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Lab 8 Log

First I need to create a trivial
c program, called lab8.c, where I compute
the cos(sqrt(3.0)). I include the stdio.h
and math.h libraries. I then use the spec
to use printf("%.17g", result). My final
program looks like:


```c
#include <stdio.h>
#include <math.h>

int main(void)
{
  double result = cos(sqrt(3.0));
  printf("%.17g", result);
  return 0;
}
```

I then run:
```
$ gcc -o lab8 lab8.c
$ ./lab8
```
and my program outputs:
-0.16055653857469052

Then I want to see which libraries my
program uses:

```
$ ldd lab8
```
which gives:
```
      linux-vdso.so.1 =>  (0x00007ffda4998000)
      libc.so.6 => /lib64/libc.so.6 (0x00007f1e3538c000)
      /lib64/ld-linux-x86-64.so.2 (0x000055f771a5f000)
```
Next I want to use strace to see
which system calls my program makes.

```
$ strace -o strace.txt ./lab8
```

I then analyze strace.txt to look for the
system calls.

```
execve("./lab8", ["./lab8"], [/* 34 vars */]) = 0
brk(NULL)                               = 0xb05000
mmap(NULL, 4096, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1,
0) = 0x7f89ab58f000
access("/etc/ld.so.preload", R_OK)      = -1 ENOENT (No such file or
```

```
directory)
open("/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
fstat(3, {st_mode=S_IFREG|0644, st_size=153128, ...}) = 0
mmap(NULL, 153128, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7f89ab569000
close(3)                                = 0
open("/lib64/libc.so.6", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>
\0\1\0\0\0\20\35\2\0\0\0\0\0"..., 832) = 832
fstat(3, {st_mode=S_IFREG|0755, st_size=2127336, ...}) = 0
mmap(NULL, 3940800, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3,
0) = 0x7f89aafac000
mprotect(0x7f89ab164000, 2097152, PROT_NONE) = 0
mmap(0x7f89ab364000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x1b8000) = 0x7f89ab364000
mmap(0x7f89ab36a000, 16832, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7f89ab36a000
close(3)                                = 0
mmap(NULL, 4096, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1,
0) = 0x7f89ab568000
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1,
0) = 0x7f89ab566000
arch_prctl(ARCH_SET_FS, 0x7f89ab566740) = 0
mprotect(0x7f89ab364000, 16384, PROT_READ) = 0
mprotect(0x600000, 4096, PROT_READ)     = 0
mprotect(0x7f89ab590000, 4096, PROT_READ) = 0
munmap(0x7f89ab569000, 153128)          = 0
fstat(1, {st_mode=S_IFCHR|0620, st_rdev=makedev(136, 4), ...}) = 0
mmap(NULL, 4096, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1,
0) = 0x7f89ab58e000
write(1, "-0.16055653857469052", 20)    = 20
exit_group(0)                           = ?
+++ exited with 0 +++
```

Strace shows that the program uses a few different system calls,
most importantly are access, mmap, open, close, fstat,
read, mprotect, and write.

The open command accesses the two libraries included
in my program, stdio.h and math.h, while close
closes the access to each of the libraries. We
know this because it is formatted as close(3), which
was the number given to each open (open(..) = 3).
Fstat helps calculate the size of the libraries to store
and then mmap allocates the correct amount of bytes from
that size. Read will read the informatio from the library
locations and then write writes the result to output.

Next, I want to run the following command:
$ ls /usr/bin | awk 'NR%101==404751250%101'
To get a list of commands to investigate:

```
abrt-action-analyze-xorg
autom4te
check-binary-files
db47_load
dviluatex
flex
glxinfo64
gtk3-demo
icotool
jstat
kpsewhich
linux-boot-prober
mkafmmap
nfs4_getfacl
opgprof
perlbug
pmtrace
rcs
satyr
snice
tar
unix2mac
xconsole
ypdomainname
```

I then want to use ldd on each command.
First I switch into the directory where each
command is:
$ cd /usr/bin

```
$ ldd abrt-action-analyze-xorg
  linux-vdso.so.1 =>  (0x00007ffdc1f2a000)
