

useful cmds

readelf

objdumb

creating file and whole compile

```
ubuntu@ubuntu-virtual-machine:~/Code_Area/C$ vim hello.c
ubuntu@ubuntu-virtual-machine:~/Code_Area/C$ cat hello.c
```

```
#include <stdio.h>
int main(){

    printf("hello linux\n");
    return 0;
}
```

```
ubuntu@ubuntu-virtual-machine:~/Code_Area/C$ gcc hello.c
ubuntu@ubuntu-virtual-machine:~/Code_Area/C$ ls -la
```

```
total 32
drwxrwxr-x 2 ubuntu ubuntu 4096 Sep  2 20:07 .
drwxrwxr-x 4 ubuntu ubuntu 4096 Sep  2 20:05 ..
-rwxrwxr-x 1 ubuntu ubuntu 16696 Sep  2 20:07 a.out
-rw-rw-r-- 1 ubuntu ubuntu   73 Sep  2 20:07 hello.c
```

```
ubuntu@ubuntu-virtual-machine:~/Code_Area/C$ ./a.out
hello linux
```

```
ubuntu@ubuntu-virtual-machine:~/Code_Area/C$
```

compile process

```
ubuntu@ubuntu-virtual-machine:~/Code_Area/C$ gcc -E hello.c > hello.i
ubuntu@ubuntu-virtual-machine:~/Code_Area/C$ gcc -S hello.i
ubuntu@ubuntu-virtual-machine:~/Code_Area/C$ gcc -c hello.s
ubuntu@ubuntu-virtual-machine:~/Code_Area/C$ gcc hello.o -o myexe
ubuntu@ubuntu-virtual-machine:~/Code_Area/C$

faster way
ubuntu@ubuntu-virtual-machine:~/Code_Area/C$ rm hello.[ios]
```

```
ubuntu@ubuntu-virtual-machine:~/Code_Area/C$ gcc -save-temps hello.c
```

what is Elf File?

- **ELF header** → Identifies the file as ELF and stores metadata (architecture, entry point, offsets).
- **Program header table** → Describes segments for the loader (needed by executables).
- **.init section** → Contains code that runs before `main()`.
- **.text section** → Holds the compiled machine instructions (program code).
- **.rodata section** → Stores read-only data like constants and string literals.
- **.data section** → Contains initialized global and static variables.
- **.bss section** → Reserves space for uninitialized globals/statics (zeroed at runtime).
- **.symtab** → Symbol table with function/variable names and addresses (for linking/debugging).
- **.debug** → Extra debug info used by debuggers (not needed at runtime).
- **.line** → Maps machine code back to source line numbers.
- **.strtab** → String table that stores names for symbols and sections.
- **Section header table** → Lists all sections and their properties (needed for linking/relocatable files).