

Choosing a University  
(*Absolutely no two-dimensional arrays may be used*)

**Purpose:**

Analyze and summarize the data collected on United States universities.

In this program you will write a C++ program to analyze a small subset of the data that has been collected. See file universities.txt .

Use precisely seven parallel arrays: one for name of university, one for state, one for city, one for yearly tuition, one for enrollment, one for average freshman retention, and one for the percent of students who graduate within six years. Note that the percentage of student accepted is not stored. An output file is opened in main() and remains open until the end of the execution.

**Input:**

Write a function to input the name of each university, the two-letter abbreviation for the state, the city, tuition, enrollment, average freshman retention rate, percent that graduate within six years.

Repeat until end of file. Assume a maximum of **1000** universities. Use getline(file, string name) to input text with spaces. You will find a very mischievous ‘\n’ character to deal with at the end of the six values. You will enjoy knowing about getline(file, tempstr); where tempstr has been declared as a string type.

**Output:** Write a separate function to output to the file all universities with name of university, state, tuition, enrollment, percentage retention for freshman, and percentage that have graduated after six years for each. **NOTE THAT THE CITY IS NOT OUTPUT.**

**Processing:**

- Call the output function to output **to a file** all data in the original order.
- Write a separate function to compute and return the average tuition for all universities. Do not output from this function but return the value and print it out **to the screen** from main().
- Write a function to ask the user for maximum he/she can pay for tuition. List **to the screen** the name only of all schools with that amount or less for tuition. Output is from within the function.

- Write a function to prompt the user for a two-letter abbreviation for a state. Output **to the file** from this function all information for colleges within that state or output message “No colleges in XX state in the list”.
- Write one and only one function to return the subscript of the university with the lowest tuition. There is no output in this function. Do not assume a sorted array. In main(), the name(s) of the university or universities with this low tuition and the amount of the tuition are output **to the screen**.
- Use a selection sort to sort universities by enrollment in ascending order. This is written as a separate function with no output.
- Write the sorted array **to the file**.

**THEME ISSUES:** one-dimensional arrays, if statements, file input, file output, searching, sorting

***Absolutely no two-dimensional arrays, no structures and no menu function.***

Sample output before sorting:

University	State	Tuition	Enrollment	%Fresh Succeed	%Gradeuate in six years
Princeton University	NJ	41820.00	8014	98.00%	97.00%
Harvard University	MA	43938.00	19882	97.00%	97.00%
Yale University	CT	45800.00	12109	99.00%	98.00%
Columbia University	NY	51008.00	23606	99.00%	96.00%
Stanford University	CA	44757.00	18136	98.00%	96.00%
University of Chicago	IL	48253.00	12539	99.00%	93.00%
Massachusetts Institute of Technology	MA	45016.00	11301	98.00%	93.00%
. . .					

**How should you do this? Follow these steps carefully!!!!!!**

STEP 1	Write main() and call <i>getData()</i> function which only opens file. Debug.
STEP 2	Complete <i>getdata()</i> . Debug.
STEP 3	Write output function. Output is directed <b>to the output file</b> and NOT the screen. Debug.
STEP 4	Write the function to compute the average of tuition at all schools. Output this value <b>to the screen from main()</b> . Debug.
STEP 5	Write a function that will output the name only of each university where the tuition is less than or equal to the given amount. Output <b>to the screen</b> .
STEP 6	Write a function to prompt the user for a two-letter abbreviation for a state. Output <b>to the file</b> from this function all information for colleges within that state or output message “No colleges in XX state in the list”. Debug.
STEP 7	Write one and only one function to return the subscript of the university with the lowest tuition. There is no output in this function. Do not assume a sorted array. In main(), the name(s) of the university or universities with this low tuition and the amount of the tuition are output <b>to the screen</b> .
STEP 8	Write a separate function using the selection sort to sort universities by enrollment in ascending order. Debug

<b>Checkpoints</b>	<b>Possible</b>
Documentation throughout to explain general outline of program. Minimum of three (3) comments in each function (Purpose: Pre: Post:) Include name, e-mail, and lab# as comment and printed to output	5
Function main() which implements each step outlined in the processing section of the lab write-up.	5
Input function fills array for names plus four numerical arrays. It should return the number of universities.	5
Output function	5
Function to compute the average of tuition at all schools	4
Function to output to screen universities where tuition is less than or equal to given amount.	4
Function to prompt the user for a two-letter abbreviation for a state. Output <b>to the file</b> from this function all information for colleges within that state or output message "No colleges in XX state in the list".	4
Write one and only one function to return the subscript of the university with the lowest tuition. There is no output in this function. Do not assume a sorted array. In main() the name(s) of the university or universities with this low tuition and the amount of the tuition are output <b>to the screen</b> .	4
Function using the selection sort to sort universities by enrollment in ascending order.	4
<b>Totals</b>	40