

Name: Ken Lin

SID: 006198682

Github repository of my code : <https://github.com/DehNutCase/CSE-461>

Part 1:

Simple Shell log:

I don't know why ls didn't work for the first run but did for the second.

```
Script started on 2020-04-09 17:04:01-07:00 [TERM="xterm" TTY="/dev/pts/2"
COLUMNS="80" LINES="24"]
```

```
]0;006198682@csusb.edu@jb358-7:~/cse461
```

```
[006198682@csusb.edu@jb358-7 cse461]$ ./aShell
```

```
[1;1H[2J#ls
```

```
ls: cannot access "$\273\377\177': No such file or directory
```

```
#
```

```
ls: cannot access "$\273\377\177': No such file or directory
```

```
#help
```

```
#
```

```
#ls
```

```
ls: cannot access "$\273\377\177': No such file or directory
```

```
#exit
```

```
#exit
```

```
#exit
```

```
]0;006198682@csusb.edu@jb358-7:~/cse461
```

```
[006198682@csusb.edu@jb358-7 cse461]$ ./aShell
```

```
[1;1H[2J#ls
```

```
SimpleShell.c cp_command.txt lab1_cp_command.txt xv6_1.txt
```

```
aShell debugging_script_1.txt simple_shell.txt xv6_2.txt
```

```
aShell.txt debugging_script_2.txt xv6
```

```
#ls
SimpleShell.c cp_command.txt          lab1_cp_command.txt xv6_1.txt
aShell      debugging_script_1.txt simple_shell.txt  xv6_2.txt
aShell.txt   debugging_script_2.txt xv6
#ls
SimpleShell.c cp_command.txt          lab1_cp_command.txt xv6_1.txt
aShell      debugging_script_1.txt simple_shell.txt  xv6_2.txt
aShell.txt   debugging_script_2.txt xv6
#
SimpleShell.c cp_command.txt          lab1_cp_command.txt xv6_1.txt
aShell      debugging_script_1.txt simple_shell.txt  xv6_2.txt
aShell.txt   debugging_script_2.txt xv6
#
SimpleShell.c cp_command.txt          lab1_cp_command.txt xv6_1.txt
aShell      debugging_script_1.txt simple_shell.txt  xv6_2.txt
aShell.txt   debugging_script_2.txt xv6
#exit
j0;006198682@csusb.edu@jb358-7:~/cse461
[006198682@csusb.edu@jb358-7 cse461]$ ./aShell
[1;1H[2J#
#ls
SimpleShell.c cp_command.txt          lab1_cp_command.txt xv6_1.txt
aShell      debugging_script_1.txt simple_shell.txt  xv6_2.txt
aShell.txt   debugging_script_2.txt xv6
#help
#ls
ls: cannot access 'p': No such file or directory
#
```

ls: cannot access 'p': No such file or directory

#exit

#ls

ls: cannot access 'p': No such file or directory

#exit

#exit

]0;006198682@csusb.edu@jb358-7:~/cse461

[006198682@csusb.edu@jb358-7 cse461]\$ e[K

exit

Script done on 2020-04-09 17:04:58-07:00 [COMMAND_EXIT_CODE="0"]

Part 2:

Xv6 debugger mode, disassembling kernel.

Log of debugger:

Script started on 2020-04-09 15:04:11-07:00 [TERM="xterm" TTY="/dev/pts/4"
COLUMNS="114" LINES="29"]

]0;006198682@csusb.edu@jb358-7:~/cse461[006198682@csusb.edu@jb358-7 cse461]\$ cd xv6

]0;006198682@csusb.edu@jb358-7:~/cse461/xv6[006198682@csusb.edu@jb358-7 xv6]\$ gdb

[35;1mGNU gdb (GDB) Fedora 8.3-6.fc30

[mCopyright (C) 2019 Free Software Foundation, Inc.

License GPLv3+: GNU GPL version 3 or later <<http://gnu.org/licenses/gpl.html>>

This is free software: you are free to change and redistribute it.

There is NO WARRANTY, to the extent permitted by law.

Type "show copying" and "show warranty" for details.

This GDB was configured as "x86_64-redhat-linux-gnu".

Type "show configuration" for configuration details.

For bug reporting instructions, please see:

<<http://www.gnu.org/software/gdb/bugs/>>.

Find the GDB manual and other documentation resources online at:

<<http://www.gnu.org/software/gdb/documentation/>>.

For help, type "help".

Type "apropos word" to search for commands related to "word".

warning: File "/home/csusb.edu/006198682/cse461/xv6/.gdbinit" auto-loading has been declined by your `auto-load safe-path' set to "\$debugdir:\$datadir/auto-load:/usr/lib/golang/src/runtime/runtime-gdb.py".

To enable execution of this file add

```
add-auto-load-safe-path /home/csusb.edu/006198682/cse461/xv6/.gdbinit
```

line to your configuration file "/home/csusb.edu/006198682/.gdbinit".

To completely disable this security protection add

```
set auto-load safe-path /
```

line to your configuration file "/home/csusb.edu/006198682/.gdbinit".

For more information about this security protection see the

"Auto-loading safe path" section in the GDB manual. E.g., run from the shell:

```
info "(gdb)Auto-loading safe path"
```

```
(gdb) target remote 27604
```

```
27604: No such file or directory.
```

```
(gdb) tr[Karget remote :27604
```

```
Remote debugging using :27604
```

warning: Remote gdbserver does not support determining executable automatically.

RHEL <=6.8 and <=7.2 versions of gdbserver do not support such automatic executable detection.

The following versions of gdbserver support it:

- Upstream version of gdbserver (unsupported) 7.10 or later
- Red Hat Developer Toolset (DTS) version of gdbserver from DTS 4.0 or later (only on x86_64)
- RHEL-7.3 versions of gdbserver (on any architecture)

warning: No executable has been specified and target does not support
determining executable automatically. Try using the "file" command.

[34m0x0000fff0[m in [33m??[m ()

(gdb) continue

Continuing.

file ^C

Thread 1 received signal SIGINT, Interrupt.

[34m0x801037e1[m in [33m??[m ()

(gdb) file kernel

A program is being debugged already.

Are you sure you want to change the file? (y or n) y

Reading symbols from [32mkernel[m...

