COP 3502 Exam 1 Review

1. Determine which lines of the code snipped below have a memory violation. Explain.

int main()

{

int a = 10;

int \* ptr, \*ptr2, \*ptr3, \*ptr4;

ptr = &a;

ptr2 = malloc(3 \* sizeof(int));

ptr2[3] = 5;

ptr3 = realloc(ptr3, sizeof(int));

\*ptr3 = 10;

\*ptr4 = 15.

return 0;

}

2. What is the worst case run time of the binary search?

a. O(nlog(n))

b. O(n^2)

c. O(n)

d. O(log(n))

3. Determine the big oh runtime of the for loop shown below.

You can assume all variables have been properly declared and initialized.

for(int i = 0; i < n; i++)

{

sum++;

for(int j = 0; j < n; j++)

strcat(arr, "b");

}

4. Write a recursive function that will return the sum of all of the odd integers in the passed array.

You may not create any global variables.

int oddSum(int \* arr, int size)

{

}

5. Write the state of the following array after each pass of the insertion sort:

7 9 3 8 5 11 1

6. Determine the big oh runtime for the following recurrence relation using the iterative method:

T(1) = 1 T(n) = 2T(n/2) + n

7. Determine the worst-case big oh runtime for each of the following operations:

a. Adding an item to the front of an arraylist: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b. Using quicksort on an array of numbers: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

c. Using a binary search to find a certain number in an array: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8. What is the best-case runtime for using the selection sort?

9. Find and fix the line that is causing the following code to segfault.

Then, explain why you changed what you did as well as the technical reason it was causing a segmentation fault error specifically.

int function1(int \* arr, int size, int number)

{

if (size == 0)

return 0;

if (arr[size - 1] == number)

return 1;

return function(arr, size + 1, number);

}

10. What benefit does an arraylist present over a regular array?