Operating Systems & C – Fall 2021 - DS

Exam Hand-in

This is the hand-in for the exam for the OS and C, fall 2021, 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 IsPower2(x)
B. How would you change your implementation of copyLSB(x) to set all bits of result to the most significant bit of x?

Question 2 (25%): Perf Lab

A. Do the benefits of loop unrolling keep on increasing as the number of unrolled operations increases? Explain your answer and give examples based on your assignment.
B. Give an example illustrating how SIMD processing increases performance. Explain how SIMD impacts performance.

Question 3 (25%): Performance Lectures

A. Is sequential access in memory always faster than random access?
B. How does a microprocessor architecture impact the performance of loop unrolling?

Question 4 (25%): Topics from the class

A. Describe what happens when executing the following instruction movl (%ebx), %eax.
B. Are footers necessary when implementing segregated free list for dynamic memory management? Explain your answer.
C. What is an inode?
D. What is a stack frame?
E. What is a mutex?