(gdb) set disassembly-flavor intel

(gdb) disass

Dump of assembler code for function mycpu:

```
[34m0x801037d0[m <+0>: push  ebp
[34m0x801037d1[m <+1>: mov   ebp,esp
[34m0x801037d3[m <+3>: push  esi
[34m0x801037d4[m <+4>: push  ebx
[34m0x801037d5[m <+5>: pushf
[34m0x801037d6[m <+6>: pop   eax
[34m0x801037d7[m <+7>: test  ah,0x2
[34m0x801037da[m <+10>:      jne  0x8010382a <mycpu+90>
[34m0x801037dc[m <+12>:      call 0x80102800 <lapicid>
=> [34m0x801037e1[m <+17>:      mov  esi,DWORD PTR ds:0x80112d00
[34m0x801037e7[m <+23>:      mov  ebx,eax
[34m0x801037e9[m <+25>:      test esi,esi
[34m0x801037eb[m <+27>:      jle  0x8010381d <mycpu+77>
```

```

[34m0x801037ed[m <+29>:      xor   edx,edx
[34m0x801037ef[m <+31>:jmp   0x801037ff <mycpu+47>
[34m0x801037f1[m <+33>:      lea   esi,[esi+eiz*1+0x0]
[34m0x801037f8[m <+40>:      add   edx,0x1
[34m0x801037fb[m <+43>:      cmp   edx,esi
[34m0x801037fd[m <+45>:      je    0x8010381d <mycpu+77>
[34m0x801037ff[m <+47>:imul  ecx,edx,0xb0
[34m0x80103805[m <+53>:      movzx  eax,BYTE PTR [ecx-0x7feed880]
[34m0x8010380c[m <+60>:      cmp   eax,ebx
[34m0x8010380e[m <+62>:      jne   0x801037f8 <mycpu+40>
[34m0x80103810[m <+64>:      lea   esp,[ebp-0x8]
[34m0x80103813[m <+67>:      lea   eax,[ecx-0x7feed880]
[34m0x80103819[m <+73>:      pop   ebx
[34m0x8010381a[m <+74>:      pop   esi

```

[m--Type <RET> for more, q to quit, c to continue without paging--

```

[34m0x8010381b[m <+75>:      pop   ebp
[34m0x8010381c[m <+76>:      ret
[34m0x8010381d[m <+77>:      sub   esp,0xc
[34m0x80103820[m <+80>:      push  0x801073c7
[34m0x80103825[m <+85>:      call  0x80100380 <panic>
[34m0x8010382a[m <+90>:      sub   esp,0xc
[34m0x8010382d[m <+93>:      push  0x801074a4
[34m0x80103832[m <+98>:      call  0x80100380 <panic>

```

End of assembler dump.

(gdb) Quit

(gdb) quit

A debugging session is active.

Inferior 1 [Remote target] will be detached.

Quit anyway? (y or n) y

Detaching from program: /home/csusb.edu/006198682/cse461/xv6/kernel, Remote target

Ending remote debugging.

[Inferior 1 (Remote target) detached]

]0;006198682@csusb.edu@jb358-7:~/cse461/xv6[006198682@csusb.edu@jb358-7 xv6]\$ exit

Script done on 2020-04-09 15:05:47-07:00 [COMMAND_EXIT_CODE="0"]

Log of xv6:

Script started on 2020-04-09 15:04:07-07:00 [TERM="xterm" TTY="/dev/pts/0"
COLUMNS="113" LINES="30"]

]0;006198682@csusb.edu@jb358-7:~/cse461[006198682@csusb.edu@jb358-7 cse461]\$ cd xv6

]0;006198682@csusb.edu@jb358-7:~/cse461/xv6[006198682@csusb.edu@jb358-7 xv6]\$ make
qemu-nox-gdb

dd if=/dev/zero of=xv6.img count=10000

10000+0 records in

10000+0 records out

5120000 bytes (5.1 MB, 4.9 MiB) copied, 0.645025 s, 7.9 MB/s

dd if=bootblock of=xv6.img conv=notrunc

1+0 records in

1+0 records out

512 bytes copied, 0.001909 s, 268 kB/s

dd if=kernel of=xv6.img seek=1 conv=notrunc

416+1 records in

416+1 records out

213104 bytes (213 kB, 208 KiB) copied, 0.0071189 s, 29.9 MB/s

which: no qemu in

(/opt/anaconda3/bin:/opt/Xilinx/SDK/2018.2/bin:/opt/Xilinx/SDK/2018.2/gnu/microblaze/lin/bin
:/opt/Xilinx/SDK/2018.2/gnu/arm/lin/bin:/opt/Xilinx/SDK/2018.2/gnu/microblaze/linux_toolchai

n/lin64_le/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch32/lin/gcc-arm-linux-
gnueabi/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch32/lin/gcc-arm-none-
eabi/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch64/lin/aarch64-
linux/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch64/lin/aarch64-
none/bin:/opt/Xilinx/SDK/2018.2/gnu/armr5/lin/gcc-arm-none-
eabi/bin:/opt/Xilinx/SDK/2018.2/tps/lnx64/cmake-
3.3.2/bin:/opt/Xilinx/DocNav:/opt/Xilinx/Vivado/2018.2/bin:/usr/lib64/openmpi/bin:/opt/UCSF/
Chimera64-
1.12/bin:/usr/local/MATLAB/R2018a/bin:/share/bin:/usr/local/racket/bin:/opt/Xilinx/14.7/ISE_DS/ISE/bin/lin64:/opt/Xilinx/14.7/ISE_DS/common/bin/lin64:/opt/Xilinx/Vivado/2017.2/bin:/opt/
Xilinx/Vivado_HLS/2017.2/bin:/opt/android-studio/bin:/opt/android-sdk-
linux/tools:/opt/android-sdk-linux/platform-
tools:/usr/java/latest/bin:/opt/anaconda3/bin:/opt/Xilinx/SDK/2018.2/bin:/opt/Xilinx/SDK/2018.
2/gnu/microblaze/lin/bin:/opt/Xilinx/SDK/2018.2/gnu/arm/lin/bin:/opt/Xilinx/SDK/2018.2/gnu/
microblaze/linux_toolchain/lin64_le/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch32/lin/gcc-arm-linux-
gnueabi/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch32/lin/gcc-arm-none-
eabi/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch64/lin/aarch64-
linux/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch64/lin/aarch64-
none/bin:/opt/Xilinx/SDK/2018.2/gnu/armr5/lin/gcc-arm-none-
eabi/bin:/opt/Xilinx/SDK/2018.2/tps/lnx64/cmake-
3.3.2/bin:/opt/Xilinx/DocNav:/opt/Xilinx/Vivado/2018.2/bin:/usr/lib64/openmpi/bin:/opt/UCSF/
Chimera64-
1.12/bin:/usr/local/MATLAB/R2018a/bin:/share/bin:/usr/local/racket/bin:/opt/Xilinx/14.7/ISE_DS/ISE/bin/lin64:/opt/Xilinx/14.7/ISE_DS/common/bin/lin64:/opt/Xilinx/Vivado/2017.2/bin:/opt/
Xilinx/Vivado_HLS/2017.2/bin:/opt/android-studio/bin:/opt/android-sdk-
linux/tools:/opt/android-sdk-linux/platform-
tools:/usr/java/latest/bin:/opt/anaconda3/bin:/opt/Xilinx/SDK/2018.2/bin:/opt/Xilinx/SDK/2018.
2/gnu/microblaze/lin/bin:/opt/Xilinx/SDK/2018.2/gnu/arm/lin/bin:/opt/Xilinx/SDK/2018.2/gnu/
microblaze/linux_toolchain/lin64_le/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch32/lin/gcc-arm-linux-
gnueabi/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch32/lin/gcc-arm-none-
eabi/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch64/lin/aarch64-
linux/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch64/lin/aarch64-
none/bin:/opt/Xilinx/SDK/2018.2/gnu/armr5/lin/gcc-arm-none-
eabi/bin:/opt/Xilinx/SDK/2018.2/tps/lnx64/cmake-
3.3.2/bin:/opt/Xilinx/DocNav:/opt/Xilinx/Vivado/2018.2/bin:/usr/lib64/openmpi/bin:/opt/UCSF/
Chimera64-
1.12/bin:/usr/local/MATLAB/R2018a/bin:/share/bin:/usr/local/racket/bin:/opt/Xilinx/14.7/ISE_DS/ISE/bin/lin64:/opt/Xilinx/14.7/ISE_DS/common/bin/lin64:/opt/Xilinx/Vivado/2017.2/bin:/opt/
Xilinx/Vivado_HLS/2017.2/bin:/opt/android-studio/bin:/opt/android-sdk-
linux/tools:/opt/android-sdk-linux/platform-tools:/usr/java/latest/bin:/usr/lib64/qt-
3.3/bin:/usr/share/Modules/bin:/usr/lib64/ccache:/usr/local/bin:/usr/bin:/usr/local/sbin:/usr/sbin:/
home/csusb.edu/006198682/.local/bin:/home/csusb.edu/006198682/bin)

