Libraries
Common scenario

$ gcc main.c math-sin.c math-cos.c

Program

main.o
math-sin.o
math-cos.o
Common scenario - introducing library

main.c

Math Library

math-sin.c  math-cos.c

Program

main.o

Math library
Libraries - archive

$ gcc -c math-sin.c math-cos.c
$ ar rcv libsincos.a math-sin.o math-cos.o

libsincos.a now contains all objects from the two c files
$ gcc main.c -L. -lsincos -o main

-L. look for libraries in .
-lsincos link a library called libsincos

main contains all objects from main.c and the library
Libraries - archive

$ gcc prog.c -L. -lsincos

prog contains all objects from main.c and the library
Both programs contain the objects from the library. What if 20 programs use this library:

- recompile all programs if updating the library?
- disk usage?

Is it possible to share one library and link it “on the fly” instead of linking it statically to the program?
Shared object file

```
$ gcc -shared math-sin.c math-cos.c -o libsincos.so
```
Shared object file

$ gcc main.c -L. -lsincos -o main
Shared object file

main.c

Shared Object File

math-sin.o
math-cos.o

libsincos.so

main

main.o

libsincos.so
Libraries and header files

When providing a library (static or shared) you (most likely) need to provide corresponding header files.

- libsincos.so
- math-sin.h
- math-cos.h