  libabrt.so.0 => /lib64/libabrt.so.0 (0x00007fb2259f8000)
  libgio-2.0.so.0 => /lib64/libgio-2.0.so.0 (0x00007fb225664000)
  libgobject-2.0.so.0 => /lib64/libgobject-2.0.so.0
(0x00007fb225413000)
  libreport.so.0 => /lib64/libreport.so.0 (0x00007fb2251e7000)
  libglib-2.0.so.0 => /lib64/libglib-2.0.so.0 (0x00007fb224ed5000)
  libsatyr.so.3 => /lib64/libsatyr.so.3 (0x00007fb224aa7000)
  libc.so.6 => /lib64/libc.so.6 (0x00007fb2246e4000)
  libffi.so.6 => /lib64/libffi.so.6 (0x00007fb2244dc000)
  libgmodule-2.0.so.0 => /lib64/libgmodule-2.0.so.0
(0x00007fb2242d7000)
  libdl.so.2 => /lib64/libdl.so.2 (0x00007fb2240d3000)
  libpcre.so.1 => /lib64/libpcre.so.1 (0x00007fb223e71000)
  libpthread.so.0 => /lib64/libpthread.so.0 (0x00007fb223c54000)
  libz.so.1 => /lib64/libz.so.1 (0x00007fb223a3e000)
  libselinux.so.1 => /lib64/libselinux.so.1 (0x00007fb223817000)
  libresolv.so.2 => /lib64/libresolv.so.2 (0x00007fb2235fc000)
```

```
libmount.so.1 => /lib64/libmount.so.1 (0x00007fb2233bb000)
libtar.so.1 => /lib64/libtar.so.1 (0x00007fb2231af000)
libjson-c.so.2 => /lib64/libjson-c.so.2 (0x00007fb222fa3000)
libsystemd.so.0 => /lib64/libsystemd.so.0 (0x00007fb222f7b000)
libaugeas.so.0 => /lib64/libaugeas.so.0 (0x00007fb222d2e000)
libstdc++.so.6 => /lib64/libstdc++.so.6 (0x00007fb222a25000)
librpm.so.3 => /lib64/librpm.so.3 (0x00007fb2227be000)
libdw.so.1 => /lib64/libdw.so.1 (0x00007fb222577000)
libelf.so.1 => /lib64/libelf.so.1 (0x00007fb22235e000)
/lib64/ld-linux-x86-64.so.2 (0x00005580aeae6000)
libblkid.so.1 => /lib64/libblkid.so.1 (0x00007fb22211f000)
libuuid.so.1 => /lib64/libuuid.so.1 (0x00007fb221f19000)
libcap.so.2 => /lib64/libcap.so.2 (0x00007fb221d14000)
libm.so.6 => /lib64/libm.so.6 (0x00007fb221a12000)
librt.so.1 => /lib64/librt.so.1 (0x00007fb221809000)
liblzma.so.5 => /lib64/liblzma.so.5 (0x00007fb2215e3000)
libgcrypt.so.11 => /lib64/libgcrypt.so.11 (0x00007fb221362000)
libgpg-error.so.0 => /lib64/libgpg-error.so.0 (0x00007fb22115c000)
libgcc_s.so.1 => /lib64/libgcc_s.so.1 (0x00007fb220f46000)
libfa.so.1 => /lib64/libfa.so.1 (0x00007fb220d33000)
libxml2.so.2 => /lib64/libxml2.so.2 (0x00007fb2209c8000)
librpmio.so.3 => /lib64/librpmio.so.3 (0x00007fb22079b000)
libnss3.so => /lib64/libnss3.so (0x00007fb220471000)
libbz2.so.1 => /lib64/libbz2.so.1 (0x00007fb220260000)
libpopt.so.0 => /lib64/libpopt.so.0 (0x00007fb220056000)
libacl.so.1 => /lib64/libacl.so.1 (0x00007fb21fe4d000)
liblua-5.1.so => /lib64/liblua-5.1.so (0x00007fb21fc1e000)
libdb-5.3.so => /lib64/libdb-5.3.so (0x00007fb21f85f000)
libattr.so.1 => /lib64/libattr.so.1 (0x00007fb21f659000)
libnssutil3.so => /lib64/libnssutil3.so (0x00007fb21f42c000)
libplc4.so => /lib64/libplc4.so (0x00007fb21f226000)
libplds4.so => /lib64/libplds4.so (0x00007fb21f022000)
libnspr4.so => /lib64/libnspr4.so (0x00007fb21ede4000)

$ ldd autom4te
  not a dynamic executable

$ ldd check-binary-files
  not a dynamic executable

$ ldd db47_load
  linux-vdso.so.1 =>  (0x00007fffaf0b3000)
  libdb-4.7.so => /usr/lib64/libdb-4.7.so (0x00007ff803d10000)
  libpthread.so.0 => /usr/lib64/libpthread.so.0 (0x00007ff803af4000)
  libc.so.6 => /usr/lib64/libc.so.6 (0x00007ff803730000)
  /lib64/ld-linux-x86-64.so.2 (0x000055e3c6443000)

$ ldd dviluatex
  linux-vdso.so.1 =>  (0x00007fffe5d34000)
  libcairo.so.2 => /lib64/libcairo.so.2 (0x00007f8ff8b20000)
```

```
    libpixman-1.so.0 => /lib64/libpixman-1.so.0 (0x00007f8ff8877000)
    libzzip-0.so.13 => /lib64/libzzip-0.so.13 (0x00007f8ff866e000)
    libpng15.so.15 => /lib64/libpng15.so.15 (0x00007f8ff8443000)
    libz.so.1 => /lib64/libz.so.1 (0x00007f8ff822d000)
    libpoppler.so.46 => /lib64/libpoppler.so.46 (0x00007f8ff7d9d000)
    libkpathsea.so.6 => /lib64/libkpathsea.so.6 (0x00007f8ff7b84000)
    libdl.so.2 => /lib64/libdl.so.2 (0x00007f8ff7980000)
    libstdc++.so.6 => /lib64/libstdc++.so.6 (0x00007f8ff7677000)
    libm.so.6 => /lib64/libm.so.6 (0x00007f8ff7375000)
