Sean Crowley
CIS 452
Project 2 Design

Goal

The goal of this project was to create a multi-process program which will evaluate a given equation.

How the Program Works

The way this program works is that each operator in the equation will spawn a new process. Each process will have three variables; left, right, and op. The left and right variables will store the number to the left and right of the operator respectively. While op will store the operation to perform on these variables.

When a second operator is detected a new process will spawn and the process before that will wait until that process has finished to perform its calculations. It must wait because the answer of the spawned process will be piped to that process based on order of operations. This will create a tree like structure.

My Design

I started by first taking user input and splitting it up into separate tokens. I then started looping through the token array to find the first operator. When an operator was found a pipe was created and a process is spawned. The child process then changes the standard output to the file “answers”. My idea was to pipe all of the answers to this file and have each process pull the current answer from this file into its calculation.

I then scan in the value of the first number into left as well as the operator into op. There is then a check if this is the end of the equation. If it is then the next number is stored in right. Then a check is done on op to specify the correct operation to perform. The answer is then stored in “answers” and the process closes. If it is not at the end of the equation then another pipe is created as well as another process. I designed the program to only work with two operators so at this point it is at the end of the equation. The values are then computed based on their operator and the answer is stored into “answers”.

When a new process is created the parent process waits until the child has been terminated. When the child is terminated the parent wakes up and takes the value from “answers” and stores that into the right variable. The equation is then evaluated based on the answer from the child process.

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The Challenge

There were many challenges that came along with this project. The first was creating the process tree. If I had another week to work on this project I would redo how I tried to tackle this problem. The way I went about it turned out to be more complex than I had expected and was hard to work with.

The second major problem was with the piping. I struggled to get the piping to work between the processes. I tried to place all the answers into a file named “answers” by changing the standard output of the process but this did not work as I had intended.

The biggest problem that I had was that I did not start on this project early enough and left it till the last week to start on. If I had started earlier I know that I would have been able to solve the above challenges and a functional program.