Assignment 1 Report
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In this assignment I was tasked with creating a parallel processing application in C that runs multiple tasks at the same time using child processes. The program was set up to handle four different tasks: computing the factorial of a number, calculating the square root of a number with Newton's method, finding prime numbers within a range, and sorting the current working directory path. By using fork() to create child processes and wait() to make sure they all finish properly, I was able to show the basics of parallel execution. Handling dynamic memory was also key, particularly for managing the prime numbers list and the sorted directory path.

One of the biggest challenges was getting comfortable with pointers and dynamic memory allocation again. At first, using malloc and realloc was tricky and led to problems like memory leaks and segmentation faults. To tackle these issues, I explored C programming guides and tutorials to get a better grasp of how pointers and dynamic memory work. Many of the stack overflow questions guided me and debugging helped me find and fix memory-related errors, ensuring proper memory management throughout the program.

Implementing Newton's Method for calculating square roots was another fun trick. This method involves iterative calculations that needed to be accurately coded to get correct results. I had to learn how Newton's Method works, understand its concept and test it under different conditions to make sure it was functioning properly. Studying the math behind the method and carefully applying it in code helped me integrate it successfully into the program. I also found it quite enjoyable diving back into calculus equations and derivatives.

Managing multiple processes and making sure they ran smoothly was also challenging. I had to design the program to handle process creation and termination effectively, ensuring that each task was completed without conflicts. Many print bugs kept creeping up and were usually at the fault of my own doing but cleaned up swiftly. By organizing the process management and using the right system calls for inter-process communication, I ensured that everything worked as expected. This assignment was a great learning experience, and exactly the type of assignment/project I enjoy that gets me comfortable with a language quickly and enhancing my skills in parallel processing, dynamic memory management, and algorithm implementation is exactly where I left off in computer architect so degreasing the muscle memory rust is a joy.