Riley Erickson UTILS LAB QUESTIONS

1. What has to be changed in order for cat to become kittycat? Hint, output from the Unix utility diff provides the preferred answer

Kittycat does not allow arguments

```
<   if(argc <= 1){
<       cat(0);
<       exit(0);
---
>   if(argc != 1){
>       fprintf(2, "kittycat: No args allowed\n");
>       exit(1);
```

2. On what line (number) is the Makefile is kittycat added in order to build and include it in thedisk image? Hint, grep can print line numbers

191: $U/_kittycat

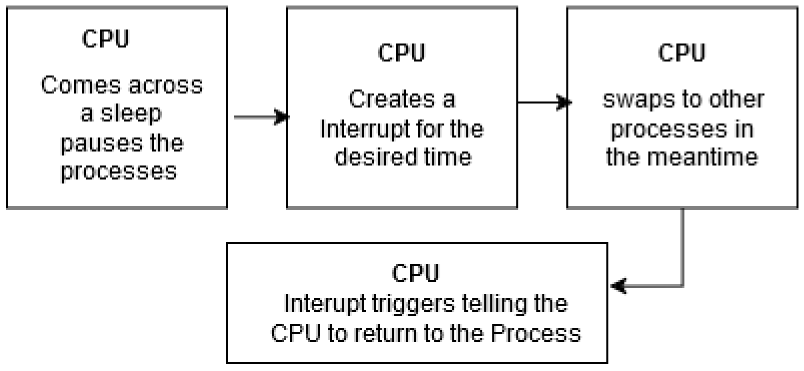
3. Can you redirect the output of kittycat to a file and use diff to verify the two files are the same? I

In XV6 you are able to redirect the output of kittycat to a new file instead of stdout, but there is not built in diff for xv6, so that would have to be done in linux

4. What is the type of argv[1] and why is it an appropriate argument for atoi()?

a pointer and atoi is used to convert it from ascii to a usable integer

5. Use a process state diagram to explain how you think the OS implements a sleeping Process.


CPU
Comes across a sleep pauses the processes
CPU
Creates a Interrupt for the desired time
CPU
swaps to other processes in the meantime
CPU
Interupt triggers telling the CPU to return to the Process

6. Examine the details of the nums.txt file. Use the Unix utility hd. This provides a hexadecimal dump of the contents of the file. What are the first three bytes of the file in hex and in ASCII?
hex(31 30 0) ascii(1 0 \n)

7. How many processes are created for this solution? – hint add a counter.
11

9. What is the condition that causes find() to make its recursive call?
if (st.type == T_DIR && strcmp(p, ".") != 0 && strcmp(p, "..") != 0)

10. What would happen if the algorithm recursed into the . file?
It would repeat forever since the ". file" represents the current directly meaning it would continuously reread the same directory.

11. What does the Linux command `$ echo > b` do?
replaces/makes a file called b that is empty.

12. The testing has a command $ sh < xargstest.sh. What does this command do?
Direct the contents of xargs.sh to the shell

