

Homework 12

Problem 1

Please write down the three rules for Unix linkers to deal with multiply defined symbols.

Rule 1: Multiple strong symbols are not allowed

Rule 2: Given a strong symbol and multiple weak symbols, choose the strong symbol.

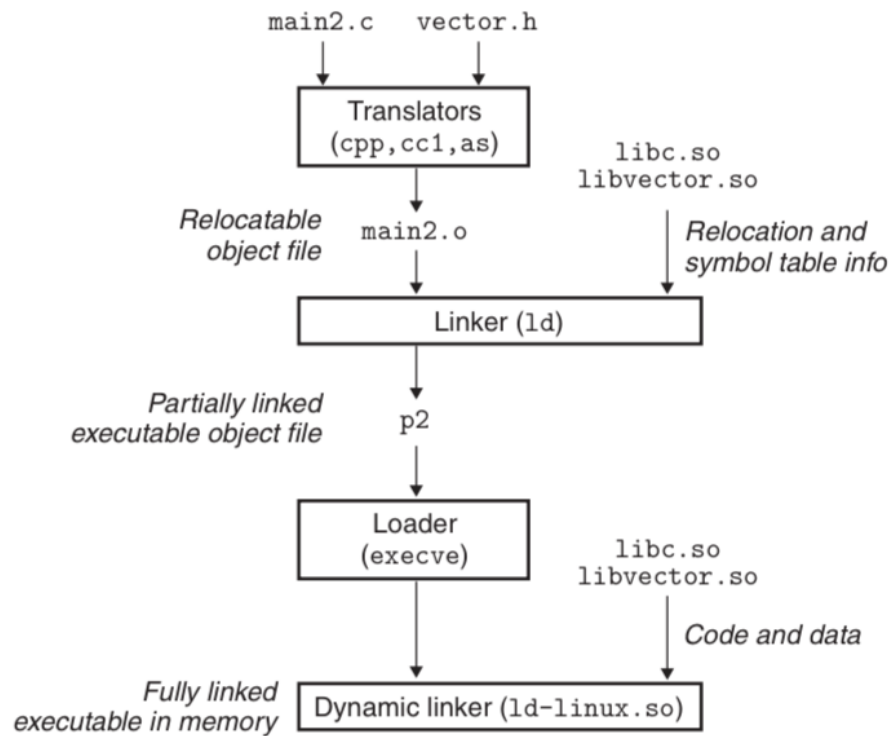
Rule 3: Given multiple weak symbols, choose any of the weak symbols.

Problem 2

[1] ERROR [2] ERROR [3] main.2 [4] main.2 [5] UNKNOWN [6] UNKNOWN

Problem 3

1. Please list the disadvantages of static libraries.
 - a. Static libraries need to be maintained and updated periodically. If programmers want to use the most recent version of a library, they must somehow become aware that the library has changed, and then **explicitly** relink their programs against the updated library.
 - b. Almost every C program uses standard I/O functions like printf and scanf. At run time, the code for these functions is **duplicated** in the text segment of each running process, which is a waste of memory system resources.
2. Please describe the process of dynamic linking. You can use a picture to illustrate it.



Problem 4

NOTE: The most important thing is to use *dlopen* and *dlsym* correctly.

```
#include <stdio.h>
#include <stdlib.h>
#include <dlfcn.h>

#include int main() {
    // Your codes here.
    void *handle;
    void (*eat)();
    char *error;

    handle = dlopen("./dog.so", RTLD_LAZY);
    if (!handle) {
        fprintf(stderr, "%s\n", dlerror());
        exit(1);
    }
    eat = dlsym(handle, "eat");
    if ((error = dlerror()) != NULL) {
        fprintf(stderr, "%s\n", dlerror());
        exit(1);
    }

    eat();
}
```