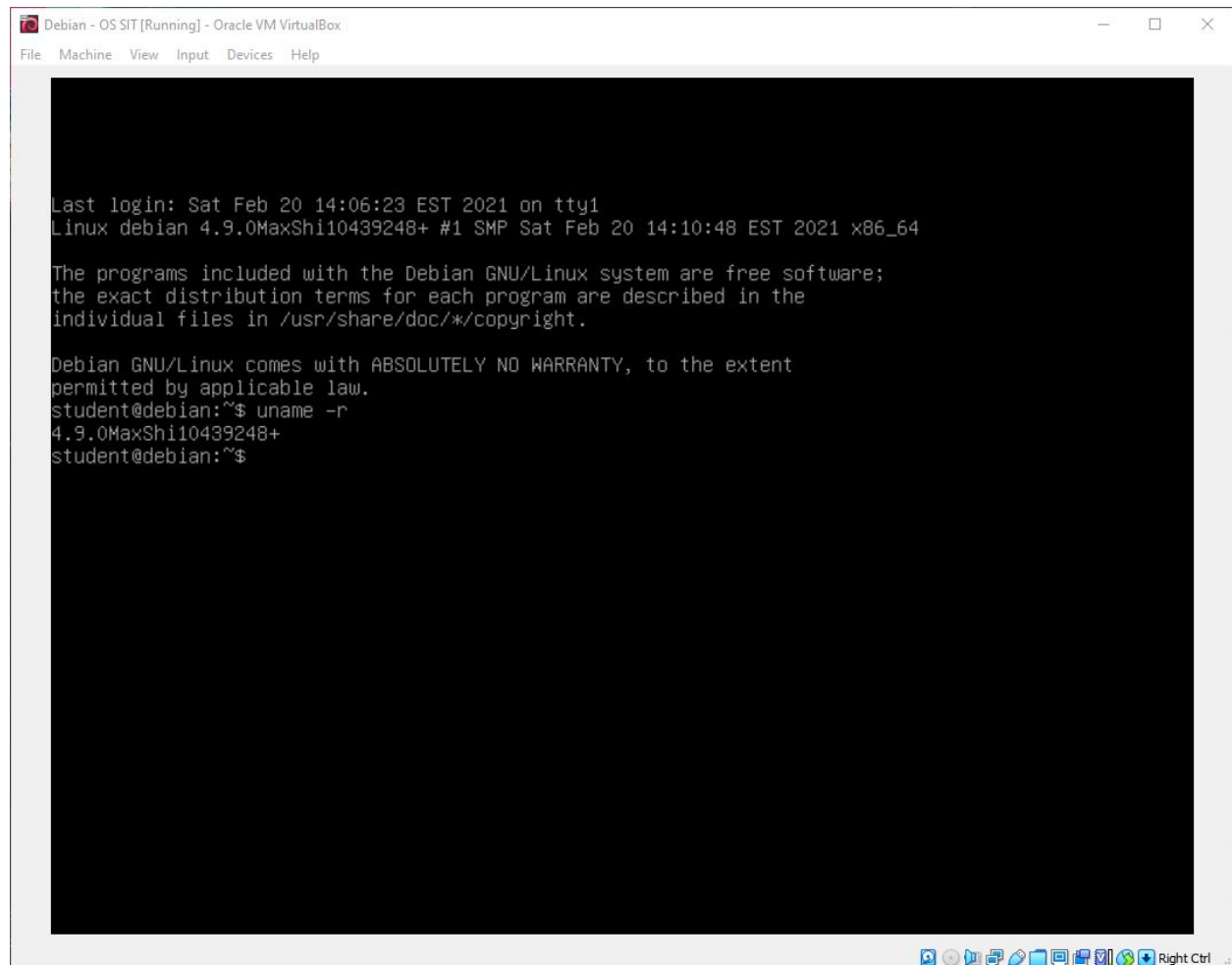
