STUDENT DATABASE MANAGEMENT SYSTEM

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Problem Description

Often teachers struggle to keep track of a students' yearly report as it is messy and difficult to do. Keeping track of continuously changing conditions like calculating averages, and total is a tedious part of a teachers' already jampacked schedule. Without a structured and actively updating system, retrieving individual student records, determining grades and identifying toppers becomes a difficult task. Therefore, the Student Performance Management System (SPMS) is a solution to the problem teachers' face. SPMS is a console-based program that actively calculates all the tedious and repeatable calculations with every input. It uses global arrays to keep track of the records of each individual student. It also supports permanent memory as the records of students need to be saved permanently and accessed at the convenience of the user.

By ensuring accurate data handling, validation, and persistence through file storage, the SPMS enables instructors to maintain organized records and quickly evaluate students' academic progress

Features Implemented

1) Student Record Management System:
- Functionality to create individual student record with name, roll number etc.
- Ability to update a record in the system
- Ability to delete a record in the system

2) File Handling and Storing Data:
- Functionality of loading file for persistent data.
- Functionality for saving file for updated persistent data.

3) Performance Calculations:
- Calculates class highest, lowest, average.
- Calculates total and percentage
- Grade assignment on student performance
- Identifies class topper(s).

4) Reports and Display:
- Displays all students
- Displays average, highest, total, topper(s).

5) Additional enhancements:
- Sorts students by percentage (descending order)
- Subject wise statistics for individual coursework performance
  - Option to export report to a text file

Sample Input/Output Screenshots

File:

```
students.txt  ✕

9
Afnan Majeed
706
A
8 9 10
10 10
48 97
192 96 A
-
Fatima Junaid
618
A
5 10 2
10 10
50 100
187 93.5 A
-
Fakhar Abbas
836
A
2 4 5
10 10
49 100
180 90 A
-
Abdur Rafey
608
A
0 0 0
10 10
50 100
170 85 B
-
Hashim Khan Niazi
703
```

Input/output:

```
Enter your choice: 1
Enter student name: Testing
Enter student roll number: 5679
Enter section(A,B,C): B
Enter quiz 1 marks(0-10): 10
Enter quiz 2 marks(0-10): 10
Enter quiz 3 marks(0-10): 10
Enter assignment 1 marks(0-10): 10
Enter assignment 2 marks(0-10): 10
Enter midterm marks(0-50): 10
Enter final marks(0-100): 10
System | Successfully added student 0
1.Add New Student
2.Update Student
3.Delete Student
4.Search by roll number and display
5.Display Class Average
6.Display Class Highest
7.Display Class Lowest
8.Display topper(s)
9.Generate Subject Wise Statistics
10.Export Report To Text File
11. Display All Students

12.Exit

 Enter your choice: 11
Students sorted by percentage (highest to lowest).
-------------------------------------------------------------------------------
Name                  Roll   Sec  Q1  Q2  Q3  A1  A2  Mid  Final  Total  %      Grade
-------------------------------------------------------------------------------
Testing               5679   B    10  10  10  10  10  10   10     70     35.00  F
-------------------------------------------------------------------------------
```

Input/output:

```
 Enter your choice: 9
 System | Generating Subject Wise Statistics . . .
 Quiz 1:
     Highest: 10
     Lowest : 0
     Average: 4.88889

 Quiz 2:
     Highest: 10
     Lowest : 0
     Average: 6

 Quiz 3:
     Highest: 10
     Lowest : 0
     Average: 4.55556

 Assignment 1:
     Highest: 10
     Lowest : 1
     Average: 8.11111

 Assignment 2:
     Highest: 10
     Lowest : 1
     Average: 8.11111

 Midterm:
     Highest: 50
     Lowest : 1
     Average: 33.5556

 Final:
     Highest: 100
     Lowest : 1
     Average: 53.4444
```

Known Limitations

1) Data capacity limited to 100:
- The system can only handle 100 students.

2) Input Validation Lacking For Certain Cases
- If user enters an empty input for name or roll number, the program will crash. (Easy fix for this)
- If user enters a string longer than 49

3) Limited Updating Options
- The system makes the user change the entire fields of a student so its a bit tedious when user wants to updates only a single field
- The system does not update the roll number of a student. This limitation was set by me as I believe ID shouldn't change for a student. And for simplicity

4) File Handling is Basic:
- Anyone can access private records easily due to lack of encryption.
- No automatic formatting of file when in the case of corruption or manual edition.

5) Majority Calculations in Int:
- For simplicity, total, highest, lowest etc was calculated in int.

6) No Undo or Recovery Options:
- If user deletes a record on accident, there is no undo option.