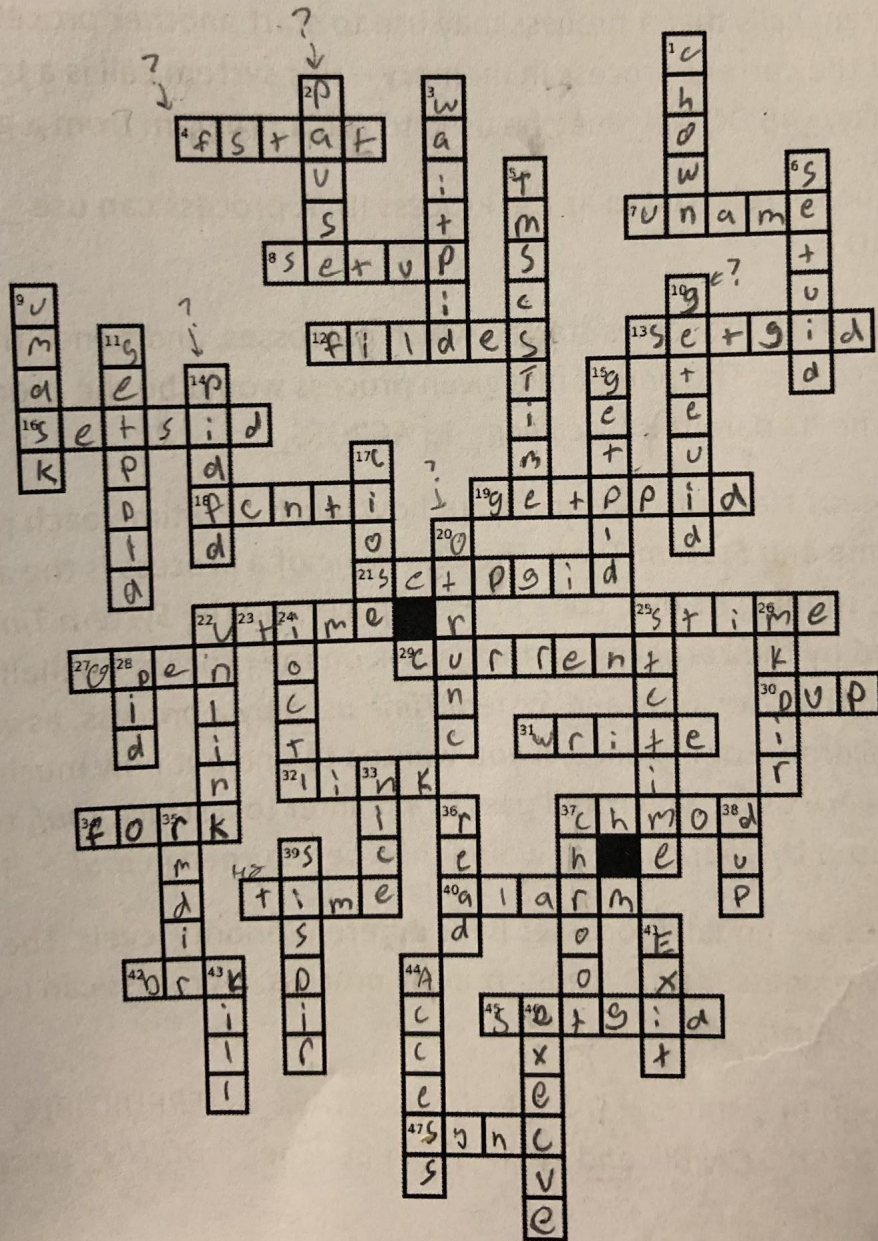


through the system calls of Linux 0.01, to get a better sense of what Linux
his first release. During this tour, you will need to study the code used to im
(hint: use Elixir) and other references from the Linux Kernel Tips Page to solv
ord puzzle:



1)

System Call	Use	Implemented version
ustat	Returns user status	1.3
ftime	Return date and time	REMOVED? (in 2.1)
mknod	Makes node	1.1
break	Breaks out of execution	REMOVED? (in 2.1)
mount	Mounts filesystem	0.10
umount	Unmount filesystem	0.10
ptrace	Observe & control process	0.95
stty	Set tty	REMOVED?(in 2.1)
gtty	Get tty	REMOVED?(in 2.1)
rename	Renames files	0.95
prof	tracer?	REMOVED?(in 2.1)
acct	Accounts and returns process	1.3
lock	Locks linux system	REMOVED?(in 2.1)
phys	Network driver utility?	REMOVED?(in 2.1)
mpx	Annotates screen?	REMOVED?(in 2.1)
ulimit	Reports resource limit	REMOVED?(in 2.1)

