Task I (50 points): Build, install, and run new Linux kernel

Task I.1 (20 points): Build the new kernel

Q. After successful completion of the build, report the three files that have the three most recent timestamp under the build directory (linux-2.6.18.2) with their size and timestamp.

The three files with most recent timestamps are “Sound”, “lib”, “Init”

Task I.2 (20 points): install the new kernel

1) report what have been added or changed in directory /boot;

New “initrd” file for the new linux kernel has been added to the directory

New “System map” file for the new linux kernel has been added to this directory

New “vmlinuz” file has been added.

2) find two files under directory /boot that are related to two of the three files reported in Task I.1 and explain their relations

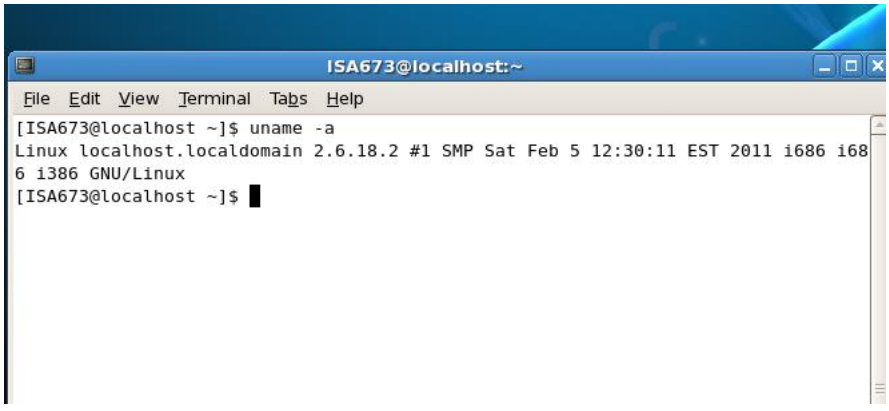
The two files under /boot directory that are related to two of the three in task I.1 are “initrd” and “symvers” files

“initrd” is mainly designed to allow system startup to occur. In the boot process, “initrd” invokes or executes “init” file we found in task I.1 on the new root filesystem.

The “lib” file we found in task I.1 is related to the “vmlinuz” file in /boot directory. The “lib” directory contains kernel modules and “vmlinuz” is the linux kernel executable file, hence “vmlinuz” has to contain “lib” file.

Task I.3 (10 points): run the newly built Linux kernel

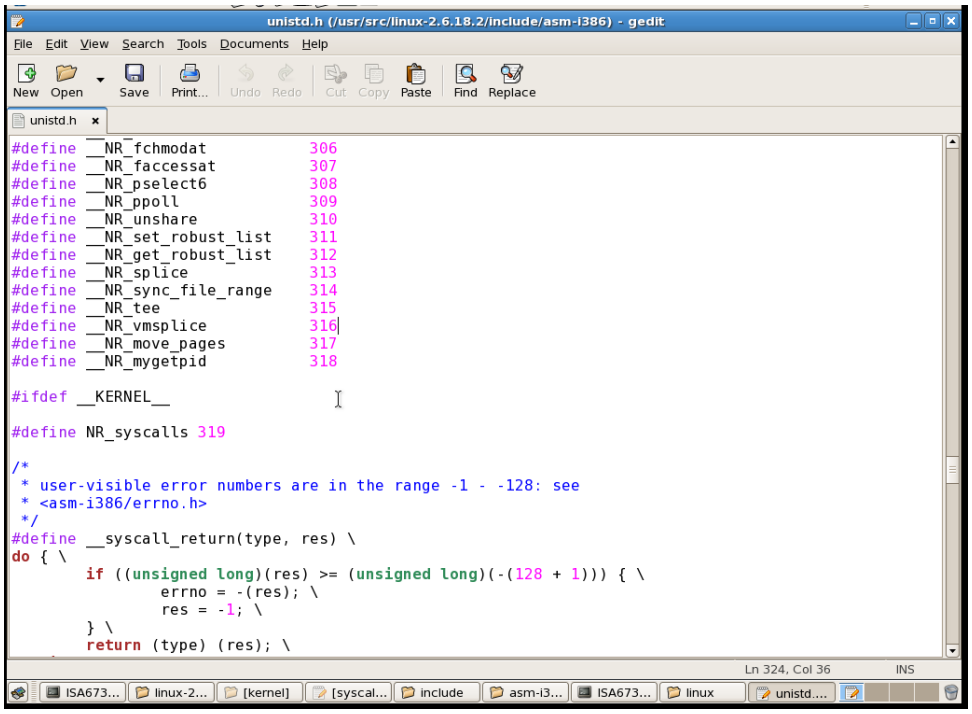
If the kernel 2.6.18.2 has been built and installed successfully, you will be able to boot with it. In a terminal, run command “uname -a”, take a screenshot and submit the screenshot.



