

## CS 307 PA 1 Report

### 1. Command Explanation

Ping command uses ICMP protocol's ECHO\_REQUEST datagram to get an ECHO\_RESPONSE from host, it essentially tests connectivity to the host. -A argument is used for adaptive ping. It makes requests adapt to round trip time of the connection so that not more than one unanswered probe is present in the network I picked this command and this option because sending and receiving packages was one of the more fun sides I remember from computer networks course I took. -A command seemed interesting to me because adapting to RTT of the network and managing the request in a way that only one is present at all times seems like a very nice concept and it is interesting that OS alone is capable of dealing with TCP/IP protocol in this way.

### 2. Process Hierarchy

Process starts from the main function, main simulates the SHELL process. After stating command that is simulates Main crates a pipe variable that uses an array called **fd** to pass information. Then it creates a new process which will be called P1. Next P1 and main runs simultaneously. Main's next job is to create a new process which we will call P2. After this happens main waits for all child processes to end.

As soon as P2 starts it waits for P1 to end before doing anything. P1 is tasked with executing left hand side of the pipe command which is *MAN*. First thing it does is to close **fd[0]** which is the read address of the pipe. Then is duplicates **fd[1]** to where STDOUT\_FILENO originally was. Therefore, anything that will normally write to console out will go to write address of the pipe. Then using `execvp` function it executes the *MAN Ping* command. Because of duplication before the output goes to write address of pipe. Then P1 ends.

When P1 ends P2 starts running. P2 main job is to execute GREP command to find -A in manual. First it closes `fd[1]` and duplicates `fd[0]` to `STDIN_FILENO` so input is taken from read address of the pipe. Then it closes `STDOUT_FILENO` and open a text file called `output.txt` in its place. Now we are ready to run `grep` command using `execute`. When we do it first tries to read from console which now reads from read end of the pipe which reads the data that was written there by P1. After it ends `execvp` tries to write data to console except now our output file is open there therefore output is written to `output.txt` Then P2 ends.

After all is done main continuous and prints the final line before terminating.