<https://man7.org/linux/man-pages/man2/syscalls.2.html>

2)

```
#define __NR_sigaction 67 --change action taken by a process
#define __NR_sgetmask 68 --gets signal mask
#define __NR_ssetmask 69 --sets signal mask
#define __NR_setreuid 70 --sets REUID
#define __NR_setregid 71 --sets REGID
#define __NR_sigsuspend 72 --suspends signal process
#define __NR_sigpending 73 --returns set of pending signals
#define __NR_sethostname 74 --sets hostname
#define __NR_setrlimit 75 --sets resource limit
#define __NR_getrlimit 76 --returns resource limit
#define __NR_getrusage 77 --gets resource usage
#define __NR_gettimeofday 78 --returns time of day
#define __NR_settimeofday 79 --sets time of day
#define __NR_getgroups 80 --returns groups
#define __NR_setgroups 81 --sets groups
#define __NR_select 82 --selects multiple file descriptors
#define __NR_symlink 83 --indirect pointer
#define __NR_lstat 84 --returns link status on file
#define __NR_readlink 85 --reads the file link
#define __NR_uselib 86 --loads a shared library
```

This is the chunk of syscalls added between 0.01 and 0.12

3) The list of system calls seems to just be added on, nothing was explicitly removed. can confirm

4) Syscall3 seems to have changed. Res__ is a long, not its own type, and the comparisons have flipped.

5) System calls added since 0.12

```
.long sys_swapon
.long sys_reboot
.long sys_old_readdir
.long sys_old_mmap /* 90 */
.long sys_munmap
.long sys_truncate
.long sys_ftruncate
.long sys_fchmod
.long sys_fchown16 /* 95 */
.long sys_getpriority
.long sys_setpriority
.long sys_ni_syscall /* old profil syscall holder */
.long sys_statfs
.long sys_fstatfs /* 100 */
.long sys_ioperm
.long sys_socketcall
.long sys_syslog
.long sys_setitimer
.long sys_getitimer /* 105 */
```

```

.long sys_newstat
.long sys_newlstat
.long sys_newfstat
.long sys_uname
.long ptrregs_iopl /* 110 */
.long sys_vhangup
.long sys_ni_syscall /* old "idle" system call */
.long ptrregs_vm86old
.long sys_wait4
.long sys_swapoff /* 115 */
.long sys_sysinfo
.long sys_ipc
.long sys_fsync
.long ptrregs_sigreturn
.long ptrregs_clone /* 120 */
.long sys_setdomainname
.long sys_newuname
.long sys_modify_ldt
.long sys_adjtimex
.long sys_mprotect /* 125 */
.long sys_sigprocmask
.long sys_ni_syscall /* old "create_module" */
.long sys_init_module
.long sys_delete_module
.long sys_ni_syscall /* 130:      old "get_kernel_syms" */
.long sys_quotactl
.long sys_getpgid
.long sys_fchdir
.long sys_bdflush
.long sys_sysfs /* 135 */
.long sys_personality
.long sys_ni_syscall /* reserved for afs_syscall */
.long sys_setfsuid16
.long sys_setfsgid16
.long sys_llseek /* 140 */
.long sys_getdents
.long sys_select
.long sys_flock
.long sys_msync
.long sys_readv /* 145 */
.long sys_writev
.long sys_getsid
.long sys_fdatasync
.long sys_sysctl
.long sys_mlock /* 150 */
.long sys_munlock
.long sys_mlockall
.long sys_munlockall
.long sys_sched_setparam