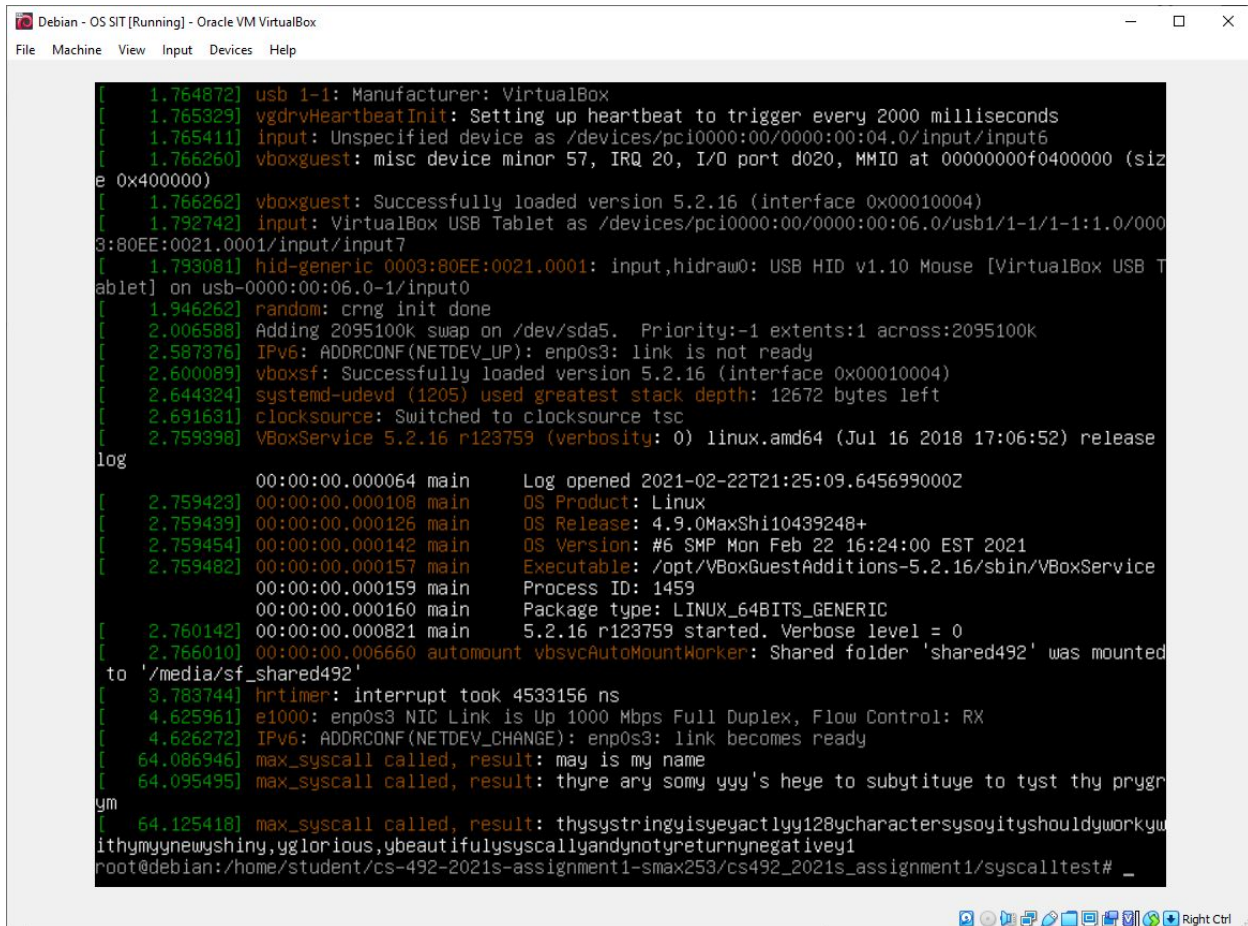


