CS 7B - Fall 2019 - CS7B Quiz 10/28/19

Write responses on separate paper.

1. Consider the following code (assume all necessary libraries are included.)

```
 1 char* strcopy(const char* s) {
       if (s == 0) return 0;
 3     int n{0};
       while (s[n++] != '\0');
 5     char* pc = new char[n + 1];
       for (int i = 0; s[i]; ++i) {
 7         pc[i] = s[i];
           cout << "pc = " << pc << endl;
 9     }
       pc[n] = 0;
11     //delete[] s;
       return pc;
13 }

15 int main() {
       string s;
17     char* cstr;
       while (cin >> s && s != "quit") {
19         cstr = strcopy(&s[0]);
           cout << cstr << "\n";
21         delete[] cstr;
       }
23 }
   /* sample output
25 catdog
   pc = c———————L**%
27 pc = ca——————L**%
   pc = cat—————L**%
29 pc = catd————L**%
   pc = catdo———L**%
31 pc = catdog–L**%
   catdog*/
```

(a) Do we need the `const` modifier on the input to `strcopy()`? If so, why? If not, why not? And, if not, is it still appropriate? Why?

(b) On line 19, `&s[0]` is passed as the argument. Explain what this is and why it is used here.

(c) Is the memory allocated for a string object necessarily contiguous in C++17? What would happen here if it weren't contiguous?

(d) What happens if we pass `strcopy()` an empty string?

(e) Is the while loop on line 4 guaranteed to terminate? How does it terminate? What is the value of `n` if and when the loop terminates?

(f) What happens on line 5?

(g) How does the for loop on line 6 terminate?

(h) What is happening on line 10. Does this make sense?

(i) Why is line 11 commented out?

(j) Explain the sample output at the end of the code.

(k) Is the way memory is allocated on the heap here at all problematic? What could go wrong?