```

```
.long sys_sched_getparam /* 155 */
.long sys_sched_setscheduler
.long sys_sched_getscheduler
.long sys_sched_yield
.long sys_sched_get_priority_max
.long sys_sched_get_priority_min /* 160 */
.long sys_sched_rr_get_interval
.long sys_nanosleep
.long sys_mremap
.long sys_setresuid16
.long sys_getresuid16 /* 165 */
.long ptregs_vm86
.long sys_ni_syscall /* Old sys_query_module */
.long sys_poll
.long sys_nfsservctl
.long sys_setresgid16 /* 170 */
.long sys_getresgid16
.long sys_prctl
.long ptregs_rt_sigreturn
.long sys_rt_sigaction
.long sys_rt_sigprocmask /* 175 */
.long sys_rt_sigpending
.long sys_rt_sigtimedwait
.long sys_rt_sigqueueinfo
.long sys_rt_sigsuspend
.long sys_pread64 /* 180 */
.long sys_pwrite64
.long sys_chown16
.long sys_getcwd
.long sys_capget
.long sys_capset /* 185 */
.long ptregs_sigaltstack
.long sys_sendfile
.long sys_ni_syscall /* reserved for streams1 */
.long sys_ni_syscall /* reserved for streams2 */
.long ptregs_vfork /* 190 */
.long sys_getrlimit
.long sys_mmap_pgoff
.long sys_truncate64
.long sys_ftruncate64
.long sys_stat64 /* 195 */
.long sys_lstat64
.long sys_fstat64
.long sys_lchown
.long sys_getuid
.long sys_getgid /* 200 */
.long sys_geteuid
.long sys_getegid
.long sys_setreuid
```

```
.long sys_setregid
.long sys_getgroups /* 205 */
.long sys_setgroups
.long sys_fchown
.long sys_setresuid
.long sys_getresuid
.long sys_setresgid /* 210 */
.long sys_getresgid
.long sys_chown
.long sys_setuid
.long sys_setgid
.long sys_setfsuid /* 215 */
.long sys_setfsgid
.long sys_pivot_root
.long sys_mincore
.long sys_madvise
.long sys_getdents64 /* 220 */
.long sys_fcntl64
.long sys_ni_syscall /* reserved for TUX */
.long sys_ni_syscall
.long sys_gettid
.long sys_readahead /* 225 */
.long sys_setxattr
.long sys_lsetxattr
.long sys_fsetxattr
.long sys_getxattr
.long sys_lgetxattr /* 230 */
.long sys_fgetxattr
.long sys_listxattr
.long sys_llistxattr
.long sys_flistxattr
.long sys_removexattr /* 235 */
.long sys_lremovexattr
.long sys_freemovexattr
.long sys_tkill
.long sys_sendfile64
.long sys_futex /* 240 */
.long sys_sched_setaffinity
.long sys_sched_getaffinity
.long sys_set_thread_area
.long sys_get_thread_area
.long sys_io_setup /* 245 */
.long sys_io_destroy
.long sys_io_getevents
.long sys_io_submit
.long sys_io_cancel
.long sys_fadvise64 /* 250 */
.long sys_ni_syscall
.long sys_exit_group
```



```

.long sys_lookup_dcookie
.long sys_epoll_create
.long sys_epoll_ctl      /* 255 */
.long sys_epoll_wait
.long sys_remap_file_pages
.long sys_set_tid_address
.long sys_timer_create
.long sys_timer_settime  /* 260 */
.long sys_timer_gettime
.long sys_timer_getoverrun
.long sys_timer_delete
.long sys_clock_settime
.long sys_clock_gettime /* 265 */
.long sys_clock_getres
.long sys_clock_nanosleep
.long sys_statfs64
.long sys_fstatfs64
.long sys_tgkill /* 270 */
.long sys_utimes
.long sys_fadvise64_64
.long sys_ni_syscall /* sys_vserver */
.long sys_mbind
.long sys_get_mempolicy
.long sys_set_mempolicy
.long sys_mq_open
.long sys_mq_unlink
.long sys_mq_timedsend
.long sys_mq_timedreceive /* 280 */
.long sys_mq_notify
.long sys_mq_getsetattr
.long sys_kexec_load
.long sys_waitid
.long sys_ni_syscall /* 285 */ /* available */
.long sys_add_key
.long sys_request_key
.long sys_keyctl
.long sys_ioprio_set
.long sys_ioprio_get /* 290 */
.long sys_inotify_init
.long sys_inotify_add_watch
.long sys_inotify_rm_watch
.long sys_migrate_pages
.long sys_openat /* 295 */
.long sys_mkdirat
.long sys_mknodat
.long sys_fchownat
.long sys_futimesat
.long sys_fstatat64 /* 300 */
.long sys_unlinkat

```

```

.long sys_renameat
.long sys_linkat
.long sys_symlinkat
.long sys_readlinkat          /* 305 */
.long sys_fchmodat
.long sys_faccessat
.long sys_pselect6
.long sys_ppoll
.long sys_unshare             /* 310 */
.long sys_set_robust_list
.long sys_get_robust_list
.long sys_splice
.long sys_sync_file_range
.long sys_tee                 /* 315 */
.long sys_vmsplice
.long sys_move_pages
.long sys_getcpu
.long sys_epoll_pwait
.long sys_utimensat          /* 320 */
.long sys_signalfd
.long sys_timerfd_create
.long sys_eventfd
.long sys_fallocate
.long sys_timerfd_settime    /* 325 */
.long sys_timerfd_gettime
.long sys_signalfd4
.long sys_eventfd2
.long sys_epoll_create1
.long sys_dup3               /* 330 */
.long sys_pipe2
.long sys_inotify_init1
.long sys_preadv
.long sys_pwritev
.long sys_rt_tgsigqueueinfo  /* 335 */
.long sys_perf_event_open
.long sys_recvmmsg

```

Total of 251 were added

6) No longer implemented because they are deprecated?

afs_syscall, break, ftime, getpmsg, gttty,
 idle, lock, madvise1, mpx, phys, prof,
 profil, putpmsg, security, stty, tuxcall,
 ulimit, and vserver

7)

https://elixir.bootlin.com/linux/v2.6.34.7/source/arch/x86/include/asm/unistd_64.h

https://elixir.bootlin.com/linux/v2.6.34.7/source/arch/x86/include/asm/unistd_32.h

32bit

64bit

```
#define __NR_restart_syscall 0 -> __NR_restart_syscall 219
#define __NR_exit 1 -> __NR_exit 60
#define __NR_fork 2 -> __NR_fork 57
#define __NR_read 3 -> __NR_read 0
#define __NR_write 4 -> __NR_write 1
```

8) Important features:

Uselib - important for setting library usage

Modify_ldt - reads or writes the local descriptor table, important for post modification

Mmap - important for managing memory, vital to good function?

9) Bloatware:

Fchmod

Fchown16

ftruncate

****All three of these are copies essentially that account for an open file case, which can be avoided.**