Max Shi
CS 492 Assignment 1

Screenshot 1: Renaming and loading the custom kernel.



Screenshot 2: Kernel log after running test program



The screenshot shows a terminal window titled "Debian - OS SIT [Running] - Oracle VM VirtualBox". The terminal displays various system messages and kernel logs. The messages include USB device initialization, vboxguest loading, random number generator initialization, adding swap space, IPv6 address configuration, vboxsf loading, systemd-udevd status, clocksource switching, and VBoxService release. The log shows the system booting on 2021-02-22T21:25:09.645699000Z, with OS Product: Linux, OS Release: 4.9.0MaxShi10439248+, OS Version: #6 SMP Mon Feb 22 16:24:00 EST 2021, Executable: /opt/VBoxGuestAdditions-5.2.16/sbin/VBoxService, Process ID: 1459, Package type: LINUX_64BITS_GENERIC, and 5.2.16 r123759 started. Verbose level = 0. The log also shows the automount vbsvcAutoMountWorker mounting a shared folder 'shared492' to '/media/sf_shared492'. The hrtimer interrupt took 4533156 ns. The e1000 NIC Link is Up 1000 Mbps Full Duplex, Flow Control: RX. The IPv6 address configuration shows enp0s3 link becomes ready. The max_syscall called, result: may is my name. The max_syscall called, result: thyre ary somy yyy's heye to subytituye to tyst thy prygrn ym. The max_syscall called, result: thysystringyisyeeyactlyy128ycharactersyssoyityshouldyworkywmithymynewyshiny,yglorious,ybeautifulsyscallyandnotyreturnynegativey1. The terminal prompt is root@debian:/home/student/cs-492-2021s-assignment1-smx253/cs492_2021s_assignment1/syscalltest# _.

```
[ 1.764872] usb 1-1: Manufacturer: VirtualBox
[ 1.765329] vgdvHeartbeatInit: Setting up heartbeat to trigger every 2000 milliseconds
[ 1.765411] input: Unspecified device as /devices/pci0000:00/0000:00:04.0/input/input6
[ 1.766260] vboxguest: misc device minor 57, IRQ 20, I/O port d020, MMIO at 00000000f0400000 (size 0x400000)
[ 1.766262] vboxguest: Successfully loaded version 5.2.16 (interface 0x00010004)
[ 1.792742] input: VirtualBox USB Tablet as /devices/pci0000:00/0000:00:06.0/usb1/1-1/1-1:1.0/0003:80EE:0021.0001/input/input7
[ 1.793081] hid-generic 0003:80EE:0021.0001: input,hidraw0: USB HID v1.10 Mouse [VirtualBox USB Tablet] on usb-0000:00:06.0-1/input0
[ 1.946262] random: crng init done
[ 2.006588] Adding 2095100k swap on /dev/sda5. Priority:-1 extents:1 across:2095100k
[ 2.587376] IPv6: ADDRCONF(NETDEV_UP): enp0s3: link is not ready
[ 2.600089] vboxsf: Successfully loaded version 5.2.16 (interface 0x00010004)
[ 2.644324] systemd-udevd (1205) used greatest stack depth: 12672 bytes left
[ 2.691631] clocksource: Switched to clocksource tsc
[ 2.759398] VBoxService 5.2.16 r123759 (verbosity: 0) linux.amd64 (Jul 16 2018 17:06:52) release
log
00:00:00.000064 main Log opened 2021-02-22T21:25:09.645699000Z
00:00:00.000108 main OS Product: Linux
00:00:00.000126 main OS Release: 4.9.0MaxShi10439248+
00:00:00.000142 main OS Version: #6 SMP Mon Feb 22 16:24:00 EST 2021
00:00:00.000157 main Executable: /opt/VBoxGuestAdditions-5.2.16/sbin/VBoxService
00:00:00.000159 main Process ID: 1459
00:00:00.000160 main Package type: LINUX_64BITS_GENERIC
00:00:00.000821 main 5.2.16 r123759 started. Verbose level = 0
00:00:00.006660 automount vbsvcAutoMountWorker: Shared folder 'shared492' was mounted to '/media/sf_shared492'
3.783744] hrtimer: interrupt took 4533156 ns
4.625961] e1000: enp0s3 NIC Link is Up 1000 Mbps Full Duplex, Flow Control: RX
4.626272] IPv6: ADDRCONF(NETDEV_CHANGE): enp0s3: link becomes ready
64.086946] max_syscall called, result: may is my name
64.095495] max_syscall called, result: thyre ary somy yyy's heye to subytituye to tyst thy prygrn ym
64.125418] max_syscall called, result: thysystringyisyeeyactlyy128ycharactersyssoyityshouldyworkywmithymynewyshiny,yglorious,ybeautifulsyscallyandnotyreturnynegativey1
root@debian:/home/student/cs-492-2021s-assignment1-smx253/cs492_2021s_assignment1/syscalltest# _
```

