

Multifile programs



- Multifile programs allow you to reuse code
- For example:
 - Functions associated with a dictionary can be used over and over in different programs
 - Can change underlying data structure for the same program, e.g. change from a list dictionary to a BST

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Header files



- Header files allow:
 - write a function prototype or definition once
 - then use it in different files
- For example:

```
#define TRUE 1
#define FALSE 0
```

or

```
int comp (char *, char *);

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```

Header files



 To avoid retyping (and likely errors!), put the definitions in a header file, e.g.

header.h

 And in your program file(s) include the header:

```
#include "header.h"
```

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```
Including header files

#include <stdio.h>
#include "dict.h"

int main()
{
    /* code in here can use
    definitions and prototypes in
    header*/
}
```

```
Compiling multifile programs

• gcc -o dict1 dict1.c bst1.c

• Prone to typing errors

• Recompiles everything from the ground up

• Makefiles

• Simplify the compilation command:

• make dict1

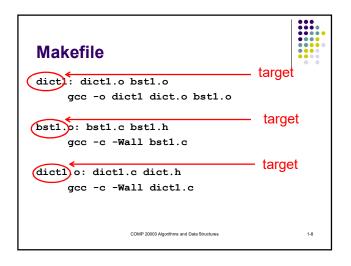
• Checks which files have been changed, and only recompile them
```

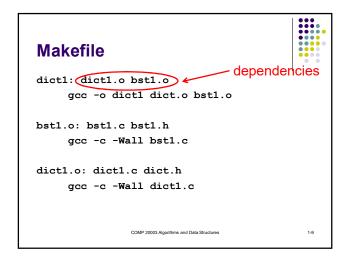
```
Makefile

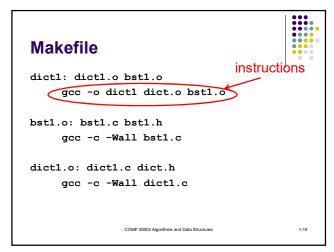
dict1: dict1.o bst1.o
    gcc -o dict1 dict.o bst1.o

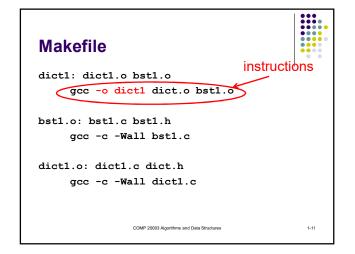
bst1.o: bst1.c bst1.h
    gcc -c -Wall bst1.c

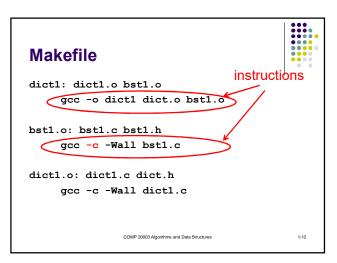
dict1.o: dict1.c dict.h
    gcc -c -Wall dict1.c
```

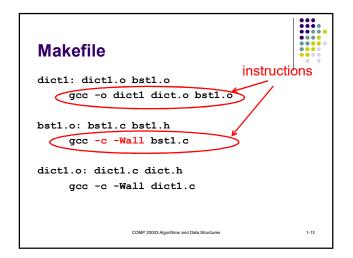




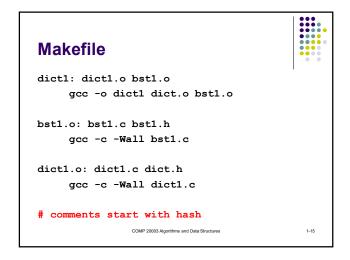


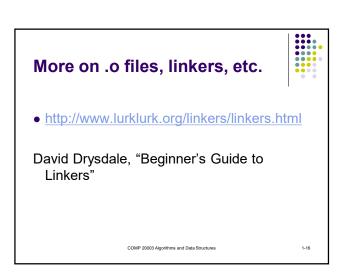












Header files • Contains • function declarations • macro definitions • shared among several source files

```
Another example: list.h

#ifndef LISTH
#define LISTH

typedef struct node{
   data_t data;
   node_t* next;
} node_t;

int search_sorted( list_t* list, data_t value );

#endif

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```

```
list.c
#include "list.h"

int search_sorted( list_t* list, data_t value ) {
    //code for the search_sorted function here
}

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```