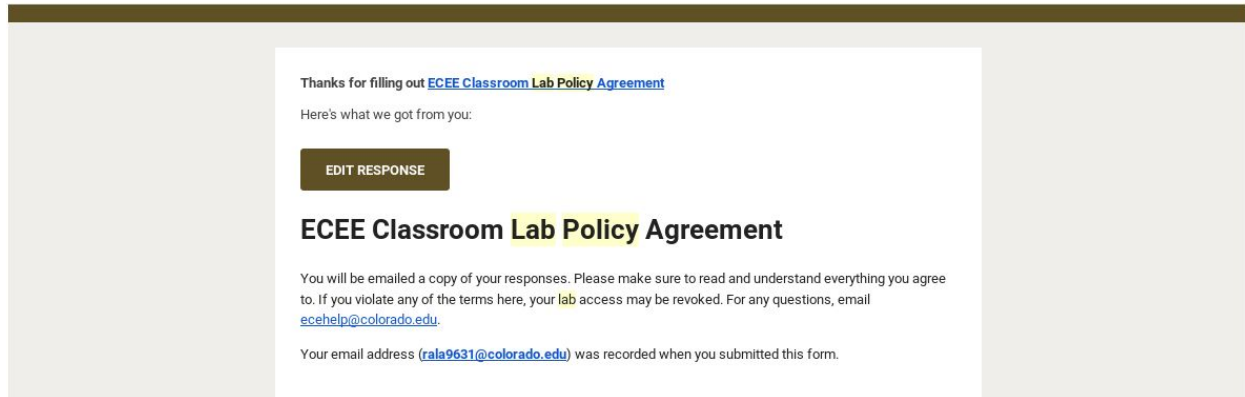


Homework -1

Problem-1



Problem 3

Setup of slack channel is done

Problem 4

Partner for the project is Yash Gupte

Problem 6

=====

```
#!/bin/bash
```

```
echo -e "User Information" >1.txt
```

```
who -u >>1.txt
```

```
echo -e "Operating System Type" >>1.txt
```

```
uname -a >>1.txt
```

```
echo -e "OS distribution"
```

```
lsb release -a >>1.txt
```

```
echo -e "OS version"
```

```
cat /etc/os-release >>1.txt
```

```
echo -e "Kernel Version"
```

```
uname -or >>1.txt
```

```
echo -e "Kernel GCC version Build"
cat /proc/version >>1.txt
```

```
echo -e "Kernel build time"
uname -v >>1.txt
```

```
echo -e "System Architecture Information"
uname -a >>1.txt
```

```
echo -e "Information on file system memory"
free -m >>1.txt
```

=====

Output file generated

=====

User Information

raj :0 2019-01-24 09:27 ? 1720 (:0)

Operating System Type

Linux raj-Inspiron-15-3567 4.15.0-42-generic #45-Ubuntu SMP Thu Nov 15 19:32:57 UTC 2018

x86\_64 x86\_64 x86\_64 GNU/Linux

OS distribution

LSB Version: core-9.20170808ubuntu1-noarch;security-9.20170808ubuntu1-noarch

Distributor ID: Ubuntu

Description: Ubuntu 18.04.1 LTS

Release: 18.04

Codename: bionic

OS version

NAME="Ubuntu"

VERSION="18.04.1 LTS (Bionic Beaver)"

ID=ubuntu

ID\_LIKE=debian

PRETTY\_NAME="Ubuntu 18.04.1 LTS"

VERSION\_ID="18.04"

HOME\_URL="https://www.ubuntu.com/"

SUPPORT\_URL="https://help.ubuntu.com/"

BUG\_REPORT\_URL="https://bugs.launchpad.net/ubuntu/"

PRIVACY\_POLICY\_URL="https://www.ubuntu.com/legal/terms-and-policies/privacy-policy"

VERSION\_CODENAME=bionic

UBUNTU\_CODENAME=bionic

Kernel Version

4.15.0-42-generic GNU/Linux

Kernel GCC version Build

Linux version 4.15.0-42-generic (buildd@lgw01-amd64-023) (gcc version 7.3.0 (Ubuntu 7.3.0-16ubuntu3)) #45-Ubuntu SMP Thu Nov 15 19:32:57 UTC 2018

Kernel build time

#45-Ubuntu SMP Thu Nov 15 19:32:57 UTC 2018

System Architecture Information

Linux raj-Inspiron-15-3567 4.15.0-42-generic #45-Ubuntu SMP Thu Nov 15 19:32:57 UTC 2018

x86\_64 x86\_64 x86\_64 GNU/Linux

Information on file system memory

	total	used	free	shared	buff/cache	available	
Mem:		7842	2389		256 463	5196	4690
Swap:		1706	0	1706			

=====

Problem 7

### Hello-arm-static compile run screenshot

```
raj@raj-Inspiron-15-3567:~/Downloads/MELP-Chapter02/MELP/Chapter02/library/hello-arm$ ./hello-arm-static
Hello from ARM
add_ints
4 + 5 = 9
multiply_ints
4 * 5 = 20
```

