C++ Programming

Week 9: Project - Student Report System

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Week 9: Agenda

- **Review Week 8 – Advanced Topics**
  - Initialization
  - Pointers and References
  - Read and Write files
  - Stack and Heap
- **New Topic: Project**

Write a program that manages student reports in a school. There should be 3 types of objects for this system:

o   **Students**:

•   student ID, name, age

•   courses taken, course grades, GPA

•   **Courses**:

o   course name, course ID, category, teacher, enrolled students, student grades

o   mean, min and max grades.

o   **Teachers**:

o   name, teacher ID, courses taught

1) Read "students.csv" with the following content and build a vector of Students.

#student id, name, age
100, John, 15
101, Ava, 16
102, Adam, 15
103, Brian, 17
104, Dan, 16
105, Cindy, 17
106, Jane, 16
107, Emma, 17
108, Susan, 17
109, Tom, 17
110, Luke, 17

2) Read "courses.csv" with the following content and build a vector of courses.

#course id, name, category
200, Math III, math
201, Pre-Calculus, math
202, Calculus A/B, math
211, C++ Programming, computer
212, Python Programming, computer
301, English I, ELA
302, English II, ELA
304, Writing I, ELA
305, Writing II, ELA
310, American History, history
311, World History, history

3) Read "teachers.csv" with the following content and build a vector of teachers and assign each course's teacher.

#teacher id, name, course id list
1001, Mr. Sal Khan, 200,
1002, Ms. Jean Porter, 201, 212
1003, Dr. Susan Grant, 202, 211
1004, Mr. James Joyce, 301, 304
1005, Ms. J.K. Rowling, 302, 305
1006, Mr. Jake Sullivan, 310, 311

4) Read "student_grades.csv" with the following content and assign student grades:

```
#student id, course id, grade
100, 200, 95
100, 212, 93
100, 301, 91
100, 304, 97
100, 310, 86
101, 200, 88
101, 212, 84
101, 301, 78
101, 304, 99
101, 310, 93
102, 200, 83
102, 212, 79
102, 301, 76
102, 304, 85
102, 310, 67
103, 200, 83
103, 212, 85
103, 301, 86
103, 304, 88
103, 310, 84
104, 200, 96
104, 212, 95
104, 301, 95
104, 304, 94
104, 310, 97
104, 201, 96
104, 211, 95
104, 302, 95
104, 305, 94
104, 311, 97
105, 201, 95
105, 211, 95
105, 302, 95
105, 305, 95
105, 311, 95
106, 201, 96
106, 211, 96
106, 302, 96
106, 305, 96
106, 311, 96
107, 201, 99
107, 211, 98
107, 302, 99
107, 304, 98
107, 305, 98
107, 311, 99
108, 202, 99
108, 211, 98
108, 212, 99
108, 302, 98
108, 304, 98
108, 311, 99
109, 202, 84
109, 211, 75
109, 212, 90
109, 302, 95
109, 304, 95
109, 311, 88
110, 202, 84
110, 211, 75
110, 212, 90
110, 302, 95
110, 304, 95
110, 311, 88
```

5) Create each student's report card that includes the following information:

student id, student name, age
course name, course category, teacher name, course grade
average grade in 100-scale
GPA in 4.0 scale (90~100 = 4, 80~89=3, 70~79=2, 60~69=1)

6) Create each course report card that includes the following information:

course id, course name, course category, teacher name,
number of students enrolled, min, max and mean of student grades

7) Create each teacher report card that includes the following information:

teacher id, teacher name
course id, course name, course category, mean of student grades of the course
total number of students enrolled among all courses by the teacher
average grade among all courses by the teacher