which: no qemu in

(/opt/anaconda3/bin:/opt/Xilinx/SDK/2018.2/bin:/opt/Xilinx/SDK/2018.2/gnu/microblaze/lin/bin:/opt/Xilinx/SDK/2018.2/gnu/arm/lin/bin:/opt/Xilinx/SDK/2018.2/gnu/microblaze/linux_toolchain/lin64_le/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch32/lin/gcc-arm-linux-gnueabi/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch32/lin/gcc-arm-none-eabi/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch64/lin/aarch64-linux/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch64/lin/aarch64-none/bin:/opt/Xilinx/SDK/2018.2/gnu/armv5/lin/gcc-arm-none-eabi/bin:/opt/Xilinx/SDK/2018.2/tps/lin64/cmake-3.3.2/bin:/opt/Xilinx/DocNav:/opt/Xilinx/Vivado/2018.2/bin:/usr/lib64/openmpi/bin:/opt/UCSF/Chimera64-

1.12/bin:/usr/local/MATLAB/R2018a/bin:/share/bin:/usr/local/racket/bin:/opt/Xilinx/14.7/ISE_DS/ISE/bin/lin64:/opt/Xilinx/14.7/ISE_DS/common/bin/lin64:/opt/Xilinx/Vivado/2017.2/bin:/opt/Xilinx/Vivado_HLS/2017.2/bin:/opt/android-studio/bin:/opt/android-sdk-linux/tools:/opt/android-sdk-linux/platform-tools:/usr/java/latest/bin:/opt/anaconda3/bin:/opt/Xilinx/SDK/2018.2/bin:/opt/Xilinx/SDK/2018.2/gnu/microblaze/lin/bin:/opt/Xilinx/SDK/2018.2/gnu/arm/lin/bin:/opt/Xilinx/SDK/2018.2/gnu/microblaze/linux_toolchain/lin64_le/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch32/lin/gcc-arm-linux-gnueabi/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch32/lin/gcc-arm-none-eabi/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch64/lin/aarch64-linux/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch64/lin/aarch64-none/bin:/opt/Xilinx/SDK/2018.2/gnu/armv5/lin/gcc-arm-none-eabi/bin:/opt/Xilinx/SDK/2018.2/tps/lin64/cmake-3.3.2/bin:/opt/Xilinx/DocNav:/opt/Xilinx/Vivado/2018.2/bin:/usr/lib64/openmpi/bin:/opt/UCSF/Chimera64-

1.12/bin:/usr/local/MATLAB/R2018a/bin:/share/bin:/usr/local/racket/bin:/opt/Xilinx/14.7/ISE_DS/ISE/bin/lin64:/opt/Xilinx/14.7/ISE_DS/common/bin/lin64:/opt/Xilinx/Vivado/2017.2/bin:/opt/Xilinx/Vivado_HLS/2017.2/bin:/opt/android-studio/bin:/opt/android-sdk-linux/tools:/opt/android-sdk-linux/platform-tools:/usr/java/latest/bin:/opt/anaconda3/bin:/opt/Xilinx/SDK/2018.2/bin:/opt/Xilinx/SDK/2018.2/gnu/microblaze/lin/bin:/opt/Xilinx/SDK/2018.2/gnu/arm/lin/bin:/opt/Xilinx/SDK/2018.2/gnu/microblaze/linux_toolchain/lin64_le/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch32/lin/gcc-arm-linux-gnueabi/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch32/lin/gcc-arm-none-eabi/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch64/lin/aarch64-linux/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch64/lin/aarch64-none/bin:/opt/Xilinx/SDK/2018.2/gnu/armv5/lin/gcc-arm-none-eabi/bin:/opt/Xilinx/SDK/2018.2/tps/lin64/cmake-3.3.2/bin:/opt/Xilinx/DocNav:/opt/Xilinx/Vivado/2018.2/bin:/usr/lib64/openmpi/bin:/opt/UCSF/Chimera64-

1.12/bin:/usr/local/MATLAB/R2018a/bin:/share/bin:/usr/local/racket/bin:/opt/Xilinx/14.7/ISE_DS/ISE/bin/lin64:/opt/Xilinx/14.7/ISE_DS/common/bin/lin64:/opt/Xilinx/Vivado/2017.2/bin:/opt/Xilinx/Vivado_HLS/2017.2/bin:/opt/android-studio/bin:/opt/android-sdk-linux/tools:/opt/android-sdk-linux/platform-tools:/usr/java/latest/bin:/usr/lib64/qt-

3.3/bin:/usr/share/Modules/bin:/usr/lib64/ccache:/usr/local/bin:/usr/bin:/usr/local/sbin:/usr/sbin:/home/csusb.edu/006198682/.local/bin:/home/csusb.edu/006198682/bin)

*** Now run 'gdb'.

qemu-system-i386 -nographic -drive file=fs.img,index=1,media=disk,format=raw -drive file=xv6.img,index=0,media=disk,format=raw -smp 2 -m 512 -S -gdb tcp::27604

c[?7l[2J[0mSeaBIOS (version 1.12.0-2.fc30)

iPXE (<http://ipxe.org>) 00:03.0 C980 PCI2.10 PnP PMM+1FF91280+1FED1280 C980

Press Ctrl-B to configure iPXE (PCI 00:03.0)...

