CS1580 - Introduction to Programming Lab (FS2024)
Lab 8

Lab Objectives

In this lab, you will be implementing the following topics:

- Arrays
- Function Documentation

Lab Task: Count the occurrences

In this assignment, you will build a program that count the occurrences of each element in the given array.

Implement the assignment in multiple files:

1. **main.cpp** – your main function
2. **functions.cpp** – all your functions implementation
3. **header.h** – function definitions

Implement the following functions:

- **int maxElement(int elements[], int size)**
  - Takes in the array of integers and the size of the array.
  - Returns maximum element in the array.

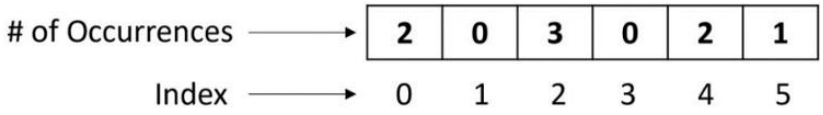
- **void occurrences(int elements[], int size, int max)**
  - Takes in the array of integers `elements`, the size of that array, and the maximum element in the array.
  - Prints the occurrence of each element in the array.

In the main.cpp,

1. Declare an array **"`elements`"** of size 8.
2. Populate the array using user inputs.
3. Find the maximum element in the array using **maxElement()**.
4. Call **occurences()** with appropriate parameters.
   a. Create another array **"`result`"** of size max.
   b. Populate array `result` with occurrences of each element based on index.
   c. Example: If `elements` = [5, 4, 2, 0, 0, 2, 2, 4].

      The max element is 5. Declare array `result` of size 5
      `int* result = new int[maxElement + 1]`

      The value 0 occurs two times, the value 2 occurs three times, the value four occurs twice, the value 5 occurs once, and the values 1 and 3 never occur.



   d. Print the occurrences.

Function Documentation (in your functions.cpp)

```
//Description: a short description about the function
//Pre: what are parameters and their data types
//Post: what is the function returning and its type
void your_function(){

}
```

Sample Input/Output

Input 1: 5, 4, 2, 0, 0, 2, 2, 4
Output 1: 2, 0, 3, 0, 2, 1

Input 2: 6, 3, 2, 9, 0, 0, 1, 2
Output 2: 2, 1, 2, 1, 0, 0, 1, 0, 0, 1

Gitlab Cloning Instructions

- Open the browser and go to https://git-classes.mst.edu/. Click on the Lab7 repository named *2024-FS-303-lab8-<your_username>*
- Click on 'Clone' button and copy the HTTPS link.
- Open Putty and
    - Change the directory to SDRIVE: `cd SDRIVE`
    - Clone the repository: `git clone <copy_the_HTTPS_link_here>`
    - Change the directory to cloned repository: `cd 2024-FS-303-lab8<your_username>`
- Start coding by opening a new file in nano: `nano main.cpp` and `nano functions.cpp`

Compiling Instructions

- To run your code, `fg++ *.cpp`
- To get the output, `./a.out`

Submission Instructions

Push your code to your gitlab account.

- Add all your files to the repository, `git add .`
- Commit your changes, `git commit -m "<your_message_goes_here>"`
- Push the changes, `git push`