Design Document
Q1 - Unix shell implementation

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PROBLEM STATEMENT:

To build a bash-like shell for the following requirements using only system-call wrappers from the library:

a) Shell should wait for the user to enter a command. User can enter a command with multiple arguments. Program should parse these arguments and pass them to execv() call. For every command, shell should search for the file in PATH and print any error. Shell should also print the pid, status of the process before asking for another command.

b) Shell should support <, >, and >> redirection operators and print details such as fd of the file, remapped fd.

c) Shell should support any number of commands in the pipeline. e.g. ls|wc|wc|wc and print details such as pipe fds, process pids and the steps. Redirection operators can be used in combination with pipes.

d) shell should support two new pipeline operators "||" and "|||". E.g.: ls -l || grep ^-, grep ^d . It means that output of ls -l command is passed as input to two other commands. Similarly "|||" means, output of one command is passed as input to three other commands separated by ",".

e) Shell should mask all signals except SIGQUIT and SIGINT. When SIGINT is received, it should print last 10 commands executed by the user, along with status of each. When SIGQUIT is pressed, it should ask user "Do you really want to exit?". If yes, it should exit.

System Description

Block Diagram: