Homework 2

Disclaimer: This is INDIVIDUAL homework. No collaboration is allowed, neither is working together. Discussions are fine, but writing code to solve the assignment is individual work. If found that your code is very similar to another student, all students with similar code will be assigned 0 points for the assignment without explanations who copied from whom or collaborated with whom! If you "borrow" code from Internet or a person not in the class, you will be assigned 0 points again without discussions.

What to submit: source code running on UNIX, all applicable files used by your source code. Submissions should be in the form of a single .zip file that contains any .c files required by the assignment, and any input or output files used by your program. DO NOT submit any executables or extra files that are not used by you program alongside your source code. This includes screenshots, assignment pdfs, Word documents, etc. Only the files required to run your program should be included. DO NOT submit any compression format other than zip. This includes tarballs and.7z

File Names: The name of your main submission should follow the format of: ASSIGNMENT_LASTNAME_FIRSTNAME.zip (ex. HW1_KLEBBS_STEVE.zip). The name of your source code should follow the format of: PROBLEMNUMBER.c (ex. Problem1.c, Problem2.c). The name of input files should be "input.txt" unless explicitly specified. The name of output files should be "output.txt" unless explicitly specified.

Problem 1 (33 points):
Write a complete program in C to input an integer value for n and then compute the value of y = a – b * (-c) where a, b, and c are defined by the tables below and each is calculated in its own function **passed by value**. Use an "if else" structure to compute **a**, a "switch" structure to compute **b**, and an "if" structure to compute **c**.

if the value of **n** is	then the value of **a** is
<3	$\sum_{i=1}^{n}(\prod_{j=1}^{n}\left(j+\frac{1}{i}\right))$
≥ 3 but < 20	$i + \sum_{i=1}^{n} i * 2$
≥ 20	$\sqrt{n}$

if the value of **n** is	then the value of **b** is	if the value for **n** is	then the value of **d** is
<5	$\sqrt{n}$	1 or 2	n + cos(n)
≥ 5 but < 25	(n-1)(n+2)	3 ≤ n ≤ 5	n-3
≥ 25 but <45	floor(n)	any other value	n*2
≥ 45	n		

Grading:

Comments	5 points
Functioning code	10 points
Well-written code	5 points
Correct results, ordered output	10 points
Full submission	3 points
Array utilization	**-27 points**

Problem 2 (35 points):
Create a .txt file with 20 integers in the range of 0 to 100. There may be repeats. The numbers **must not** be ordered/sorted. **The task is to find and print the two smallest numbers**. You must accomplish this task without sorting the file and without using arrays for any purpose.

It is possible that the smallest numbers are repeated – you should print the number of occurrences of the two smallest numbers.

The reading of the numbers, the comparisons, the printing of the smallest numbers should all be in separate functions. You MUST employ **pass by value** for this problem. The counting of the two smallest numbers occurrences functionality must be implemented with static counter.

Grading:

Comments	5 points
Functioning code	10 points
Well-written code	5 points
Correct results, ordered output	7 points
Pass by value	5 points
Correct input file	3 points
Array utilization and/or sorting	**-30 points**

Problem 3 (25 points):
This is the same problem as Problem 2, but you MUST employ **pass by reference** including in the counting function (do you still need a static counter?!?).

Grading:

Comments	2 points
Functioning code	6 points
Well-written code	4 points
Correct results, ordered output	4 points
Pass by reference	7 points
Full submission	2 point
Array utilization and/or sorting	**-20 points**