San José State University
Department of Computer Engineering

CMPE 180-92

Data Structures and Algorithms in C++

Fall 2016
Instructor: Ron Mak

Assignment #4B

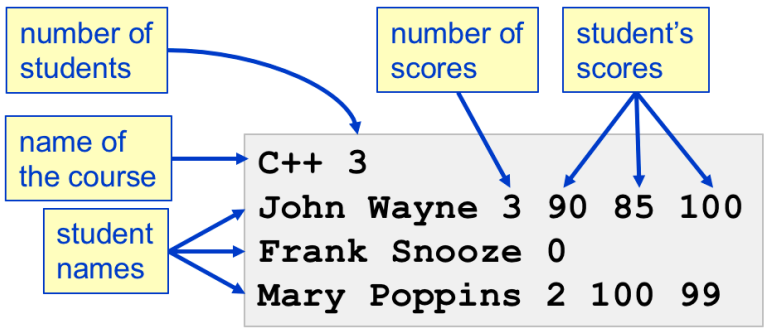
Assigned: Friday, September 16
Due: Friday, September 23 at 11:59 PM
URL: http://codecheck.it/codecheck/files/16091708133qzzdr5zkas8p3f0ib5zrzcwb
Canvas: Assignment 4.b. Student Scores
Points: 100

Student scores

This assignment will give you practice with dynamic arrays. You will first create a one-dimensional dynamic array of strings and a two-dimensional dynamic array of integers. Then you will access these arrays to print the data they contain.

Sample input file

Your program should read an input file **students.txt** that is similar in format to the following sample:



After the first line, the input file contains one line per student. Each student name is a first name and a last name only, and all the scores are integers. You may assume that there are no errors in the file; in particular, the number of students and the numbers of scores are all correct.

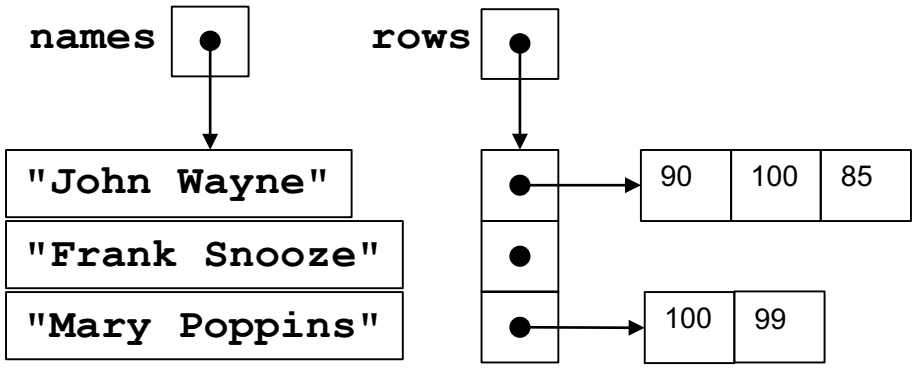
Download the complete input file **students.txt**:
http://www.cs.sjsu.edu/~mak/CMPE180-92/assignments/4B/students.txt
This file is already uploaded to CodeCheck.

Dynamic arrays

Create dynamic arrays to store the data from the input files:

- A one-dimensional string array to store the student names.
- A two-dimension integer array (a matrix) to store the student scores. One row of the matrix stores the scores for one student, and there should be a row for each student. If a student has no scores, then the corresponding row should be empty or nonexistent.

For this assignment, you must use dynamic arrays and not vectors. For the above sample input file, your arrays should be something like the following:



Remember that an array variable is a pointer to the first element of the array, and that a two-dimensional array is an array of one-dimensional arrays. Therefore, the student scores matrix is dynamic in the number of rows and in the number of scores per student. The matrix will be "ragged" since the rows will be different sizes.

You must delete your dynamic arrays before your program finishes executing.

Tip: How can you mark the ends of the dynamic arrays so that when your program prints their contents, it will know when to stop?

Expected output

The following shows the expected output format for the sample input file:

```
STUDENT SCORES for C++

John Wayne
   90   85  100

Frank Snooze
   (none)

Mary Poppins

  100   99
```

Your program must generate the output from the dynamic arrays, after it has read all the input data.

Program structure

You must decompose your program with functions. There should be at least the following two functions:

- One function to read the input file and build the dynamic arrays. It returns the arrays via reference parameters.
- Another function to print the output from the content of the dynamic arrays, which are passed to it as arguments.

You may have other helper functions. Your program should have no global variables. Use function parameters instead. Global constants are OK.

Rubrics

Criteria	Maximum points
Good program output (as determined by CodeCheck)	**20**
Dynamic arrays • Good creation and use of dynamic arrays. • Delete dynamic arrays.	**30** • Create and use: 25 • Delete: 5
Good program design • Function to build the dynamic arrays. • Function to print the contents of the dynamic arrays. • Good choice of names. • No global variables.	**40** • Build function: 10 • Print function: 10 • Names: 10 • No global variables: 10
Good program style • Follow the formatting (indentation, position of braces, etc.) and naming conventions of the Savitch textbook.	**10**

You can submit as many times as necessary to get satisfactory results, and the number of submissions will not affect your score. When you're done with your program, click the "Download" link at the very bottom of the Report screen to download a signed zip file of your solution.

Submit the signed zip file into **Canvas: Assignment 4.b. Student scores**.