Assignment 1 Design Document
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1. Goal

The goal of this assignment is to create a simple c shell program that executes system calls and commands.

2. Assumptions

I assume that the support files shell.l and argshell.c are provided.

3. Design

This program will first reads and parses a line of input, and execute the command provided on the input.

This program need to support the following features:

a. exit

The program will exit and return if “exit” is read from the input.

b. command with no arguments

Runs any executable command in default search path.

c. command with one or more arguments

Argument 0 is the name of the command, other arguments follow in sequence.

d. input redirection

Special character ‘<’ contained. The name of the input file comes after ‘<’.

e. output rediection

Special character ‘>’, ‘>>’ contained. If the output file doesn’t already exist, > and >> do the same thing. If the output file already exist, > will overwrites what is in the output file with the command output, and >> will append the command output to the end of the output file. The name of the output file comes after ‘>’, ‘>>’.

f. piping

Special character ‘|’ is contained. This takes the output of the first command and makes it this input the second command.

g. Redirection of standard error

Special character ‘&’ is contained. If any output redirection operator includes an & character at the end, standard error is redirected in addition to standard output, and both go to the same file / pipe

h. multiple commands

Special character ‘;’ is contained. Commands are separated by a semicolon. The shell runs the first command and waits for it to finish. When it finishes, the next command is run, regardless of any error encountered by the previous sequence.

i. cd

Sets the working directory to the directory provided in the command. If no directory is provided, the working directory is set to whatever the working directory was when the shell was started.

4. Pseudocode

```
procedure  MYSHELL
        procedure child_proc
                check args[0]
                        if args[0] == NULL then exit
                for i <- args[0]…args[n]
                        if args[i] = '<'
                                redirect input
                        if args[i] = '>' or args[i] = '>>'
                                redirect output
                        if args[i] = '|'
                                piping
                        if args[i] = '>&' or args[i] = '>>&'
                                redirect standard error in addition to output
                        if args[i] = '|&'
                                redirect standard error in addition to piping
                        if args[i] = ';'
                                run command before ';' first
                                run child_proc for command(s) after ';'
                execute the command in args[0]

        procedure main
                save the working directory
                loop
                        print prompt
                        get argument array using get_args()
                        run child_proc(args)
                        if args[0] = "exit" then
                                exit
                        if args[0] = "cd" then
                                change the working directory to the one on the command line
```