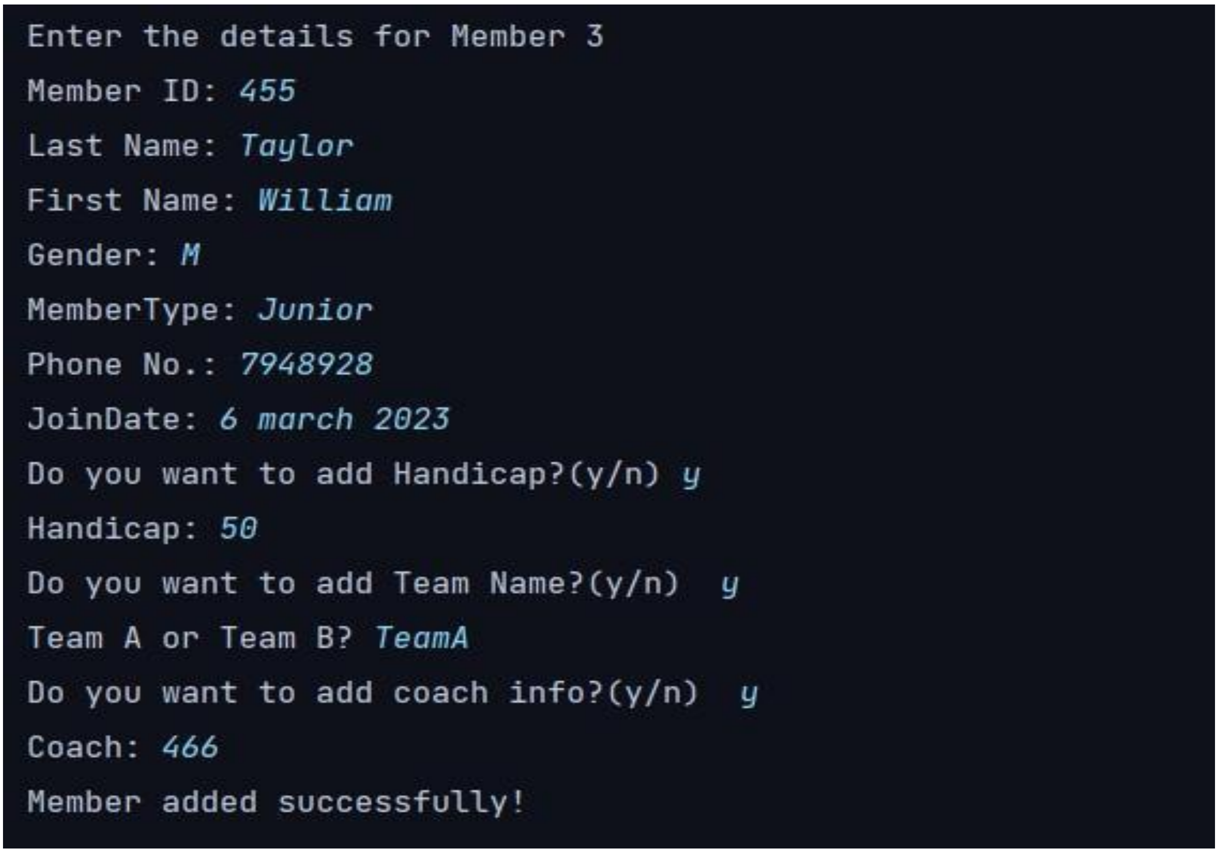
```
How many members you want to add in the golf club? 3
Enter the details for Member 1
Member ID: 178
Last Name: Beck
First Name: Sarah
Gender: F
MemberType: Senior
Phone No.: 9782738
JoinDate: 5 April 2009
Do you want to add Handicap?(y/n) y
Handicap: 10
Do you want to add Team Name?(y/n)  y
Team A or Team B? TeamB
Do you want to add coach info?(y/n)  n
Member added successfully!
```