Task II (50 points): Add a new system call in Linux kernel 2.6.18.2

Task II.1 (10 points): Please report the new system call number in your homework submission.

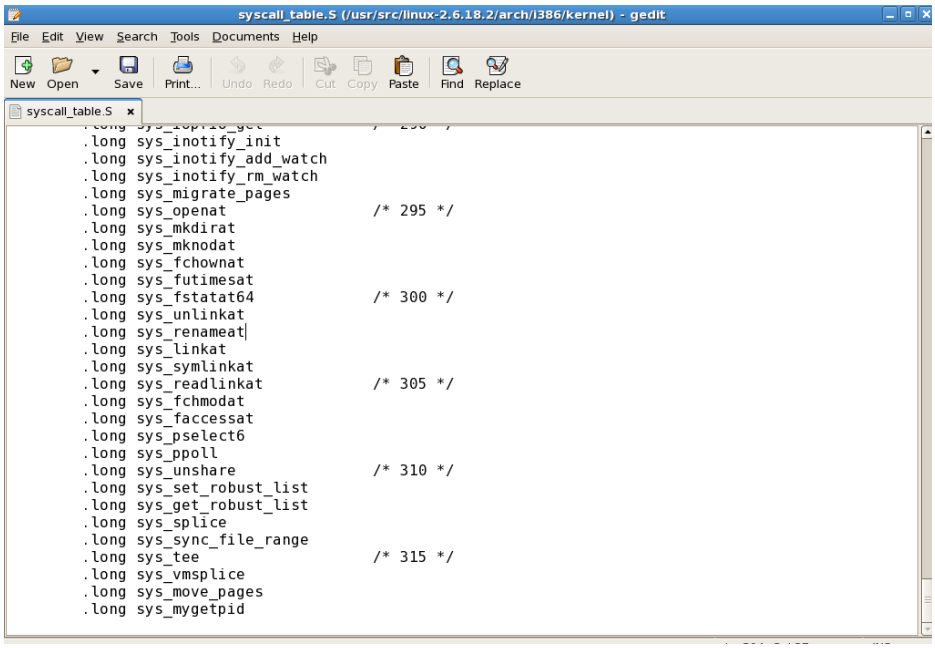
New system call number is 318



Task II.2 (20 points): Please report where you have added any file or have changed what files, and submit all the added files and the changed parts. You need to include everything that allows the TA to reproduce what you have.

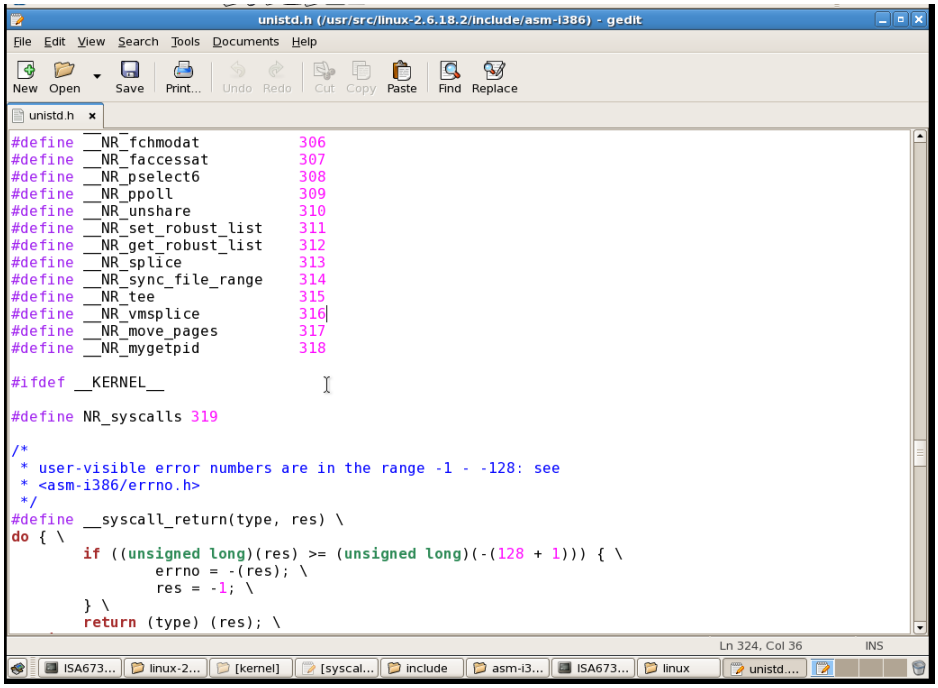
Add the function ".long sys_mygetpid" at the end of the file,

