

# **Operating System Project Report:**

**HAFSA BAIG**

## **Introduction:**

We are making the assumption that the cigarette preparation needs three essential constituent for preparation and smoke: paper, matches and tobacco. Between three smokers, there is a boundless supply of one of these ingredients, which is tobacco, paper and matches.

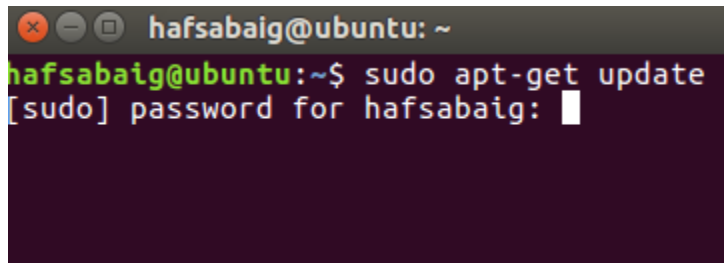
The agent enables the smokers to make their cigarettes by picking two of the supplies to place on the table. The smoker who has the third supply should remove the two items from table, using them along with their own supply to prepare a cigarette, which they smoke for a while. For convenience, the agent places two of the three items on the table, and the smoker that has the third item make the cigarette and smokes for a while. Immediately after the smoker finishes the cigarette, the agent places two new random items on the table. This process is endless.

## **Methodology:**

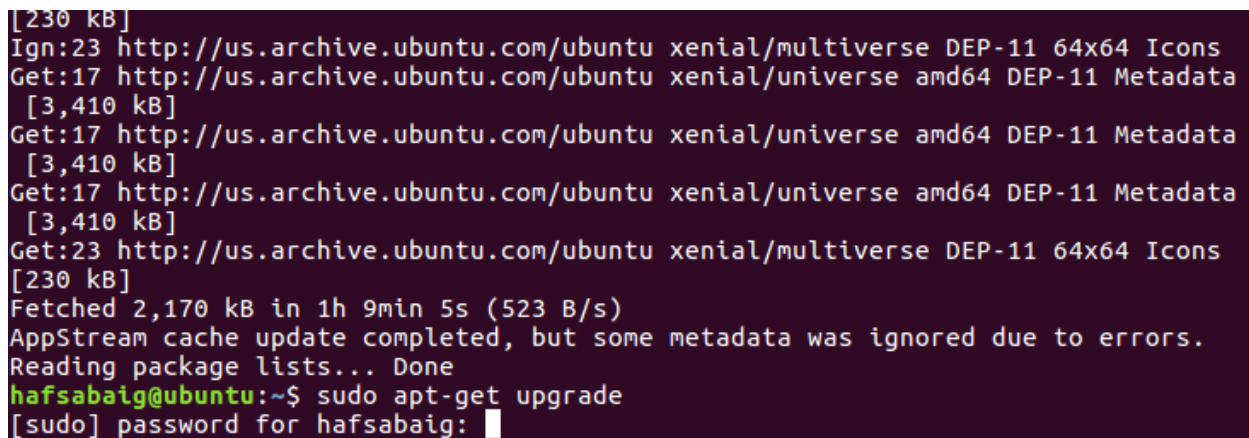
The 3 smoker tactics will make a cigarette and smoke it. If they cannot make a cigarette, then they will sleep. The agent system will place objects at the table, and awaken the perfect smoker, after which it will sleep. All semaphores (integer variables which are used to clear up the essential segment problem with the aid of using the usage of atomic operations, wait

and signal which are used for system synchronization) besides lock are initialized to 0. A lock is initialized to 1 and is a mutex variable.