Input for Member 2



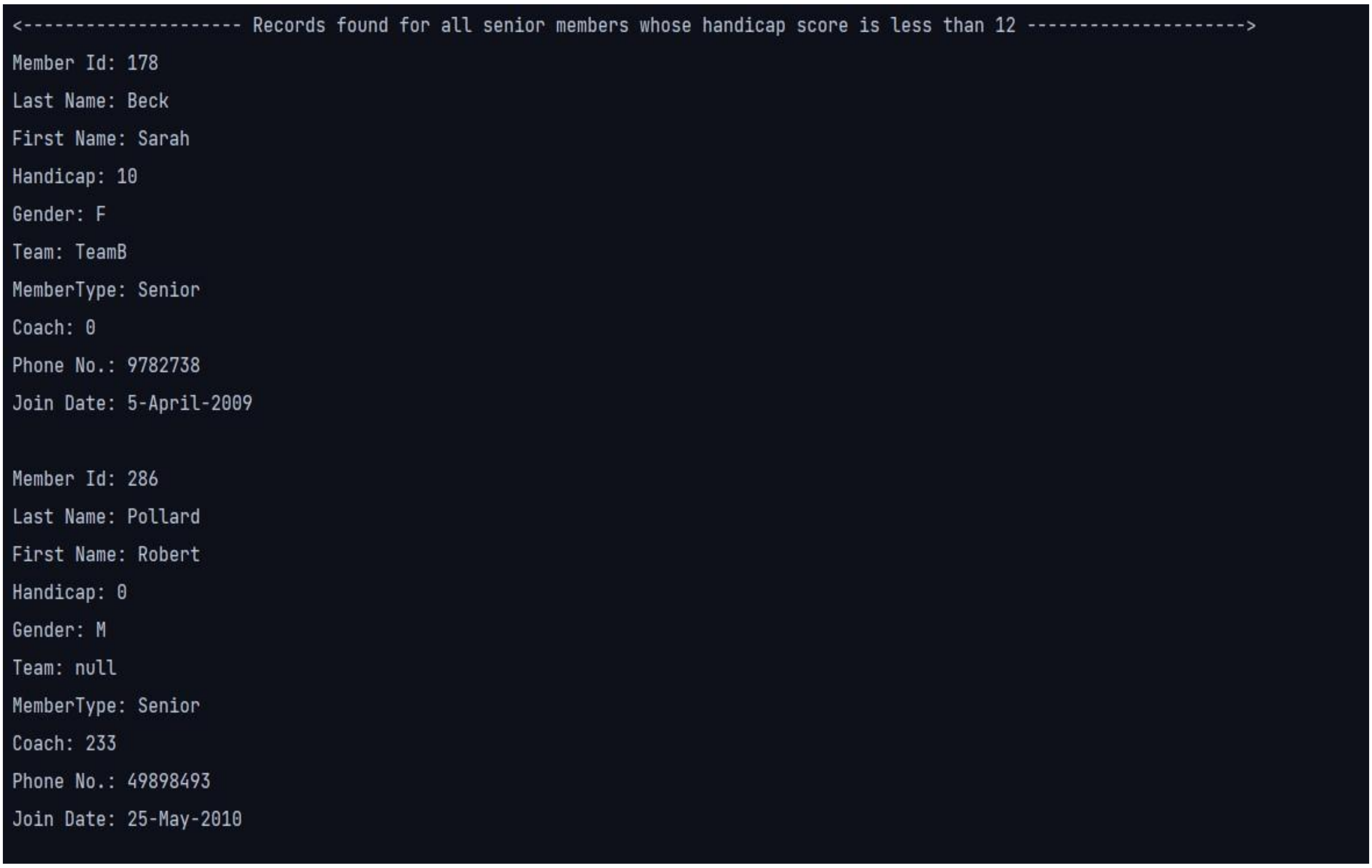
```
Enter the details for Member 2
Member ID: 286
Last Name: Pollard
First Name: Robert
Gender: M
MemberType: Senior
Phone No.: 49898493
JoinDate: 25 May 2010
Do you want to add Handicap?(y/n) n
Do you want to add Team Name?(y/n)  n
Do you want to add coach info?(y/n)  y
Coach: 233
Member added successfully!
```

Input for Member3



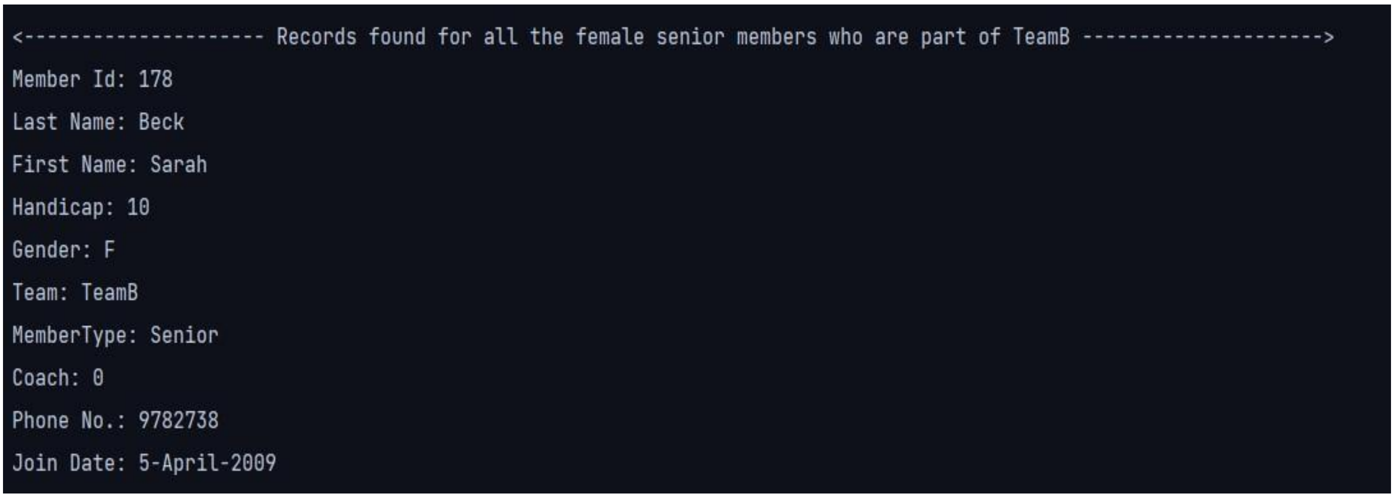
```
Enter the details for Member 3
Member ID: 455
Last Name: Taylor
First Name: William
Gender: M
MemberType: Junior
Phone No.: 7948928
JoinDate: 6 march 2023
Do you want to add Handicap?(y/n) y
Handicap: 50
Do you want to add Team Name?(y/n)  y
Team A or Team B? TeamA
Do you want to add coach info?(y/n)  y
Coach: 466
Member added successfully!
```

