CS 115 Exam 2 Review Quiz

Oct. 28, 2009

Rules

• You must briefly explain your answers to receive partial credit.
• When a snippet of code is given to you, you can assume
  o that the code is enclosed within some function, even if no function
    definition is shown
  o that the main function is properly defined
  o that the iostream, algorithm, fstream, iomanip, string, and
    cmath libraries have been included at the beginning of the program.
• When you are asked to write a snippet of code, you may assume
  o that your code is enclosed within some function
  o that any necessary libraries have been included.
• When you are asked to write a complete program, you must write the
  #include statements, the int main(), etc. in your solution to receive full
  credit.
• A line consisting solely of “…” represents one or more unspecified C++
  statements, some of which may change the values of program variables.
• You are encouraged to use the backs of these pages for scratch paper. If you
  want answers written there to be graded, they must be very clearly labeled
  and also noted on the main test, e.g. “See the back of page 1 for 3a.”
**Problem 1: 25 points.**

(a) What does this snippet of code print?
```cpp
for (int i = 1; i < 3; i++) {
    for (int j = 1; j <= 2; j++) {
        cout << i+j << " ";
    }
    cout << endl;
}
```

(b) What does this snippet of code print?
```cpp
int a[6] = {5, 8, 7, 9, 13, -1};
cout << a[4] << endl;
```

(c) If the following function is defined somewhere in the program and prototyped above main....
```cpp
int square(int & x) {
    return x*x;
}
```

...what does the following code print?
```cpp
int x = 5;
int y = square(x);
cout << x << endl;
cout << y << endl;
```
(d) For the snippet of code...

```c
float f[50];
```

...what is the datatype of `f[15]`?

(e) If the following function is defined somewhere in the program and prototyped above main....

```c
int my_function (int x, float array[]) {
    array[1] = 2.5;
    return x*2;
}
```

...what does the following code print?

```c
int x = 5;
float a[3] = {0.2, 0.4, 0.6};
int y = my_function(x, a);
cout << x << endl;
cout << y << endl;
cout << a[1] << endl;
cout << a[2] << endl;
```
Problem 2: 25 points.

The snippets of code in this problem do not successfully accomplish the task described in their accompanying comment. Correct the code so that it performs the task described in the comment. The code may have more than one error. Make your corrections clear and unambiguous.

(a) /* Function that finds and returns the smallest element of an integer array. Inputs are the array and its size */
int FindMin(int[] array, int size) {
    int min = 0;
    for (int i=0; i <= size; i++) {
        if (i < min) {
            min = array[i];
        }
    }
}

(b) Assume that the 2D array
int x[100][5]
has already been declared and defined.

/* Prints out all the elements of the 2D array X */
for (int i=0; i<=5; i++) {
    cout X[i][j];
}
int InitArray(int[] arr, int init_value, int size) {
    for (int i=0; i<= size; i+1) {
        cout << init_value;
    }
    cout << init_value;
}
Problem 3: 25 points.

Write short snippets of code to accomplish the following tasks:

(a) For an array that has been declared as

    ```c
    float floatArr[5][8];
    ```

    write a snippet of code that computes and prints the average of all the elements in the entire array.

(b) Write a snippet of code that repeatedly asks for the user’s input as a character. If the user’s input is ‘u’, your code should call the function `Update()`, which has no inputs. If the user’s input is ‘p’, your code should call the function `Print()`, which has no inputs. If the user’s input is ‘q’, you should print a goodbye message and stop printing the menu. If the input is anything else, you should print an error message and reprint the menu.
(c) Write a function called `GetLargestOdd` with the following properties:

a. Parameters:
   i. a, an array of integers
   ii. N, an integer (the size of the array)

b. Return value: an int

c. Description:
   i. Goes through the array in sequence, from the first element to
      the last
   ii. Returns the largest *odd* element of the array, ignoring elements
      that are even numbers
   iii. If the array doesn’t have any odd elements, returns 0
Problem 4: 25 points.

For this problem, you must write a complete program that contains the following:

- A function, defined below the main function, called GetIntegers with the following properties:
  - Parameters:
    - inputArr, an array of integers
    - N, an integer (the size of the array)
  - Return value: a bool
  - Description:
    - Prompts the user to enter 1000 integers.
    - Prompts for each integer individually
    - Returns false immediately if the user enters an invalid integer
    - Returns true if all of the integers were filled in correctly

- Prototype for GetIntegers

- A function, defined below the main function, called AllEqual with the following properties:
  - Parameters:
    - inputArr, an array of integers
    - N, an integer (the size of the array)
  - Return value: The function should return a bool whose value is true if all of the elements of the array are equal and false otherwise.

- Prototype for AllEqual

- A main function that does the following:
  - Declares an array of 1000 integers
  - Calls GetIntegers to initialize the array
  - If the user entered an invalid integer, prints an error message and exits
  - Otherwise, calls AllEqual. Based on the result of AllEqual, prints “All elements = [num]” if all of the elements are equal, where [num] is the number that they are all equal to.