

OS Assignment2 Part2 Write-up

Add new syscall to table in kernelbuild/linux-5.xx.xx/arch/x86/entry/syscalls/syscall_64.tbl

Define function in kernelbuild/linux-5.xx.xx/kernel/sys.c

Adding in table:

```
Artix Linux base2 Clone [Running] - Oracle VM VirtualBox
GNU nano 6.4 syscalls/syscall_64.tbl
425 common io_uring_setup sys_io_uring_setup
426 common io_uring_enter sys_io_uring_enter
427 common io_uring_register sys_io_uring_register
428 common open_tree sys_open_tree
429 common move_mount sys_move_mount
430 common fsopen sys_fsopen
431 common fsconfig sys_fsconfig
432 common fsmount sys_fsmount
433 common fspick sys_fspick
434 common pidfd_open sys_pidfd_open
435 common clone3 sys_clone3
436 common close_range sys_close_range
437 common openat2 sys_openat2
438 common pidfd_getfd sys_pidfd_getfd
439 common faccessat2 sys_faccessat2
440 common process_madvise sys_process_madvise
441 common epoll_pwait2 sys_epoll_pwait2
442 common mount_setattr sys_mount_setattr
443 common quotactl_fd sys_quotactl_fd
444 common landlock_create_ruleset sys_landlock_create_ruleset
445 common landlock_add_rule sys_landlock_add_rule
446 common landlock_restrict_self sys_landlock_restrict_self
447 common memfd_secret sys_memfd_secret
448 common process_mrelease sys_process_mrelease
449 common futex_waitv sys_futex_waitv
450 common set_mempolicy_home_node sys_set_mempolicy_home_node
451 common kernel_2d_mempcpy sys_kernel_2d_mempcpy_

#
# Due to a historical design error, certain syscalls are numbered differently
# in x32 as compared to native x86_64. These syscalls have numbers 512-547.
# Do not add new syscalls to this range. Numbers 548 and above are available
# for non-x32 use.
#
512 x32 rt_sigaction compat_sys_rt_sigaction
513 x32 rt_sigreturn compat_sys_x32_rt_sigreturn
514 x32 ioctl compat_sys_ioctl
515 x32 readv sys_readv
516 x32 writev sys_writev
517 x32 recvmmsg compat_sys_recvmmsg
518 x32 sendmsg compat_sys_sendmsg
519 x32 recvmmsg compat_sys_recvmmsg
520 x32 execve compat_sys_execve
521 x32 ptrace compat_sys_ptrace

#
# Help Write Out Where Is Cut Execute Location Undo Set Mark
# Exit Read File Replace Paste Justify Go To Line Redo Redo Copy
#
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```

Defining function in sys.c

```
Artix Linux base2 Clone [Running] - Oracle VM VirtualBox
GNU nano 6.4 sys.c
}

memset(&s_32, 0, sizeof(s_32));
s_32.uptime = s.uptime;
s_32.loads[0] = s.loads[0];
s_32.loads[1] = s.loads[1];
s_32.loads[2] = s.loads[2];
s_32.totalram = s.totalram;
s_32.freeram = s.freeram;
s_32.sharedram = s.sharedram;
s_32.bufferram = s.bufferram;
s_32.totalswap = s.totalswap;
s_32.freeswap = s.freeswap;
s_32.procs = s.procs;
s_32.totalhigh = s.totalhigh;
s_32.freehigh = s.freehigh;
s_32.mem_unit = s.mem_unit;
if (copy_to_user(info, &s_32, sizeof(s_32)))
    return -EFAULT;
return 0;
}
#endif /* CONFIG_COMPAT */

SYSCALL_DEFINE4(kernel_2d_mempcpy, float*, srcmatrix, float*, dstmatrix, int, num_row, int, num_col)
{
    int flag1;
    int flag2;

    float matrix[num_row][num_col];

    flag1 = copy_from_user(&matrix, dstmatrix, sizeof(matrix));
    if (flag1 != 0) {
        return -EFAULT;
    }

    flag2 = copy_to_user(srcmatrix, &matrix, sizeof(matrix));
    if (flag2 != 0) {
        return -EFAULT;
    }

    return 0;
}

#
# Help Write Out Where Is Cut Execute Location Undo Set Mark
# Exit Read File Replace Paste Justify Go To Line Redo Redo Copy
#
Type here to search
```

Build and compile:

```
Get .config file into a folder say os-repo
cd os-repo
cp .config (linux folder ka path poora)
make menuconfig /->esc then escape/
make -j2
make modules_install
cp -v arch/x86_64/boot/bzImage /boot/vmlinuz-linux5198
mkinitcpio -k 5.19.8 -g /boot/initramfs-linux5198.img
cp System.map /boot/System.map-linux5198
cp /boot/System.map-linux5198 System.map
grub-mkconfig -o /boot/grub/grub.cfg
update-grub
reboot
```

```
Test:
gcc test.c -o test
./test
```