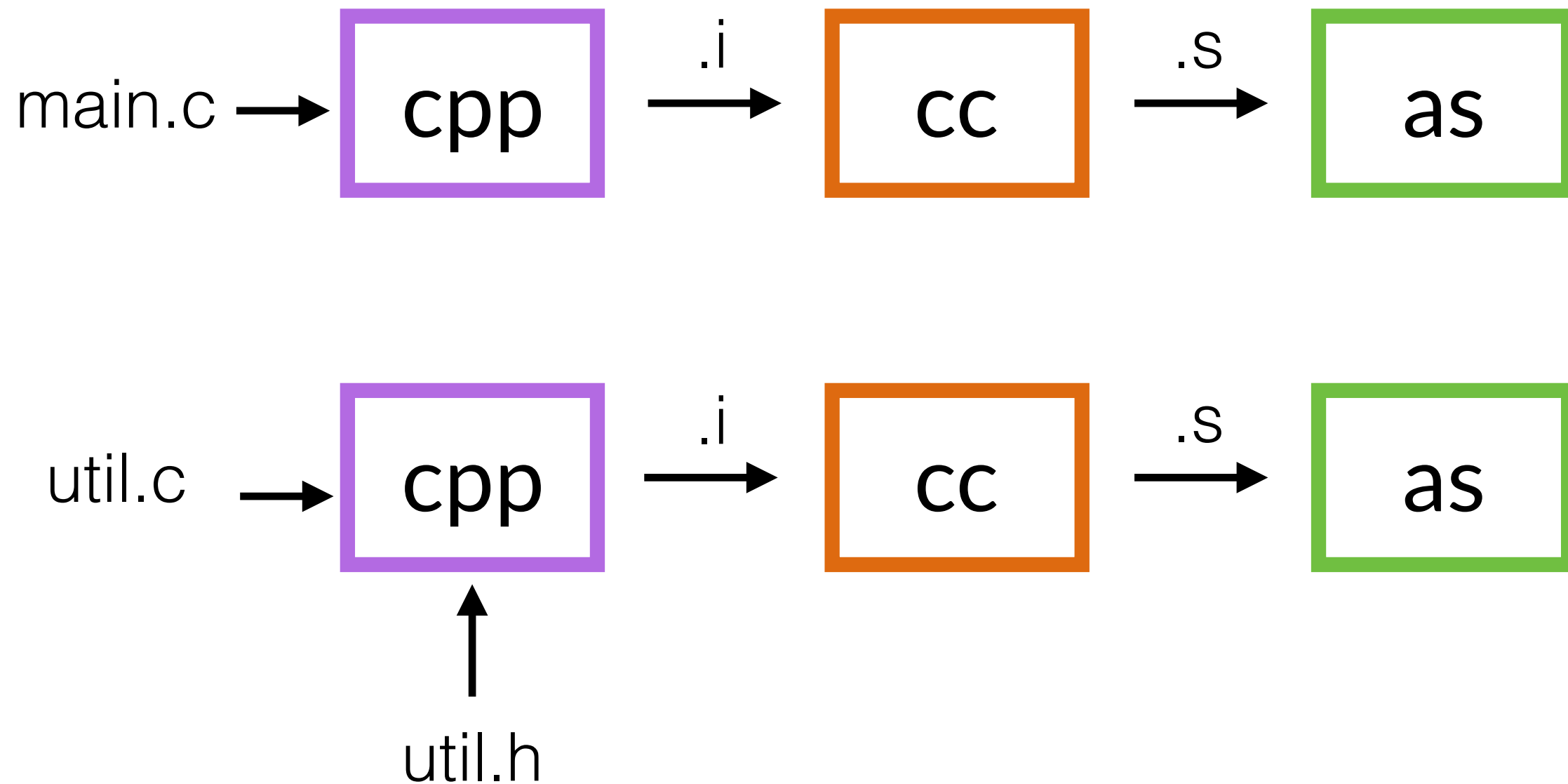


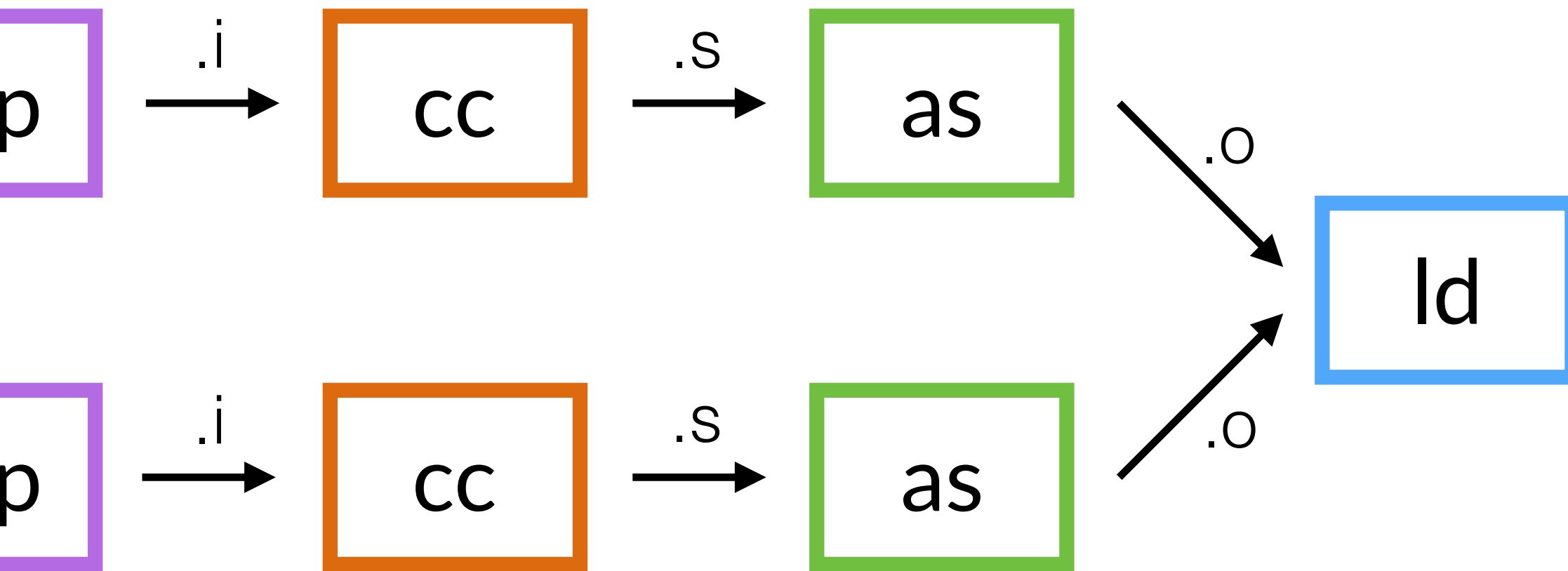
# The Trying Journey of the C Program

from '.c.' to '.bin'

