System Programming
4th Laboratory (19 … 22 March 2019)

I

Implement a system that counts how many prime numbers there are in a sequence of integers.
This system is composed of a master process (that generates a sequence of random numbers and writes those numbers on a pipe) and slaves (that continuously read integers from a pipe and verify if those numbers are prime).
The master receives as arguments (argv), the number of slaves and how many random, numbers to be generated.
The master process will generate positive random numbers (lower than 99999) in a sequential manner and write them to pipe to be processed by one slave.
Each slave will read from the pipe a nuumber and verify if it is prime and count how many primes were read.
Each slave, right before exiting should print the number of prime values read. The slave processes do not know how many numbers will be generated.

NOTE: every process reading from a pipe is notified (read returns 0) when that pipe is last closed for writing (i.e. no more processes are writing to it).

II

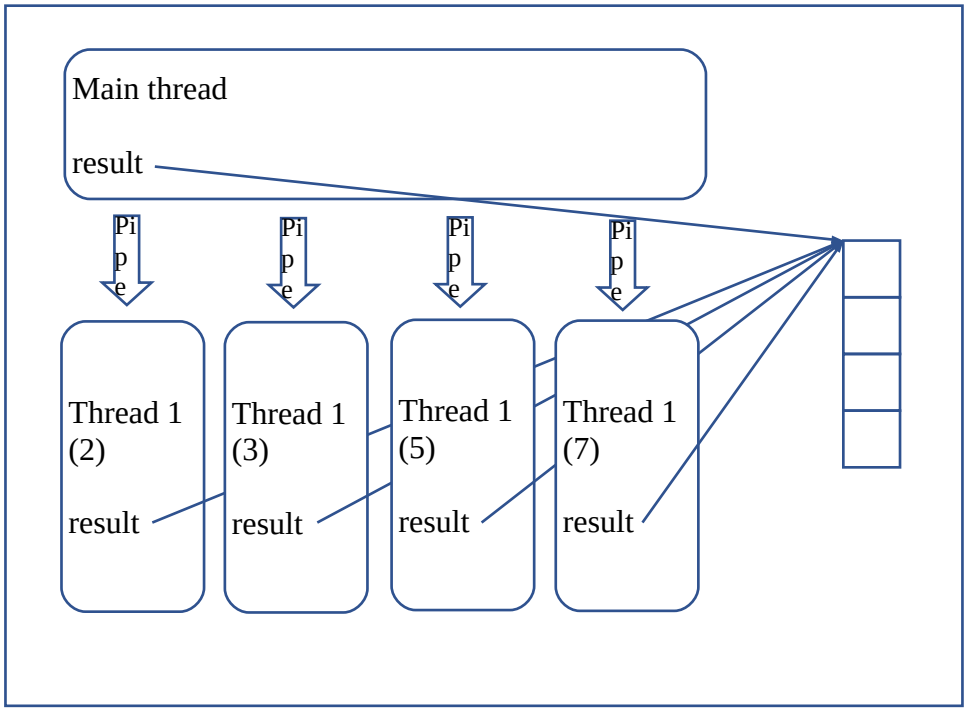
Modify the previous programs so that the child processes do not print the count of prime values, but send to the parent its count (through another pipe). The parent process will read the results from each process, sum them and print the total count.

III

Write a program that reads from the keyboard several integers and verifies whether these number are multiples of 2, 3, 5 or 7.
The main thread of this program reads form the keyboard integers and terminates when a negative number is read. The values read are sent into 4 different pipes.
Each of the pipes is read by one thread responsible for verifying whether tat number is multiple or not:

- one threat verifies if the numbers are multiples of 2
- one threat verifies if the numbers are multiples of 3
- one threat verifies if the numbers are multiples of 5
- one threat verifies if the numbers are multiples of 7

Each thread stores its count in a position of a shared array.
The main thread (after reading all numbers from the keyboard) will read an print the values in the shared array



REFERENCES

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