

CS100 Spring 2024

Quiz 1

Apr 24, 2024

1. (15 points) Your name: _____. Your student ID: _____.
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2. (40 points) (C) The following functions are all related to “removing digits from a string”. For each function, does it correctly implement the behavior described in its documentation (the comments before it)? If not, what is wrong with it?

- (a) */// @brief Writes a string to 'dest' obtained from 'source' by removing all the digits.
/// @param dest Points to a block of memory large enough to hold the result.
/// @param source Points to a null-terminated byte string.*

```
void remove_digits(char *dest, const char *source) {  
    while (*source != '\0') {  
        if (!isdigit(*source))  
            *dest++ = *source;  
        ++source;  
    }  
}
```

- (b) */// @brief Writes a string to 'dest' obtained from 'source' by removing all the digits.
/// @param dest Points to a block of memory large enough to hold the result.
/// @param source Points to a null-terminated byte string.*

```
void remove_digits(char *dest, const char *source) {  
    strcpy(dest, source);  
    for (char *i = dest; *i != '\0';) {  
        if (isdigit(*i)) {  
            for (char *j = i; *j != '\0'; ++j)  
                *j = *(j + 1);  
        } else  
            ++i;  
    }  
}
```

- (c) */// @brief Writes a string to 'dest' obtained from 'source' by removing all the digits.
 /// @param dest Points to a block of memory large enough to hold the result.
 /// @param source Points to a null-terminated byte string.*

```
void remove_digits(char *dest, const char *source) {
    int cnt = 0;
    for (const char *i = source; *i != '\0'; ++i)
        if (!isdigit(*i))
            ++cnt;
    dest = calloc(cnt + 1, 1);
    for (const char *i = source; *i != '\0'; ++i)
        if (!isdigit(*i))
            *dest++ = *i;
}
```

- (d) */// @brief Removes the digits in the given string.
 /// @param str Points to a null-terminated byte string.
 /// @return int The number of digits removed.*

```
int remove_digits(char *str) {
    int digit_cnt = 0;
    for (char *i = str; *i != '\0'; ++i) {
        if (isdigit(*i)) {
            ++digit_cnt;
            for (char *j = i; *j != '\0'; ++j)
                *j = *(j + 1);
        }
    }
    return digit_cnt;
}
```

3. (15 points) (C++) Define a function `length_sum` that computes the sum of the length of all strings in a `std::vector<std::string>`. Fill in the blanks below.

```
#include <vector>
#include <string>
#include <cassert>
```

```
std::size_t length_sum(/* (a) */) {
```

```
    std::size_t sum = 0;
```

```
    for (/* (b) Use a range-based for loop. */)
```

```
        sum += /* (c) */;
```

```
    return sum;
```

```
}
```

```
int main() {
```

```
    std::vector<std::string> vs{"hello", "C++", "world"};
```

```
    assert(length_sum(vs) == 13); // This assertion should succeed.
```

```
}
```