# Exercise sheet 2 – Build C programs

**Goals:**

- Build on command line

- ELF structure and commands

- Makefiles usage

- Autotools usage

### Exercise 2.1: Build and run on command line

(a) Update the `OS_exercises` repository with `git pull`

```
1  cd OS_exercises
2  git pull
3  cd ~
```

(b) Build `OS_exercises/sheet_02_build/1_hello_world/main.c`

(c) Run the program

### Exercise 2.2: Explore ELF file
*Use the program from the above exercise for this.*

(a) Find all strings that are contained in the ELF.

(b) Which sections has the ELF?

(c) Which symbols are defined?

(d) Determine the size of the program.

(e) Strip the symbols of the program.

(f) Try to list the symbols again.

(g) Determine the size of the program again? Has something changed?

### Exercise 2.3: Build with a Makefile

(a) Go to `OS_exercises/sheet_02_build/2_simple_prog`

(b) Build the program

(c) Run the program

(d) Clean the object files

(e) Can you easily install the program into the system?

### Exercise 2.4: Build with Autotools

(a) Go to `OS_exercises/sheet_02_build/3_simple_prog_automake`

(b) Initialise the build system

(c) Configure the build

(d) Explore `configure.ac`

(e) Explore `Makefile.am`

(f) Build the program

(g) Explore the automatically created `Makefile`.

(h) Install the program

(i) Run the program

(j) Set the `-DUSE_SPECIAL_ADD` define

(k) Create a manpage (you may do a test view directly on the created file)

(l) Include the manpage into the build

(m) Build, install, and run again.

(n) Can you use `man` `simple_prog`?