Booting from Hard Disk...

xv6...

cpu1: starting 1

cpu0: starting 0

sb: size 1000 nblocks 941 ninodes 200 nlog 30 logstart 2 inodestart 32 bmap start 58

init: starting sh

\$ ex ls

. 1 1 512

.. 1 1 512

README 2 2 2290

cat 2 3 16132

echo 2 4 14972

```
forktest    2 5 9296
grep        2 6 18328
init        2 7 15576
kill        2 8 15000
ln          2 9 14872
ls          2 10 17496
mkdir       2 11 15116
rm          2 12 15092
sh          2 13 27616
stressfs    2 14 16008
usertests   2 15 66944
wc          2 16 16856
zombie      2 17 14688
console     3 18 0
$ exit
exec: fail
exec exit failed
$ QEMU: Terminated
```

```
j0;006198682@csusb.edu@jb358-7:~/cse461/xv6[006198682@csusb.edu@jb358-7 xv6]$ exit
```

Script done on 2020-04-09 15:05:45-07:00 [COMMAND_EXIT_CODE="0"]

Part 3:

Debugging commands and observations:

The debugger isn't very useful if I don't have the source code in front of me, since there's no way I'd know what switch means or is supposed to do without the source code. Further, it's simpler for me to modify the code directly and change it directly and test the results than to use the debugger to do so.

While the debugger allows me access to the values of variables during run-time, I can obtain that information by simply making my program print to console, so it would only be useful if I ran

into a bug I didn't expect or if I wasn't aware of where a bug was. However, in those cases running the debugger line by line would take, perhaps, just as long as looking over the source code line by line (possibly far longer, if the debugger is going through a loop in the code---a human can get away with reading the loop once, the debugger will have to keep going through the loop).

The debugger doesn't seem very useful for debugging, since it doesn't really do anything that directly modifying the source code and running test doesn't.

Debugger log:

```
Script started on 2020-04-09 14:41:54-07:00 [TERM="xterm" TTY="/dev/pts/4"
COLUMNS="114" LINES="29"]
```

```
[0;006198682@csusb.edu@jb358-7:~/cse461[006198682@csusb.edu@jb358-7 cse461]$ cd xv6
```

```
[0;006198682@csusb.edu@jb358-7:~/cse461/xv6[006198682@csusb.edu@jb358-7 xv6]$ gdb
```

```
[35;1mGNU gdb (GDB) Fedora 8.3-6.fc30
```

```
[mCopyright (C) 2019 Free Software Foundation, Inc.
```

```
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
```

```
This is free software: you are free to change and redistribute it.
```

```
There is NO WARRANTY, to the extent permitted by law.
```

```
Type "show copying" and "show warranty" for details.
```

```
This GDB was configured as "x86_64-redhat-linux-gnu".
```

```
Type "show configuration" for configuration details.
```

```
For bug reporting instructions, please see:
```

```
<http://www.gnu.org/software/gdb/bugs/>.
```

```
Find the GDB manual and other documentation resources online at:
```

```
<http://www.gnu.org/software/gdb/documentation/>.
```

For help, type "help".

Type "apropos word" to search for commands related to "word".

```
warning: File "/home/csusb.edu/006198682/cse461/xv6/.gdbinit" auto-loading has been declined
by your `auto-load safe-path' set to "$debugdir:$datadir/auto-
load:/usr/lib/golang/src/runtime/runtime-gdb.py".
```

To enable execution of this file add

```
add-auto-load-safe-path /home/csusb.edu/006198682/cse461/xv6/.gdbinit
```

line to your configuration file "/home/csusb.edu/006198682/.gdbinit".

To completely disable this security protection add

```
set auto-load safe-path /
```

line to your configuration file "/home/csusb.edu/006198682/.gdbinit".

For more information about this security protection see the

"Auto-loading safe path" section in the GDB manual. E.g., run from the shell:

```
info "(gdb)Auto-loading safe path"
```

```
(gdb) target remote :27604
```

```
Remote debugging using :27604
```

```
warning: Remote gdbserver does not support determining executable automatically.
```

RHEL <=6.8 and <=7.2 versions of gdbserver do not support such automatic executable detection.

The following versions of gdbserver support it:

- Upstream version of gdbserver (unsupported) 7.10 or later
- Red Hat Developer Toolset (DTS) version of gdbserver from DTS 4.0 or later (only on x86_64)
- RHEL-7.3 versions of gdbserver (on any architecture)

```
warning: No executable has been specified and target does not support
determining executable automatically. Try using the "file" command.
```

```
[34m0x0000fff0[m in [33m??[m ()
```

```
(gdb) file kernel
```

```
A program is being debugged already.
```

```
Are you sure you want to change the file? (y or n) y
```

```
Reading symbols from [32mkernel[m...
```

```
(gdb) break swtch
```

```
Breakpoint 1 at [34m0x801046eb[m: file [32mswtch.S[m, line 11.
```

```
(gdb) continue
```

```
Continuing.
```

[Switching to Thread 2]

Thread 2 hit Breakpoint 1, [33mswtch[m () at [32mswtch.S[m:11

```
11      movl [35m4[m[31m(%[m[32mesp[m[31m),[m [31m%[m[32meax[m  
(gdb) step
```

```
12      movl [35m8[m[31m(%[m[32mesp[m[31m),[m [31m%[m[32medx[m  
(gdb) step
```

```
15      pushl [31m%[m[32mebp[m  
(gdb) step
```

[33mswtch[m () at [32mswtch.S[m:16

```
16      pushl [31m%[m[32mebx[m  
(gdb) step
```

[33mswtch[m () at [32mswtch.S[m:17

```
17      pushl [31m%[m[32mesi[m  
(gdb) step
```

[33mswtch[m () at [32mswtch.S[m:18

```
18      pushl [31m%[m[32medi[m  
(gdb) step
```