## Configuration:

A terminal window with a dark background. The title bar shows the user 'hafsabaig@ubuntu' and the home directory '~'. The prompt is 'hafsabaig@ubuntu:~\$' and the command 'sudo apt-get update' has been entered. The next line shows '[sudo] password for hafsabaig:' followed by a white cursor box.

```
hafsabaig@ubuntu: ~  
hafsabaig@ubuntu:~$ sudo apt-get update  
[sudo] password for hafsabaig: 
```

A terminal window showing the output of the previous command. It lists several mirrors and their update status. The output ends with 'Reading package lists... Done'. The next line shows the prompt 'hafsabaig@ubuntu:~\$' and the command 'sudo apt-get upgrade' has been entered. The next line shows '[sudo] password for hafsabaig:' followed by a white cursor box.

```
[230 kB]  
Ign:23 http://us.archive.ubuntu.com/ubuntu xenial/multiverse DEP-11 64x64 Icons  
Get:17 http://us.archive.ubuntu.com/ubuntu xenial/universe amd64 DEP-11 Metadata  
[3,410 kB]  
Get:17 http://us.archive.ubuntu.com/ubuntu xenial/universe amd64 DEP-11 Metadata  
[3,410 kB]  
Get:17 http://us.archive.ubuntu.com/ubuntu xenial/universe amd64 DEP-11 Metadata  
[3,410 kB]  
Get:23 http://us.archive.ubuntu.com/ubuntu xenial/multiverse DEP-11 64x64 Icons  
[230 kB]  
Fetched 2,170 kB in 1h 9min 5s (523 B/s)  
AppStream cache update completed, but some metadata was ignored due to errors.  
Reading package lists... Done  
hafsabaig@ubuntu:~$ sudo apt-get upgrade  
[sudo] password for hafsabaig: 
```

```
root@ubuntu: ~
hafsabaig@ubuntu:~$ sudo -s
[sudo] password for hafsabaig:
root@ubuntu:~# apt-get install gcc
```

```
gcc set to manually installed.
The following packages were automatically installed and are no longer required:
  libdbusmenu-gtk4 ubuntu-core-launcher
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 57 not upgraded.
root@ubuntu:~# apt-get install python-pip python-dev libffi-dev libssl-dev libxm
l2-dev libxslt1-dev libjpeg8-dev zlib1g-dev
```

```
hafsabaig@ubuntu: ~
hafsabaig@ubuntu:~$ uname -r
4.4.0-31-generic
hafsabaig@ubuntu:~$ wget https://www.kernel.org/pub/linux/kernel/v4.x/linux-4.4.
1.tar.gz
```

```
Length: 132878998 (127M) [application/x-gzip]
Saving to: 'linux-4.4.1.tar.gz'

linux-4.4.1.tar.gz  100%[=====>] 126.72M  375KB/s   in 7m 12s

2022-05-23 12:46:59 (300 KB/s) - 'linux-4.4.1.tar.gz' saved [132878998/132878998]

hafsabaig@ubuntu:~$ sudo -s
[sudo] password for hafsabaig:
root@ubuntu:~# tar -xvf linux-4.4.1.tar.gz -C /usr/src/
```

```
root@ubuntu:/usr/src/linux-4.4.1/spin_lock# cd ..
root@ubuntu:/usr/src/linux-4.4.1# mkdir chainmokerproblem
root@ubuntu:/usr/src/linux-4.4.1# cd chainmokerproblem
root@ubuntu:/usr/src/linux-4.4.1/chainmokerproblem# gedit chainmokerproblem.c
```

```
root@ubuntu:/usr/src/linux-4.4.1/chainmokerproblem# cd ..
root@ubuntu:/usr/src/linux-4.4.1# gedit Makefile
```

```

else
mod_sign_cmd = true
endif
export mod_sign_cmd

ifeq ($(KBUILD_EXTMOD),)
core-y      += kernel/ certs/ mm/ fs/ ipc/ security/ crypto/ block/
chainsmokerproblem/

vmlinux-dirs := $(patsubst %/,%, $(filter %/, $(init-y) $(init-m) \
$(core-y) $(core-m) $(drivers-y) $(drivers-m) \
$(net-y) $(net-m) $(libs-y) $(libs-m) $(virt-y)))

```

```

i2c-dev.h          percpu.h          xattr.h
i2c-gpio.h          percpu_ida.h        xz.h
i2c.h              percpu_refcount.h  yam.h
i2c-mux-gpio.h      percpu_rwsem.h      z2_battery.h
i2c-mux.h           perf              zbud.h
i2c-mux-pinctrl.h   perf_event.h          zconf.h
i2c-ocores.h         perf_regs.h        zlib.h
i2c-omap.h           personality.h       zorro.h
i2c-pca-platform.h  pfn.h                  zpool.h
i2c-pnx.h            phonet.h           zsmalloc.h
i2c-pxa.h            phy              zutil.h
root@ubuntu:/usr/src/linux-4.4.1/include/linux# gedit syscalls.h

