CO21BTECH11002

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OS1 Assignment

The isPerfect( ) function:

This function takes an integer n and checks if the integer is a perfect number or not.

We start by initializing the sum variable equal to 1 (since every number is divisible by 1).

It runs a for loop from 2 till $\sqrt{n}$ and checks if the iterator i divides n. If i is a divisor of n then we add i and n/i to the sum. We do not need to check after $\sqrt{n}$ since if a number greater than $\sqrt{n}$ and it divides n then the other divisor will be smaller than $\sqrt{n}$ which we have already accounted.

Hence the time complexity for each function call is $O(\sqrt{n})$.

The main( ) function:

We start by taking reading the value of n and k from the input file.

ct variable holds the number of integers each process will work on.

Using the for loop, the parent process creates k child processes. Each child process calls the isPerfect() function for ct integers. It also keeps a count of how many perfect numbers it finds and stores the value in cn variable and also stores those numbers in the localArr variable. Each child gets its own copy of localArr, hence, changing its value does not affect other processes. If the child process finds atleast one perfect number then this process modifies the main file to include the process name the perfect numbers found.

Each child process also creates an output file which classifies all the numbers in its domain as perfect or not.