

CS16, UCSB

Pre-lab #8: worth 50% of Lab 8 score (50 total points)

Print this form, staple loose pages together, and write your answers on it.

Accepted: On paper, in lab Wednesday, August 22.

Name (2 pts): _____

Email (2 pts): _____

Lab section (2 pts) Circle one: 2:00 3:30

If you have the book, read Chapter 7, through section 7.4 (page 339). Then answer the following questions:

1. Both a C structure (a struct) and an array may store multiple data values, but otherwise structs and arrays are very different types. Explain how a struct object named `S` differs from an array object named `A` in terms of these aspects:
 - a. (4 pts) The types of data that can be stored in `S` and `A`

 - b. (4 pts) The ways that data stored in `S` and `A` are accessed

2. (7 pts) Define a C structure on the next page named

```
struct book that has three data members:  
title: book title, a character string (may be as long as 49  
      characters)  
year: the year the book was published, an integer  
pages: the total number of pages in the book, another  
      integer
```

Problems 3-5 refer to the `struct book` you defined for Problem 2.

3. Write C statements to accomplish the following steps in order:

a. (3 pts) Define an object of `struct book` named `cs16text`.

b. (5 pts) Let `char s[] = "Engineering Problem Solving with C"`. Copy this string into the `title` field of `cs16text`. Properly use the library function `strcpy` to do this. (See Etter 6.6, or <http://www.cplusplus.com/reference/cstring/strcpy/> for more information on using `strcpy`.)

c. (4 pts) Set `cs16text`'s `year` field to 2005 and the `pages` field to 448. You must use two separate statements to do these things.

4. Consider the following code:

```
void change1( struct book s ) {
    s.year = 1000;
}
void change2( struct book* s ) {
    s->year = 2000;
}
int main() {
    struct book temp = { "title", 2012, 50 };
    change1( temp );
    printf( "%i\n", temp.year ); // prints 2012
    change2( &temp );
    printf( "%i\n", temp.year ); // prints 2000
    return 0;
}
```

a. (4 pts) Calling `change1` does not change the value of `temp.year`. why not?

b. (4 pts) Calling `change2` does change the value of `temp.year`. why?

5. (9 pts) write function definition for a function named `printBook` that takes a pointer to a struct `book` as its only parameter. `printBook` neatly prints the fields of the structure like the following example, and does not return anything. Here is how the function would work at the `ch` prompt (using the object created in Problem 3):

```
ch> printBook( &cs16text ); // address of object passed
Engineering Problem Solving with C
published 2005
448 pages
```