```

\*syscalls.h (/usr/src/linux-4.4.1/include/linux) - gedit 6:02 AM

```
Open  [icon] *syscalls.h /usr/src/linux-4.4.1/include/linux

        unsigned long liovcnt,
        const struct iovec __user *rvec,
        unsigned long riovcnt,
        unsigned long flags);
asmlinkage long sys_process_vm_writev(pid_t pid,
        const struct iovec __user *lvec,
        unsigned long liovcnt,
        const struct iovec __user *rvec,
        unsigned long riovcnt,
        unsigned long flags);

asmlinkage long sys_kcmp(pid_t pid1, pid_t pid2, int type,
        unsigned long idx1, unsigned long idx2);
asmlinkage long sys_finit_module(int fd, const char __user *uargs, int flags
asmlinkage long sys_seccomp(unsigned int op, unsigned int flags,
        const char __user *uargs);
asmlinkage long sys_getrandom(char __user *buf, size_t count,
        unsigned int flags);
asmlinkage long sys_bpf(int cmd, union bpf_attr *attr, unsigned int size);

asmlinkage long sys_execveat(int dfd, const char __user *filename,
        const char __user *const __user *argv,
        const char __user *const __user *envp, int flags);

asmlinkage long sys_membarrier(int cmd, int flags);

asmlinkage long sys_mlock2(unsigned long start, size_t len, int flags);

asmlinkage long sys_chainsmokerproblem2(long, long);
#endif
```

