Programming with C I

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Objectives

- To learn how to return function results through a function’s arguments

Segmentation fault

- **Runtime error**
- **Means you tried to access memory that you weren't allowed to access**
- **Examples of causes:**
  - trying to read from a file that wasn't open
  - following a dangling pointer
  - accessing data beyond array bounds

Let's introduce a segmentation fault in read.c

The NULL pointer

- **Uninitialized pointers point somewhere**
- **NULL is a pointer that points nowhere**
- **0 also works for the null pointer**

```
int* ptr = NULL;

if (myptr == NULL) {
        …
        …
```

sizeof() function

- **Gives the number of bytes that a variable or value takes up**

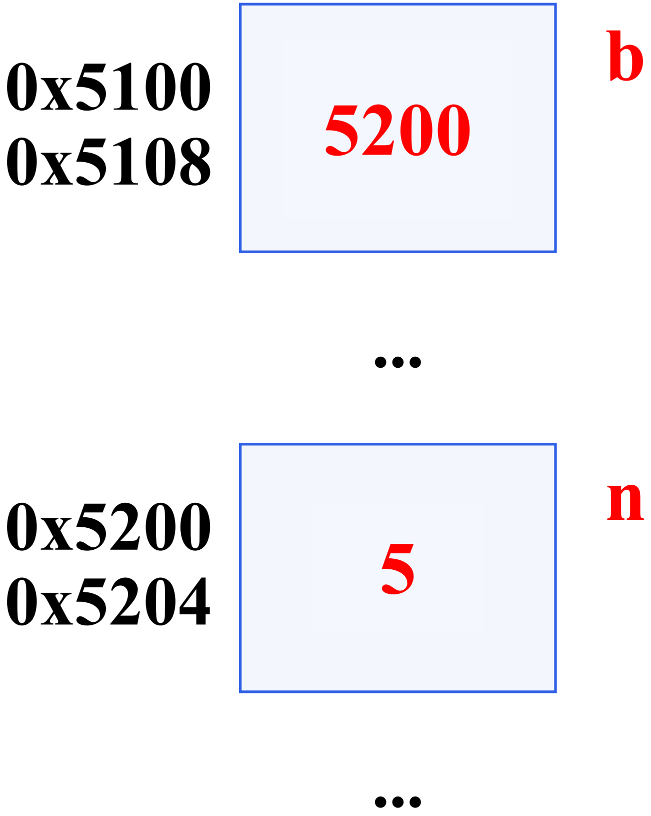
  sizeof(m)

- **On our server:**
  - Char: 1 bytes
  - Int: 4 bytes
  - Float: 4 bytes
  - Double: 8 bytes
  - Pointer: 8 bytes

Pointers

- Create an integer pointer variable and set it

```
int main(void) {
    int *b;
    int n;
    n = 5;
    b = &n;
```



0x5100
0x5108

5200

b

...

0x5200
0x5204

5

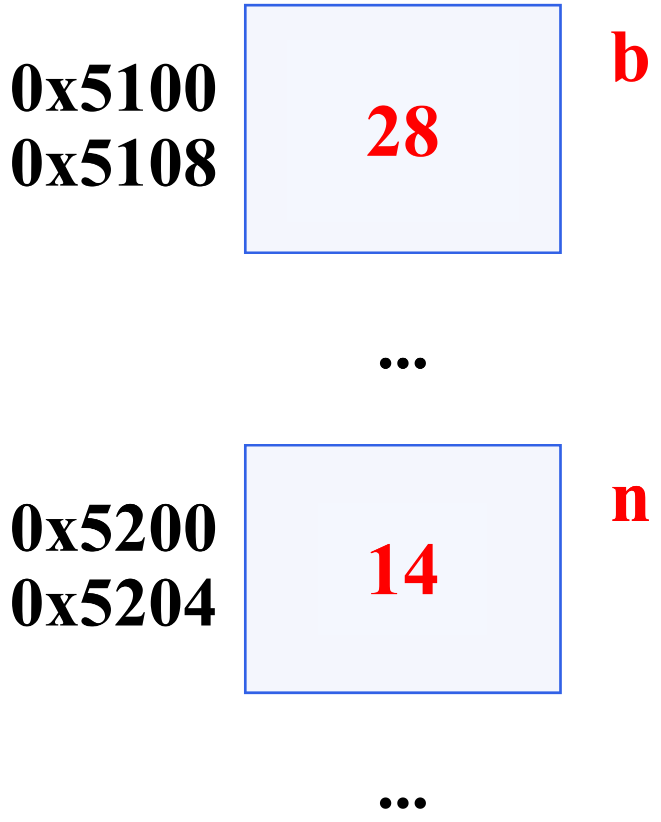
n

...

Pointers

- Create an integer pointer variable and set it

```
int main(void) {
    int *b;
    int n;
    n = 5;
    b = &n;
    n = 6;
    *b += 1;
    *b = 2 *(*b);
    b = 2 * (*b);
```



0x5100
0x5108
28
b

...

0x5200
0x5204
14
n

...

ptr0.c shows seg fault accessing *b

Functions with Output Parameters

- We’ve used the return statement to send back one result value from a function.
- We can also use output parameters to return multiple results from a function.

