Operating Systems & C – Fall 2020 - DS

Exam Hand-in

This is the hand-in for the exam for the OS and C, fall 2020, for DS students. You will get your grade based on your written answers to the questions below.

This hand-in exam is composed of four questions, with equal weight. Each question contains several sub-questions. The first two questions concern the assignments. The third question focuses on the performance lectures. The fourth question concerns concepts and techniques introduced in class.

Question 1 (25%): Data Lab

A. Describe your implementation of *logicalNeg(x)*

B. Consider a function that counts the number of 1s set in a char: *howManyOnes*(x). Describe the implementation of this function. Does your solution involve a form of parallel processing? Explain your answer.

Question 2 (25%): Perf Lab

A. What are the benefits of loop unrolling? Give an example based on your assignment.

B. What is SIMD processing? Explain whether and how your solution benefits from SIMD (and if not, why not)?

Question 3 (25%): Performance Lectures

A. Why is locality in space and time crucial for performance?

B. What is the impact of cache line size on performance?

Question 4 (25%): Topics from the class

A. What is a race condition? Give an example of how it can be prevented.

B. What is a socket?

C. What happens when the CPU executes a store instruction?

D. What happens when a program writes to a file?