Activat  
Go to Set

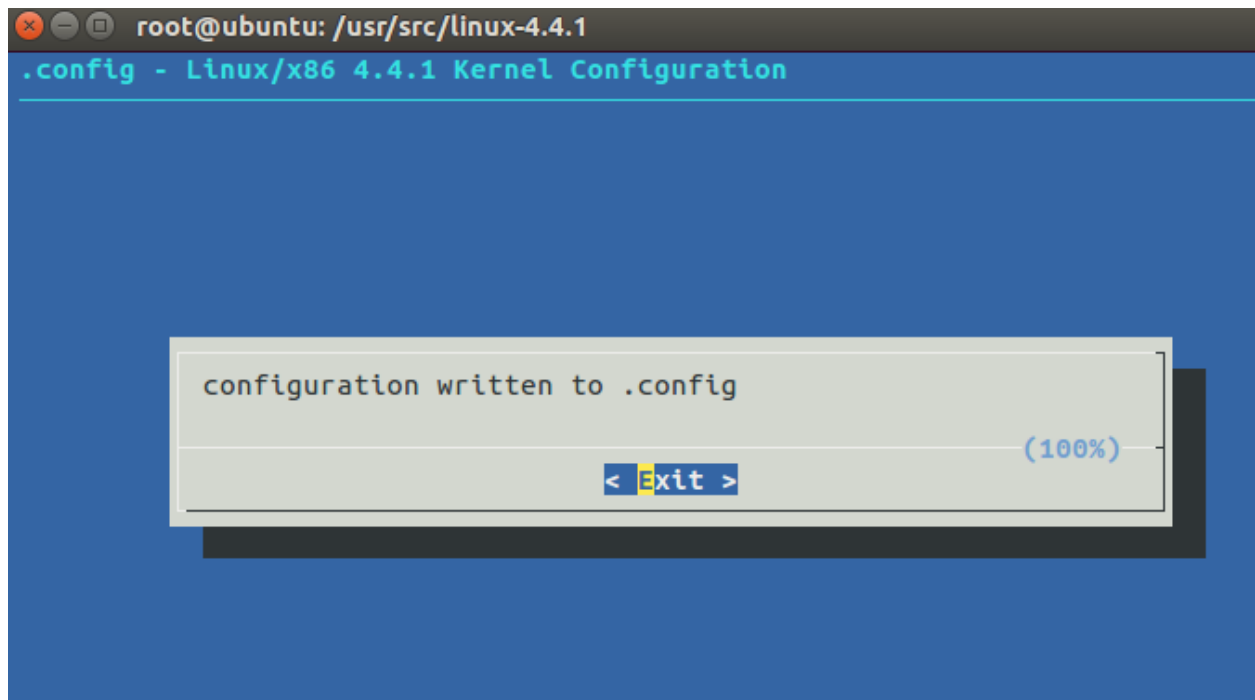
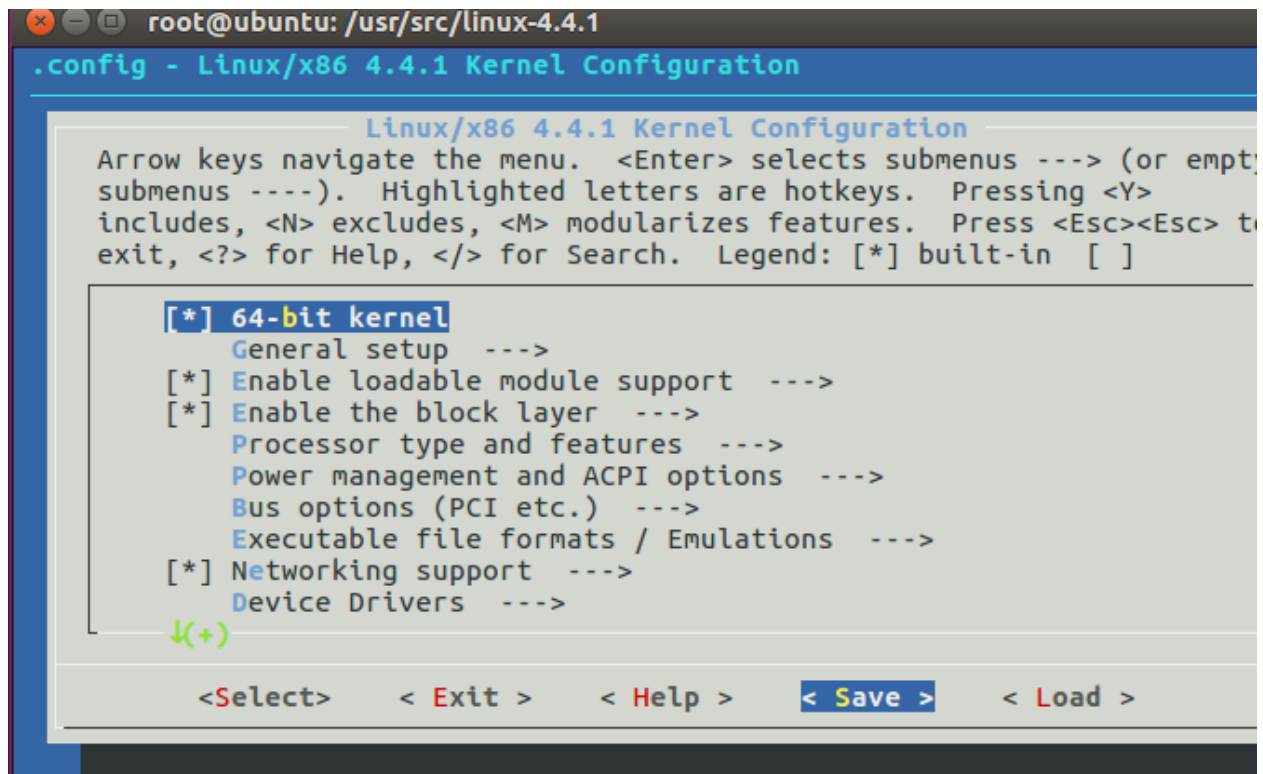
```
root@ubuntu:/usr/src/linux-4.4.1# cd arch/x86/entry/syscalls
root@ubuntu:/usr/src/linux-4.4.1/arch/x86/entry/syscalls# ls
Makefile syscall_32.tbl syscall_64.tbl syscallhdr.sh syscalltbl.sh
root@ubuntu:/usr/src/linux-4.4.1/arch/x86/entry/syscalls# gedit syscall_64.tbl
```

```
*syscall_64.tbl (/usr/src/linux-4.4.1/arch/x86/entry/syscalls) - gedit
Open [icon] *syscall_64.tbl
/usr/src/linux-4.4.1/arch/x86/entry/syscalls

309 common getcpu sys_getcpu
310 64 process_vm_readv sys_process_vm_readv
311 64 process_vm_writev sys_process_vm_writev
312 common kcmp sys_kcmp
313 common finit_module sys_finit_module
314 common sched_setattr sys_sched_setattr
315 common sched_getattr sys_sched_getattr
316 common renameat2 sys_renameat2
317 common seccomp sys_seccomp
318 common getrandom sys_getrandom
319 common memfd_create sys_memfd_create
320 common kexec_file_load sys_kexec_file_load
321 common bpf sys_bpf
322 64 execveat stub_execveat
323 common userfaultfd sys_userfaultfd
324 common membarrier sys_membarrier
325 common mlock2 sys_mlock2
326 64 chain smokerproblem2 sys_chain smokerproblem2

#
# x32-specific system call numbers start at 512 to avoid cache impact
# for native 64-bit operation.
#
512 x32 rt_sigaction compat_sys_rt_sigaction
513 x32 rt_sigreturn stub_x32_rt_sigreturn
514 x32 ioctl compat_sys_ioctl
515 x32 readv compat_sys_readv
516 x32 writev compat_sys_writev
```

```
root@ubuntu: /usr/src/linux-4.4.1
root@ubuntu: /usr/src/linux-4.4.1# make menuconfig
```





```
*** End of the configuration.  
*** Execute 'make' to start the build or try 'make help'.
```

```
root@ubuntu:/usr/src/linux-4.4.1# make oldconfig  
HOSTCC scripts/kconfig/conf.o  
HOSTLD scripts/kconfig/conf  
scripts/kconfig/conf --oldconfig Kconfig  