[33mswtch[m () at [32mswtch.S[m:21

```
21      movl [31m%[m[32mesp[m[31m,[m [31m(%[m[32meax[m[31m)[m  
(gdb) step
```

```
22      movl [31m%[m[32medx[m[31m,[m [31m%[m[32mesp[m  
(gdb) step
```

[33mswtch[m () at [32mswtch.S[m:25

```
25      popl [31m%[m[32medi[m  
(gdb) step
```

[33mswtch[m () at [32mswtch.S[m:26

```
26      popl [31m%[m[32mesi[m
```

(gdb) step

[33mswtch[m () at [32mswtch.S[m:27

27 popl [31m%[m[32mebx[m

(gdb) step

[33mswtch[m () at [32mswtch.S[m:28

28 popl [31m%[m[32mebp[m

(gdb) step

[33mswtch[m () at [32mswtch.S[m:29

29 [01;34mret[m

(gdb) step

[33mforkret[m () at [32mproc.c[m:401

401 [01mrelease[m[31m(&[mptable[31m.[mlock[31m);[m

(gdb) step

[33mrelease[m ([36mlk[m=0x80112d20 <ptable>) at [32mspinlock.c[m:49

49 [01;34mif[m[31m(![m[01mholding[m[31m([mlk[31m))[m

(gdb) step

[33mholding[m ([36mlock[m=0x80112d20 <ptable>) at [32mspinlock.c[m:92

92 [01;34mreturn[m lock[31m->[mlocked [31m&&[m lock[31m->[mcpu [31m==[m
[01mmypcpu[m[31m());[m

(gdb) clear

No breakpoint at this line.

(gdb) continue

Continuing.

Thread 2 hit Breakpoint 1, [33mswtch[m () at [32mswtch.S[m:11

11 movl [35m4[m[31m(%[m[32mesp[m[31m),[m [31m%[m[32meax[m

(gdb) clear

Deleted breakpoint 1

(gdb) continue

Continuing.

break exec

^C

Thread 2 received signal SIGINT, Interrupt.

[34m0x801037e1[m in [33mmypcu[m () at [32mproc.c[m:45

45 apicid [31m=[m [01mlapicid[m[31m());[m

(gdb) break exec

Breakpoint 2 at [34m0x80100a70[m: file [32mexec.c[m, line 20.

(gdb) continue

Continuing.

Thread 2 hit Breakpoint 2, [33mexec[m ([36mpath[m=0x18e0 "ls", [36margv[m=0x8dfbeed0) at [32mexec.c[m:20

20 [01;34mstruct[m [32mproc[m [31m*[mcurproc [31m=[m [01mmyproc[m[31m());[m

(gdb) conti[K[Ktinue

Continuing.

Thread 2 hit Breakpoint 2, [33mexec[m ([36mpath[m=0x18e0 "ls", [36margv[m=0x8df23ed0) at [32mexec.c[m:20

20 [01;34mstruct[m [32mproc[m [31m*[mcurproc [31m=[m [01mmyproc[m[31m());[m

(gdb) continue

Continuing.

[Switching to Thread 1]

Thread 1 hit Breakpoint 2, [33mexec[m ([36mpath[m=0x18e0 "ls", [36margv[m=0x8dfc6ed0) at [32mexec.c[m:20

20 [01;34mstruct[m [32mproc[m [31m*[mcurproc [31m=[m [01mmyproc[m[31m());[m

(gdb) continue

Continuing.

Remote connection closed

(gdb) exit

Undefined command: "exit". Try "help".

(gdb) quit

j0;006198682@csusb.edu@jb358-7:~/cse461/xv6[006198682@csusb.edu@jb358-7 xv6]\$ exit

Script done on 2020-04-09 14:46:35-07:00 [COMMAND_EXIT_CODE="0"]

Xv6 log:

Script started on 2020-04-09 14:42:05-07:00 [TERM="xterm" TTY="/dev/pts/3"
COLUMNS="114" LINES="29"]

j0;006198682@csusb.edu@jb358-7:~/cse461[006198682@csusb.edu@jb358-7 cse461]\$ cd xv6

j0;006198682@csusb.edu@jb358-7:~/cse461/xv6[006198682@csusb.edu@jb358-7 xv6]\$ make
qemu-nox-gdb

dd if=/dev/zero of=xv6.img count=10000

10000+0 records in

10000+0 records out

5120000 bytes (5.1 MB, 4.9 MiB) copied, 0.355392 s, 14.4 MB/s

dd if=bootblock of=xv6.img conv=notrunc

1+0 records in

1+0 records out

512 bytes copied, 0.00182727 s, 280 kB/s

dd if=kernel of=xv6.img seek=1 conv=notrunc

416+1 records in

416+1 records out

213104 bytes (213 kB, 208 KiB) copied, 0.0045323 s, 47.0 MB/s

sed "s/localhost:1234/localhost:27604/" < .gdbinit.tmpl > .gdbinit

which: no qemu in

(/opt/anaconda3/bin:/opt/Xilinx/SDK/2018.2/bin:/opt/Xilinx/SDK/2018.2/gnu/microblaze/lin/bin
:/opt/Xilinx/SDK/2018.2/gnu/arm/lin/bin:/opt/Xilinx/SDK/2018.2/gnu/microblaze/linux_toolchai

