

## LOCK PROMOTION AND LOCK SPLITTING

If a process sets a read lock on a file, for example from address 0 to 256, then sets a write lock on the file from address 0 to 512, the process will own only one write lock on the file from 0 to 512.

The previous read lock from 0 to 256 is now covered by the write lock, and the process does not own two locks on the region from 0 to 256. This process is called *lock promotion*.

Furthermore, if the process now unlocks the file from 128 to 480, it will own two write locks on the file: one from 0 to 127 and the other from 481 to 512. This process is called *lock splitting*.

The procedure for setting the mandatory locks for UNIX system V3 and V4 are:

The following *file\_lock.C* program illustrates a use of *fcntl* for file locking:

```
#include <iostream.h>
#include <stdio.h>
#include <sys/types.h>
#include <fcntl.h>
#include <unistd.h>

int main (int argc, char* argv[]) {
    struct flock      fvar;
    int              fdesc;
    while (--argc > 0) {          /* do the following for each file */
        if ((fdesc=open(*++argv,O_RDWR))==-1) {
            perror("open"); continue;
        }
        fvar.l_type    = F_WRLCK;
        fvar.l_whence = SEEK_SET;
        fvar.l_start   = 0;
        fvar.l_len     = 0;
```

```

/* Attempt to set an exclusive (write) lock on the entire file */
while (fcntl(fdesc, FSETLK,&fvar)==-1) {
/* Set lock fails, find out who has locked the file */
while (fcntl(fdesc,F_GETLK,&fvar)!=-1 && fvar.l_type != F_UNLCK){
cout<<*argv<<"locked by"<<fvar.l_pid<<"from"<<fvar.l_start<<"for"<<fvar.l_len
    <<"byte for"<<(fvar.l_type == F_WRLCK ? 'w':'r')<<endl;
if (!fvar.l_len) break;
fvar.l_start += fvar.l_len;
fvar.l_len      = 0;
}/* while there are locks set by other processes */
} /* while set lock un-successful */

Lock the file OK. Now process data in the file */

/* Now unlock the entire file */
fvar.l_type      = F_UNLCK;
fvar.l_whence    = SEEK_SET;
fvar.l_start     = 0;
fvar.l_len       = 0;
if (fcntl(fdosc, F_SETLKW,&fvar)==-1) perror("fcntl");
}
return 0;
)/* main */

```

Source : <http://elearningatria.files.wordpress.com/2013/10/cse-iv-unix-and-shell-programming-10cs44-notes.pdf>