Java Assignment 3

Sahil Goyal

AIML-B1

22070126094

2022-26

Write a menu-driven Java Program to study the concepts of classes, array of objects, instance members, constructors in java.
Assignment description: Create a Student class describing attributes of a student like prn, name, DoB, marks etc. Create an array of objects of Student class and perform operations like: Add students, Display, Search (by prn, by name, by position), Update/Edit and Delete

Code:

```
//Main.java
//Sahil Goyal
//AIML-B1
//2022-26
//22070126094
package Assignment_3;

import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        // Create a Scanner object to take user input
        Scanner sc = new Scanner(System.in);

        // Create an instance of UserInput class to handle student operations
        UserInput user = new UserInput();

        // Display menu and handle user input in a loop
```

```
while (true) {
    // Display menu options
    System.out.println("Menu:");
    System.out.println("1. Add Student");
    System.out.println("2. Display Students");
    System.out.println("3. Search by PRN");
    System.out.println("4. Update Student Name");
    System.out.println("5. Delete Student");
    System.out.println("6. Exit");
    System.out.print("Enter your choice: ");

    // Read user choice
    int choice = sc.nextInt();

    // Process user choice using switch statement
    switch (choice) {
        case 1:
            // Add a new student
            user.addStudent();
            break;
        case 2:
            // Display all student details
            System.out.println("Student Details:");
            user.display();
            break;
        case 3:
            // Search for a student by PRN
            System.out.println("Enter PRN to search:");
            int prn = sc.nextInt();
            int index = user.searchByPrn(prn);
            if (index != -1) {
                System.out.println("Student found at index " + index);
```

```
                }
                else {
                    System.out.println("Student not found.");
                }
                break;
            case 4:
                // Update student name by PRN
                System.out.println("Enter PRN to update details:");
                int prn1 = sc.nextInt();
                user.updateName(prn1);
                user.display();
                break;
            case 5:
                // Delete a student by PRN
                System.out.println("Enter PRN to delete:");
                int prn2 = sc.nextInt();
                user.deleteStudent(prn2);
                user.display();
                break;
            case 6:
                // Exit the program
                System.out.println("Exiting program. Goodbye!");
                System.exit(0);
            default:
                // Handle invalid choice
                System.out.println("Invalid choice. Please try again.");
        }
    }
  }
}

// Student.java
```

```
package Assignment_3;

public class Student {
    // Private fields to store student information
    private int prn; // PRN
    private String name; // Name of the student
    private String dob; // Date of birth of the student
    private float marks; // Marks obtained by the student

    // Constructor to initialize the Student object
    Student(int prn, String name, String dob, float marks) {
        this.prn = prn;
        this.name = name;
        this.dob = dob;
        this.marks = marks;
    }

    // Setter method to set the PRN
    public void setPrn(int prn) {
        this.prn = prn;
    }

    // Getter method to get the PRN
    public int getPrn() {
        return prn;
    }

    // Setter method to set the name
    public void setName(String name) {
        this.name = name;
    }
```

```
    // Getter method to get the name
    public String getName() {
        return name;
    }

    // Setter method to set the date of birth
    public void setDob(String dob) {
        this.dob = dob;
    }

    // Getter method to get the date of birth
    public String getDob() {
        return dob;
    }

    // Setter method to set the marks
    public void setMarks(float marks) {
        this.marks = marks;
    }

    // Getter method to get the marks
    public float getMarks() {
        return marks;
    }
}

//UserInput.java
package Assignment_3;

import java.util.ArrayList;
import java.util.Scanner;
```

```
public class UserInput {
    // ArrayList to store Student objects
    ArrayList<Student> student = new ArrayList<Student>();

    // Method to add students to the ArrayList
    public void addStudent() {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter number of students: ");
        int n = sc.nextInt();
        sc.nextLine();
        for (int i = 0; i < n; i++) {
            System.out.println("Enter details of student " + (i + 1) + ": ");
            String input = sc.nextLine();
            String[] details = input.split(" ");
            if (details.length >= 4) {
                // Extracting details from input and creating Student object
                int prn = Integer.parseInt(details[0]);
                String name = details[1];
                String dob = details[2];
                float marks = Float.parseFloat(details[3]);

                // Creating Student object and adding it to the ArrayList
                Student s = new Student(prn, name, dob, marks);
                student.add(s);
            } else {
                // Error message for invalid input format
                System.out.println("Invalid input format. Please enter details in the format: PRN Name
DOB Marks");
                i--; // Decrementing the loop counter to re-enter the details
            }
        }
    }
```

```
    // Method to display details of all students
    public void display(){
        for(int i = 0; i < student.size(); i++){
            System.out.println(student.get(i).getPrn() + " " + student.get(i).getName() + " " +
student.get(i).getDob() + " " + student.get(i).getMarks());
        }
    }

    // Method to search for a student by PRN
    public int searchByPrn(int prn){
        int index = -1;
        for(int i = 0; i < student.size(); i++){
            if(student.get(i).getPrn() == prn){
                index = i;
                break;
            }
        }
        return index;
    }

    // Method to update the name of a student by PRN
    public void updateName(int prn){
        int index = searchByPrn(prn);
        if(index != -1){
            Scanner sc = new Scanner(System.in);
            System.out.println("Enter new name: ");
            String name = sc.nextLine();
            student.get(index).setName(name);
            System.out.println("Name updated successfully");
        }
        else {
            System.out.println("Student not found");
        }
```

```
    }

    // Method to delete a student by PRN
    public void deleteStudent(int prn){
        int index = searchByPrn(prn);
        if(index != -1){
            student.remove(index);
            System.out.println("Student deleted successfully");
        }
        else {
            System.out.println("Student not found");
        }
    }
}
```

Checkout and follow my github repository for more updates:

https://github.com/sahilgoyal7214/programming-in-java/tree/main/Assignment_3