Exercise 4

Creating Libraries
Why Libraries?

Take common functionality and share it.

For example: printf, fopen, exp

Two kinds of libraries: static and shared.
Static Libraries

Contain object code from .o files

Object code is copied into final program during linking

After linking, library not needed to run
Shared Libraries

Contain object code from .o files

Object code is *referred* by final program during linking

After linking, library *is* needed to run
Tasks may be done on your VM or on the lab machines via SSH
Tasks

1. Create a function `int getRandomNumber()` in `rand.c` that returns 4. Add its prototype to `rand.h`.

2. Create a `static` library containing this function
   
   ```
   gcc -c -o rand.o rand.c  
   ar rcs librand.a rand.o
   ```

3. Compile a program that uses this function to print a "random" number
   
   ```
   gcc -static -o random main.c -L. -lrand
   ```
Tasks

4. Create a shared library containing this function
   
   gcc -fPIC -c -o rand.o rand.c
   ar rcs librand.so rand.o

5. Compile a program that uses this function to print a "random" number
   
   gcc -o random main.c -L. -lrand

6. Write a Makefile with rules librand.a, librand.so, and random which compile each file
Submission

Create a tarball of your source code and Makefile and submit it on Canvas

tar cJf exercise4.tar.xz "
  rand.h rand.c main.c Makefile"