System Programming Lab

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Report 3

The following commands, *'open', 'read', 'write',* and *'close',* are commonly used system calls in C programming file operations. This report will summarize the Linux manual of these commands given using the *'man'* command.

open(): The open() system call opens the file specified by a certain *pathname*. It also has the feature to create a file if a specified file does not exist. The return value of open() is a file descriptor expressed through nonnegative integers. This file descriptor is used in subsequent system calls such as read() or write(). Using argument flags, a file can be opened with different access modes and status, including *'Read only', 'Write only', 'Truncate',* etc.

read(): The read() system call attempts to read up to a certain number of bytes from a file descriptor into the buffer. The number of bytes to be read is decided during the system call. On files that support seeking, the read operation will commence from the file offset. If the file offset is at or past the end of file, no bytes can be read, and read() will return zero. Otherwise, during a success, the number of bytes read is returned.

write(): The write() system call writes up to a certain number of bytes from the buffer into the file referred to by the file descriptor. The number of bytes to be written is decided during the system call. For a seekable file, the writing occurs at the file offset, overwriting the previously contained data. For a file opened with the *'append'* flag, the file offset is set at the end of the file before writing. On success, the number of bytes written is returned. On error, -1 is returned.

close(): The close() system call closes a file descriptor, so that it can no longer be accessed or reused within the current program. Any flags and status that was set on the file will be removed during the process. If there are no more file descriptors referring to the underlying open file description, the resources will be freed. In the case of the close() system call being the last reference to a certain file, the file itself will be deleted. Close() returns zero on success and -1 on error.

In conclusion, these system calls are the essential building blocks in file operations.