➢ *Figure Diagram of function separate with Multiple Results*

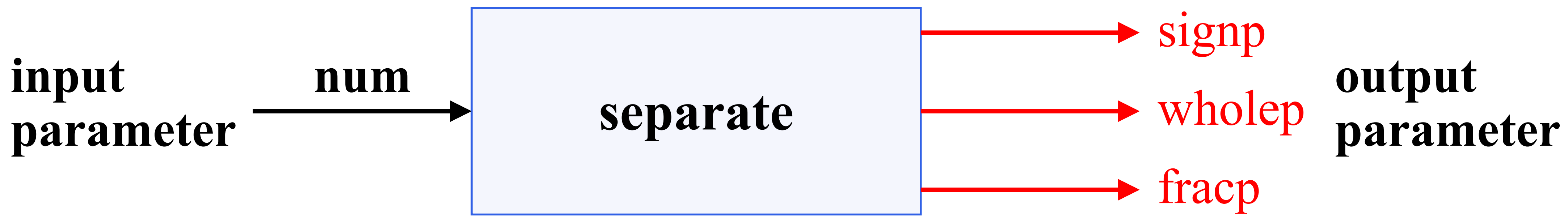


Figure Parameter Correspondence for separate(value, &sn, &whl, &fr);

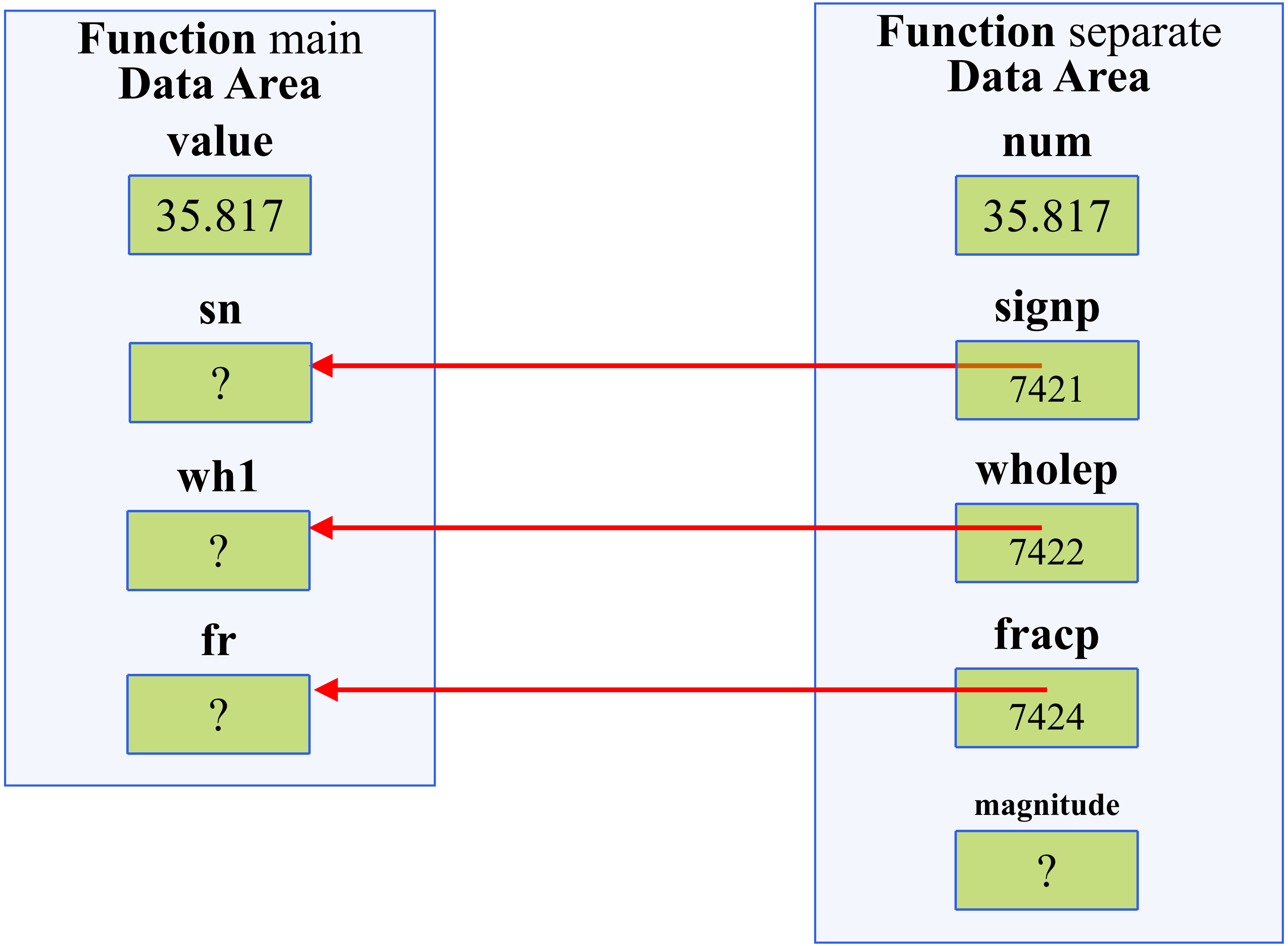


Table Effect of & Operator on the Data Type of a Reference

Declaration	Data Type of x	Data Type of &x
char x	char	char * (pointer to char)
int x	int	int * (pointer to int)
double x	double	double * (pointer to double)

Meaning of Symbol *

- binary operator for multiplication
- “pointer to” when used when declaring a variable or a function parameters
- unary indirection operator in a function body

THE END

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