**Programming Assignment Unit 3**

University of the People

CS 1102-01: Programming 1 AY2025-T2

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# Programming Assignment Unit 3

## Problem Statement

Create a robust Student Record Management System in Java to empower administrators with efficient tools for handling student records. This system should encompass functionalities such as adding new students, updating student information, and viewing student details.

**Requirements:**

**Student Data Storage:**

Use individual variables to store student information such as name, ID, age, and grade.

**Student Management:**

Develop a set of logically separated methods/functions within a dedicated classless structure, employing static variables for storing the total number of students and the student list.

**Administrator Interface:**

Display a menu with options to add a new student, update student information, and view student details.

Prompt the administrator for necessary inputs and perform the requested operations using the StudentManagement logic.

**Error Handling:**

Implement error handling to manage cases where the student ID is not found or invalid inputs are provided.

**Documentation:**

Provide comprehensive documentation.

Include instructions for running the program and interacting with the administrator interface.

Remember to use appropriate variable names and follow coding best practices.

**Abstract**

The "Efficient Student Record Management System in Java" presents a robust solution to manage student records effectively. This system provides the user options to add new students, update existing student details, and view student information with ease.

The system comprises of two main classes: `Student` and `StudentManagement`. The `Student` class encapsulates individual student information, including name, ID, age, and grade, while the `StudentManagement` class provides methods to manage student-related operations.

Administrators interact with the system through a user-friendly interface displayed in the console. Upon launching the program, administrators are presented with a menu offering options to add new students, update student information, view student details, and exit the system. Error handling mechanisms are implemented to handle cases where invalid inputs are provided or student IDs are not found.

**Solution Code (VSCode Snapshot)**

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**Solution Code (VSCode Text)**

import java.util.Scanner;

// Student class to represent individual student objects

class Student {

private String name;

private int id;

private int age;

private String grade;

// Constructor to initialize student properties

public Student(String name, int id, int age, String grade) {

this.name = name;

this.id = id;

this.age = age;

this.grade = grade;

}

// Getters and setters for accessing and modifying student properties

public String getName() {

return name;

}

public void setName(String name) {

this.name = name;

}

public int getId() {

return id;

}

public void setId(int id) {

this.id = id;

}

public int getAge() {

return age;

}

public void setAge(int age) {

this.age = age;

}

public String getGrade() {

return grade;

}

public void setGrade(String grade) {

this.grade = grade;

}

}

// StudentManagement class to manage student-related operations

class StudentManagement {

private static int totalStudents = 0;

private static Student[] students = new Student[100]; // Assuming max 100 students

// Method to add a new student to the system

public static void addStudent(String name, int id, int age, String grade) {

Student student = new Student(name, id, age, grade);

students[totalStudents++] = student; // Add student to the array and increment totalStudents

System.out.println("Student added successfully!");

}

// Method to update information of an existing student

public static void updateStudent(int id, String newName, int newAge, String newGrade) {

for (int i = 0; i < totalStudents; i++) {

if (students[i].getId() == id) {

// Update student information if the ID matches

students[i].setName(newName);

students[i].setAge(newAge);

students[i].setGrade(newGrade);

System.out.println("Student information updated successfully!");

return;

}

}

// If student ID not found

System.out.println("Student ID not found!");

}

// Method to view details of a specific student

public static void viewStudentDetails(int id) {

for (int i = 0; i < totalStudents; i++) {

if (students[i].getId() == id) {

// Display student details if ID matches

System.out.println("Name: " + students[i].getName());

System.out.println("ID: " + students[i].getId());

System.out.println("Age: " + students[i].getAge());

System.out.println("Grade: " + students[i].getGrade());

return;

}

}

// If student ID not found

System.out.println("Student ID not found!");

}

}

// Main class to handle user interactions and execute the program

public class StudentRecordManagementSystem {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

int choice;

// Main menu loop to keep the program running until the user chooses to exit

do {

// Display menu options

System.out.println("\nStudent Record Management System");

System.out.println("1. Add New Student");

System.out.println("2. Update Student Information");

System.out.println("3. View Student Details");

System.out.println("4. Exit");

System.out.print("Enter your choice: ");

choice = scanner.nextInt();

switch (choice) {

case 1:

// Adding a new student

System.out.print("Enter student name: ");

String name = scanner.next();

System.out.print("Enter student ID: ");

int id = scanner.nextInt();

System.out.print("Enter student age: ");

int age = scanner.nextInt();

System.out.print("Enter student grade: ");

String grade = scanner.next();

StudentManagement.addStudent(name, id, age, grade);

break;

case 2:

// Updating student information

System.out.print("Enter student ID to update: ");

int updateId = scanner.nextInt();

System.out.print("Enter new name: ");

String newName = scanner.next();

System.out.print("Enter new age: ");

int newAge = scanner.nextInt();

System.out.print("Enter new grade: ");

String newGrade = scanner.next();

StudentManagement.updateStudent(updateId, newName, newAge, newGrade);

break;

case 3:

// Viewing student details

System.out.print("Enter student ID to view details: ");

int viewId = scanner.nextInt();

StudentManagement.viewStudentDetails(viewId);

break;

case 4:

// Exiting the program

System.out.println("Exiting...");

break;

default:

// Handling invalid choice

System.out.println("Invalid choice!");

}

} while (choice != 4); // Repeat until the user chooses to exit

scanner.close(); // Close the scanner to avoid resource leaks

}

}

**Documentation**

**Student Record Management System Documentation**

**Introduction**

The Student Record Management System is a Java-based application designed to empower administrators with efficient tools for handling student records. It allows administrators to add new students, update student information, and view student details through a user-friendly interface.