Output 1



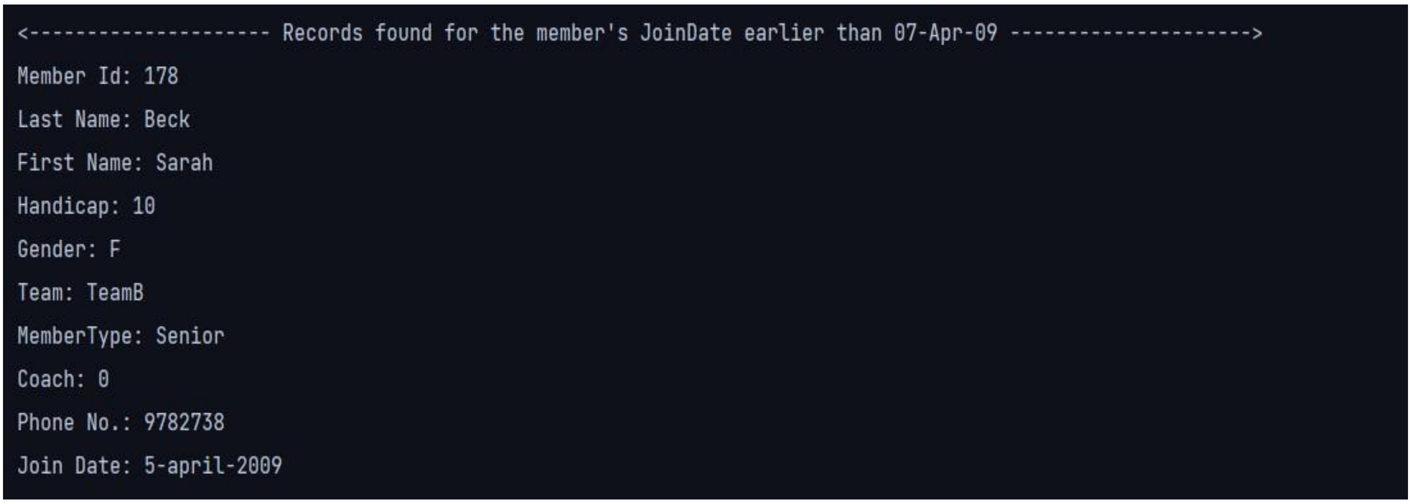
```
<-------------------- Records found for all senior members whose handicap score is less than 12 -------------------->
Member Id: 178
Last Name: Beck
First Name: Sarah
Handicap: 10
Gender: F
Team: TeamB
MemberType: Senior
Coach: 0
Phone No.: 9782738
Join Date: 5-April-2009

Member Id: 286
Last Name: Pollard
First Name: Robert
Handicap: 0
Gender: M
Team: null
MemberType: Senior
Coach: 233
Phone No.: 49898493
Join Date: 25-May-2010
```

Output 2



```
<--------------------- Records found for all the female senior members who are part of TeamB --------------------->
Member Id: 178
Last Name: Beck
First Name: Sarah
Handicap: 10
Gender: F
Team: TeamB
MemberType: Senior
Coach: 0
Phone No.: 9782738
Join Date: 5-April-2009
```

Output 3



```
<--------------------- Records found for the member's JoinDate earlier than 07-Apr-09 --------------------->
Member Id: 178
Last Name: Beck
First Name: Sarah
Handicap: 10
Gender: F
Team: TeamB
MemberType: Senior
Coach: 0
Phone No.: 9782738
Join Date: 5-april-2009
```

-- End of Project --

Thank You