n/lin64_le/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch32/lin/gcc-arm-linux-
gnueabi/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch32/lin/gcc-arm-none-
eabi/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch64/lin/aarch64-
linux/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch64/lin/aarch64-
none/bin:/opt/Xilinx/SDK/2018.2/gnu/armr5/lin/gcc-arm-none-
eabi/bin:/opt/Xilinx/SDK/2018.2/tps/lnx64/cmake-
3.3.2/bin:/opt/Xilinx/DocNav:/opt/Xilinx/Vivado/2018.2/bin:/usr/lib64/openmpi/bin:/opt/UCSF/
Chimera64-
1.12/bin:/usr/local/MATLAB/R2018a/bin:/share/bin:/usr/local/racket/bin:/opt/Xilinx/14.7/ISE_DS/ISE/bin/lin64:/opt/Xilinx/14.7/ISE_DS/common/bin/lin64:/opt/Xilinx/Vivado/2017.2/bin:/opt/
Xilinx/Vivado_HLS/2017.2/bin:/opt/android-studio/bin:/opt/android-sdk-
linux/tools:/opt/android-sdk-linux/platform-
tools:/usr/java/latest/bin:/opt/anaconda3/bin:/opt/Xilinx/SDK/2018.2/bin:/opt/Xilinx/SDK/2018.
2/gnu/microblaze/lin/bin:/opt/Xilinx/SDK/2018.2/gnu/arm/lin/bin:/opt/Xilinx/SDK/2018.2/gnu/
microblaze/linux_toolchain/lin64_le/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch32/lin/gcc-arm-linux-
gnueabi/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch32/lin/gcc-arm-none-
eabi/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch64/lin/aarch64-
linux/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch64/lin/aarch64-
none/bin:/opt/Xilinx/SDK/2018.2/gnu/armr5/lin/gcc-arm-none-
eabi/bin:/opt/Xilinx/SDK/2018.2/tps/lnx64/cmake-
3.3.2/bin:/opt/Xilinx/DocNav:/opt/Xilinx/Vivado/2018.2/bin:/usr/lib64/openmpi/bin:/opt/UCSF/
Chimera64-
1.12/bin:/usr/local/MATLAB/R2018a/bin:/share/bin:/usr/local/racket/bin:/opt/Xilinx/14.7/ISE_DS/ISE/bin/lin64:/opt/Xilinx/14.7/ISE_DS/common/bin/lin64:/opt/Xilinx/Vivado/2017.2/bin:/opt/
Xilinx/Vivado_HLS/2017.2/bin:/opt/android-studio/bin:/opt/android-sdk-
linux/tools:/opt/android-sdk-linux/platform-
tools:/usr/java/latest/bin:/opt/anaconda3/bin:/opt/Xilinx/SDK/2018.2/bin:/opt/Xilinx/SDK/2018.
2/gnu/microblaze/lin/bin:/opt/Xilinx/SDK/2018.2/gnu/arm/lin/bin:/opt/Xilinx/SDK/2018.2/gnu/
microblaze/linux_toolchain/lin64_le/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch32/lin/gcc-arm-linux-
gnueabi/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch32/lin/gcc-arm-none-
eabi/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch64/lin/aarch64-
linux/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch64/lin/aarch64-
none/bin:/opt/Xilinx/SDK/2018.2/gnu/armr5/lin/gcc-arm-none-
eabi/bin:/opt/Xilinx/SDK/2018.2/tps/lnx64/cmake-
3.3.2/bin:/opt/Xilinx/DocNav:/opt/Xilinx/Vivado/2018.2/bin:/usr/lib64/openmpi/bin:/opt/UCSF/
Chimera64-
1.12/bin:/usr/local/MATLAB/R2018a/bin:/share/bin:/usr/local/racket/bin:/opt/Xilinx/14.7/ISE_DS/ISE/bin/lin64:/opt/Xilinx/14.7/ISE_DS/common/bin/lin64:/opt/Xilinx/Vivado/2017.2/bin:/opt/
Xilinx/Vivado_HLS/2017.2/bin:/opt/android-studio/bin:/opt/android-sdk-
linux/tools:/opt/android-sdk-linux/platform-tools:/usr/java/latest/bin:/usr/lib64/qt-
3.3/bin:/usr/share/Modules/bin:/usr/lib64/ccache:/usr/local/bin:/usr/bin:/usr/local/sbin:/usr/sbin:/
home/csusb.edu/006198682/.local/bin:/home/csusb.edu/006198682/bin)

which: no qemu in

(/opt/anaconda3/bin:/opt/Xilinx/SDK/2018.2/bin:/opt/Xilinx/SDK/2018.2/gnu/microblaze/lin/bin:/opt/Xilinx/SDK/2018.2/gnu/arm/lin/bin:/opt/Xilinx/SDK/2018.2/gnu/microblaze/linux_toolchain/lin64_le/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch32/lin/gcc-arm-linux-gnueabi/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch32/lin/gcc-arm-none-eabi/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch64/lin/aarch64-linux/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch64/lin/aarch64-none/bin:/opt/Xilinx/SDK/2018.2/gnu/armv5/lin/gcc-arm-none-eabi/bin:/opt/Xilinx/SDK/2018.2/tps/lin64/cmake-3.3.2/bin:/opt/Xilinx/DocNav:/opt/Xilinx/Vivado/2018.2/bin:/usr/lib64/openmpi/bin:/opt/UCSF/Chimera64-

1.12/bin:/usr/local/MATLAB/R2018a/bin:/share/bin:/usr/local/racket/bin:/opt/Xilinx/14.7/ISE_DS/ISE/bin/lin64:/opt/Xilinx/14.7/ISE_DS/common/bin/lin64:/opt/Xilinx/Vivado/2017.2/bin:/opt/Xilinx/Vivado_HLS/2017.2/bin:/opt/android-studio/bin:/opt/android-sdk-linux/tools:/opt/android-sdk-linux/platform-tools:/usr/java/latest/bin:/opt/anaconda3/bin:/opt/Xilinx/SDK/2018.2/bin:/opt/Xilinx/SDK/2018.2/gnu/microblaze/lin/bin:/opt/Xilinx/SDK/2018.2/gnu/arm/lin/bin:/opt/Xilinx/SDK/2018.2/gnu/microblaze/linux_toolchain/lin64_le/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch32/lin/gcc-arm-linux-gnueabi/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch32/lin/gcc-arm-none-eabi/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch64/lin/aarch64-linux/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch64/lin/aarch64-none/bin:/opt/Xilinx/SDK/2018.2/gnu/armv5/lin/gcc-arm-none-eabi/bin:/opt/Xilinx/SDK/2018.2/tps/lin64/cmake-3.3.2/bin:/opt/Xilinx/DocNav:/opt/Xilinx/Vivado/2018.2/bin:/usr/lib64/openmpi/bin:/opt/UCSF/Chimera64-

1.12/bin:/usr/local/MATLAB/R2018a/bin:/share/bin:/usr/local/racket/bin:/opt/Xilinx/14.7/ISE_DS/ISE/bin/lin64:/opt/Xilinx/14.7/ISE_DS/common/bin/lin64:/opt/Xilinx/Vivado/2017.2/bin:/opt/Xilinx/Vivado_HLS/2017.2/bin:/opt/android-studio/bin:/opt/android-sdk-linux/tools:/opt/android-sdk-linux/platform-tools:/usr/java/latest/bin:/opt/anaconda3/bin:/opt/Xilinx/SDK/2018.2/bin:/opt/Xilinx/SDK/2018.2/gnu/microblaze/lin/bin:/opt/Xilinx/SDK/2018.2/gnu/arm/lin/bin:/opt/Xilinx/SDK/2018.2/gnu/microblaze/linux_toolchain/lin64_le/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch32/lin/gcc-arm-linux-gnueabi/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch32/lin/gcc-arm-none-eabi/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch64/lin/aarch64-linux/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch64/lin/aarch64-none/bin:/opt/Xilinx/SDK/2018.2/gnu/armv5/lin/gcc-arm-none-eabi/bin:/opt/Xilinx/SDK/2018.2/tps/lin64/cmake-3.3.2/bin:/opt/Xilinx/DocNav:/opt/Xilinx/Vivado/2018.2/bin:/usr/lib64/openmpi/bin:/opt/UCSF/Chimera64-

