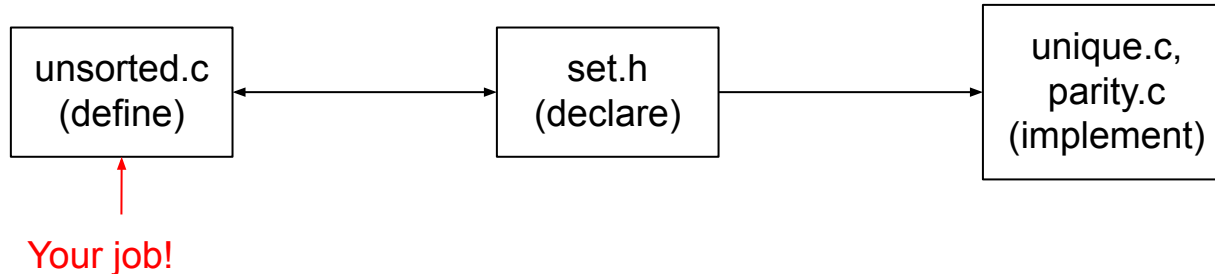# Sets and Arrays

Project 2

Unsorted Array (1st week)

- Download the tar file and untar it with the command:
  tar xvf project2.tar

- Header file (set.h): declaration of the set functions; the linkage between c files.

- Driver programs (unique.c, parity.c) call set functions by including set.h:

  – unique.c: collect unique words.

  – parity.c: collect words that occur odd times.

```
┌─────────────┐        ┌─────────────┐        ┌─────────────┐
│ unsorted.c  │ ◄────► │   set.h     │ ─────► │  unique.c,  │
│ (define)    │        │  (declare)  │        │  parity.c   │
│             │        │             │        │ (implement) │
└─────────────┘        └─────────────┘        └─────────────┘
      ▲
      │
  Your job!
```

Unsorted Array (1st week)

- Set functions (set.h):
  - createSet
  - destroySet
  - numElements
  - addElements
    - strdup vs. strcpy vs. assignment
  - removeElements
  - findElements
  - getElements
    - memcpy (dest, src, size)

- Internal (private) function:
  - search: return index or ?

Testing Commands

- Compile:

  gcc -o unique_unsorted unique.c unsorted.c

  gcc -o parity_unsorted parity.c unsorted.c

- Execute (always try to debug by yourself first):

  (1) Testing addElement:

  ./unique_unsorted /scratch/coen12/Macbeth.txt

  (2) Testing removeElement if (1) works:

  ./unique_unsorted /scratch/coen12/Macbeth.txt /scratch/coen12/Bible.txt

  (3) Testing getElements if (1) & (2) works:

  ./unique_unsorted -l /scratch/coen12/Macbeth.txt /scratch/coen12/Bible.txt

  (4) Testing findElement if (1) & (2) works:

  ./parity_unsorted /scratch/coen12/Macbeth.txt

Demo

```
[tzhou@linux10623 demo]$ make clean all
rm -f unique-unsorted unique-sorted parity-unsorted parity-sorted *.o core
gcc -g -Wall   -c -o unique.o unique.c
gcc -g -Wall   -c -o unsorted.o unsorted.c
gcc -o unique-unsorted  unique.o unsorted.o
gcc -g -Wall   -c -o sorted.o sorted.c
gcc -o unique-sorted  unique.o sorted.o
gcc -g -Wall   -c -o parity.o parity.c
gcc -o parity-unsorted  parity.o unsorted.o
gcc -o parity-sorted  parity.o sorted.o
[tzhou@linux10623 demo]$ ./unique-unsorted /scratch/coen12/Macbeth.txt
18464 total words
3894 distinct words
[tzhou@linux10623 demo]$ ./unique-unsorted /scratch/coen12/Macbeth.txt /scratch/coen12/Bible.txt
18464 total words
3894 distinct words
1641 remaining words
```

Demo

```
[tzhou@linux10623 demo]$ ./unique-unsorted -l /scratch/coen12/Macbeth.txt /scratch/coen12/Bible.txt
SCENE
Scotland
Whateer
England
ACT
harbingers
Direness
enrages
underwrit
forsworn
frog
theres
interdiction
Witches
FIRST
WITCH
artificial
speculative
Fate
stared
Pronounce
END
```

Demo

```
profound
Didst
mated
scannd
scream
crickets
howld
Ay
rabbles
sights
Looks
lated
bleed
s
methinks
towering
Ist
addressd
brows
unfortunate
diggd
[tzhou@linux10623 demo]$ ./parity-unsorted /scratch/coen12/Macbeth.txt
18464 total words
2900 words occur an odd number of times
```

report.txt

- Record the "real" execution time for your programs.

```
time ./unique /scratch/coen12/Macbeth.txt
```

```
[tzhou@linux10623 lab2]$ time ./unique-unsorted /scratch/coen12/GreenEggsAndHam.txt
803 total words
67 distinct words

real    0m0.014s
user    0m0.001s
sys     0m0.002s
```

report.txt

```
 1  unique
 2  ------
 3                                      unsorted    sorted
 4  GreenEggsAndHam.txt                   0.014      ????
 5  Macbeth.txt                           ????       ????
 6  Genesis.txt                           ????       ????
 7  HoundOfTheBaskervilles.txt            ????       ????
 8  TheWarOfTheWorlds.txt                 ????       ????
 9  TreasureIsland.txt                    ????       ????
10  TheSecretGarden.txt                   ????       ????
11  TwentyThousandLeagues.txt             ????       ????
12  TheCountOfMonteCristo.txt             ????       ????
13  Bible.txt                             ????       ????
14
15
16  parity
17  ------
18                                      unsorted    sorted
19  GreenEggsAndHam.txt                   ????       ????
20  Macbeth.txt                           ????       ????
21  Genesis.txt                           ????       ????
22  HoundOfTheBaskervilles.txt            ????       ????
23  TheWarOfTheWorlds.txt                 ????       ????
24  TreasureIsland.txt                    ????       ????
25  TheSecretGarden.txt                   ????       ????
26  TwentyThousandLeagues.txt             ????       ????
27  TheCountOfMonteCristo.txt             ????       ????
28  Bible.txt                             ????       ????
```