OS Tutorial

Lab 3* - Input and Output

Goal

- Second part of the Shell
  - Implement input and output features
    - A form of pipeline/chain for commands
  - **cd** - directory navigation

exec() family of functions

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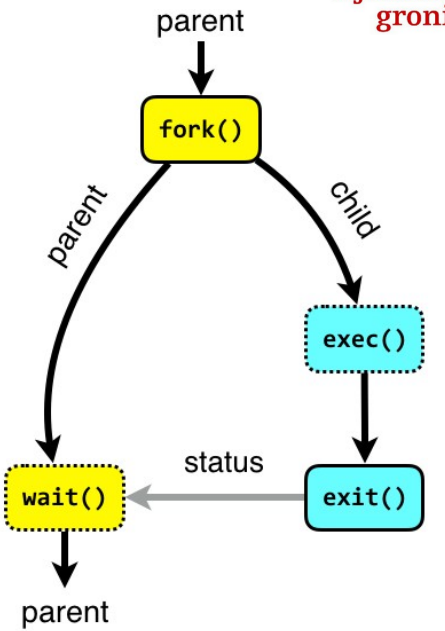
- Replaces the current process image with a new process image.
- execv()
- execlp()
- execl()
- execvp()
- execvpe()
- execle()

https://man7.org/linux/man-pages/index.html

Functions

- fork()
  - To create a child process.
- exec()
  - To replace the program executed by a process.
- exit()
  - To terminate the process, and return an exit status.
- wait() or waitpid()
  - To suspend execution until child terminates.



open()

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- The open() system call opens the file specified by pathname.
- The return value of open() is a file descriptor, a small, nonnegative integer that is an index to an entry in the process's table of open file descriptors.

Value	Meaning
O_RDONLY	Open the file so that it is read only.
O_WRONLY	Open the file so that it is write only.
O_RDWR	Open the file so that it can be read from and written to.
O_APPEND	Append new information to the end of the file.
O_TRUNC	Initially clear all data from the file.
O_CREAT	If the file does not exist, create it. If the O_CREAT option is used, then you must include the third parameter.
O_EXCL	Combined with the O_CREAT option, it ensures that the caller *must* create the file. If the file already exists, the call will fail.

https://man7.org/linux/man-pages/index.html

dup() and dup2()

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- Requires **<unistd.h>**
- The dup() system call allocates a new file descriptor that refers to the same open file description as the descriptor oldfd.
- The dup2() system call performs the same task as dup(), but instead of using the lowest-numbered unused file descriptor, it uses the file descriptor number specified in newfd.

Example:

```
int file = open("file.txt", O_APPEND);
dup2(file, 1)
```

What does this do?

https://man7.org/linux/man-pages/index.html

Useful commands for cd

- chdir() - changes the current working directory of the calling process to the directory specified in path.

- getcwd() - return a null-terminated string containing an absolute pathname that is the current working directory of the calling process.

https://man7.org/linux/man-pages/index.html

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Thank you & good luck!