    libgcc_s.so.1 => /lib64/libgcc_s.so.1 (0x00007f8ff715f000)
    libc.so.6 => /lib64/libc.so.6 (0x00007f8ff6d9b000)
    libpthread.so.0 => /lib64/libpthread.so.0 (0x00007f8ff6b7f000)
    libfontconfig.so.1 => /lib64/libfontconfig.so.1 (0x00007f8ff6942000)
    libfreetype.so.6 => /lib64/libfreetype.so.6 (0x00007f8ff669b000)
    libEGL.so.1 => /lib64/libEGL.so.1 (0x00007f8ff646e000)
    libxcb-shm.so.0 => /lib64/libxcb-shm.so.0 (0x00007f8ff626a000)
    libxcb.so.1 => /lib64/libxcb.so.1 (0x00007f8ff6041000)
    libxcb-render.so.0 => /lib64/libxcb-render.so.0 (0x00007f8ff5e33000)
    libXrender.so.1 => /lib64/libXrender.so.1 (0x00007f8ff5c28000)
    libX11.so.6 => /lib64/libX11.so.6 (0x00007f8ff58e9000)
    libXext.so.6 => /lib64/libXext.so.6 (0x00007f8ff56d7000)
    libGL.so.1 => /lib64/libGL.so.1 (0x00007f8ff5465000)
    librt.so.1 => /lib64/librt.so.1 (0x00007f8ff525c000)
    /lib64/ld-linux-x86-64.so.2 (0x0000555a58541000)
    liblcms2.so.2 => /lib64/liblcms2.so.2 (0x00007f8ff5002000)
    libtiff.so.5 => /lib64/libtiff.so.5 (0x00007f8ff4d8d000)
    libjpeg.so.62 => /lib64/libjpeg.so.62 (0x00007f8ff4b38000)
    libopenjpeg.so.1 => /lib64/libopenjpeg.so.1 (0x00007f8ff4914000)
    libexpat.so.1 => /lib64/libexpat.so.1 (0x00007f8ff46e9000)
    libselinux.so.1 => /lib64/libselinux.so.1 (0x00007f8ff44c2000)
    libX11-xcb.so.1 => /lib64/libX11-xcb.so.1 (0x00007f8ff42c0000)
    libxcb-dri2.so.0 => /lib64/libxcb-dri2.so.0 (0x00007f8ff40ba000)
    libxcb-xfixes.so.0 => /lib64/libxcb-xfixes.so.0 (0x00007f8ff3eb2000)
    libxcb-dri3.so.0 => /lib64/libxcb-dri3.so.0 (0x00007f8ff3caf000)
    libxcb-present.so.0 => /lib64/libxcb-present.so.0
(0x00007f8ff3aab000)
    libxcb-sync.so.1 => /lib64/libxcb-sync.so.1 (0x00007f8ff38a4000)
    libxshmfence.so.1 => /lib64/libxshmfence.so.1 (0x00007f8ff36a2000)
    libgbm.so.1 => /lib64/libgbm.so.1 (0x00007f8ff3495000)
    libdrm.so.2 => /lib64/libdrm.so.2 (0x00007f8ff3286000)
    libXau.so.6 => /lib64/libXau.so.6 (0x00007f8ff3082000)
    libglapi.so.0 => /lib64/libglapi.so.0 (0x00007f8ff2e52000)
    libXdamage.so.1 => /lib64/libXdamage.so.1 (0x00007f8ff2c4f000)
    libXfixes.so.3 => /lib64/libXfixes.so.3 (0x00007f8ff2a49000)
    libxcb-glx.so.0 => /lib64/libxcb-glx.so.0 (0x00007f8ff282d000)
    libXxf86vm.so.1 => /lib64/libXxf86vm.so.1 (0x00007f8ff2627000)
    libjbig.so.2.0 => /lib64/libjbig.so.2.0 (0x00007f8ff241a000)
    libpcre.so.1 => /lib64/libpcre.so.1 (0x00007f8ff21b8000)

$ ldd flex
```

```
   linux-vdso.so.1 =>  (0x00007ffc3f5f5000)
   libm.so.6 => /lib64/libm.so.6 (0x00007fe351179000)
   libc.so.6 => /lib64/libc.so.6 (0x00007fe350db6000)
   /lib64/ld-linux-x86-64.so.2 (0x000055c0950ae000)

$ ldd glxinfo64
   linux-vdso.so.1 =>  (0x00007ffc1c36b000)
   libGL.so.1 => /lib64/libGL.so.1 (0x00007f2795624000)
   libX11.so.6 => /lib64/libX11.so.6 (0x00007f27952e6000)
   libc.so.6 => /lib64/libc.so.6 (0x00007f2794f22000)
   libexpat.so.1 => /lib64/libexpat.so.1 (0x00007f2794cf8000)
   libxcb-dri3.so.0 => /lib64/libxcb-dri3.so.0 (0x00007f2794af5000)
   libxcb-present.so.0 => /lib64/libxcb-present.so.0
(0x00007f27948f1000)
   libxcb-sync.so.1 => /lib64/libxcb-sync.so.1 (0x00007f27946ea000)
   libxshmfence.so.1 => /lib64/libxshmfence.so.1 (0x00007f27944e8000)
   libglapi.so.0 => /lib64/libglapi.so.0 (0x00007f27942b8000)
   libselinux.so.1 => /lib64/libselinux.so.1 (0x00007f2794091000)
   libXext.so.6 => /lib64/libXext.so.6 (0x00007f2793e7f000)
   libXdamage.so.1 => /lib64/libXdamage.so.1 (0x00007f2793c7b000)
   libXfixes.so.3 => /lib64/libXfixes.so.3 (0x00007f2793a75000)
   libX11-xcb.so.1 => /lib64/libX11-xcb.so.1 (0x00007f2793873000)
   libxcb.so.1 => /lib64/libxcb.so.1 (0x00007f279364a000)
   libxcb-glx.so.0 => /lib64/libxcb-glx.so.0 (0x00007f279342f000)
   libxcb-dri2.so.0 => /lib64/libxcb-dri2.so.0 (0x00007f279322a000)
   libXxf86vm.so.1 => /lib64/libXxf86vm.so.1 (0x00007f2793023000)
