Midterm Exam Spring 2024
ESE 124
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1. (**40 pts**) The symmetric difference of two sets is the set of elements which are in either one of the two sets but not in both. For example, given sets **A = {1, 2, 3}** and **B = {2, 3, 4}**, then the symmetric difference is the set **{1, 4}** (The value 1 is in set A but not in set B, and the value 4 is in set B but not in set A).

Devise a C program that reads the set A from file *In1.txt* and the set B from file *In2.txt,* and then writes the symmetric difference of set A and set B in the output file *Out1.txt*.

2. (**30 points**) Devise a C program to compute the value of the following function described by its Taylor series approximation:

$$\sinh(z)=z + z^3/3! + z^5/5! + z^7/7! + ...$$

The value of the parameter **z** is read from the keyboard, and the function value is displayed on the computer screen. New terms are added to the Taylor series until the value of a new term is below the value of the variable **epsilon**. The value of the variable **epsilon** is also input from the keyboard.

3. (**30 points**) Devise a C program that reads strings from an input file, and then creates an output file that includes only the input strings that contain a certain substring. The substring is read from the keyboard.

Example:

Input file: This is the test string
Substring: st
Output file: test string