### Hello-arm-shared compile run screenshot

```
@raj@raj-Inspiron-15-3567:~/Downloads/MELP-Chapter02/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
```

## Readelf screenshot for both shared and static

```
File Edit View Search Terminal Help
raj@raj-Inspiron-15-3567:~/Downloads/MELP-Chapter02/MELP/Chapter02/library/hello-arm$ readelf -d hello-arm-static | grep libtest.so
0x0000000000000001 (NEEDED)      Shared library: [libtest.so]
raj@raj-Inspiron-15-3567:~/Downloads/MELP-Chapter02/MELP/Chapter02/library/hello-arm$
```

```
raj@raj-Inspiron-15-3567:~/Downloads/MELP-Chapter02/MELP/Chapter02/library/hello-arm$ readelf -e hello-arm-shared | grep "program interpreter"
[Requesting program interpreter: /lib64/ld-linux-x86-64.so.2]
raj@raj-Inspiron-15-3567:~/Downloads/MELP-Chapter02/MELP/Chapter02/library/hello-arm$ readelf -e hello-arm-shared | grep "Shared library"
raj@raj-Inspiron-15-3567:~/Downloads/MELP-Chapter02/MELP/Chapter02/library/hello-arm$ readelf -a hello-arm-shared | grep "Shared library"
0x0000000000000001 (NEEDED)      Shared library: [libtest.so]
0x0000000000000001 (NEEDED)      Shared library: [libc.so.6]
```

## Problem 8

### Arm configurations arm cortex a8

```
raj@raj-Inspiron-15-3567:~/Desktop/crosstool-ng$ ./ct-ng show-arm-cortex_a8-linux-gnueabi
[... ] 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 nproc-1.1.0 mpfr-4.0.1 ncurses-6.1
Companion tools : autoconf-2.69 automake-1.16.1
```

## Sysroot directory

```
raj@raj-Inspiron-15-3567:~/x-tools/arm-cortex_a8-linux-gnueabihf/arm-cortex_a8-linux-gnueabihf/sysroot$ ls
etc lib sbin usr var
raj@raj-Inspiron-15-3567:~/x-tools/arm-cortex_a8-linux-gnueabihf/arm-cortex_a8-linux-gnueabihf/sysroot$
```

## Size Comparison

```
raj@raj-Inspiron-15-3567:~/Downloads/MELP-Chapter02/MELP/Chapter02/library/hello-arm$ ls -l hello-arm-s*
-rwxr-xr-x 1 raj raj 8416 Jan 23 17:16 hello-arm-shared
-rwxr-xr-x 1 raj raj 11232 Jan 23 17:16 hello-arm-static
raj@raj-Inspiron-15-3567:~/Downloads/MELP-Chapter02/MELP/Chapter02/library/hello-arm$
```

## Grep command

```
raj@raj-Inspiron-15-3567:~/Downloads/MELP-Chapter02/MELP/Chapter02/library/hello-arm$ readelf -e hello-arm-shared | grep "program interpreter"
[Requesting program interpreter: /lib64/ld-linux-x86-64.so.2]
raj@raj-Inspiron-15-3567:~/Downloads/MELP-Chapter02/MELP/Chapter02/library/hello-arm$ readelf -e hello-arm-shared | grep "Shared library"
raj@raj-Inspiron-15-3567:~/Downloads/MELP-Chapter02/MELP/Chapter02/library/hello-arm$ readelf -a hello-arm-shared | grep "Shared library"
0x0000000000000001 (NEEDED)           Shared library: [libtest.so]
0x0000000000000001 (NEEDED)           Shared library: [libc.so.6]
```

## Version - 8.2.0- arm cortex a8

```
raj@raj-Inspiron-15-3567:~/x-tools/arm-cortex-a8-linux-gnueabi$ gcc -v
Using built-in specs.
COLLECT_GCC=arm-cortex-a8-linux-gnueabi-gcc
COLLECT_LTO_WRAPPER=/home/raj/x-tools/arm-cortex-a8-linux-gnueabi/libexec/gcc/arm-cortex-a8-linux-gnueabi/8.2.0/lto-wrapper
Target: arm-cortex-a8-linux-gnueabi
Configured with: /home/raj/Desktop/crosstool-ng/build/arm-cortex-a8-linux-gnueabi/src/gcc/configure --build=x86_64-build_pc-linux-gnu --host=x86_64-build_pc-linux-gnu --target=arm-cortex-a8-linux-gnueabi --prefix=/home/raj/x-tools/arm-cortex-a8-linux-gnueabi --with-sysroot=/home/raj/x-tools/arm-cortex-a8-linux-gnueabi/sysroot --enable-languages=c,cs --with-cpu=cortex-a8 --with-float=hard --with-pkgversion='crosstool-NG 1.23.0.593 daa952' --enable-cxa-atexit --disable-libcudfp --disable-libgomp --disable-libssp --disable-libquadmath --disable-libquadmath-support --disable-lto --disable-lto --with-gmp=/home/raj/Desktop/crosstool-ng/build/arm-cortex-a8-linux-gnueabi/buildtools --with-mpfr=/home/raj/Desktop/crosstool-ng/build/arm-cortex-a8-linux-gnueabi/buildtools --with-mpc=/home/raj/Desktop/crosstool-ng/build/arm-cortex-a8-linux-gnueabi/buildtools --with-isl=/home/raj/Desktop/crosstool-ng/build/arm-cortex-a8-linux-gnueabi/buildtools --enable-lto --with-host-libstdcxx=-static-libgcc -Wl,-Bstatic,-lstdc++,-Bdynamic -lnl --enable-threads-posix --enable-target-optspace --enable-plugin --enable-gold --disable-nls --disable-multilib --with-local-prefix=/home/raj/x-tools/arm-cortex-a8-linux-gnueabi/arm-cortex-a8-linux-gnueabi/sysroot --enable-long-long
Thread model: posix
gcc version 8.2.0 (crosstool-NG 1.23.0.593-daa952)
```