   libdrm.so.2 => /lib64/libdrm.so.2 (0x00007f2792e14000)
   libm.so.6 => /lib64/libm.so.6 (0x00007f2792b12000)
   libpthread.so.0 => /lib64/libpthread.so.0 (0x00007f27928f5000)
   libdl.so.2 => /lib64/libdl.so.2 (0x00007f27926f1000)
   /lib64/ld-linux-x86-64.so.2 (0x000056376f7a2000)
   libXau.so.6 => /lib64/libXau.so.6 (0x00007f27924ec000)
   libpcre.so.1 => /lib64/libpcre.so.1 (0x00007f279228a000)

$ ldd gtk3-demo
   linux-vdso.so.1 =>  (0x00007ffd27351000)
   libgtk-3.so.0 => /lib64/libgtk-3.so.0 (0x00007f7fcf35b000)
   libgdk-3.so.0 => /lib64/libgdk-3.so.0 (0x00007f7fcf0a3000)
   libgmodule-2.0.so.0 => /lib64/libgmodule-2.0.so.0
(0x00007f7fcee9e000)
   librt.so.1 => /lib64/librt.so.1 (0x00007f7fcec96000)
   libatk-1.0.so.0 => /lib64/libatk-1.0.so.0 (0x00007f7fcea70000)
   libatk-bridge-2.0.so.0 => /lib64/libatk-bridge-2.0.so.0
(0x00007f7fce840000)
   libpangocairo-1.0.so.0 => /lib64/libpangocairo-1.0.so.0
(0x00007f7fce633000)
   libgdk_pixbuf-2.0.so.0 => /lib64/libgdk_pixbuf-2.0.so.0
(0x00007f7fce40b000)
   libcairo-gobject.so.2 => /lib64/libcairo-gobject.so.2
(0x00007f7fce201000)
```

```
libgio-2.0.so.0 => /lib64/libgio-2.0.so.0 (0x00007f7fcde6d000)
libXinerama.so.1 => /lib64/libXinerama.so.1 (0x00007f7fcdc6a000)
libXi.so.6 => /lib64/libXi.so.6 (0x00007f7fcda59000)
libXrandr.so.2 => /lib64/libXrandr.so.2 (0x00007f7fcd84e000)
libXcursor.so.1 => /lib64/libXcursor.so.1 (0x00007f7fcd643000)
libXcomposite.so.1 => /lib64/libXcomposite.so.1 (0x00007f7fcd43f000)
libXdamage.so.1 => /lib64/libXdamage.so.1 (0x00007f7fcd23c000)
libXfixes.so.3 => /lib64/libXfixes.so.3 (0x00007f7fcd036000)
libcairo.so.2 => /lib64/libcairo.so.2 (0x00007f7fccd0d000)
libX11.so.6 => /lib64/libX11.so.6 (0x00007f7fcc9cf000)
libXext.so.6 => /lib64/libXext.so.6 (0x00007f7fcc7bd000)
libepoxy.so.0 => /lib64/libepoxy.so.0 (0x00007f7fcc4c7000)
libm.so.6 => /lib64/libm.so.6 (0x00007f7fcc1c5000)
libharfbuzz.so.0 => /lib64/libharfbuzz.so.0 (0x00007f7fcbf62000)
libpangoft2-1.0.so.0 => /lib64/libpangoft2-1.0.so.0
(0x00007f7fcbd4b000)
libpango-1.0.so.0 => /lib64/libpango-1.0.so.0 (0x00007f7fcbb00000)
libfontconfig.so.1 => /lib64/libfontconfig.so.1 (0x00007f7fcb8c3000)
libgobject-2.0.so.0 => /lib64/libgobject-2.0.so.0
(0x00007f7fcb672000)
libglib-2.0.so.0 => /lib64/libglib-2.0.so.0 (0x00007f7fcb360000)
libfreetype.so.6 => /lib64/libfreetype.so.6 (0x00007f7fcb0ba000)
libpthread.so.0 => /lib64/libpthread.so.0 (0x00007f7fcae9d000)
libc.so.6 => /lib64/libc.so.6 (0x00007f7fcaada000)
libdl.so.2 => /lib64/libdl.so.2 (0x00007f7fca8d5000)
libpcre.so.1 => /lib64/libpcre.so.1 (0x00007f7fca673000)
libatspi.so.0 => /lib64/libatspi.so.0 (0x00007f7fca443000)
libdbus-1.so.3 => /lib64/libdbus-1.so.3 (0x00007f7fca1fa000)
libthai.so.0 => /lib64/libthai.so.0 (0x00007f7fc9fee000)
libgthread-2.0.so.0 => /lib64/libgthread-2.0.so.0
(0x00007f7fc9dec000)
libpng15.so.15 => /lib64/libpng15.so.15 (0x00007f7fc9bc0000)
libpixman-1.so.0 => /lib64/libpixman-1.so.0 (0x00007f7fc9917000)
libEGL.so.1 => /lib64/libEGL.so.1 (0x00007f7fc96ea000)
libxcb-shm.so.0 => /lib64/libxcb-shm.so.0 (0x00007f7fc94e5000)
libxcb.so.1 => /lib64/libxcb.so.1 (0x00007f7fc92bd000)
libxcb-render.so.0 => /lib64/libxcb-render.so.0 (0x00007f7fc90af000)
libXrender.so.1 => /lib64/libXrender.so.1 (0x00007f7fc8ea3000)
libz.so.1 => /lib64/libz.so.1 (0x00007f7fc8c8d000)
libGL.so.1 => /lib64/libGL.so.1 (0x00007f7fc8a1b000)
libffi.so.6 => /lib64/libffi.so.6 (0x00007f7fc8812000)
libselinux.so.1 => /lib64/libselinux.so.1 (0x00007f7fc85eb000)
libresolv.so.2 => /lib64/libresolv.so.2 (0x00007f7fc83d1000)
libmount.so.1 => /lib64/libmount.so.1 (0x00007f7fc818f000)
/lib64/ld-linux-x86-64.so.2 (0x000055c25147e000)
libgraphite2.so.3 => /lib64/libgraphite2.so.3 (0x00007f7fc7f61000)
libexpat.so.1 => /lib64/libexpat.so.1 (0x00007f7fc7d36000)
libX11-xcb.so.1 => /lib64/libX11-xcb.so.1 (0x00007f7fc7b34000)