# What's going on? “gcc main.c util.c”

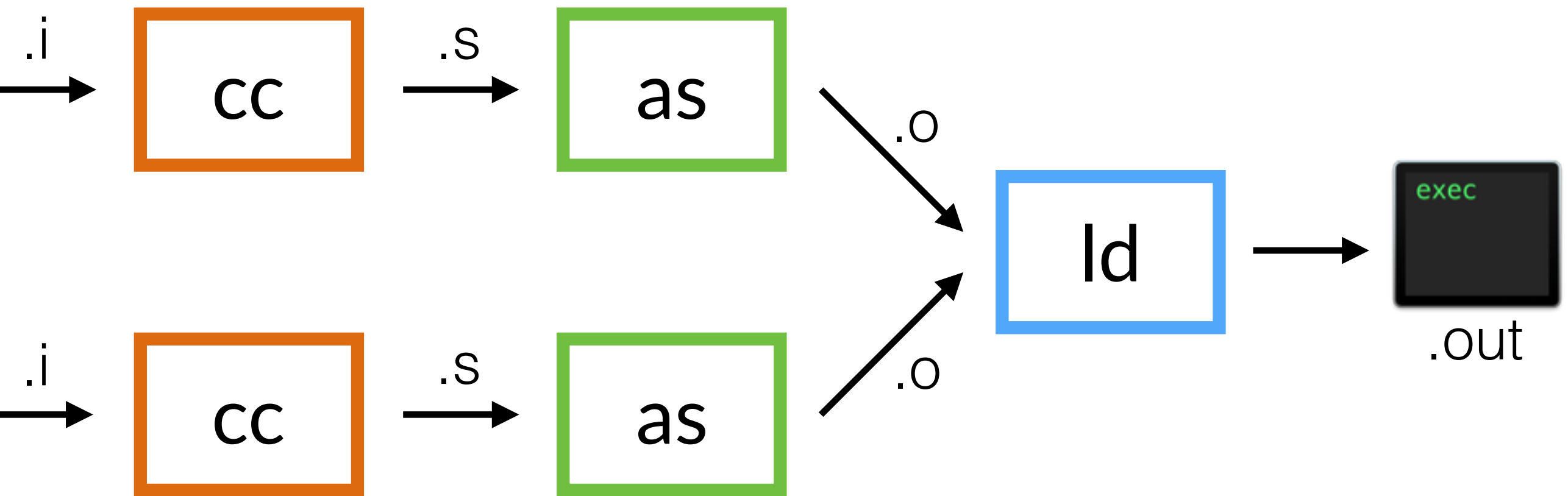


# What's going on? "gcc main.c util.c"

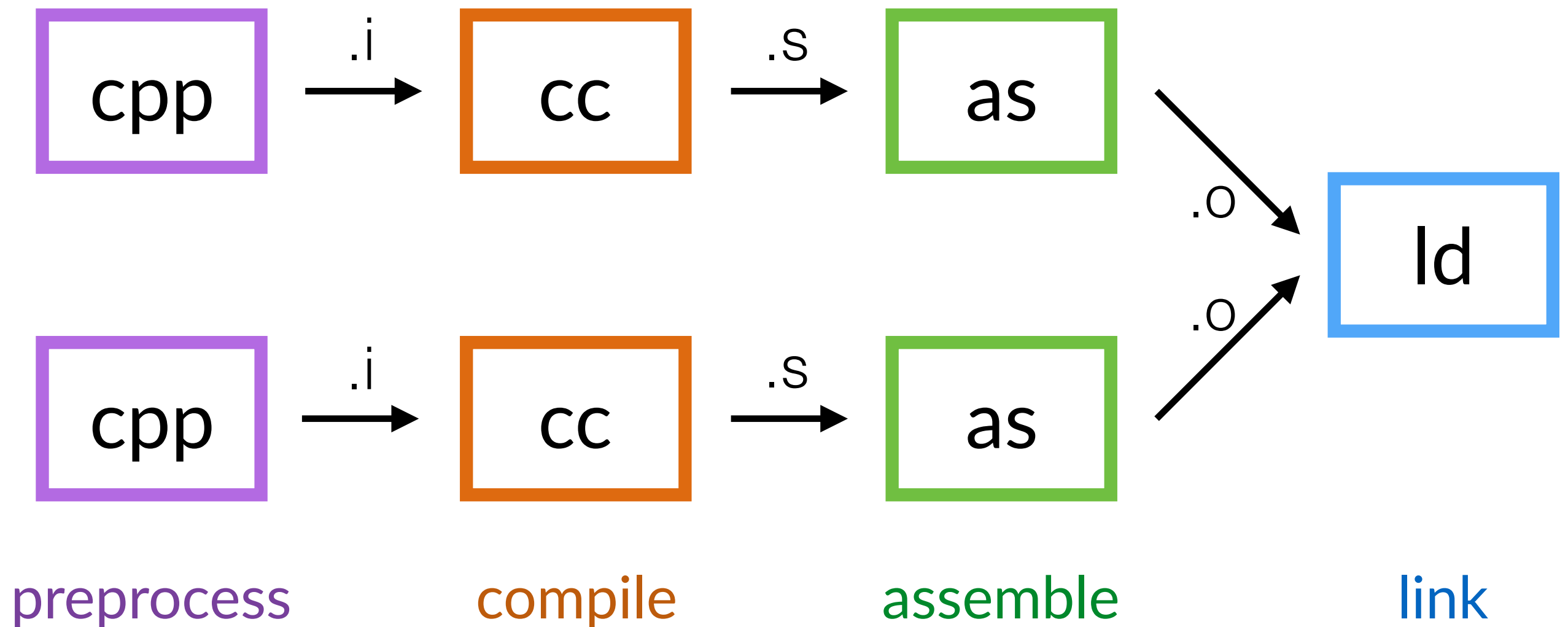


h

# What's going on? "gcc main.c util.c"



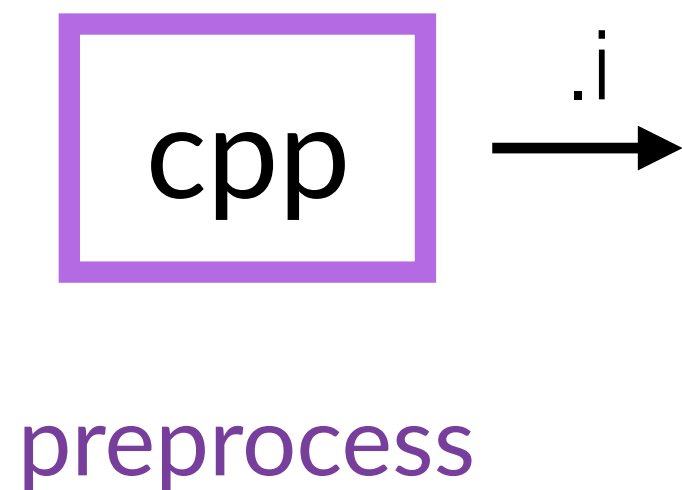
# What's going on? "gcc main.c util.c"



let's see!

# What's going on? "gcc -E"

Do something useful with comments!



Macros: `#define`

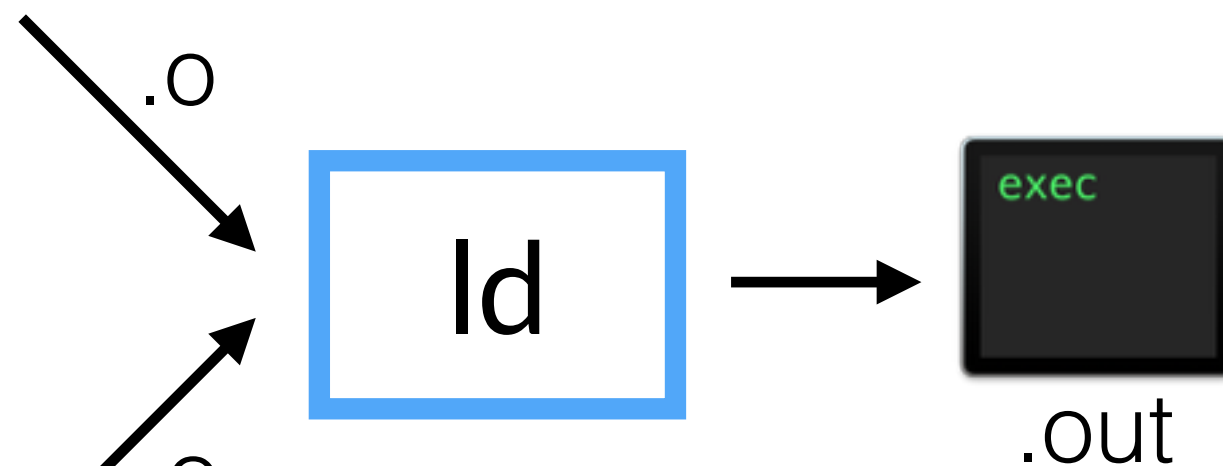
Header Files: `#include`

Conditionals: `#ifdef`, `#ifndef`, `#if`

let's see!



