Sample Exam 2

CSI 201: Computer Science 1
Fall 2016
Professors: Shaun Ramsey and Kyle Wilson

Question	Points	Score
1	12	
2	28	
3	15	
4	15	
Total:	70	

I understand that this exam is closed book and closed note and is to be completed without a calculator, phone, or other computer. I am **NOT** allowed to use any external resources to complete this exam. All of the work that I am submitting for this exam is mine. I have completed this exam in accordance with the Washington College Honor Code.

Name: _____

Signature: _____

Section: _____

1. **Concepts.** Answer each question briefly.

    (a) $\boxed{\text{3 points}}$ Match the functions in the left column with their libraries in the right column.

time	cstdlib
tan	cmath
rand	ctime

    (b) $\boxed{\text{3 points}}$ What type does the following function return?
    ```
    int test1(double a, bool b, string c);
    ```

    (c) $\boxed{\text{3 points}}$ Does a dynamic array get allocated on the stack, or on the heap?

    (d) $\boxed{\text{3 points}}$ Explain the differences between static and dynamic arrays.

2. **Short Coding Questions.** Write a line or two of code to answer each question.

    (a) $\boxed{\text{3 points}}$ Show how to call function `test1` with parameters `9.9`, `"pi"`, and `false`. Be sure to put the parameters in the correct order. Here is `test1`'s prototype:
    ```
    int test1(double a, bool b, string c);
    ```

    (b) $\boxed{\text{3 points}}$ Show C++ code to find the square root of `3.3`.

(c) 3 points Declare a static array of seventeen strings named equipment.

(d) 3 points Give a single line of code to output the 12th element of an array called skills.

(e) 3 points Give a line of code to change the last element of an integer array to the value 0. The array is called bonus and the size variable is called N.

(f) 3 points Give a single line of code to declare a dynamic array called candies with a number of elements names n. You should assume that n was already declared and read in from the user.

(g) 5 points Give several lines of code that increase every element of an array by 10. You should assume that the array is called my_array and that the length of the array is stored in a variable named N.

(h) 5 points Write a for loop to print each element of an array to the console, except for the last two. You may assume that array has been declared and initialized elsewhere and is named pizzas, and that the size of the array is stored in an int named num_pizzas.

3. **Code Output.**

(a) ⟨3 points⟩ What is the console output of the following code snippet?
```
for (int k = 0; k < 4; k++) {
    cout << k / 2.0 << endl;
}
```

Output:

(b) ⟨3 points⟩ What value does the function call `jump(33, 27)` return?
```
int jump(int alpha, int beta) {
    int beta_max = alpha / 5;
    if (beta > beta_max) {
        beta_max = beta;
    }
    return beta_max;
}
```

(c) ⟨4 points⟩ Suppose that the function `f` is defined like this:
```
int f(int a){
    a += 1;
    return a;
}
```

What is the console output of this code snippet?
```
int i = 0;
f(i);
cout << i << endl;
```

Output:

(d) 5 points What is the console output of the following code?

```
#include <iostream>
#include <string>
using namespace std;

int pumpkin(string s);

int main() {
    int i = pumpkin("pumpkin");
    if (i == 0) {
        cout << " is great!" << endl;
    }
    else {
        cout << " is okay!" << endl;
    }
}

int pumpkin(string s) {
    if (s.length() > 5) {
        cout << "spice";
        return 1;
    }
    else {
        cout << s;
        return 0;
    }
}
```

Output:

4. ⎡15 points⎤ Write a function to compute the evaluation of the algorithm described below. Use good programming practice, and choose proper return types and parameter values.

   Also write a `main` that demonstrates at least one function call of this function.

   Algorithm: Given three values (which may contain decimal places) called `dv`, `di`, and `v`, first compute `2 v sin( di * 3.1415 / 360)`. If this computed value is less than or equal to `dv`, then return `di` from the function. Otherwise, return `360 asin(dv / (2v)) / 3.1415`. Note that `asin` (which stands for arcsin) is simply a function in `cmath` that takes a `double` parameter and returns a `double` result.