libxcb-dri2.so.0 => /lib64/libxcb-dri2.so.0 (0x00007f7fc792e000)
libxcb-xfixes.so.0 => /lib64/libxcb-xfixes.so.0 (0x00007f7fc7726000)
```

```
   libxcb-dri3.so.0 => /lib64/libxcb-dri3.so.0 (0x00007f7fc7523000)
   libxcb-present.so.0 => /lib64/libxcb-present.so.0
(0x00007f7fc731f000)
   libxcb-sync.so.1 => /lib64/libxcb-sync.so.1 (0x00007f7fc7118000)
   libxshmfence.so.1 => /lib64/libxshmfence.so.1 (0x00007f7fc6f16000)
   libgbm.so.1 => /lib64/libgbm.so.1 (0x00007f7fc6d09000)
   libdrm.so.2 => /lib64/libdrm.so.2 (0x00007f7fc6afa000)
   libXau.so.6 => /lib64/libXau.so.6 (0x00007f7fc68f6000)
   libglapi.so.0 => /lib64/libglapi.so.0 (0x00007f7fc66c6000)
   libxcb-glx.so.0 => /lib64/libxcb-glx.so.0 (0x00007f7fc64ab000)
   libXxf86vm.so.1 => /lib64/libXxf86vm.so.1 (0x00007f7fc62a5000)
   libblkid.so.1 => /lib64/libblkid.so.1 (0x00007f7fc6065000)
   libuuid.so.1 => /lib64/libuuid.so.1 (0x00007f7fc5e60000)
   libgcc_s.so.1 => /lib64/libgcc_s.so.1 (0x00007f7fc5c49000)

$ ldd icotool
   linux-vdso.so.1 =>  (0x00007ffcf99c4000)
   libpng15.so.15 => /lib64/libpng15.so.15 (0x00007fc0b2b7b000)
   libz.so.1 => /lib64/libz.so.1 (0x00007fc0b2965000)
   libm.so.6 => /lib64/libm.so.6 (0x00007fc0b2662000)
   libc.so.6 => /lib64/libc.so.6 (0x00007fc0b229f000)
   /lib64/ld-linux-x86-64.so.2 (0x0000556ceaca1000)

$ ldd jstat
   linux-vdso.so.1 =>  (0x00007ffdb8c38000)
   libpthread.so.0 => /lib64/libpthread.so.0 (0x00007fcad7818000)
   libjli.so => /usr/lib/jvm/java-1.7.0-
openjdk-1.7.0.151-2.6.11.1.el7_4.x86_64/jre/lib/amd64/jli/libjli.so
(0x00007fcad7609000)
   libdl.so.2 => /lib64/libdl.so.2 (0x00007fcad7405000)
   libc.so.6 => /lib64/libc.so.6 (0x00007fcad7042000)
   /lib64/ld-linux-x86-64.so.2 (0x000055cb08c9b000)
   libz.so.1 => /lib64/libz.so.1 (0x00007fcad6e2b000)

$ ldd kpsewhich
   linux-vdso.so.1 =>  (0x00007ffc06f8a000)
   libkpathsea.so.6 => /lib64/libkpathsea.so.6 (0x00007f8dc9edc000)
   libc.so.6 => /lib64/libc.so.6 (0x00007f8dc9b19000)
   /lib64/ld-linux-x86-64.so.2 (0x00005598f2055000)

$ ldd linux-boot-prober
   not a dynamic executable

$ ldd mkafmmap
   linux-vdso.so.1 =>  (0x00007ffcd3b55000)
   libm.so.6 => /lib64/libm.so.6 (0x00007f308651a000)
   libc.so.6 => /lib64/libc.so.6 (0x00007f3086157000)
   /lib64/ld-linux-x86-64.so.2 (0x000055d94c2a9000)

$ ldd nfs4_getfacl
```

```
  linux-vdso.so.1 =>  (0x00007ffe297c0000)
  libattr.so.1 => /lib64/libattr.so.1 (0x00007f12b8406000)
  libc.so.6 => /lib64/libc.so.6 (0x00007f12b8043000)
  /lib64/ld-linux-x86-64.so.2 (0x000055a005ae9000)

$ ldd opgprof
  linux-vdso.so.1 =>  (0x00007fff061fa000)
  libpopt.so.0 => /lib64/libpopt.so.0 (0x00007ffbe7fc0000)
  libz.so.1 => /lib64/libz.so.1 (0x00007ffbe7daa000)
  libdl.so.2 => /lib64/libdl.so.2 (0x00007ffbe7ba5000)
  libstdc++.so.6 => /lib64/libstdc++.so.6 (0x00007ffbe789d000)
  libm.so.6 => /lib64/libm.so.6 (0x00007ffbe759b000)
  libgcc_s.so.1 => /lib64/libgcc_s.so.1 (0x00007ffbe7384000)
  libc.so.6 => /lib64/libc.so.6 (0x00007ffbe6fc1000)
  /lib64/ld-linux-x86-64.so.2 (0x000055fdd2f77000)

$ ldd perlbug
  not a dynamic executable

$ ldd pmtrace
  linux-vdso.so.1 =>  (0x00007ffe7b966000)
  libpcp_trace.so.2 => /lib64/libpcp_trace.so.2 (0x00007f5d694fc000)
  libpcp.so.3 => /lib64/libpcp.so.3 (0x00007f5d69274000)
  libc.so.6 => /lib64/libc.so.6 (0x00007f5d68eb0000)
  libpthread.so.0 => /lib64/libpthread.so.0 (0x00007f5d68c94000)
  libdl.so.2 => /lib64/libdl.so.2 (0x00007f5d68a90000)
  libssl3.so => /lib64/libssl3.so (0x00007f5d68843000)
  libnss3.so => /lib64/libnss3.so (0x00007f5d68519000)
  libnspr4.so => /lib64/libnspr4.so (0x00007f5d682db000)
  libsasl2.so.3 => /lib64/libsasl2.so.3 (0x00007f5d680bd000)
  libavahi-common.so.3 => /lib64/libavahi-common.so.3
(0x00007f5d67eb0000)
  libavahi-client.so.3 => /lib64/libavahi-client.so.3
(0x00007f5d67c9f000)
  libm.so.6 => /lib64/libm.so.6 (0x00007f5d6799c000)
  /lib64/ld-linux-x86-64.so.2 (0x0000563b33e82000)
