

Pointers and Structs

ITSC 2181: Introduction to Computer Systems
UNC Charlotte
College of Computing and Informatics

structs Can **Contain** Pointers

```
struct person {  
    char *name;  
    ...  
} person1;  
  
person1.name = "Donna";  
printf("Name is %s\n", person1.name);  
char initial = *person1.name;
```

Are parentheses needed? No

Be careful when assigning string values from another function. Use the **strcpy()** or the **strncpy()** function.

Pointers **to** Structs

```
struct person {  
    ...  
} person1, *p;  
  
p = &person1;  
  
(*p).name = "Donna";  
(*p).height = 65;  
printf("Name is %s\n", (*p).name);  
char initial = *(*p).name;  
printf("Height is %d\n", (*p).height );
```

(see `struct_pointer1.c` in *Code samples and Demonstrations in Canvas*)

⚠ common source of bugs ⚠
failure to use parenthesis
around `(*p).m`

Are parentheses needed?
Yes!

A New Operator: \rightarrow

- Unfortunately, $*p.height \neq (*p).height$
 - the value pointed to by the member $p.height$
 - the height of the person pointed to by p
- A new operator (for convenience):
 $(*a).b$ can be replaced by $a \rightarrow b$

```
...  
p = &person1;  
  
p->name = "Donna";  
p->height = 65;  
printf("Name is %s\n", p->name);  
char initial = *p->name;  
printf("Height is %d\n", p->height);
```

⚠ common source of bugs ⚠
failure to use parenthesis
around $(*p).m$

(see [struct_pointer2.c](#) in Code samples and Demonstrations in Canvas)

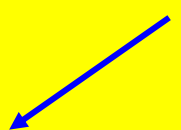
What does $*$ dereference?

A New Operator... (cont'd)

- How about **pointer** to a **struct** containing **pointer** to a **struct** containing...? No problem!

```
struct person {  
    ...  
    struct person *father;  
    struct person *mother;  
} persons[100], *p;  
p = &persons[1];  
p->father = &persons[22];  
p->mother = &persons[45];  
  
if ( p->father->age >= 65 )  
    ...  
printf("Mother: %s\n", p->mother->name );
```

Parentheses needed?



References

- S. J. Matthews, T. Newhall and K. C. Webb, *Dive into Systems*, Version 1.2. Free online textbook, available at:
<https://diveintosystems.org/book/>
- K. N. King, *C Programming: A Modern Approach*, 2nd Edition. W. W. Norton & Company. 2008.
- D.S. Malik, *C++ Programming: From Problem Analysis to Program Design*, Seventh Edition. Cengage Learning. 2014.