CMPT125, Spring 2023
Lab exam

Wednesday, March 22, 2023, 3:30pm-4:20pm

You need to implement the functions in *labexam.c*.
Submit only the *.c* file to Coursys
Coursys Assignment - **Lab Exam D207-D208 Wed 3:30pm**

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

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 not have any 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.

Good luck!

Question 1 [6 points]

Write a function that gets an array of strings of length n. It changes all lowercase vowels in all strings to an asterisk, and returns the total number of modified chars. For example:
- hide_vowels(["HeLLo", "hi", "yes", "NO"], n=4).
  should modify the strings to ["H*LL*", "h*", "y*s", "NO"] and return 4.

```
// the function gets an array of strings of length n
// and modifies each string by changing all *lower case* vowels into asterisk
// and returns the total number of modified chars
// The vowels are: {a,e,i,o,u}
int hide_vowels(char* arr[], int n);
```

Question 2 [7 points]

Write a function that gets a 2d array, and returns an array SUM where SUM[i] contains the sum of all numbers in the i'th column.

```
// gets a 2d array of ints
// it returns an array SUM
// such that SUM[i] contains the sum of numbers in the i'th column
int* sum_columns(int height, int width, const int ar[height][width]);
```

Question 3 [7 points]

Write a function that gets an array of ints and returns the length of the longest increasing subarray. For example,
- on input [3,**1,2,4,7**,1,1,8,8,10,1,2,9,5] the function returns 3.

```
// the function gets an array of ints of length n>0
// and returns the length of the longest subarray containing an increasing
sequence of numbers
int longest_increasing_seq(const int* ar, int n);
```