  libnssutil3.so => /lib64/libnssutil3.so (0x00007f5d6776f000)
  libplc4.so => /lib64/libplc4.so (0x00007f5d6756a000)
  libplds4.so => /lib64/libplds4.so (0x00007f5d67365000)
  libz.so.1 => /lib64/libz.so.1 (0x00007f5d6714f000)
  librt.so.1 => /lib64/librt.so.1 (0x00007f5d66f47000)
  libresolv.so.2 => /lib64/libresolv.so.2 (0x00007f5d66d2c000)
  libcrypt.so.1 => /lib64/libcrypt.so.1 (0x00007f5d66af5000)
  libdbus-1.so.3 => /lib64/libdbus-1.so.3 (0x00007f5d668ad000)
  libfreebl3.so => /lib64/libfreebl3.so (0x00007f5d666a9000)

$ ldd rcs
  linux-vdso.so.1 =>  (0x00007fff8b9da000)
  libc.so.6 => /lib64/libc.so.6 (0x00007f97bdbef000)
  /lib64/ld-linux-x86-64.so.2 (0x000055a824344000)
```

```
$ ldd satyr
  linux-vdso.so.1 =>  (0x00007fff367cf000)
  libsatyr.so.3 => /lib64/libsatyr.so.3 (0x00007fe852e76000)
  libz.so.1 => /lib64/libz.so.1 (0x00007fe852c60000)
  libdl.so.2 => /lib64/libdl.so.2 (0x00007fe852a5b000)
  libstdc++.so.6 => /lib64/libstdc++.so.6 (0x00007fe852753000)
  librpm.so.3 => /lib64/librpm.so.3 (0x00007fe8524ec000)
  libdw.so.1 => /lib64/libdw.so.1 (0x00007fe8522a4000)
  libelf.so.1 => /lib64/libelf.so.1 (0x00007fe85208c000)
  libc.so.6 => /lib64/libc.so.6 (0x00007fe851cc9000)
  /lib64/ld-linux-x86-64.so.2 (0x0000558eb2072000)
  libm.so.6 => /lib64/libm.so.6 (0x00007fe8519c6000)
  libgcc_s.so.1 => /lib64/libgcc_s.so.1 (0x00007fe8517b0000)
  librpmio.so.3 => /lib64/librpmio.so.3 (0x00007fe851583000)
  libnss3.so => /lib64/libnss3.so (0x00007fe851258000)
  libbz2.so.1 => /lib64/libbz2.so.1 (0x00007fe851048000)
  liblzma.so.5 => /lib64/liblzma.so.5 (0x00007fe850e22000)
  libpopt.so.0 => /lib64/libpopt.so.0 (0x00007fe850c17000)
  libselinux.so.1 => /lib64/libselinux.so.1 (0x00007fe8509f0000)
  libcap.so.2 => /lib64/libcap.so.2 (0x00007fe8507eb000)
  libacl.so.1 => /lib64/libacl.so.1 (0x00007fe8505e1000)
  liblua-5.1.so => /lib64/liblua-5.1.so (0x00007fe8503b3000)
  libdb-5.3.so => /lib64/libdb-5.3.so (0x00007fe84fff4000)
  libpthread.so.0 => /lib64/libpthread.so.0 (0x00007fe84fdd7000)
  libnssutil3.so => /lib64/libnssutil3.so (0x00007fe84fbaa000)
  libplc4.so => /lib64/libplc4.so (0x00007fe84f9a4000)
  libplds4.so => /lib64/libplds4.so (0x00007fe84f7a0000)
  libnspr4.so => /lib64/libnspr4.so (0x00007fe84f562000)
  libpcre.so.1 => /lib64/libpcre.so.1 (0x00007fe84f2ff000)
  libattr.so.1 => /lib64/libattr.so.1 (0x00007fe84f0fa000)
  librt.so.1 => /lib64/librt.so.1 (0x00007fe84eef1000)

$ ldd snice
  linux-vdso.so.1 =>  (0x00007ffc6cabf000)
  libprocps.so.4 => /lib64/libprocps.so.4 (0x00007f38bef53000)
  libsystemd.so.0 => /lib64/libsystemd.so.0 (0x00007f38bef2b000)
  libdl.so.2 => /lib64/libdl.so.2 (0x00007f38bed26000)
  libc.so.6 => /lib64/libc.so.6 (0x00007f38be963000)
  libcap.so.2 => /lib64/libcap.so.2 (0x00007f38be75e000)
  libm.so.6 => /lib64/libm.so.6 (0x00007f38be45b000)
  librt.so.1 => /lib64/librt.so.1 (0x00007f38be253000)
  libselinux.so.1 => /lib64/libselinux.so.1 (0x00007f38be02c000)
  liblzma.so.5 => /lib64/liblzma.so.5 (0x00007f38bde05000)
  libgcrypt.so.11 => /lib64/libgcrypt.so.11 (0x00007f38bdb84000)
  libgpg-error.so.0 => /lib64/libgpg-error.so.0 (0x00007f38bd97f000)
  libresolv.so.2 => /lib64/libresolv.so.2 (0x00007f38bd764000)
  libdw.so.1 => /lib64/libdw.so.1 (0x00007f38bd51d000)
  libgcc_s.so.1 => /lib64/libgcc_s.so.1 (0x00007f38bd307000)
  libpthread.so.0 => /lib64/libpthread.so.0 (0x00007f38bd0ea000)
```

```
  /lib64/ld-linux-x86-64.so.2 (0x00005634b4bb0000)
  libattr.so.1 => /lib64/libattr.so.1 (0x00007f38bcee5000)
  libpcre.so.1 => /lib64/libpcre.so.1 (0x00007f38bcc82000)
  libelf.so.1 => /lib64/libelf.so.1 (0x00007f38bca6a000)
  libz.so.1 => /lib64/libz.so.1 (0x00007f38bc854000)
  libbz2.so.1 => /lib64/libbz2.so.1 (0x00007f38bc643000)

$ ldd tar
  linux-vdso.so.1 =>  (0x00007ffc6c5a1000)
  libacl.so.1 => /lib64/libacl.so.1 (0x00007f6247491000)
  libselinux.so.1 => /lib64/libselinux.so.1 (0x00007f624726a000)