Screenshot 3: Running tests for max_syscall

```
Debian - OS SIT [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help

root@debian:/home/student/cs-492-2021s-assignment1-smax253# dir
arch      cs492      include  lib      Module.symvers  security  vmlinux
block     cs492_2021s_assignment1  init     MAINTAINERS  net          sound     vmlinux.o
certs     Documentation  ipc     Makefile    README       System.map
COPYING   drivers       Kbuild  mm         REPORTING-BUGS  tools
CREDITS   firmware     Kconfig modules.builtin  samples      usr
crypto    fs            kernel  modules.order  scripts      virt
root@debian:/home/student/cs-492-2021s-assignment1-smax253# cd cs492_2021s_assignment1/
root@debian:/home/student/cs-492-2021s-assignment1-smax253/cs492_2021s_assignment1# dir
module syscalltest
root@debian:/home/student/cs-492-2021s-assignment1-smax253/cs492_2021s_assignment1# cd syscalltest/
root@debian:/home/student/cs-492-2021s-assignment1-smax253/cs492_2021s_assignment1/syscalltest# gcc
test_max_syscall.c
root@debian:/home/student/cs-492-2021s-assignment1-smax253/cs492_2021s_assignment1/syscalltest# ./a.out
System call max_syscall returned 1 substitutions with result 'may is my name' on input 'max is my name'

System call max_syscall returned 13 substitutions with result 'thyre ary somy yyy's heye to subytitu
