

Write a Java program to create a class called "Student" with a name, grade, and courses attributes, and methods to add and remove courses.

Sample Solution:

Java Code:

```
// Student.java
// Import the ArrayList class from the Java Collections Framework
import java.util.ArrayList;

// Define the Student class
public class Student {

    // Declare a private variable to store the name of the student
    private String name;

    // Declare a private variable to store the grade of the student
    private int grade;

    // Declare a private ArrayList to store the courses of the student
    private ArrayList courses;

    // Constructor for the Student class
    public Student(String name, int grade) {
        // Initialize the name of the student
        this.name = name;

        // Initialize the grade of the student
        this.grade = grade;

        // Initialize the courses ArrayList
        this.courses = new ArrayList();
    }

    // Method to get the name of the student
    public String getName() {
        // Return the name of the student
        return name;
    }
}
```

```

// Method to get the grade of the student
public int getGrade() {
    // Return the grade of the student
    return grade;
}

// Method to get the courses of the student
public ArrayList getCourses() {
    // Return the courses ArrayList
    return courses;
}

// Method to add a course to the student's course list
public void addCourse(String course) {
    // Add the given course to the courses ArrayList
    courses.add(course);
}

// Method to remove a course from the student's course list
public void removeCourse(String course) {
    // Remove the given course from the courses ArrayList
    courses.remove(course);
}

// Method to print the details of the student
public void printStudentDetails() {
    // Print the name of the student
    System.out.println("Name: " + name);

    // Print the grade of the student
    System.out.println("Grade: " + grade);
}
}

```

The above code defines the methods for the Student class. The methods are: getGrade(), getCourses(), addCourse(), removeCourse(), and printStudentDetails(). The getGrade() method returns the grade of the student. The getCourses() method returns the ArrayList of courses. The addCourse() method adds a new course to the student's course list. The removeCourse() method removes a course from the student's course list. The printStudentDetails() method prints the name and grade of the student.

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```
// Main.java

// Define the Main class
public class Main {

    // Main method, the entry point of the Java application
    public static void main(String[] args) {

        // Create a new Student object named student1 with name "Carolus Vitali"
        Student student1 = new Student("Carolus Vitali", 11);

        // Create a new Student object named student2 with name "Nakeisha Uhuru"
        Student student2 = new Student("Nakeisha Uhuru", 10);

        // Create a new Student object named student3 with name "Gabriella Cherice"
        Student student3 = new Student("Gabriella Cherice", 10);

        // Print a header for student details
        System.out.println("Student Details:");

        // Print the details of student1
        student1.printStudentDetails();

        // Print the details of student2
        student2.printStudentDetails();

        // Print the details of student3
        student3.printStudentDetails();

        // Print a message indicating courses are being added for student1
        System.out.println("Adding courses for " + student1.getName());

        // Add the course "Math" to student1's courses
        student1.addCourse("Math");

        // Add the course "Science" to student1's courses
        student1.addCourse("Science");

        // Add the course "English" to student1's courses
        student1.addCourse("English");
```

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// Print student1's name and their list of courses
System.out.println(student1.getName() + "'s courses: " + student1.getCourses());

// Print a message indicating courses are being added for student2
System.out.println("\nAdding courses for " + student2.getName());

// Add the course "History" to student2's courses
student2.addCourse("History");

// Add the course "Geography" to student2's courses
student2.addCourse("Geography");

// Add the course "English" to student2's courses
student2.addCourse("English");

// Print student2's name and their list of courses
System.out.println(student2.getName() + "'s courses: " + student2.getCourses());

// Print a message indicating the course "Science" is being removed for student1
System.out.println("\nRemoving 'Science' course for " + student1.getName());

// Remove the course "Science" from student1's courses
student1.removeCourse("Science");

// Print student1's name and their updated list of courses
System.out.println(student1.getName() + "'s courses: " + student1.getCourses());
}
}

```

The above Main class creates three instances of the Student class, adds courses to their courses list using the “addCourse()” method, and prints out the list of courses for each student using the “getCourses()” method. It then removes a course for student1 using the ‘removeCourse()’ method, and prints out the updated list of courses for student1.

Sample Output:

```

Student Details:
Name: Carolus Vitali
Grade: 11
Name: Nakeisha Uhuru
Grade: 10

```

Name: Gabriella Cherice

Grade: 10

Adding courses for Carolus Vitali

Carolus Vitali's courses: [Math, Science, English]

Adding courses for Nakeisha Uhuru

Nakeisha Uhuru's courses: [History, Geography, English]

Removing 'Science' course for Carolus Vitali

Carolus Vitali's courses: [Math, English]

Flowchart: