Homework 3
Compilers, Monsoon 2020

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30 August 2020

1. Done.
2. Done.
3. Done. Doing Q7.9 and Q7.10 from the book *Computer Systems: A Programmer's Perspective.*

7.9. We are able to compile and execute the program because the way the C language specification deals with this is that the `main` symbol defined in `foo6.c` is a strong symbol, while the `main` defined in `bar6.c` is a weak symbol. If we try to decompile the generated program, we see this.

```
000000000000064a <main>:
 64a: 55                       push   %rbp
 64b: 48 89 e5                 mov    %rsp,%rbp
 64e: e8 07 00 00 00           callq  65a <p2>
 653: b8 00 00 00 00           mov    $0x0,%eax
 658: 5d                       pop    %rbp
 659: c3                       retq
```

Clearly, the symbol used by p2 is actually `%rbp` (which is 55, which is also the output of the program), which is the `main` defined in `foo6.c`, but the value of the main symbol is the value of the command compiled by the `main` function.

We can confirm this behavior by changing the line in bar6.c to `printf("0x%x\n", *(&main+1));`   The output of the program is now `0x56`.

7.10. A) Since we have a static linker, and `libx.a` depends on p.o first, we can link the two files using the command `gcc p.o libx.a`   fdsfThis also takes care of the fact that p.o depends on `libx.a` again.

    B) Since we have a static linker, we break down the requirement. `libx.a` depends on p.o first, so our arguments will have p.o and `libx.a` first. Then, `libx.y` depends on

`libx.a` n and vice versa, so we must mention `libx.a` again after `libx.y.` epends So the command is `gcc p.o libx.a liby.a libx.a`

C) Similarly, we know the base order first is p.o → libx.a → liby.a → libz.a. Clearly, p.o must be linked first. The only differing one here is that `libz.a` depends directly on both `libx.a` and `liby.z`, and `liby.a` comes after `libx.a` too. As a result, `libx.a` must be linked to both those files. So our final command required is `gcc p.o libx.a liby.a libx.a libz.a`.