#  
# configuration written to .config  
#  
root@ubuntu:/usr/src/linux-4.4.1#
```

```
root@ubuntu: /usr/src/linux-4.4.1  
root@ubuntu:/usr/src/linux-4.4.1# make
```

```
IHEX      firmware/edgeport/down3.bin  
IHEX2FW  firmware/whiteheat_loader.fw  
IHEX2FW  firmware/whiteheat.fw  
IHEX2FW  firmware/keyspan_pda/keyspan_pda.fw  
IHEX2FW  firmware/keyspan_pda/xircom_pgs.fw  
IHEX      firmware/cpia2/stv0672_vp4.bin  
IHEX      firmware/yam/1200.bin  
IHEX      firmware/yam/9600.bin  
root@ubuntu:/usr/src/linux-4.4.1# make modules_install install
```

```
run-parts: executing /etc/kernel/postinst.d/zz-update-grub 4.4.1
4.4.1
Generating grub configuration file ...
Warning: Setting GRUB_TIMEOUT to a non-zero value when GRUB_HIDDEN
t is no longer supported.
Found linux image: /boot/vmlinuz-4.4.1
Found initrd image: /boot/initrd.img-4.4.1
Found linux image: /boot/vmlinuz-4.4.0-31-generic
Found initrd image: /boot/initrd.img-4.4.0-31-generic
Found memtest86+ image: /boot/memtest86+.elf
Found memtest86+ image: /boot/memtest86+.bin
done
root@ubuntu:/usr/src/linux-4.4.1# shutdown -r now
```

```
hafsabaig@ubuntu:~$ uname -r
4.4.1
hafsabaig@ubuntu:~$ ls
Desktop    Downloads      linux-4.4.1.tar.gz  Pictures  Templates
Documents  examples.desktop Music            Public    Videos
hafsabaig@ubuntu:~$ cd Desktop
hafsabaig@ubuntu:~/Desktop$ mkdir test
hafsabaig@ubuntu:~/Desktop$ cd test
hafsabaig@ubuntu:~/Desktop/test$ gedit testprog.c
```

```
collect2: error: ld returned 1 exit status
hafsabaig@ubuntu:~/Desktop/test$ gcc -pthread testprog.c
hafsabaig@ubuntu:~/Desktop/test$ ls
a.out  testprog.c
hafsabaig@ubuntu:~/Desktop/test$
```

```
smoker is smoking returns 0  
Agent is supplying returns 0  
hafsabaig@ubuntu:~/Desktop/test$ dmesg
```

## Reference:

<https://www.cs.umd.edu/~hollings/cs412/s96/synch/smokers.html>