

CS14 - Proficiency Exam
20 points possible

1. (4 pts) Briefly describe what a destructor is and what it is typically used for.

When is a destructor invoked (called/executed)?

Should a destructor be public, private, or protected?

2. (3 pts) Explain when to use the dot (.) operator and when to use the arrow (->) operator.

3. (4 pts) Write a *recursive* function to return the summation of the numbers from 0 to a given number. For example, the summation of 5 would be $0+1+2+3+4+5=15$. Use the following recursive formula:

$$\begin{aligned}\text{summation}(0) &= 0 \\ \text{summation}(n) &= n + \text{summation}(n-1)\end{aligned}$$

Remember to use good programming style and provide error checking. SYNTAX WILL BE GRADED.

4. (3 pts) Write a function to find, print out, and return the largest value in an array. Remember to use good programming style and provide error checking. SYNTAX WILL BE GRADED. Use the following function prototype:

```
// A is the array of ints
// numItems is the number of items stored in the array
// ARRAYSIZE is a global constant variable holding the declared size of the array
int max ( int A[], int numItems ) {
```

4. (6 pts) Given the following snippet of code: (There are no syntax errors in this code)

```
int* x = new int(5);  
int y = *x;  
int* z = x;  
(*x)++;  
int* a = 0;
```

Describe what the following statements will produce (either what will be printed or what will happen). If a memory address is printed, be as specific as you can by telling me what variable/value the memory address is associated with.

- a) `cout << x << endl;`
- b) `cout << &x << endl;`
- c) `cout << *x << endl;`
- d) `cout << y << endl;`
- e) `cout << z << endl;`
- f) `cout << &z << endl;`
- g) `cout << *z << endl;`
- h) `cout << a << endl;`
- i) `cout << &a << endl;`
- j) `cout << *a << endl;`
- k) `cout << *&y << endl;`