  libc.so.6 => /lib64/libc.so.6 (0x00007f6246ea6000)
  libattr.so.1 => /lib64/libattr.so.1 (0x00007f6246ca1000)
  libpcre.so.1 => /lib64/libpcre.so.1 (0x00007f6246a3f000)
  libdl.so.2 => /lib64/libdl.so.2 (0x00007f624683a000)
  /lib64/ld-linux-x86-64.so.2 (0x00005570c2061000)
  libpthread.so.0 => /lib64/libpthread.so.0 (0x00007f624661e000)

$ ldd unix2mac
  linux-vdso.so.1 =>  (0x00007ffc3c6f4000)
  libc.so.6 => /lib64/libc.so.6 (0x00007fef8fe1e000)
  /lib64/ld-linux-x86-64.so.2 (0x0000555bbecb4000)

$ ldd xconsole
  linux-vdso.so.1 =>  (0x00007ffde09b4000)
  libXaw.so.7 => /lib64/libXaw.so.7 (0x00007f9dabcc0000)
  libXmu.so.6 => /lib64/libXmu.so.6 (0x00007f9dabaa5000)
  libXt.so.6 => /lib64/libXt.so.6 (0x00007f9dab83d000)
  libX11.so.6 => /lib64/libX11.so.6 (0x00007f9dab4ff000)
  libutil.so.1 => /lib64/libutil.so.1 (0x00007f9dab2fc000)
  libc.so.6 => /lib64/libc.so.6 (0x00007f9daaf38000)
  libXext.so.6 => /lib64/libXext.so.6 (0x00007f9daad26000)
  libXpm.so.4 => /lib64/libXpm.so.4 (0x00007f9daab14000)
  libSM.so.6 => /lib64/libSM.so.6 (0x00007f9daa90b000)
  libICE.so.6 => /lib64/libICE.so.6 (0x00007f9daa6ef000)
  libxcb.so.1 => /lib64/libxcb.so.1 (0x00007f9daa4c7000)
  libdl.so.2 => /lib64/libdl.so.2 (0x00007f9daa2c2000)
  /lib64/ld-linux-x86-64.so.2 (0x00005612325f9000)
  libuuid.so.1 => /lib64/libuuid.so.1 (0x00007f9daa0bd000)
  libXau.so.6 => /lib64/libXau.so.6 (0x00007f9da9eb9000)

$ ldd ypdomainname
  linux-vdso.so.1 =>  (0x00007fff6bb93000)
  libnsl.so.1 => /lib64/libnsl.so.1 (0x00007f1c09dfb000)
  libc.so.6 => /lib64/libc.so.6 (0x00007f1c09a38000)
  /lib64/ld-linux-x86-64.so.2 (0x0000557a757e4000)
```

The following commands gave a "not a dynamic executable"
warning:
autom4te, check-binary-files, perlbug, linux-boot-prober

This is because these commands are just scripts.
I use "file <command>" to find which types of scripts
these are.

```
$ file autom4te
autom4te: Perl script, ASCII text executable

$ file check-binary-files
check-binary-files: POSIX shell script, ASCII text executable

$ file perlbug
perlbug: Perl script, ASCII text executable

$ file linux-boot-prober
linux-boot-prober: POSIX shell script, ASCII text executable
```

Next, I want to get a sorted list of every dynamic library
that is used by any of the commands on your list and omit
any duplicates.

I do this by putting all of the output into one file,
then sorting that file and deleting duplicates.

I use the sort -u command to sort the list in alphabetical
order, and the sed command to delete duplicates.

```
$ cat commands | sed 's/([^()]*)$//g' | sort -u
```

This prints:

```
  /lib64/ld-linux-x86-64.so.2
  libabrt.so.0 => /lib64/libabrt.so.0
  libacl.so.1 => /lib64/libacl.so.1
  libatk-1.0.so.0 => /lib64/libatk-1.0.so.0
  libatk-bridge-2.0.so.0 => /lib64/libatk-bridge-2.0.so.0
  libatspi.so.0 => /lib64/libatspi.so.0
  libattr.so.1 => /lib64/libattr.so.1
  libaugeas.so.0 => /lib64/libaugeas.so.0
  libavahi-client.so.3 => /lib64/libavahi-client.so.3
  libavahi-common.so.3 => /lib64/libavahi-common.so.3
  libblkid.so.1 => /lib64/libblkid.so.1
  libbz2.so.1 => /lib64/libbz2.so.1
  libcairo-gobject.so.2 => /lib64/libcairo-gobject.so.2
  libcairo.so.2 => /lib64/libcairo.so.2
  libcap.so.2 => /lib64/libcap.so.2
  libcrypt.so.1 => /lib64/libcrypt.so.1
  libc.so.6 => /lib64/libc.so.6
  libc.so.6 => /usr/lib64/libc.so.6
  libdb-4.7.so => /usr/lib64/libdb-4.7.so
```

```
libdb-5.3.so => /lib64/libdb-5.3.so
libdbus-1.so.3 => /lib64/libdbus-1.so.3
libdl.so.2 => /lib64/libdl.so.2
libdrm.so.2 => /lib64/libdrm.so.2
libdw.so.1 => /lib64/libdw.so.1
libEGL.so.1 => /lib64/libEGL.so.1
libelf.so.1 => /lib64/libelf.so.1
libepoxy.so.0 => /lib64/libepoxy.so.0
libexpat.so.1 => /lib64/libexpat.so.1
libfa.so.1 => /lib64/libfa.so.1
libffi.so.6 => /lib64/libffi.so.6
libfontconfig.so.1 => /lib64/libfontconfig.so.1
libfreebl3.so => /lib64/libfreebl3.so