**Features**

* + Add new students: Enter student details such as name, ID, age, and grade to add them to the system.
  + Update student information: Modify the information of existing students by providing their ID and updated details.
  + View student details: Retrieve and display the details of a specific student based on their ID.
  + Error handling: Manage cases where the student ID is not found or invalid inputs are provided.

**Requirements**

* + Java Development Kit (JDK) installed on your system.

**Installation and Setup**

* 1. Download the Java files (`Student.java`, `StudentManagement.java`, and `StudentRecordManagementSystem.java`) from the provided source.
  2. Compile the Java files using the following command: *javac \*.java*
  3. Run the compiled program by executing the `StudentRecordManagementSystem` class: *java StudentRecordManagementSystem*

**Administrator Interface**

Upon running the program, you will be presented with the following menu options:

* 1. *Add New Student*: Add a new student to the system by entering their name, ID, age, and grade.
  2. *Update Student Information*: Update the information of an existing student by providing their ID and updated details.
  3. *View Student Details*: Retrieve and display the details of a specific student by entering their ID.
  4. *Exit*: Exit the program.

**Interacting with the Interface**

* + *Add New Student*: Enter the student's name, ID, age, and grade as prompted.
  + *Update Student Information*:
    - Enter the ID of the student whose information you want to update.
    - Provide the updated name, age, and grade.
  + *View Student Details*: Enter the ID of the student whose details you want to view.
  + *Exit*: Choose this option to exit the program.

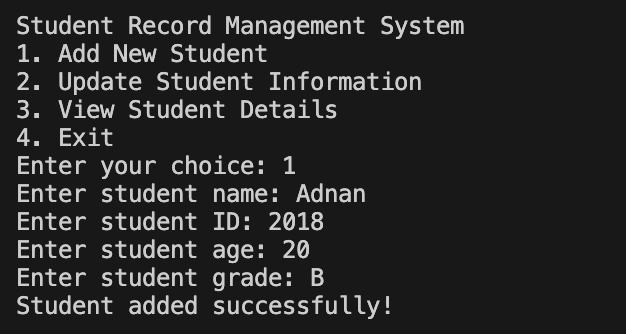
**Error Handling**

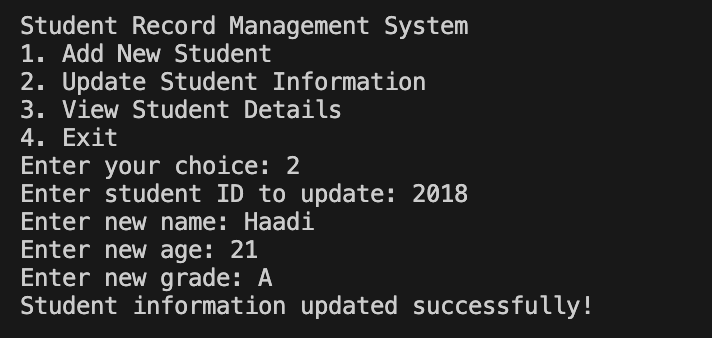
* + If the provided student ID is not found when updating or viewing student details, an error message will be displayed.
  + Invalid inputs (e.g., non-numeric ID, negative age) will be detected and appropriate error messages will be shown.

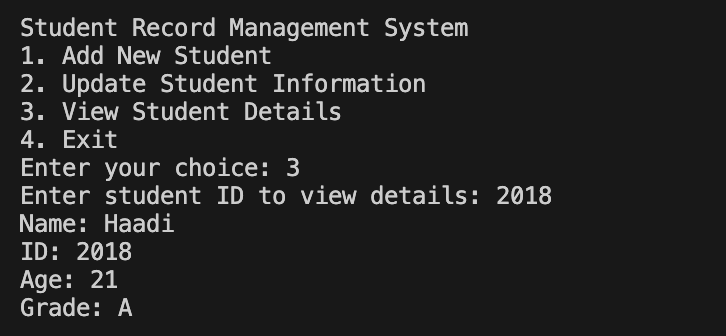
**Conclusion**

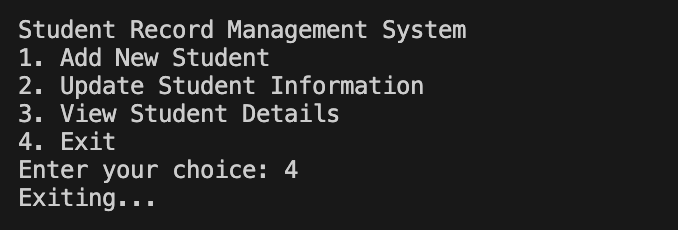
The Student Record Management System provides administrators with a robust toolset for efficiently managing student records. With its user-friendly interface and error handling capabilities, it streamlines the process of adding, updating, and viewing student information.

**Outputs**

1. Adding a record:

2. Updating a record:

3. Viewing a record:

4. Exiting

**References**

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