**File locking system call**

**Subject - Unix Operating System**

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**Assignment No – 3B(b)**

**Title-** Write a program to lock the file using flock system call.

**Objective-**

1. To learn about File locking-mandatory and advisory locking.

**Theory-** File locking is used to prevent concurrent access to a file by multiple processes in a way that prevents data corruption. In Unix-like systems, the flock() system call is often used for advisory file locking. This means that it doesn’t enforce locking by the operating system but relies on processes to cooperate and respect the lock**.**

There are two types of locking mechanisms:

* **Advisory Locking**: The process locks the file voluntarily and other processes are expected to check and obey the lock.
* **Mandatory Locking**: The kernel enforces the lock, and other processes are prevented from accessing the locked file until the lock is released.

1. **flock() System Call:** The flock() function provides an advisory lock. It locks or unlocks a file to prevent other processes from accessing it in conflicting modes.

The syntax is:

**int flock(int fd, int operation);**

**fd:** File descriptor of the file to be locked.

**operation:** The type of lock. It can be one of the following:

* **LOCK\_SH:** Shared lock.
* **LOCK\_EX:** Exclusive lock.
* **LOCK\_UN:** Unlock the file.
* **LOCK\_NB:** Non-blocking version of the above locks.

**Program:**

#include <stdio.h>

#include <fcntl.h>

#include <unistd.h>

#include <sys/file.h>

#include <errno.h>

int main() {

// Open the file

int fd = open("example.txt", O\_WRONLY | O\_CREAT, S\_IRUSR | S\_IWUSR);

if (fd == -1) {

perror("Error opening file");

return 1;

}

// Lock the file exclusively

if (flock(fd, LOCK\_EX) == -1) {

perror("Error locking file");

return 1;

}

printf("File locked successfully. Press any key to release lock.\n");

// Wait for user input to release the lock

getchar();

// Unlock the file

if (flock(fd, LOCK\_UN) == -1) {

perror("Error unlocking file");

return 1;

}

printf("File unlocked successfully.\n");

// Close the file

close(fd);

return 0;

}

**Conclusion-** The flock system call allows for simple file locking mechanisms in programs, ensuring safe access to files in multi-process environments. By understanding and using file locking properly, we can avoid race conditions and data corruption.