1.12/bin:/usr/local/MATLAB/R2018a/bin:/share/bin:/usr/local/racket/bin:/opt/Xilinx/14.7/ISE_DS/ISE/bin/lin64:/opt/Xilinx/14.7/ISE_DS/common/bin/lin64:/opt/Xilinx/Vivado/2017.2/bin:/opt/Xilinx/Vivado_HLS/2017.2/bin:/opt/android-studio/bin:/opt/android-sdk-linux/tools:/opt/android-sdk-linux/platform-tools:/usr/java/latest/bin:/usr/lib64/qt-

3.3/bin:/usr/share/Modules/bin:/usr/lib64/ccache:/usr/local/bin:/usr/bin:/usr/local/sbin:/usr/sbin:/home/csusb.edu/006198682/.local/bin:/home/csusb.edu/006198682/bin)

*** Now run 'gdb'.

qemu-system-i386 -nographic -drive file=fs.img,index=1,media=disk,format=raw -drive file=xv6.img,index=0,media=disk,format=raw -smp 2 -m 512 -S -gdb tcp::27604

c[?7l[2J[0mSeaBIOS (version 1.12.0-2.fc30)

iPXE (<http://ipxe.org>) 00:03.0 C980 PCI2.10 PnP PMM+1FF91280+1FED1280 C980

Press Ctrl-B to configure iPXE (PCI 00:03.0)...

Booting from Hard Disk..xv6...

cpu1: starting 1

cpu0: starting 0

sb: size 1000 nblocks 941 ninodes 200 nlog 30 logstart 2 inodestart 32 bmap start 58

init: starting sh

\$ ls

. 1 1 512

.. 1 1 512

README 2 2 2290

cat 2 3 16132

echo 2 4 14972

forktest 2 5 9296

grep 2 6 18328

init	2 7 15576
kill	2 8 15000
ln	2 9 14872
ls	2 10 17496
mkdir	2 11 15116
rm	2 12 15092
sh	2 13 27616
stressfs	2 14 16008
usertests	2 15 66944
wc	2 16 16856
zombie	2 17 14688
console	3 18 0
\$ ls	
.	1 1 512
..	1 1 512
README	2 2 2290
cat	2 3 16132
echo	2 4 14972
forktest	2 5 9296
grep	2 6 18328
init	2 7 15576
kill	2 8 15000
ln	2 9 14872
ls	2 10 17496
mkdir	2 11 15116
rm	2 12 15092
sh	2 13 27616
stressfs	2 14 16008

usertests 2 15 66944

wc 2 16 16856

zombie 2 17 14688

console 3 18 0

\$ ls -l

ls: cannot open -l

\$ QEMU: Terminated

]0;006198682@csusb.edu@jb358-7:~/cse461/xv6[006198682@csusb.edu@jb358-7 xv6]\$ exit

Script done on 2020-04-09 14:46:37-07:00 [COMMAND_EXIT_CODE="0"]

Part 4:

CP command:

Log of XV6 running the cp command:

Script started on 2020-04-09 16:46:47-07:00 [TERM="xterm" TTY="/dev/pts/2"
COLUMNS="116" LINES="27"]