libfreetype.so.6 => /lib64/libfreetype.so.6
libgbm.so.1 => /lib64/libgbm.so.1
libgcc_s.so.1 => /lib64/libgcc_s.so.1
libgcrypt.so.11 => /lib64/libgcrypt.so.11
libgdk-3.so.0 => /lib64/libgdk-3.so.0
libgdk_pixbuf-2.0.so.0 => /lib64/libgdk_pixbuf-2.0.so.0
libgio-2.0.so.0 => /lib64/libgio-2.0.so.0
libglapi.so.0 => /lib64/libglapi.so.0
libglib-2.0.so.0 => /lib64/libglib-2.0.so.0
libGL.so.1 => /lib64/libGL.so.1
libgmodule-2.0.so.0 => /lib64/libgmodule-2.0.so.0
libgobject-2.0.so.0 => /lib64/libgobject-2.0.so.0
libgpg-error.so.0 => /lib64/libgpg-error.so.0
libgraphite2.so.3 => /lib64/libgraphite2.so.3
libgthread-2.0.so.0 => /lib64/libgthread-2.0.so.0
libgtk-3.so.0 => /lib64/libgtk-3.so.0
libharfbuzz.so.0 => /lib64/libharfbuzz.so.0
libICE.so.6 => /lib64/libICE.so.6
libjbig.so.2.0 => /lib64/libjbig.so.2.0
libjli.so => /usr/lib/jvm/java-1.7.0-
openjdk-1.7.0.151-2.6.11.1.el7_4.x86_64/jre/lib/amd64/jli/libjli.so
libjpeg.so.62 => /lib64/libjpeg.so.62
libjson-c.so.2 => /lib64/libjson-c.so.2
libkpathsea.so.6 => /lib64/libkpathsea.so.6
liblcms2.so.2 => /lib64/liblcms2.so.2
liblua-5.1.so => /lib64/liblua-5.1.so
liblzma.so.5 => /lib64/liblzma.so.5
libmount.so.1 => /lib64/libmount.so.1
libm.so.6 => /lib64/libm.so.6
libnsl.so.1 => /lib64/libnsl.so.1
libnspr4.so => /lib64/libnspr4.so
libnss3.so => /lib64/libnss3.so
libnssutil3.so => /lib64/libnssutil3.so
libopenjpeg.so.1 => /lib64/libopenjpeg.so.1
libpango-1.0.so.0 => /lib64/libpango-1.0.so.0
libpangocairo-1.0.so.0 => /lib64/libpangocairo-1.0.so.0
libpangoft2-1.0.so.0 => /lib64/libpangoft2-1.0.so.0
```

```
libpcp.so.3 => /lib64/libpcp.so.3
libpcp_trace.so.2 => /lib64/libpcp_trace.so.2
libpcre.so.1 => /lib64/libpcre.so.1
libpixman-1.so.0 => /lib64/libpixman-1.so.0
libplc4.so => /lib64/libplc4.so
libplds4.so => /lib64/libplds4.so
libpng15.so.15 => /lib64/libpng15.so.15
libpoppler.so.46 => /lib64/libpoppler.so.46
libpopt.so.0 => /lib64/libpopt.so.0
libprocps.so.4 => /lib64/libprocps.so.4
libpthread.so.0 => /lib64/libpthread.so.0
libpthread.so.0 => /usr/lib64/libpthread.so.0
libreport.so.0 => /lib64/libreport.so.0
libresolv.so.2 => /lib64/libresolv.so.2
librpmio.so.3 => /lib64/librpmio.so.3
librpm.so.3 => /lib64/librpm.so.3
librt.so.1 => /lib64/librt.so.1
libsasl2.so.3 => /lib64/libsasl2.so.3
libsatyr.so.3 => /lib64/libsatyr.so.3
libselinux.so.1 => /lib64/libselinux.so.1
libSM.so.6 => /lib64/libSM.so.6
libssl3.so => /lib64/libssl3.so
libstdc++.so.6 => /lib64/libstdc++.so.6
libsystemd.so.0 => /lib64/libsystemd.so.0
libtar.so.1 => /lib64/libtar.so.1
libthai.so.0 => /lib64/libthai.so.0
libtiff.so.5 => /lib64/libtiff.so.5
libutil.so.1 => /lib64/libutil.so.1
libuuid.so.1 => /lib64/libuuid.so.1
libX11.so.6 => /lib64/libX11.so.6
libX11-xcb.so.1 => /lib64/libX11-xcb.so.1
libXau.so.6 => /lib64/libXau.so.6
libXaw.so.7 => /lib64/libXaw.so.7
libxcb-dri2.so.0 => /lib64/libxcb-dri2.so.0
libxcb-dri3.so.0 => /lib64/libxcb-dri3.so.0
libxcb-glx.so.0 => /lib64/libxcb-glx.so.0
libxcb-present.so.0 => /lib64/libxcb-present.so.0
libxcb-render.so.0 => /lib64/libxcb-render.so.0
libxcb-shm.so.0 => /lib64/libxcb-shm.so.0
libxcb.so.1 => /lib64/libxcb.so.1
libxcb-sync.so.1 => /lib64/libxcb-sync.so.1
libxcb-xfixes.so.0 => /lib64/libxcb-xfixes.so.0
libXcomposite.so.1 => /lib64/libXcomposite.so.1
libXcursor.so.1 => /lib64/libXcursor.so.1
libXdamage.so.1 => /lib64/libXdamage.so.1
libXext.so.6 => /lib64/libXext.so.6
libXfixes.so.3 => /lib64/libXfixes.so.3
libXinerama.so.1 => /lib64/libXinerama.so.1
libXi.so.6 => /lib64/libXi.so.6
libxml2.so.2 => /lib64/libxml2.so.2
```

```
libXmu.so.6 => /lib64/libXmu.so.6
libXpm.so.4 => /lib64/libXpm.so.4
libXrandr.so.2 => /lib64/libXrandr.so.2
libXrender.so.1 => /lib64/libXrender.so.1
libxshmfence.so.1 => /lib64/libxshmfence.so.1
libXt.so.6 => /lib64/libXt.so.6
libXxf86vm.so.1 => /lib64/libXxf86vm.so.1
libz.so.1 => /lib64/libz.so.1
libzzip-0.so.13 => /lib64/libzzip-0.so.13
linux-vdso.so.1 =>
```