## Part2

### Part 2 arm unknown version

```
raj@raj-Inspiron-15-3567:~/x-tools/arm-unknown-linux-gnueabi$ gcc -v
Using built-in specs.
COLLECT_GCC=arm-unknown-linux-gnueabi-gcc
COLLECT_LTO_WRAPPER=/home/raj/x-tools/arm-unknown-linux-gnueabi/libexec/gcc/arm-unknown-linux-gnueabi/8.2.0/lto-wrapper
Target: arm-unknown-linux-gnueabi
Configured with: /home/raj/Desktop/crosstool-ng/build/arm-unknown-linux-gnueabi/src/gcc/configure --build=x86_64-build_pc-linux-gnu --host=x86_64-build_pc-linux-gnu --target=arm-unknown-linux-gnueabi --prefix=/home/raj/x-tools/arm-unknown-linux-gnueabi --with-sysroot=/home/raj/x-tools/arm-unknown-linux-gnueabi/sysroot --enable-languages=c,cs --with-float=hard --with-pkgversion='crosstool-NG 1.23.0.593 daa952' --disable-sjlj-exceptions --enable-cxa-atexit --disable-libcudfp --disable-libgomp --disable-libssp --disable-libquadmath --disable-libquadmath-support --disable-lto --with-gmp=/home/raj/Desktop/crosstool-ng/build/arm-unknown-linux-gnueabi/buildtools --with-mpfr=/home/raj/Desktop/crosstool-ng/build/arm-unknown-linux-gnueabi/buildtools --with-mpc=/home/raj/Desktop/crosstool-ng/build/arm-unknown-linux-gnueabi/buildtools --with-isl=/home/raj/Desktop/crosstool-ng/build/arm-unknown-linux-gnueabi/buildtools --enable-lto --with-host-libstdcxx=-static-libgcc -Wl,-Bstatic,-lstdc++,-Bdynamic -lnl --enable-threads-posix --enable-target-optspace --enable-plugin --enable-gold --disable-nls --disable-multilib --with-local-prefix=/home/raj/x-tools/arm-unknown-linux-gnueabi/arm-unknown-linux-gnueabi/sysroot --enable-long-long
Thread model: posix
```

### Part 2 Shared and Static

```
raj@raj-Inspiron-15-3567:~/Desktop/MELP-Chapter02/MELP/Chapter02/library/hello-arm$ ls -l hello-arm-s*
-rwxr-xr-x 1 raj raj 12028 Jan 24 16:51 hello-arm-shared
-rwxr-xr-x 1 raj raj 14572 Jan 24 16:51 hello-arm-static
```

### Part2 readelf command

```
hello-arm.c hello-arm.o hello-arm-shared hello-arm-static Makefile
raj@raj-Inspiron-15-3567:~/Desktop/MELP-Chapter02/MELP/Chapter02/library/hello-arm$ readelf -d hello-arm-static | grep libtest.so
raj@raj-Inspiron-15-3567:~/Desktop/MELP-Chapter02/MELP/Chapter02/library/hello-arm$ readelf -d hello-arm-shared | grep libtest.so
raj@raj-Inspiron-15-3567:~/Desktop/MELP-Chapter02/MELP/Chapter02/library/hello-arm$
```

## Unknown Configuration



```
raj@raj-Inspiron-15-3567:~/Desktop/crostoool-ng$ ./ct-ng show-arm-unknown-linux-gnueabi
[L..]  arm-unknown-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
raj@raj-Inspiron-15-3567:~/Desktop/crostoool-ng$
```

## Sysroot for unknown configuration

```
raj@raj-Inspiron-15-3567:~/x-tools/arm-unknown-linux-gnueabi/arm-unknown-linux-gnueabi/sysroot$ ls
etc lib sbin usr var
raj@raj-Inspiron-15-3567:~/x-tools/arm-unknown-linux-gnueabi/arm-unknown-linux-gnueabi/sysroot$
```