***Java Assignment 3***

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**AIML-B2**

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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

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package Assign3;

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 Assign3;

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 Assign3;

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/vaibhav7766/PIJ/tree/main/Assign3>