

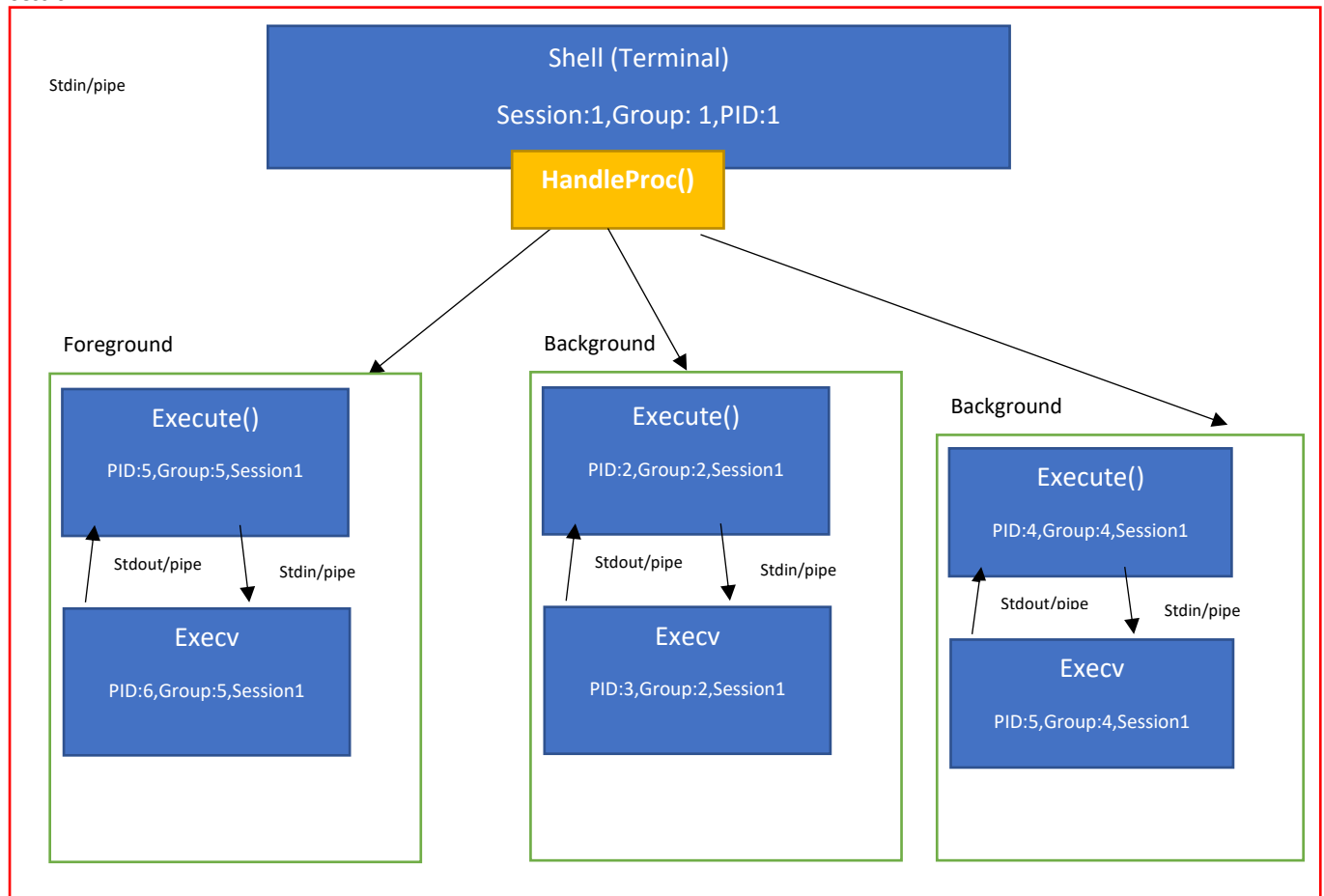
NETWORK PROGRAMMING (IS F462)

Assignment – 1

P1. [contains README at end]

Basic Shell Structure

Session: 1



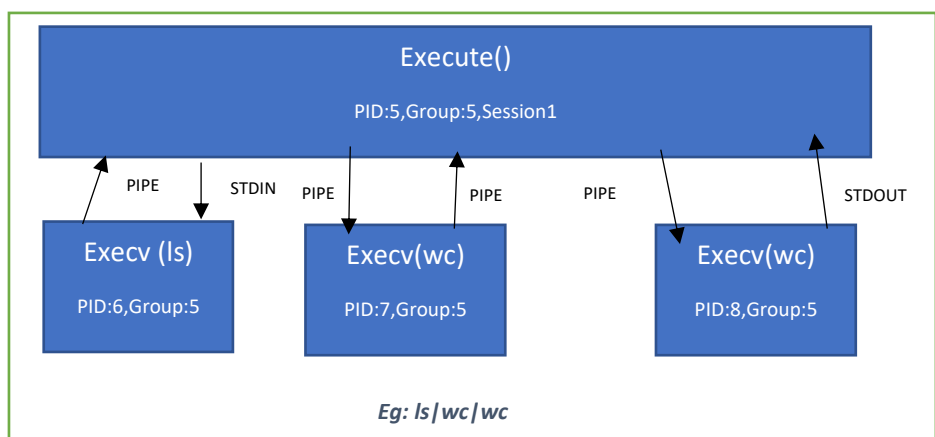
Shell allows for 1 foreground and any number of background process.