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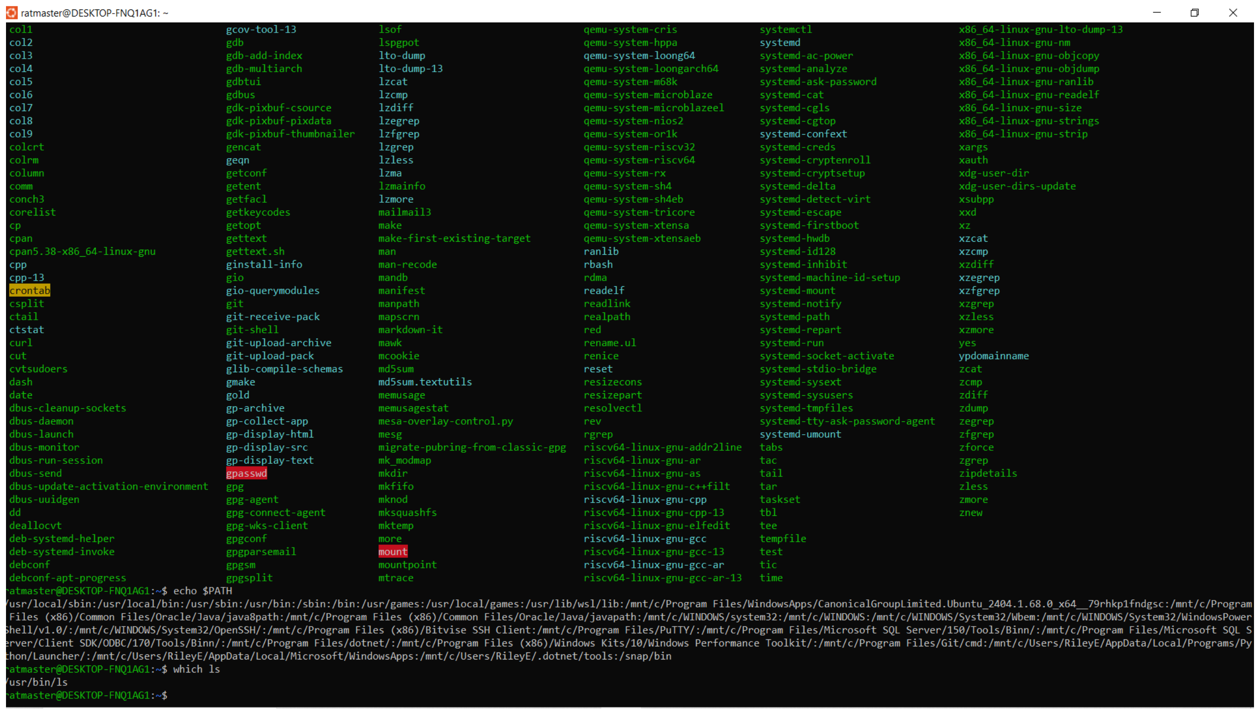
13 What is the `sh` program?

