CSE 220 – C Programming

Writing Large Programs Part 2

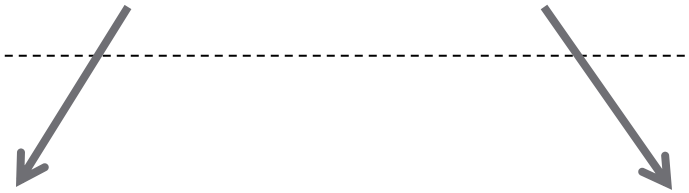
Code Sharing

- Share function prototypes
  - (already covered)
- Share macro definitions
- Share variable definitions

Sharing Macro Definitions

physconstants.h

```
#define speedLightKms  299792
#define kWhToKJoules 3600
#define calToJoules 4184
```



Prog1.c

```
#include
“physconstants.h”
…
…
int x = calToJoules*10;
```

Prog2.c

```
#include “physconstants.h”
…

float y =
speedLightKms/1000.0;
```

Sharing external variables

config.h

```
extern int delay;
```

MainProg.c

```
#include “config.h”


int main(void) {
    printf("%d", delay);
}
```

config.c

```
#include “config.h”
int delay = 10;
//define
```

“extern” tells the compiler that the variable delay is declared elsewhere, so there’s no need to allocate space for it

config.c actually initializes the variable

Make sure the types match in the definition and the declaration

Makefiles

- Putting all source files on command line:
  - Tedious
  - Wastes time building program
- Makefile: a file containing information to build the program
  - Lists the files that are part of the program
  - Dependencies: files needed by the program
  - Normally stored in a file named Makefile

Example Makefile contents

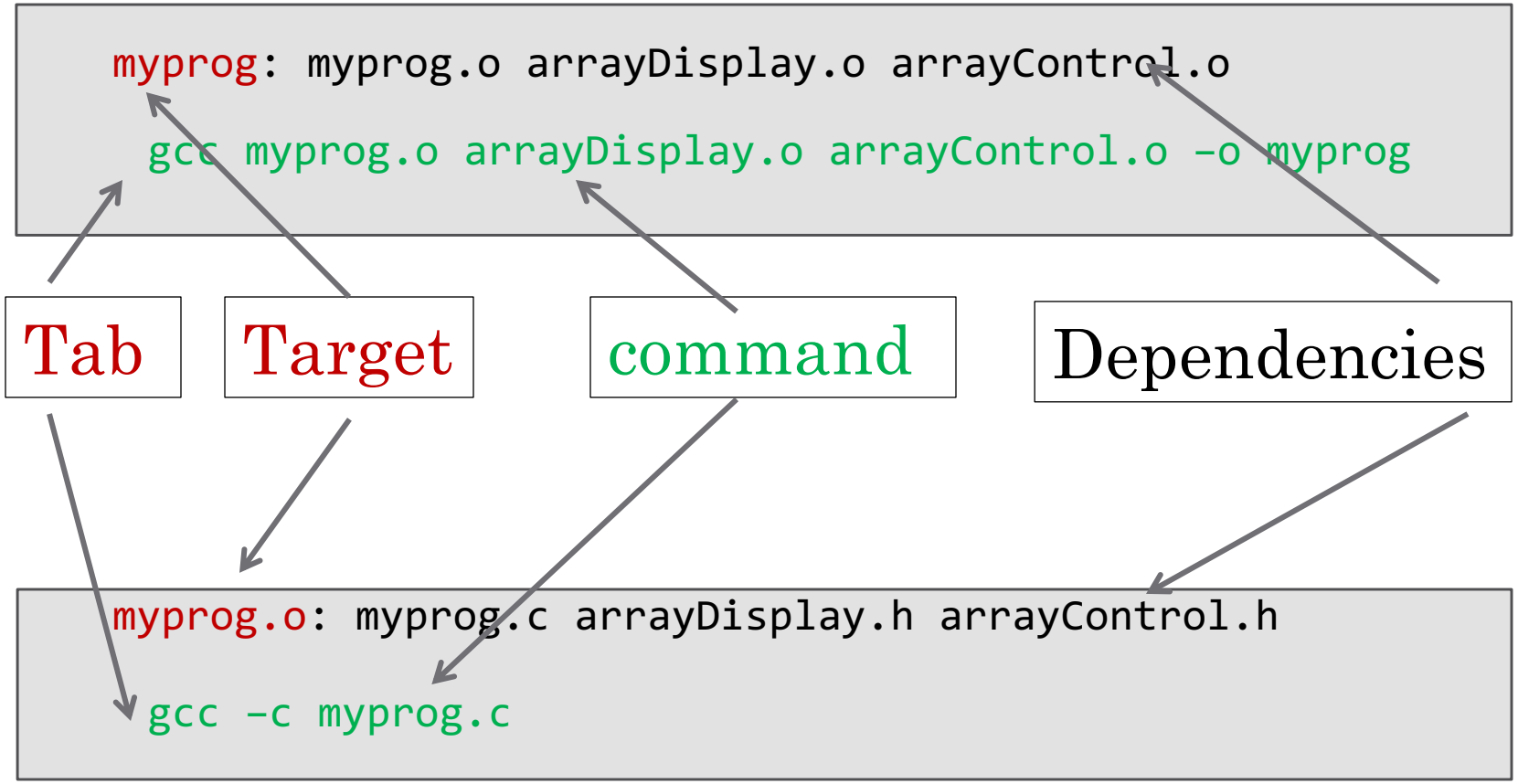
```
myprog: myprog.o arrayDisplay.o arrayControl.o
  gcc myprog.o arrayDisplay.o arrayControl.o –o myprog

myprog.o: myprog.c arrayDisplay.h arrayControl.h
  gcc –c myprog.c

arrayDisplay.o: arrayDisplay.c arrayDisplay.h
  gcc –c arrayDisplay.c

arrayControl.o: arrayControl.c arrayControl.h
  gcc –c arrayControl.c
```

Example


myprog: myprog.o arrayDisplay.o arrayControl.o
gcc myprog.o arrayDisplay.o arrayControl.o –o myprog
Tab
Target
command
Dependencies
myprog.o: myprog.c arrayDisplay.h arrayControl.h
gcc –c myprog.c

Makefiles

- The *make* utility is used to invoke a makefile

```
make target
make myprog
```

- Calling make without a target will build the target of the first rule
- When rebuilding, make utility checks the timestamp of the files, and decides what needs to be rebuilt