

Perfect Numbers by k processes

Aaryan , CO21BTECH11001

Contents of the zip file: Input.txt contains the inputs to be given to the program.

Source code: Assign1Src_CO21BTECH11001.c

Working of code:

It can be described as follows:

1. Function `check_perfect` takes an integer as input and returns true if the number is perfect. Otherwise false.
2. In the main function, the program reads input from file `input.txt` using `fscanf`.
3. For every input `n` and `k`, it makes a directory named as "`Input_ct`" where `ct` is the input number.
For e.g., the directory of first input will be named as "`Input_1`".
4. Then it makes an array of $(k+1)$ file pointers.
The 0th pointer will point to log file generated by main process (`Main_process.log`)
After that `i`th pointer will point to log file generated by `i`th process (`Child_process_i.log`)
5. Then the program will create `k` child processes. Each process is responsible for a particular set of numbers.
First $(k-1)$ child processes will be assigned (n/k) numbers each.
Rest of the numbers will be assigned to `k`th child process.

The schematic distribution of numbers to processes is done as follows:

1st process: 1, `n`, 2, `n-1`, 3, `n-2`...., `i`, `n-i+1`

2nd process: `i+1`, `n-i`, `i+2`, `n-i-1`, ..., `j`, `n-j+1`

.
. .
.

(k-1)th process: o, n-o+1, o+1, n-o, ..., p, n-p+1

(k)th process: p+1, n-p, ..., q, q+1

6. This distribution is done by creating 2 shared memory pointers:

```
int *num_from_start;
```

```
int *num_from_end;
```

num_from_start is initialized with 1 and num_from_end is initialized with n.

Each process will increment num_from_start and decrement num_from_end, after checking them.

7. Let ith child process is running and a number “num” is checked by the process.

- a. If the number turns out to be perfect: It will add the line
“num: Is a perfect number” to the log file of this child process, by
using the (i+1)th file pointer.
Also, it will add num in line “Pi: ” of log file of main process, by using
0th file pointer.
- b. If the number is not perfect: It will add the line
“num: Not a perfect number” to the log file of this child process, by
using the (i+1)th file pointer.