Once a foreground process is forked, shell releases its control over terminal input via `tcsetpgrp()` call. This is taken back when `SIGCHLD` from the group leader is received. Shell waits for foreground process to exit.

Handling PIPE (|):

Pipe chaining is handled by piping i/p and o/p to the group that coordinates like co-process.

Foreground/Background



Redirection is handled via dup2 calls where ever necessary. **Note: Redirection has preference over piping**, i.e. if `ls|wc>a.txt|wc-l` is the command, the pipe to last `wc` would be closed.

Handling PIPE2 (|) and PIPE3 (||):

[Note: Can be used in association to pipe chains i.e. `ls|wc||wc,wc` or `ls|wc|||wc,wc-c,wc-l`

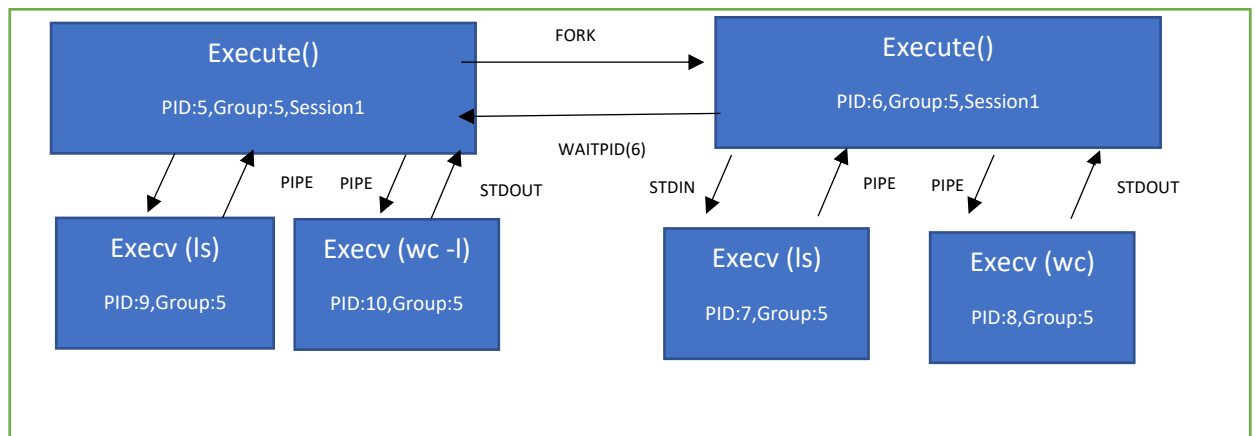
However, commands can internally have only pipes (single or PIPE1), i.e. `ls|||wc|wc|wc,wc|wc-l,wc>a.txt`

1

Ex: `ls || wc , wc -l`

`ls` is broken down into 2 pipes: `ls|wc` (runs first in a separate process forked from `execute`) followed by `ls|wc-l` in `execute` itself after the freshly created `execute` copy exits.

Foreground/Background



Similarly, PIPE 3 can be visualized as PIPE followed by PIPE 2.

README:

- If any command has cd, eg: ls|cd /dir | wc, only cd will be performed.
- cd ignores all other inputs past one argument
- Options (like ^d or -al) must be followed by a space in order to differentiate an option from next input. [**ps -al xyz (valid)** , **ps -alxyz (invalid)**]
- sc command works as a toggle for Shortcut Mode, i.e. one sc will turn on and sc again would turn off toggle mode.[\$ sc]
- Shortcut mode terminal is marked by > before the prompt.
- Shortcut mode can also be turned off by Cntrl+C and entering -1.
- sc -i <index> <cmd>, supports only one command like ls or wc etc. without options.
- Index range is limited to maximum of 50 commands[0-49]. Can be changed via the MAX_SHORTCUTS.
- sc -i <index> <cmd> and sc -d <index> <cmd> cannot be chained with other commands
- Character set identified: [**a-zA-Z**]* [**0-9**]* | || || , & > >> < / - ^

FOR COMPILING:

- gcc -o shell shell.c

or

- make compile

For Running:

- ./shell