

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**

Week 9: Project - Student Report Management System

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

- **Students:**

- student ID, name, age
- courses taken, course grades, GPA

- **Courses:**

- course name, course ID, category, teacher, enrolled students, student grades
- mean, min and max grades.

- **Teachers:**

- 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
```

Week 9: Project - Student Report Management System

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

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

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