

# CS 100 Lab Nine – Spring 2016

**WARNING – Not properly submitting your files correctly will result in a penalty of 20 points.**

Create a directory called **lab9** on your machine. Move into that directory. Complete the four tasks shown below.

1. Name this program **create.c** – Retrieve the data file **Data1** from **troll.cs.ua.edu/cs100/labs**. This file contains one million random numbers in the range of 1 to 1000. Write a simple program that reads, from the command line, the number of rows the number of columns for a two-dimensional array of integers. You program should dynamically allocate a two-dimensional array of integers and read these values into it. You can assume that the number of rows times the number of columns (total elements in the array) will never be more than one million. After reading these values, print the size of the array and the sum of all elements in the array.

**./a.out 1000 1000**

**Array size = 1000 rows and 1000 columns, the sum of all elements in the array is 500562283**

**./a.out 500 2000**

**Array size = 500 rows and 2000 columns, the sum of all elements in the array is 500562283**

**./a.out 1 1000000**

**Array size = 1 rows and 1000000 columns, the sum of all elements in the array is 500562283**

**./a.out 4 250000**

**Array size = 4 rows and 250000 columns, the sum of all elements in the array is 500562283**

2. Name this program **find.c** – Retrieve the data file **Data2** from **troll.cs.ua.edu/cs100/labs**. This file contains one million random numbers in the range of 1 to 100,000. Modify your **create.c** program from above so that it allocates the array, reads data into the array, and then prompts the user for a number to find. The program should print all locations in the array where the number is found.

**./a.out 500 2000**

**Enter a number to find : 1959**

**found at row 13 column 111**

**found at row 74 column 578**

**found at row 96 column 1599**

**found at row 119 column 89**

**found at row 189 column 169**

**found at row 457 column 622**

**found at row 493 column 135**

**./a.out 1000 1000**

**Enter a number to find : 2016**

**found at row 248 column 458**

**found at row 459 column 589**

**found at row 459 column 849**

**found at row 478 column 490**

**found at row 486 column 839**

**found at row 547 column 870**

**found at row 574 column 646**

**found at row 748 column 852**

**found at row 803 column 99**

3. Name this program **sum1.c** – Using the **Data1** file, write a program that allocates an array of rows and columns based on what the user specifies as command line arguments. It should then compute and print the sum of the first elements on each row of the array (all the element at location zero on each row of the array).

**./a.out 1000 1000**

**The sum of the first number on each row is 495461**

**./a.out 1000000 1**

**The sum of the first number on each row is 500562283**

**./a.out 1 1000000**

**The sum of the first number on each row is 384**

4. Name this program **sum2.c** – Using the **Data2** file, write a program that allocates an array of rows and columns based on what the user specifies as command line arguments. It should then compute and print the sum of all the elements on the very last row of the array.

**./a.out 1000 1000**

**The sum of the numbers on the last row is 48848451**

**./a.out 2000 500**

**The sum of the numbers on the last row is 24574952**

**./a.out 250000 4**

**The sum of the numbers on the last row is 148908**

## Submit your lab

First, on your local machine, bundle the files in your **lab9** directory into a single (compressed) file.

**Once you have a zip file that contains your four lab9 programs, submit that file to Blackboard.**