# What's going on? “blink.o vs. blink.exe”



ELF Format

Linking view

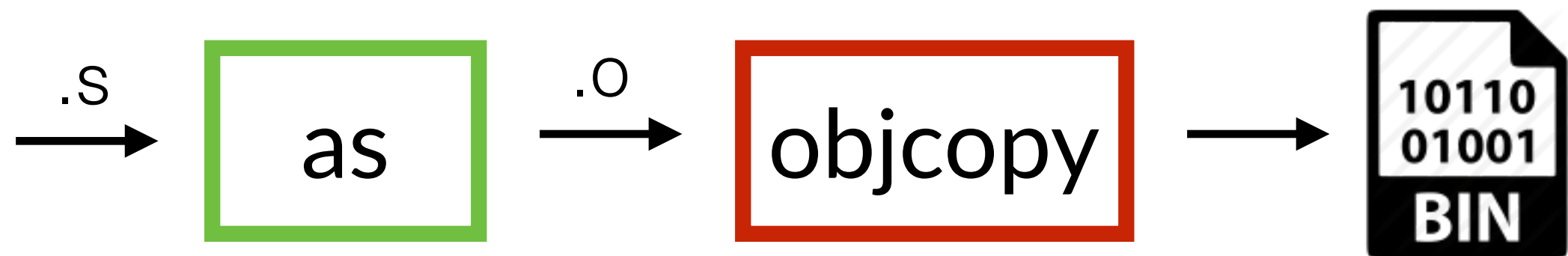
ELF header
Program header table (optional)
Section 1
...
Section n
...
...
Section header table

Execution view

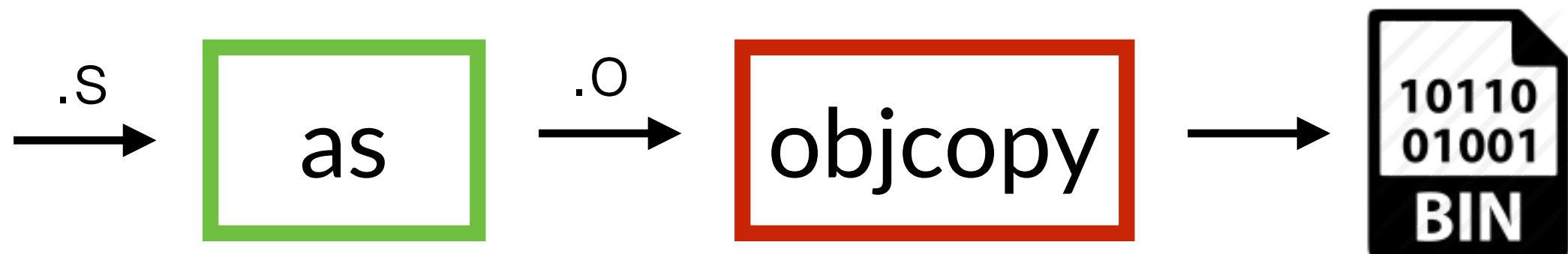
ELF header
Program header table
Segment 1
Segment 2
...
Section header table (optional)

let's see!

# What's going on? “objcopy -O binary”



# What's going on? “objcopy -O binary”



```
#define ELF_MAGIC 0x464C457FU
struct Elf {
    uint32_t e_magic; // ELF_MAGIC
    uint8_t e_elf[12];
    uint16_t e_type; // exec, reloc, etc.
    uint16_t e_machine; // machine type
    ...
    uint32_t e_shoff; // offset to sh
    ...
    uint16_t e_shstrndx; // sh str index
};
```

```
struct Secthdr {
    uint32_t sh_name; // sh str offset
    uint32_t sh_type; // progbits, etc.
    ...
    uint32_t sh_offset; // file offset
    uint32_t sh_size;
    ...
};
```

let's write it!