/usr/src/linux-2.6.18.2/arch/i386/kernel/syscall_table.S



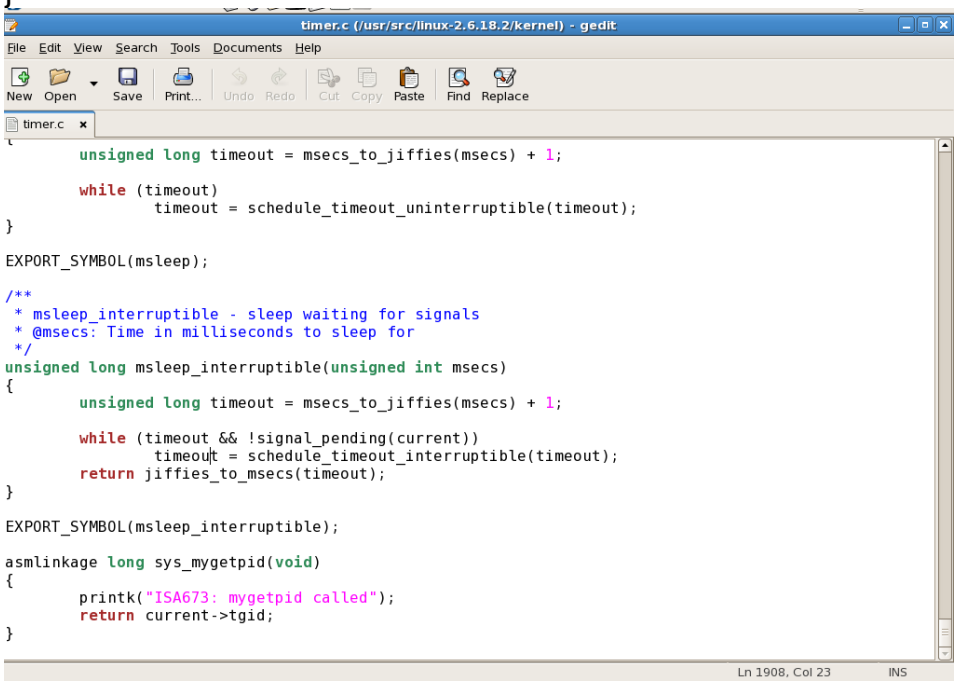
Add a new line “#define __NR_mygetpid 318”, after the last line in the list and subsequently update NR_syscalls by one i.e. “#define NR_syscalls 319” in the file,