ye to tyst thy prygrym' on input 'thxre arx somx xxx's hexe to subxtituxe to txst thx prxgrxm'

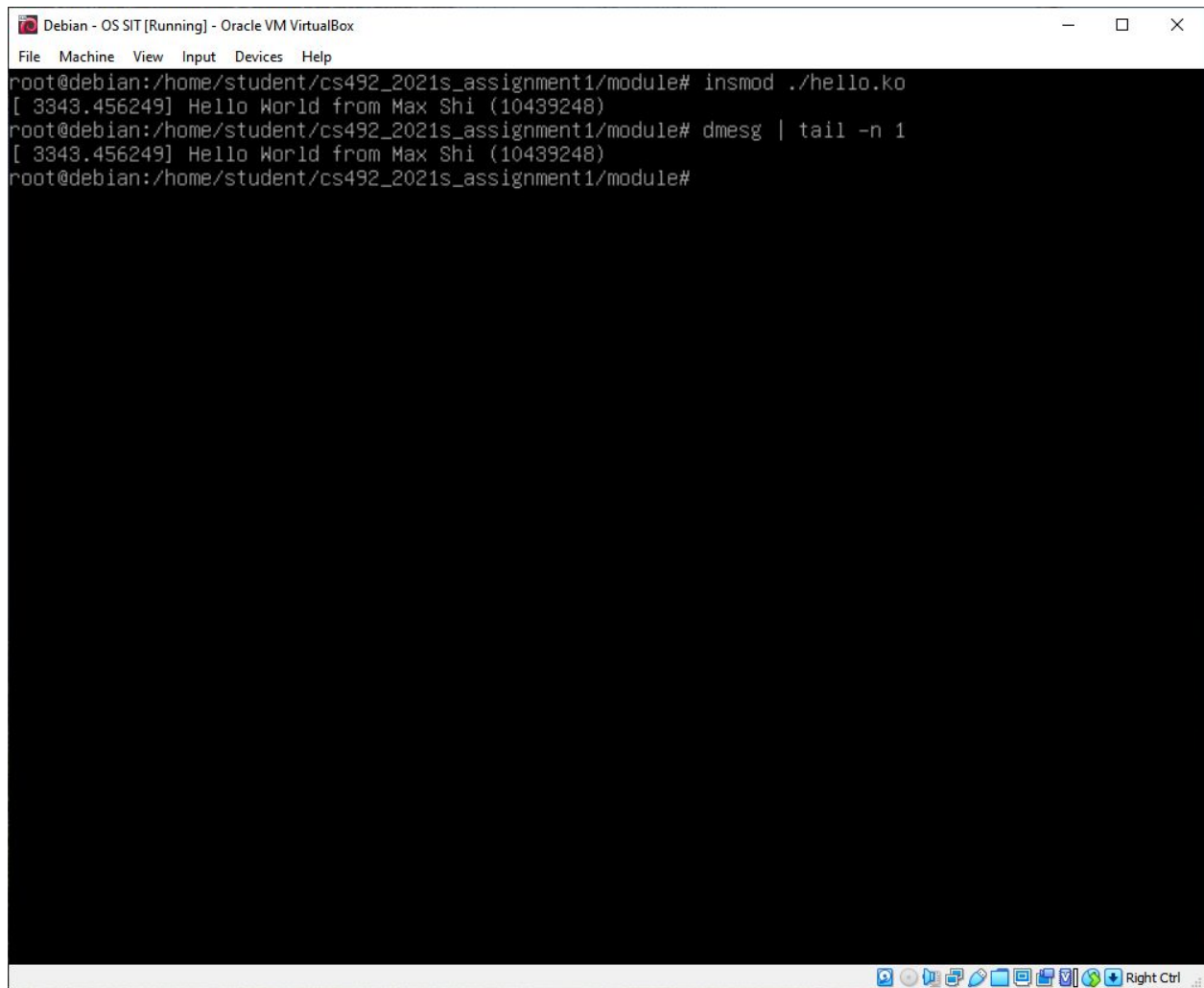
System call max_syscall returned 23 substitutions with result 'thysystringyisyeayctlyy128ycharacters
ysoyityshouldyworkywithymyxnewxshiny,xglorious,ybeautifulysyscalllyandynotyreturynnegativey1' on input
t 'thxsxstringxisxexactlyx128xcharactersxsoxitxshouldxworkxwithxmyxnewxshiny,xglorious,xbeautifulxsys
syscallxandxnotxreturnxnegativex1'

System call max_syscall returned -1 substitutions with result 'thxsxstringxisxexactlyx129xcharacters
xsoxitshouldnotworkxwithxmyxnewxshiny,xglorious,xbeautifulxsyscallxandxnotxreturnxnegativex1' on input
ut 'thxsxstringxisxexactlyx129xcharactersxsoxitshouldnotworkxwithxmyxnewxshiny,xglorious,xbeautifulx
syscallxandxnotxreturnxnegativex1'

System call max_syscall returned -1 substitutions with result 'this string needs to be longer than 1
28 characters so I will fill it to the brim with these characters until the length exceeds 128 and g
oes beyond!!' on input 'this string needs to be longer than 128 characters so I will fill it to the
brim with these characters until the length exceeds 128 and goes beyond!!'

root@debian:/home/student/cs-492-2021s-assignment1-smax253/cs492_2021s_assignment1/syscalltest#
```

