

CSci 1113

Midterm 2

Name: _____

Student ID: _____

Instructions: Please pick and answer any 6 of the 7 problems for a total of 60 points. If you answer more than 6 problems, only the first 6 will be graded. The time limit is 50 minutes. Please write your answers in the space provided. The exam is open book and notes. You may use electronic devices to ONLY look at either an e-book version or electronic notes. You may not use the internet, compiler or any other outside resources. (If you are typing on your keyboard/input device for anything other than ctrl-F to find words in the e-book or notes, this is probably not acceptable.)

Problem (1) [10 points]

Write a function in C++ that takes a string and integer as an input, then returns the string repeated that many times (with spaces between).

Input: string="hi there", integer=3

Returned: "hi there hi there hi there"

Problem (2) [10 points]

Write a function in C++ that takes in three inputs: an integer array, the array size and an index. The function should return the next occurrence of the integer at the index passed into the function. If the element at the index does not occur again, you should return -1.

Example 1: Input = [1, 3, 5, 1, 6], size = 5, index = 0... return 3

Example 2: Input = [1, 3, 5, 1, 6], size = 5, index = 3... return -1

Problem (3) [10 points]

What is the output of this code: (Show work for full credit.)

```
string funkytown(string x) {
    if(x.length() <= 1) {
        return x;
    }
    string s = x.substr(0,x.length()/2);
    string e = x.substr(x.length()/2);
    return funkytown(e) + funkytown(s);
}

int main() {
    cout << funkytown("abcdefghijklmnopqrstuvwxyz");
}
```

Problem (4) [10 points]

Write C++ code to do the following. Assume there is a two dimensional square bool array called “fire” that is declared and initialized of size 100 by 100. Cout the number of cells with three or more true values adjacent to them (regardless of what value is inside the cell). Here “adjacent” means the index differs by only one (i.e. up, down, left or right, but not diagonal).

Array (size 4, not 100 for obvious reasons):

```
T F T F  
F T T T  
F T F T  
F F F F
```

Should cout: 3

Problem (5) [10 points]

Write C++ code that continually reads input from the keyboard until they enter the same word twice in a row. This code should also put all the words that were typed in (spaces between) into a file “words.txt”, include the repeated word twice at the end.

Input:

hi there hi bob hi hi

In ‘words.txt’:

hi there hi bob hi hi

Problem (6) [10 points]

Clearly indicate what “magic.txt” should contain so that the following code will cout the number one hundred. (Just three characters, not “0100” or something...)

```
int main() {
    ifstream in;
    in.open("magic.txt");
    int a=0, b=0, c=0, i=0;
    while(a >= b) {
        c=b;
        b=a;
        i++;
        in >> a;
    }
    int x=a;
    while(!in.eof()) {
        in >> x;
    }
    if(c == 0 && b == 2) {
        cout << "100" << endl;
    }
    else if (x > i) {
        cout << a << i << endl;
    }
    else if (b != c && a > c) {
        cout << c << x << endl;
    }
    else {
        cout << i << x << endl;
    }
}
```

Problem (7) [10 points]

Find 3 errors in the code below. Assume that the code is completely shown except for #includes and “using namespace std”. For each error, identify whether it is a runtime error, syntax error or logic error. You must also precisely describe why you think the part of code you identify is an error.

```
void backwards(string & word, int i) {
    if(i == word.length()) {
        i == 0;
        return;
    }
    char c = word[i];
    i++;
    backwards(word, i);
    word[i] = c;
    i++;
    return;
}

int main() {
    int start = 0;
    cout << backwards("something", start);
    // "not doing backwards" not valid "error"
}
```