The shell

14. Perform the following.



ratmaster@DESKTOP-FNQ1AG1: ~

```
col1                                gcov-tool-13             lsof                               qemu-system-cris              systemctl                        x86_64-linux-gnu-lto-dump-13
col2                                gdb                      lspgpot                            qemu-system-hppa              systemd                          x86_64-linux-gnu-nm
col3                                gdb-add-index            lto-dump                           qemu-system-loong64           systemd-ac-power                 x86_64-linux-gnu-objcopy
col4                                gdb-multiarch            lto-dump-13                        qemu-system-loongarch64       systemd-analyze                  x86_64-linux-gnu-objdump
col5                                gdbtui                   lzcat                              qemu-system-m68k              systemd-ask-password             x86_64-linux-gnu-ranlib
col6                                gdbus                    lzcmp                              qemu-system-microblaze        systemd-cat                      x86_64-linux-gnu-readelf
col7                                gdk-pixbuf-csource       lzdiff                             qemu-system-microblazeel      systemd-cgls                     x86_64-linux-gnu-size
col8                                gdk-pixbuf-pixdata       lzegrep                            qemu-system-nios2             systemd-cgtop                    x86_64-linux-gnu-strings
col9                                gdk-pixbuf-thumbnailer   lzfgrep                            qemu-system-or1k              systemd-confext                  x86_64-linux-gnu-strip
colcrt                              gencat                   lzgrep                             qemu-system-riscv32           systemd-creds                    xargs
colrm                               geqn                     lzless                             qemu-system-riscv64           systemd-cryptenroll              xauth
column                              getconf                  lzma                               qemu-system-rx                systemd-cryptsetup               xdg-user-dir
comm                                getent                   lzmainfo                           qemu-system-sh4               systemd-delta                    xdg-user-dirs-update
conch3                              getfacl                  lzmore                             qemu-system-sh4eb             systemd-detect-virt              xsubpp
corelist                            getkeycodes              mailmail3                          qemu-system-tricore           systemd-escape                   xxd
cp                                  getopt                   make                               qemu-system-xtensa            systemd-firstboot                xz
cpan                                gettext                  make-first-existing-target         qemu-system-xtensaeb          systemd-hwdb                     xzcat
cpan5.38-x86_64-linux-gnu           gettext.sh               man                                ranlib                        systemd-id128                    xzcmp
cpp                                 ginstall-info            man-recode                         rbash                         systemd-inhibit                  xzdiff
cpp-13                              gio                      mandb                              rdma                          systemd-machine-id-setup         xzegrep
crontab                             gio-querymodules         manifest                           readelf                       systemd-mount                    xzfgrep
csplit                              git                      manpath                            readlink                      systemd-notify                   xzgrep
ctail                               git-receive-pack         mapscrn                            realpath                      systemd-path                     xzless
ctstat                              git-shell                markdown-it                        red                           systemd-repart                   xzmore
curl                                git-upload-archive       mawk                               rename.ul                     systemd-run                      yes
cut                                 git-upload-pack          mcookie                            renice                        systemd-socket-activate          ypdomainname
cvtsudoers                          glib-compile-schemas     md5sum                             reset                         systemd-stdio-bridge             zcat
dash                                gmake                    md5sum.textutils                   resizecons                    systemd-sysext                   zcmp
date                                gold                     memusage                           resizepart                    systemd-sysusers                 zdiff
dbus-cleanup-sockets                gp-archive               memusagestat                       resolvectl                    systemd-tmpfiles                 zdump
dbus-daemon                         gp-collect-app           mesa-overlay-control.py            rev                           systemd-tty-ask-password-agent   zegrep
dbus-launch                         gp-display-html          mesg                               rgrep                         systemd-umount                   zfgrep
dbus-monitor                        gp-display-src           migrate-pubring-from-classic-gpg   riscv64-linux-gnu-addr2line   tabs                             zforce
dbus-run-session                    gp-display-text          mk_modmap                          riscv64-linux-gnu-ar          tac                              zgrep
dbus-send                           gpasswd                  mkdir                              riscv64-linux-gnu-as          tail                             zipdetails
dbus-update-activation-environment  gpg                      mkfifo                             riscv64-linux-gnu-c++filt     tar                              zless
dbus-uuidgen                        gpg-agent                mknod                              riscv64-linux-gnu-cpp         taskset                          zmore
dd                                  gpg-connect-agent        mksquashfs                         riscv64-linux-gnu-cpp-13      tbl                              znew
deallocvt                           gpg-wks-client           mktemp                             riscv64-linux-gnu-elfedit     tee
deb-systemd-helper                  gpgconf                  more                               riscv64-linux-gnu-gcc         tempfile
deb-systemd-invoke                  gpgparsemail             mount                              riscv64-linux-gnu-gcc-13      test
debconf                             gpgsm                    mountpoint                         riscv64-linux-gnu-gcc-ar      tic
debconf-apt-progress                gpgsplit                 mtrace                             riscv64-linux-gnu-gcc-ar-13   time
atmaster@DESKTOP-FNQ1AG1:~$ echo $PATH
/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/games:/usr/local/games:/usr/lib/wsl/lib:/mnt/c/Program Files/WindowsApps/CanonicalGroupLimited.Ubuntu_2404.1.68.0_x64__79rhkp1fndgsc:/mnt/c/Program
 Files (x86)/Common Files/Oracle/Java/java8path:/mnt/c/Program Files (x86)/Common Files/Oracle/Java/javapath:/mnt/c/WINDOWS/system32:/mnt/c/WINDOWS:/mnt/c/WINDOWS/System32/Wbem:/mnt/c/WINDOWS/System32/WindowsPower
Shell/v1.0/:/mnt/c/WINDOWS/System32/OpenSSH/:/mnt/c/Program Files (x86)/Bitvise SSH Client:/mnt/c/Program Files/PuTTY/:/mnt/c/Program Files/Microsoft SQL Server/150/Tools/Binn/:/mnt/c/Program Files/Microsoft SQL S
erver/Client SDK/ODBC/170/Tools/Binn/:/mnt/c/Program Files/dotnet/:/mnt/c/Program Files (x86)/Windows Kits/10/Windows Performance Toolkit/:/mnt/c/Program Files/Git/cmd:/mnt/c/Users/RileyE/AppData/Local/Programs/Py
thon/Launcher/:/mnt/c/Users/RileyE/AppData/Local/Microsoft/WindowsApps:/mnt/c/Users/RileyE/.dotnet/tools:/snap/bin
atmaster@DESKTOP-FNQ1AG1:~$ which ls
/usr/bin/ls
atmaster@DESKTOP-FNQ1AG1:~$
```

15. Explain in your own words what a xv6/Linux pipe is.

A buffer that allows one way communication from a child /parent process.

16. Notice how the I/O functions `read()` and `write()` are used for reading/writing both files and pipes. The `open()` function and the `pipe()` function both return a file descriptor. Explain in your own words what is the difference between reading/writing pipes and files?

Files are more permanent then a pipe so it is written to into memory, while a pipe is more temporary where it's data is FIFO and is not editable.