

CS 53 – Introduction to Programming

Homework Assignment #6

Instructions:

- (1) This assignment is **due by 10 a.m. on Monday, November 22, 2004**. Late assignments will not be accepted.
- (2) You must submit your solution through the *Digital Drop Box* on the Blackboard web site (blackboard.umr.edu). Directions for doing this are given at the end of this document.
- (3) This assignment will be worth 5% of your course grade.

For this assignment you are to make some modifications to the HW #5 program. You may either modify your own HW #5 program, or you may download the HW #5 solution that is posted on the Blackboard web site and modify it.

Here are the modifications that you are to make:

1. Initially read in the monster information into your array from an input data file called `monsters.txt` (a sample of that file is available for download from the Blackboard web site). Note that this file is structured as a “header” file; the first line in the file tells you how many monsters need to be processed. You may assume this will be an integer between 0 and 10 (inclusive). Information for each monster is then contained over 3 lines: the 1st line contains the monster’s name, the 2nd line contains the monster’s weapons, and the 3rd line contains the monster’s health rating.
2. After reading in the monster information, display a menu that lets the user choose between the following: (1) print a neatly formatted list of monsters sorted in ascending order by name, (2) print a neatly formatted list of monsters sorted in descending order by health rating, (3) create an output file called `monsters.out` that contains a neatly formatted list of the monsters (in any order), (4) prompt the user to enter a monster’s name and then list all info about the monster (if he exists in the array), or (5) exit the program. Allow the user to continue making selections from the menu until they choose to exit the program.

To make sure that you meet the objectives of this assignment, **your program MUST satisfy the following requirements:**

- Include program “header” comments (e.g., author name, date, description of the program, etc.)
- Comment every function in terms of what it does, what its input parameters are, and what it returns (either through its return type or via pass-by-reference parameters).
- Appropriately “modularize” your program into functions. No function (including `main`) should be more than about 20 lines for this program!

- Do not use any global variables!!!
- Pass parameters appropriately for how they are being used in a function (this includes the use of *const* in the parameter declaration).
- Include at least one function where you pass the monsterInfo array by reference (i.e., no **&** and no **const**).
- Include at least one function where you pass the monsterInfo array by value (i.e., **const**).
- Pass the input and output file stream variables as needed to the various functions. Do NOT declare them as global variables!!!
- You must write at least 12 functions (not including *main*) for this project, each of which does something meaningful in the program.

There is no “starter” program posted on the Blackboard web site for this assignment. However, given below is a suggestion for your *main* function as well as suggested declarations for functions to write for this program:

```
// Function declarations
void openInputDataFile(ifstream& inStream);
void openOutputDataFile(ofstream& outStream);
string getName(ifstream& infile);
string getWeapons(ifstream& infile);
monsterInfo getMonster(ifstream& infile);
void getListOfMonsters(monsterInfo m[ ], int& numMonsters);
void printColumnHeadings(ostream& outStream);
void printOneMonster(const monsterInfo m, ostream& outStream);
void printListOfMonsters(const monsterInfo m[ ], const int numMonsters,
                        const string title, ostream& outStream);
void sortByHealthRating(monsterInfo m[ ], const int numMonsters);
int findHighestRating(const monsterInfo m[ ], const int numMonsters, const int start);
void sortByName(monsterInfo m[ ], const int numMonsters);
int findLowestName(const monsterInfo m[ ], const int numMonsters, const int start);
int findMonster(const monsterInfo monsters[ ], const int numMonsters);
void displayMenu();
void processUserRequestsFromMenu(monsterInfo monsters[ ], const int numMonsters);

int main() {
    monsterInfo monsters[MAX_MONSTERS];
    int count;

    getListOfMonsters(monsters, count);
    processUserRequestsFromMenu(monsters, count);

    return(0);
}
```

Directions for Submitting Your Assignment for Grading

For this assignment, you are to submit your program using the *Digital Drop Box* on the Blackboard web site as follows:

- (1) Name your program ***hw6.cpp***

- (2) Compile and run your program using the GNU (g++) compiler.
- (3) Thoroughly test your program on your own.
- (4) Login to the CS 53 Blackboard web site (blackboard.umr.edu).
- (5) Select *Tools*.
- (6) Select *Digital Drop Box*.
- (7) Click on *Send File*.
- (8) For *Title*: enter **CS 53 – HW #6**
- (9) For *File*: use the *Browse* dialog to select your **hw6.cpp** file from your computer.
- (10) Click on *Submit*.
- (11) On the next page that appears (which should say *Receipt: Success*), click on *OK*.

If you have problems, contact your instructor (leopoldj@umr.edu) or the TA (Rong Zhuge, rzwr6@umr.edu).

You may submit your program any time before the due date, but please only submit it once. Do **NOT** wait until the last minute to submit your work in case you encounter problems!