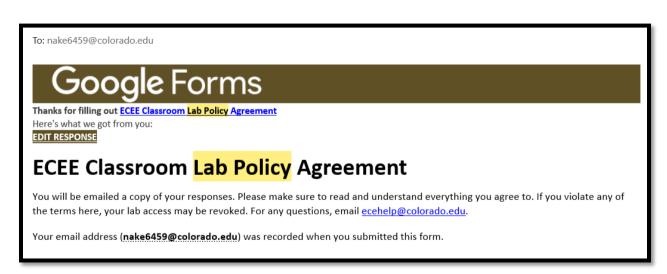
Homework 1

Advanced Embedded Software Development

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LAB Policy Agreement



Question 7:

Compiled application

```
nachiket@nachiket-VirtualBox:~/AESD/HW1/MELP/Chapter02/library/hello-arm$ ./hello-arm-static
Hello from ARM
add_ints
4 + 5 = 9
multiply_ints
4 * 5 = 20
nachiket@nachiket-VirtualBox:~/AESD/HW1/MELP/Chapter02/library/hello-arm$ ./hello-arm-shared
./hello-arm-shared: error while loading shared libraries: libtest.so: cannot open shared object file: No such file or directory
nachiket@nachiket-VirtualBox:~/AESD/HW1/MELP/Chapter02/library/hello-arm$ LD_LIBRARY_PATH=../shared ./hello-arm-shared
Hello from ARM
add_ints
4 + 5 = 9
multiply_ints
4 * 5 = 20
```

Difference between static and shared file size

```
nachiket@nachiket-VirtualBox:~/AESD/HW1/MELP/Chapter02/library/hello-arm$ ls -l hello-arm-s*
-rwxr-xr-x 1 nachiket nachiket 8416 Jan 24 19:01 hello-arm-shared
-rwxr-xr-x 1 nachiket nachiket 847680 Jan 24 19:01 hello-arm-static
```

Shared library use of executable

Question 8

ARM

Version and configuration

```
nachiket@nachiket-VirtualBox:~/AESD/Projects/crosstool-ng$ ./ct-ng show-arm-cortex_a8-linux-gnueabi

[L..] arm-cortex_a8-linux-gnueabi

Languages : C,C++

OS : linux-4.19.1

Binutils : binutils-2.31.1

Compiler : gcc-8.2.0

C library : glibc-2.28

Debug tools : duma-2_5_15 gdb-8.2 ltrace-0.7.3 strace-4.24

Companion libs : expat-2.2.6 gettext-0.19.8.1 gmp-6.1.2 isl-0.20 libelf-0.8.13 libiconv-1.15 mpc-1.1.0 mpfr-4.0.1 ncurses-6.1

Companion tools : autoconf-2.69 automake-1.16.1
```

Sysroot directory

```
nachiket@nachiket-VirtualBox:~/AESD/Projects/crosstool-ng$ arm-cortex_a8-linux-gnueabihf-gcc -print-sysroot
/home/nachiket/x-tools/arm-cortex_a8-linux-gnueabihf/arm-cortex_a8-linux-gnueabihf/sysroot
```

Shared library use and program interpreter

Size of executable

```
nachiket@nachiket-VirtualBox:~/AESD/HW1/ARM/MELP/Chapter02/library/hello-arm$ ls -l hello-arm-s*
-rwxr-xr-x 1 nachiket nachiket 12076 Jan 24 20:06 hello-arm-shared
-rwxr-xr-x 1 nachiket nachiket 4145192 Jan 24 20:06 hello-arm-static
```

QEMU Emulator

Version and configuration

```
nachiket@nachiket-VirtualBox:~/AESD/Projects/crosstool-ng$ ./ct-ng show-arm-unknown-linux-gnueabi

[L..] arm-unknown-linux-gnueabi

Languages : C,C++

0S : linux-4.19.1

Binutils : binutils-2.31.1

Compiler : gcc-8.2.0

C library : glibc-2.28

Debug tools : duma-2_5_15 gdb-8.2 ltrace-0.7.3 strace-4.24

Companion libs : expat-2.2.6 gettext-0.19.8.1 gmp-6.1.2 isl-0.20 libelf-0.8.13 libiconv-1.15 mpc-1.1.0 mpfr-4.0.1 ncurses-6.1

Companion tools : autoconf-2.69 automake-1.16.1
```

Sysroot directory

```
nachiket@nachiket-VirtualBox:~/AESD/Projects/crosstool-ng$ arm-unknown-linux-gnueabi-gcc -print-sysroot
/home/nachiket/x-tools/arm-unknown-linux-gnueabi/arm-unknown-linux-gnueabi/sysroot
```

Shared library and program interpreter

```
machiket@nachiket-VirtualBox:~/AESD/HM1/QEMU/MELP/Chapter02/library/hello-arm$ readelf -a hello-arm-shared | grep "Shared library"

0x000000001 (NEEDED) Shared library: [libtest.so]

0x000000001 (NEEDED) Shared library: [libc.so.6]

nachiket@nachiket-VirtualBox:~/AESD/HM1/QEMU/MELP/Chapter02/library/hello-arm$ readelf -a hello-arm-shared | grep "program interpreter"

[Requesting program interpreter: /lib/ld-linux.so.3]

nachiket@nachiket-VirtualBox:~/AESD/HM1/QEMU/MELP/Chapter02/library/hello-arm$ file hello-arm-shared

hello-arm-shared: ELF 32-bit LSB executable, ARM, EABIS version 1 (SYSV), dynamically linked, interpreter /lib/ld-linux.so.3, for GNU/Linux 4.19.1, with debug_info, not stripped
```

Size of executable

```
nachiket@nachiket-VirtualBox:~/AESD/HW1/QEMU/MELP/Chapter02/library/hello-arm$ ls -l hello-arm-s*
-rwxr-xr-x 1 nachiket nachiket 12020 Jan 24 20:19 hello-arm-shared
-rwxr-xr-x 1 nachiket nachiket 4258220 Jan 24 20:19 hello-arm-static
```