/usr/src/linux-2.6.18.2/include/asm-i386/unistd.h



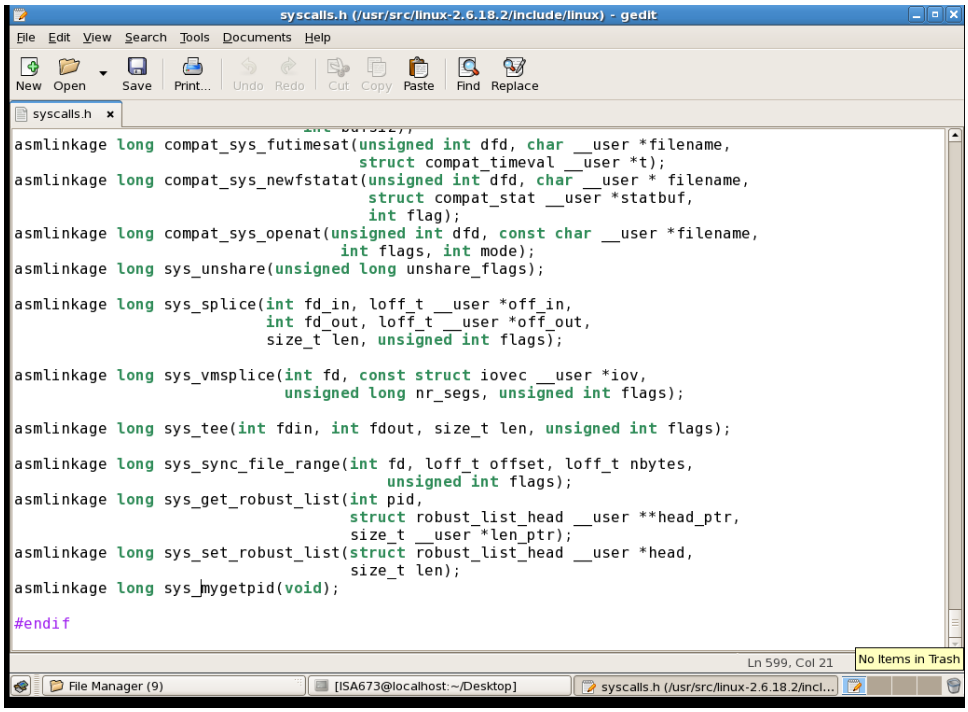
Add the function below to the end of the file, /usr/src/linux-2.6.18.2/kernel/timer.c

```
asmlinkage long sys_mygetpid(void)
{
    printk("ISA673: mygetpid called");
    return current->pid;
}
```

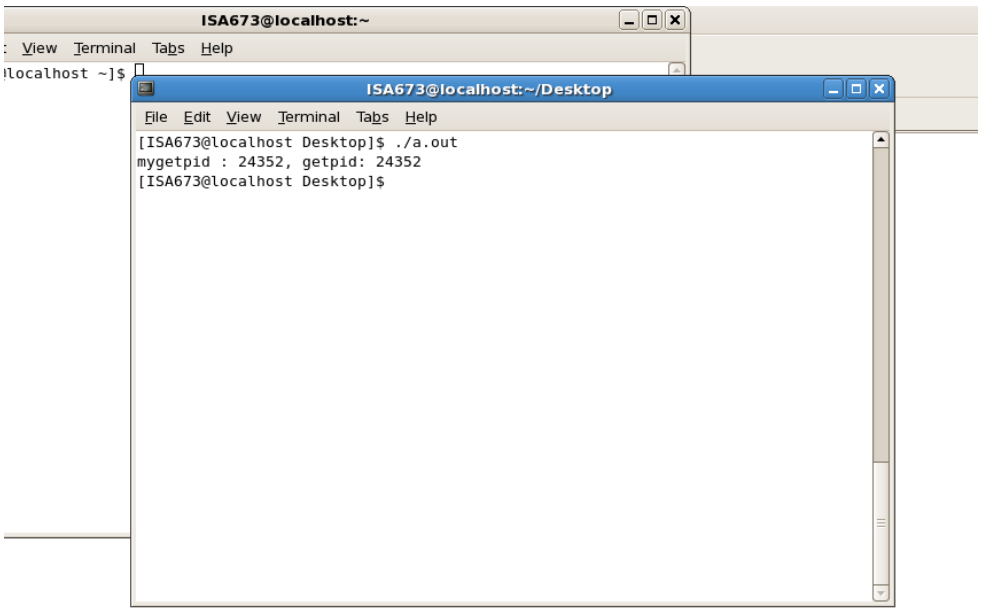


Add the line “asmlinkage long sys_mygetpid(void)” at the end of the file

/usr/src/linux-2.6.18.2/include/linux/syscalls.h



Run the ‘syscall-test.c’ file provided by the professor and it will give this output



Task II.3 (20 points): Show the kernel message by running dmesg from a terminal, take a screenshot and submit the screenshot.