CSE 344
SYSTEM PROGRAMMING
HOMEWORK 2 REPORT

OĞUZHAN SEZGİN
1801042005

In this assignment parent and child processes communicate each other with using SIGUSR1 and SIGUSR2 signals. When parent process starts the child process, children starts to wait for read the file. When one process will start read file firstly locks the file for the syncronization. Because of that other process has to wait until the file unlock. Child process which reads the file, reads the corresponding line and stores the value in the buffer array and then converts double.
Before the calculation, it stores the file content after the corresponding line. After that it calculate Lagrange polynomial value and write this value end of the line. Then it writes file content which stores before. After the calculation done, child process unlock the file and sends SIGUSR1 signal to parent process and waits the SIGUSR2 signal to make 2.calculation. Meanwhile parent process waiting this signal from all children with using sigsuspend. Every time this signal arrives, the signal handler decrements the "first_calc_child" variable that it defines globally and waits until it reaches 0. When it reaches 0, it realizes that all child processes have finished their initial calculations. The parent process then locks the file and reads it, calculates the error values and prints them on the screen by averaging them.
After performing this operation, the parent sends the SIGUSR2 signal to the child process to do their second calculations. Child processes that receive the SIGUSR2 signal take action for the second calculation. As in the first calculation, they wait for the file not to be locked in order to read, and as soon as they find it unlock, they start calculating by locking the file. They write the coefficients of the Lagrange polynomial on the screen after making the second calculations and writing them to the file. All sub-processes perform these steps. Each child process that completes its process is finished, which allows them to send a SIGCHLD signal. Parent process waits for this signal again using sigsupend. The SIGCHLD handler part is taken from the 557th page of the book. When all sub-processes complete their operations completely, the parent process checks the second calculations and prints the error value to the screen. In this way, the program ends.

I got the "dvand" and "r8vec_copy_new" function used in this program to find the coefficients of the Lagrange polynomial from “https://people.sc.fsu.edu/~jburkardt/c_src/vandermonde/vandermonde.html”