]0;006198682@csusb.edu@jb358-7:~/cse461

[006198682@csusb.edu@jb358-7 cse461]\$ cd xv6

]0;006198682@csusb.edu@jb358-7:~/cse461/xv6

[006198682@csusb.edu@jb358-7 xv6]\$ make qemu-0 [Knox

dd if=/dev/zero of=xv6.img count=10000

10000+0 records in

10000+0 records out

5120000 bytes (5.1 MB, 4.9 MiB) copied, 0.434345 s, 11.8 MB/s

dd if=bootblock of=xv6.img conv=notrunc

1+0 records in

1+0 records out

512 bytes copied, 0.00136823 s, 374 kB/s

dd if=kernel of=xv6.img seek=1 conv=notrunc

416+1 records in

416+1 records out

213104 bytes (213 kB, 208 KiB) copied, 0.00649258 s, 32.8 MB/s

which: no qemu in

(/opt/anaconda3/bin:/opt/Xilinx/SDK/2018.2/bin:/opt/Xilinx/SDK/2018.2/gnu/microblaze/lin/bin:/opt/Xilinx/SDK/2018.2/gnu/arm/lin/bin:/opt/Xilinx/SDK/2018.2/gnu/microblaze/linux_toolchain/lin64_le/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch32/lin/gcc-arm-linux-gnueabi/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch32/lin/gcc-arm-none-eabi/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch64/lin/aarch64-linux/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch64/lin/aarch64-none/bin:/opt/Xilinx/SDK/2018.2/gnu/armv5/lin/gcc-arm-none-eabi/bin:/opt/Xilinx/SDK/2018.2/tps/lin64/cmake-3.3.2/bin:/opt/Xilinx/DocNav:/opt/Xilinx/Vivado/2018.2/bin:/usr/lib64/openmpi/bin:/opt/UCSF/Chimera64-1.12/bin:/usr/local/MATLAB/R2018a/bin:/share/bin:/usr/local/racket/bin:/opt/Xilinx/14.7/ISE_DS/ISE/bin/lin64:/opt/Xilinx/14.7/ISE_DS/common/bin/lin64:/opt/Xilinx/Vivado/2017.2/bin:/opt/Xilinx/Vivado_HLS/2017.2/bin:/opt/android-studio/bin:/opt/android-sdk-linux/tools:/opt/android-sdk-linux/platform-tools:/usr/java/latest/bin:/opt/anaconda3/bin:/opt/Xilinx/SDK/2018.2/bin:/opt/Xilinx/SDK/2018.2/gnu/microblaze/lin/bin:/opt/Xilinx/SDK/2018.2/gnu/arm/lin/bin:/opt/Xilinx/SDK/2018.2/gnu/microblaze/linux_toolchain/lin64_le/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch32/lin/gcc-arm-linux-gnueabi/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch32/lin/gcc-arm-none-eabi/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch64/lin/aarch64-linux/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch64/lin/aarch64-none/bin:/opt/Xilinx/SDK/2018.2/gnu/armv5/lin/gcc-arm-none-eabi/bin:/opt/Xilinx/SDK/2018.2/tps/lin64/cmake-3.3.2/bin:/opt/Xilinx/DocNav:/opt/Xilinx/Vivado/2018.2/bin:/usr/lib64/openmpi/bin:/opt/UCSF/Chimera64-1.12/bin:/usr/local/MATLAB/R2018a/bin:/share/bin:/usr/local/racket/bin:/opt/Xilinx/14.7/ISE_DS/ISE/bin/lin64:/opt/Xilinx/14.7/ISE_DS/common/bin/lin64:/opt/Xilinx/Vivado/2017.2/bin:/opt/Xilinx/Vivado_HLS/2017.2/bin:/opt/android-studio/bin:/opt/android-sdk-linux/tools:/opt/android-sdk-linux/platform-tools:/usr/java/latest/bin:/opt/anaconda3/bin:/opt/Xilinx/SDK/2018.2/bin:/opt/Xilinx/SDK/2018.2/gnu/microblaze/lin/bin:/opt/Xilinx/SDK/2018.2/gnu/arm/lin/bin:/opt/Xilinx/SDK/2018.2/gnu/microblaze/linux_toolchain/lin64_le/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch32/lin/gcc-arm-linux-gnueabi/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch32/lin/gcc-arm-none-eabi/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch64/lin/aarch64-linux/bin:/opt/Xilinx/SDK/2018.2/gnu/aarch64/lin/aarch64-none/bin:/opt/Xilinx/SDK/2018.2/gnu/armv5/lin/gcc-arm-none-

```
eabi/bin:/opt/Xilinx/SDK/2018.2/tps/lnx64/cmake-
3.3.2/bin:/opt/Xilinx/DocNav:/opt/Xilinx/Vivado/2018.2/bin:/usr/lib64/openmpi/bin:/opt/UCSF/
Chimera64-
1.12/bin:/usr/local/MATLAB/R2018a/bin:/share/bin:/usr/local/racket/bin:/opt/Xilinx/14.7/ISE_DS/ISE/bin/lin64:/opt/Xilinx/14.7/ISE_DS/common/bin/lin64:/opt/Xilinx/Vivado/2017.2/bin:/opt/
Xilinx/Vivado_HLS/2017.2/bin:/opt/android-studio/bin:/opt/android-sdk-
linux/tools:/opt/android-sdk-linux/platform-tools:/usr/java/latest/bin:/usr/lib64/qt-
3.3/bin:/usr/share/Modules/bin:/usr/lib64/ccache:/usr/local/bin:/usr/bin:/usr/local/sbin:/usr/sbin:/
home/csusb.edu/006198682/.local/bin:/home/csusb.edu/006198682/bin)
```

```
qemu-system-i386 -nographic -drive file=fs.img,index=1,media=disk,format=raw -drive
file=xv6.img,index=0,media=disk,format=raw -smp 2 -m 512
```

```
c [?7l [2J [0mSeaBIOS (version 1.12.0-2.fc30)
```

iPXE (<http://ipxe.org>) 00:03.0 C980 PCI2.10 PnP PMM+1FF91280+1FED1280 C980

Press Ctrl-B to configure iPXE (PCI 00:03.0)...

Booting from Hard Disk...

xv6...

cpu1: starting 1

cpu0: starting 0

sb: size 1000 nblocks 941 ninodes 200 nlog 30 logstart 2 inodestart 32 bmap start 58

init: starting sh

\$ cp

Need 2 arguments!

\$ ls


```
.          1 1 512
..         1 1 512
README    2 2 2290
cat        2 3 16132
echo       2 4 14972
forktest   2 5 9296
grep        2 6 18328
init        2 7 15576
kill        2 8 15000
ln          2 9 14872
ls          2 10 17496
mkdir       2 11 15116
rm          2 12 15092
sh          2 13 27616
stressfs    2 14 16008
usertests   2 15 66944
wc          2 16 16856
cp          2 17 15444
zombie      2 18 14688
console     3 19 0
$ cp README test
$ ls
.          1 1 512
..         1 1 512
README    2 2 2290
cat        2 3 16132
echo       2 4 14972
forktest   2 5 9296
```

grep	2 6 18328
init	2 7 15576
kill	2 8 15000
ln	2 9 14872
ls	2 10 17496
mkdir	2 11 15116
rm	2 12 15092
sh	2 13 27616
stressfs	2 14 16008
usertests	2 15 66944
wc	2 16 16856
cp	2 17 15444
zombie	2 18 14688
console	3 19 0
test	2 20 2290

\$ cat test

xv6 is a re-implementation of Dennis Ritchie's and Ken Thompson's Unix Version 6 (v6). xv6 loosely follows the structure and style of v6, but is implemented for a modern x86-based multiprocessor using ANSI C.

ACKNOWLEDGMENTS

xv6 is inspired by John Lions's Commentary on UNIX 6th Edition (Peer to Peer Communications; ISBN: 1-57398-013-7; 1st edition (June 14, 2000)). See also <http://pdos.csail.mit.edu/6.828/2016/xv6.html>, which provides pointers to on-line resources for v6.

xv6 borrows code from the following sources:

JOS (asm.h, elf.h, mmu.h, bootasm.S, ide.c, console.c, and others)

Plan 9 (entryother.S, mp.h, mp.c, lapic.c)

FreeBSD (ioapic.c)

NetBSD (console.c)

The following people have made contributions: Russ Cox (context switching, locking), Cliff Frey (MP), Xiao Yu (MP), Nickolai Zeldovich, and Austin Clements.

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The code in the files that constitute xv6 is

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ERROR REPORTS

Please send errors and suggestions to Frans Kaashoek and Robert Morris (kaashoek,rtm@mit.edu). The main purpose of xv6 is as a teaching operating system for MIT's 6.828, so we are more interested in simplifications and clarifications than new features.

BUILDING AND RUNNING XV6

To build xv6 on an x86 ELF machine (like Linux or FreeBSD), run "make". On non-x86 or non-ELF machines (like OS X, even on x86), you will need to install a cross-compiler gcc suite capable of producing x86 ELF binaries. See <http://pdos.csail.mit.edu/6.828/2016/tools.html>. Then run "make TOOLPREFIX=i386-jos-elf-". Now install the QEMU PC simulator and run "make qemu".

\$ QEMU: Terminated

```
j0;006198682@csusb.edu@jb358-7:~/cse461/xv6  
[006198682@csusb.edu@jb358-7 xv6]$ exit
```

Script done on 2020-04-09 16:47:12-07:00 [COMMAND_EXIT_CODE="0"]