

## CS 115 Midterm 2 Exam Review Quiz

April 7, 2009

### Rules

- You must briefly explain your answers to receive partial credit.
- When a snippet of code is given to you, you can assume that the code is enclosed within some function, even if no function definition is shown. You can also assume that the `main` function is properly defined and that the `iostream`, `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 also assume that it is enclosed within some function 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: 15 points.

What is the output of each of the following snippets of code?

(a)

```
for (int i = 1; i <= 3; i++) {
    for (int j = 1; j <= 2; j++) {
        cout << i+j << " ";
    }
    cout << endl;
}
```

(b)

```
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....

```
int square(int& x) {
    return x*x;
}
```

...what does the following code print?

```
int x = 5;
int y = square(x);
cout << x << endl;
cout << y << endl;
```

**Problem 2: 10 points.**

(a) For the snippet of code...

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

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

(b) Assume that the following declaration appears above the main program:

```
struct team_record {  
    string team_name;  
    float total_score;  
    float num_wins;  
};
```

For the snippet of code...

```
team_record teams[2];
```

...what is the datatype of `teams`?

### Problem 3: 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) For this problem, you may assume that the struct `team_record` from Problem 2b has been declared above the main program.

```
/* Update a team's record after a new game.
The team's score in the new game is in the variable
score, and the team's win-loss record for that game is
in the variable points */
team_record my_team;
float points, score;
...
my_team[total_score] += score;
my_team[num_wins] = points;
```

(c)

```
/* Function sets every element of the array arr to
init_value. Size = size of the array. */

int InitArray(int[] arr, int init_value, int size) {
    for (int i=0; i<= size; i+1) {
        cout << init_value;
    }
}
```

**Problem 4: 25 points.**

Write short snippets of code to accomplish the following tasks:

(a) For an array that has been declared as

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

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

(b) For this problem, you may assume that the `struct team_record` from Problem 2b has been declared above the main program. Write a snippet of code that declares an `team_record` array of size 50 and initializes the scores and point totals to zero for each element of the array.

(c) 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.

### Problem 5: 25 points.

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

- The definition of a `struct` called `MenuItem` that has two fields. You should decide the appropriate data types for these fields:
  - `itemName`, the name of a menu item
  - `price`, its price in dollars
- A function called `ComputeAvg` that computes the average price of an array of `MenuItem`. Its return value is the average price, as a float. Its inputs are:
  - `inputArr`, an array of `MenuItem`
  - `size`, the size of the array
- Prototype for `ComputeAvg`
- A `main` function that does the following:
  - Declares **an array** of 3 `MenuItem` variables
  - Initializes the menu items as follows:
    - The first item is `coffee`, for 1.25
    - The second item is `bagel`, for 2.25
    - The third item is `smoothie`, for 3.75
  - Calls `ComputeAvg` to compute the average price of an item in the menu
  - Prints the average price computed by `ComputeAvg`.