Screenshot 4: Loading hello world kernel module

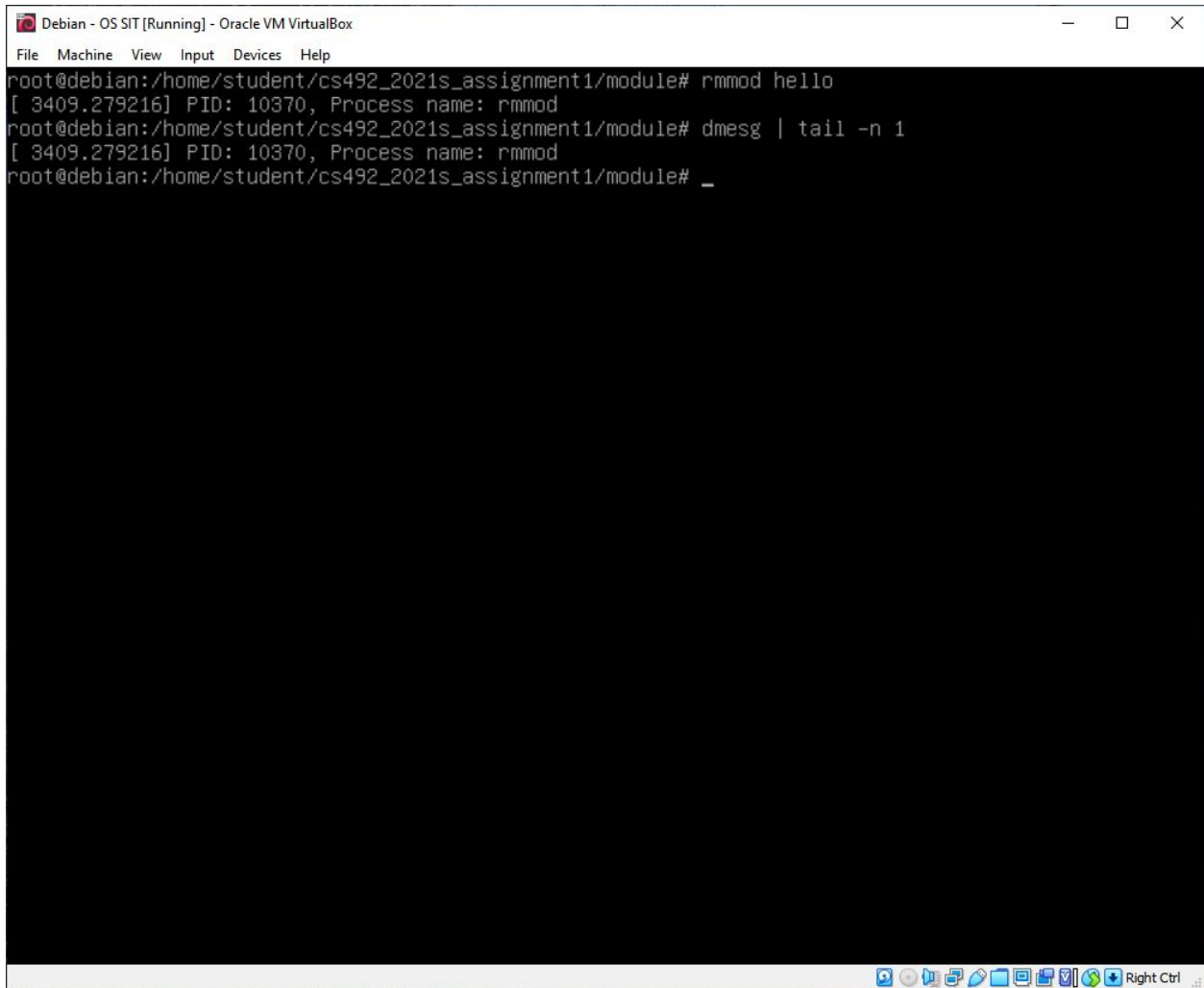


The screenshot shows a terminal window titled "Debian - OS SIT [Running] - Oracle VM VirtualBox". The terminal output is as follows:

```
root@debian:/home/student/cs492_2021s_assignment1/module# insmod ./hello.ko
[ 3343.456249] Hello World from Max Shi (10439248)
root@debian:/home/student/cs492_2021s_assignment1/module# dmesg | tail -n 1
[ 3343.456249] Hello World from Max Shi (10439248)
root@debian:/home/student/cs492_2021s_assignment1/module#
```

The terminal window has a menu bar with "File", "Machine", "View", "Input", "Devices", and "Help". The bottom of the window shows a taskbar with various icons and a "Right Ctrl" button.

Screenshot 5: Unloading hello kernel module



The screenshot shows a terminal window titled "Debian - OS SIT [Running] - Oracle VM VirtualBox". The terminal output is as follows:

```
root@debian:/home/student/cs492_2021s_assignment1/module# rmmod hello
[ 3409.279216] PID: 10370, Process name: rmmod
root@debian:/home/student/cs492_2021s_assignment1/module# dmesg | tail -n 1
[ 3409.279216] PID: 10370, Process name: rmmod
root@debian:/home/student/cs492_2021s_assignment1/module# _
```

The terminal window has a menu bar with "File", "Machine", "View", "Input", "Devices", and "Help". The bottom status bar shows various icons and the text "Right Ctrl".

Commit URL:

<https://github.com/stevens-cs492/cs-492-2021s-assignment1-smax253/commit/90751663972067ede6a795bbda0174fbde1752a4>