OS
Assignment-3

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“/bin/ls|/bin/sort|/bin/uniq” command

- Initially for /bin/ls | /bin/sort | /bin/uniq, we use get_input to get the input.
- As we are dividing on the basis of spaces, add_space function is called to add spaces at the appropriate places. This is to cater for commands such as 1>filename. A space is inserted after 1> so that we can find the filename correctly.
- Similar procedure is used for “|”, “2>&1”, “>”, “<”, “2>”, “>>”.
- We find “|” and store the corresponding piping commands in an array piping_commands[100][100]. The first index is for indicating which level of pipe it is and the second index is for indicating the commands and arguments in that piping level.
- Then the rec_execute_pipe function is being called with these piping commands. This is a recursive function which executes piping.
- If the first piping command[1][0] is null, then this means that the number of “|” is 0, so normal_exec is called.
- If the first piping command[2][0] is null, then this means that the number of “|” is 1. We call fork. If the pid after fork is 0, then this is the parent.

```
close(fd2[0]);

 close(1);
```

```
dup(fd2[1]);

close(fd2[1]);
```

We perform the above and then call normal_exec.

- Within the normal_exec function, we find the correct path for the command for linux. I search for the last "/" sign and take the part after that. Then execvp is called using this part. Execvp is path independent and thus works just for the command without the path.
- For ls | sort | uniq, we are recursively calling the pipe function. After forking, we perform the operations for the parent ie: close(fd1[0]), close(1), dup(fd1[1]), close(fd1[1]), and then call exec. If it is the child then we close(fd[1]), close(0), dup(fd1[0]), close(fd[1]) and the call rec_execute_pipe for the rest of the piping_commands.
- So for /bin/ls | /bin/sort | /bin/uniq, first the ls is performed and then its output is directed to the rest of the command for which the rec_execute_pipe function is called using piping_commands which has /bin/sort and /bin/uniq.
- Now /bin/sort is performed for the output of /bin/ls. The output of the is directed to /bin/uniq. Rec_execute_pipe is called using piping_commands which has /bin/uniq.
- Now the final output is found.