

osh > ls -l | less

has the output of the command **ls -l** serve as the input to the less command. Both the ls and less commands will run as separate processes and will communicate using the UNIX **pipe()** function described in Section 3.7.4. Perhaps the easiest way to create these separate processes is to have the parent process create the child process (which will execute **ls -l**). This child will also create another child process (which will execute less) and will establish a pipe between itself and the child process it creates. Implementing pipe functionality will also require using the **dup2()** function as described in the previous section. Finally, although several commands can be chained together using multiple pipes, you can assume that commands will contain only one pipe character and will not be combined with any redirection operators.

cpsc 351-Project Two --- Unix Shell --- due 25 Mar 2021 at 2359

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Verify each of the following items and check the correct column. Incorrectly marked items will incur a 5% penalty.

Complete d	Not Complete d	Unix Shell
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Complete a Unix shell (osh) project that runs on any Linux, Unix or macOS system.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Program is written in the C language, using fork() and exec() and wait()
<input type="checkbox"/>	<input type="checkbox"/>	Shell program uses dup2() and pipe()
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Program creates a Unix shell with the parent process forking a child process
<input type="checkbox"/>	<input type="checkbox"/>	Shell can run concurrently, e.g., osh> cat program.c &
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Shell can run in the background, e.g., osh> ls
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Shell terminates when exit() is typed, e.g., osh> exit()
<input type="checkbox"/>	<input type="checkbox"/>	Shell allows multiple arguments to be passed through the command line
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Has a history feature that remembers the shell commands typed, e.g., osh>ls -l osh> !!

		will execute ls -l again
□	□	Allows redirection of input using the dup2() function, and the < and > symbols osh> < input_file, or output, osh> > output_file, or both osh> < input_file > output_file
□	□	Allows the parent and child process to communicate with a pipe (sends the output of ls to the less program) osh>ls -l less
Comments	N/A	