

# CS 161, Lecture n-1: Structs and Objects

# Objects

- The world is filled with them
- Often made of mixed types
- Examples:

Book → title, pages, authors

Protein bar → nutritional, rating

Videogame

Car

# Structs – Objects without functionality

- Structs are user defined types that have multiple types

```
struct book {  
    char* title;  
    int num_authors;  
    char** authors;  
    int num_pages;  
};  
book text_book;  
text_book.num_pages = 500;
```

# Use of Structs

- Can use the same way as any other type

```
book* bookshelf = new book[10];
```

```
for(int i=0; i<10; i++) {
```

```
    bookshelf[i].num_pages = 100;
```

```
    strcpy(bookshelf[i].title, "Place holder");
```

```
    bookshelf[i].authors = new char*[2];
```

```
    for(int j=0; j<2; j++)
```

```
        bookshelf[i].authors[j] = new char[256];
```

```
}
```

# Demo

```
access.engr.orst.edu - PuTTY
1 #include <iostream>
2 #include <string>
3
4 using namespace std;
5
6 struct book {
7
8     int pages;
9     string title;
10    int num_authors;
11    string* authors;
12 };
13
14 void print_book(book b) {
15     cout << "Title: " << b.title << endl;
16     for(int i=0; i<b.num_authors; i++) {
17         cout << "Author " << i+1 << ": " << b.authors[i] << endl;
18     }
19     cout << "Pages: " << b.pages << endl;
20
21 }
22
23 void pop_book(book* b) {
```

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```
22
23 void pop_book(book* b) {
24     cout << "What is is the title? ";
25     getline(cin, b->title);
26     cout << "How many authors? ";
27     cin >> b->num_authors;
28     cin.ignore();
29     cin.clear();
30     b->authors = new string[b->num_authors];
31     for(int i=0; i<b->num_authors; i++) {
32         cout << "Who is author " << i+1 << "? ";
33         getline(cin, b->authors[i]);
34     }
35     cout << "How many pages? ";
36     cin >> b->pages;
37 }
38
39
40 int main () {
41
42     book my_book;
43     /*my_book.pages = 319;
44     my_book.title = "Once Upon and Algorithm";
45     my_book.num_authors = 1;
```

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55%

```
40 int main () {
41
42     book my_book;
43     /*my_book.pages = 319;
44     my_book.title = "Once Upon and Algorithm";
45     my_book.num_authors = 1;
46     my_book.authors = new string;
47     my_book.authors[0] = "Martin Erwig";*/
48
49     pop_book (&my_book) ;
50
51     /*cout << "Title: " << my_book.title << endl;
52     cout << "Authors: " << my_book.authors[0] << endl;
53     cout << "Pages: " << my_book.pages << endl;*/
54
55     print_book (my_book) ;
56
57
58
59
60
61     return 0;
62 }
```

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