

CMPT125, Fall 2021

Lab exam - Version 1

Wednesday, November 17, 2021, 9:30am-10:20am

You need to implement the functions in ***labexam.c***.

Submit only the **.c** file to Canvas

Canvas Assignment - Lab Exam 9:30-10:20.

You have 50 minutes to solve all 3 problems.

The maximal score is 20 points.

The exam will be graded both **automatically** and by **reading your code**.

You can run your code using

```
>> make
```

```
>> ./run_test_v1
```

Correctness: Make sure that your code compiles without warnings/errors, and works as expected.

Readability: Your code should be readable. Add comments wherever necessary. If needed, write helper functions to break the code into small, readable chunks.

Compilation: Your code **MUST** compile in CSIL with the Makefile provided. If the code does not compile in CSIL, the grade on the assignment is 0 (zero). Even if you can't solve a problem, make sure it compiles.

Helper functions: If necessary, you may add helper functions to the .c file.

main() function: do not add main(). Adding main() will cause compilation errors, as the main() function is already in the test file.

Using printf()/scanf(): Your function should have no unnecessary printf() statements. They may interfere with the automatic graders.

Warnings: Warnings during compilation will reduce points. More importantly, they indicate that something is probably wrong with the code.

Testing: An example of a test file is included.

Your code will be tested using the provided tests as well as additional tests.

You are *strongly encouraged to write more tests* to check your solution is correct, but you don't need to submit them.

Question 1 [7 points]

Write a function that gets an array of ints of length n , and a number k , and returns the longest subsequence of consecutive k 's in the array. For example

- On input ([1, 1, 1, 3, 3, 3, 1, 5, 1], 1), the function returns 3
- On input ([1, 3, 3, 2, 3, 3, 3, 3], 3), the function returns 4
- On input ([3, 5, 2, 5, 2, 5, 5], 5), the function returns 2
- On input ([1, 2, 3, 3, 3, 3], 5), the function returns 0

```
// returns the length of the longest subsequence
// of consecutive k's in the array
int longest_seq(const int* ar, int n, int k);
```

Question 2 [6 points]

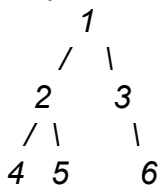
Write a function that gets a string, and replaces all digits in it with '*'. For example,

- When running `hide_digits("hi123")` the string becomes "hi****"
- When running `hide_digits("A1B2C3")` the string becomes "A*B*C*"
- When running `hide_digits("Hello World")` the string remains the same

```
// replaces each digit with '*'
void hide_digits(char* str);
```

Question 3 [7 points]

Write a function that gets a root of a binary tree with int values, and returns the sum of the numbers in the leaves of the tree. If the tree is empty, the function returns 0. For example, on input



The function returns $4+5+6=15$.

```
// gets a root of a binary tree
// returns the sum of all numbers in the leaves
// if the tree is empty, returns 0
// if the tree has only one node, returns the value in the root
int sum_leaves(const BTreeNode* root);
```