Introduction (1A)

Young Won Lim
7/20/09

Please send corrections (or suggestions) to youngwlim@hotmail.com.

This document was produced by using OpenOffice.

Young Won Lim
09년 7월 20일

Calculating the Mean

The mean of 3 numbers

$$m = \frac{a + b + c}{3}$$

$$\frac{40 + 50 + 60}{3} = 50 \qquad \text{Integer number}$$

$$\frac{45 + 53 + 63}{3} = \frac{161}{3} = 53.6666666\ldots \qquad \text{Real number}$$

Calculating the Mean – in C

```
int        a, b, c;
int        mean;

a = 40;
b = 50;
c = 60;

mean = (a + b +c) /  3;
```

```
int        a, b, c;
float      mean;

a = 45;
b = 53;
c = 63;

mean = (a + b +c) /  3.0;
```

* Variable
* Type
* Assignment
* Operator

Variable – Int

a ▭

b ▭

c ▭

mean ▭

int type

a = 40; → a [40]

b = 50; → b [50]

c = 60; → c [60]

mean = (a+b+c) / 3; → mean [50]

Variable – Float

a = 40;

b = 50;

c = 60;

mean = (a+b+c) / 3.0;

a	
b	
c	
mean	

a	45
b	53
c	63
mean	53.6...67
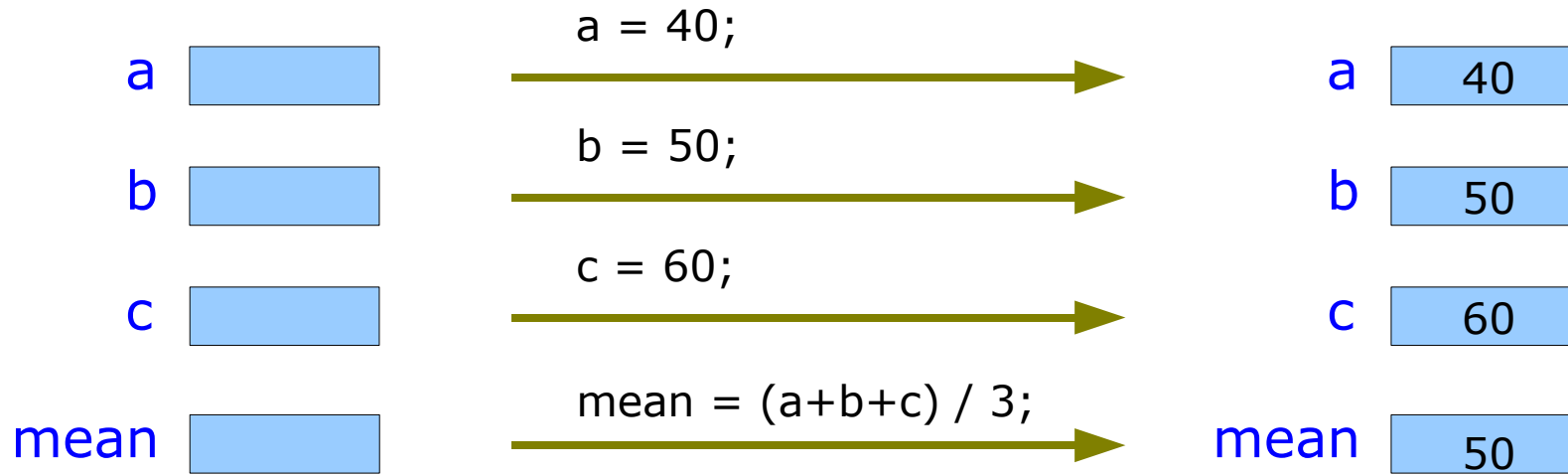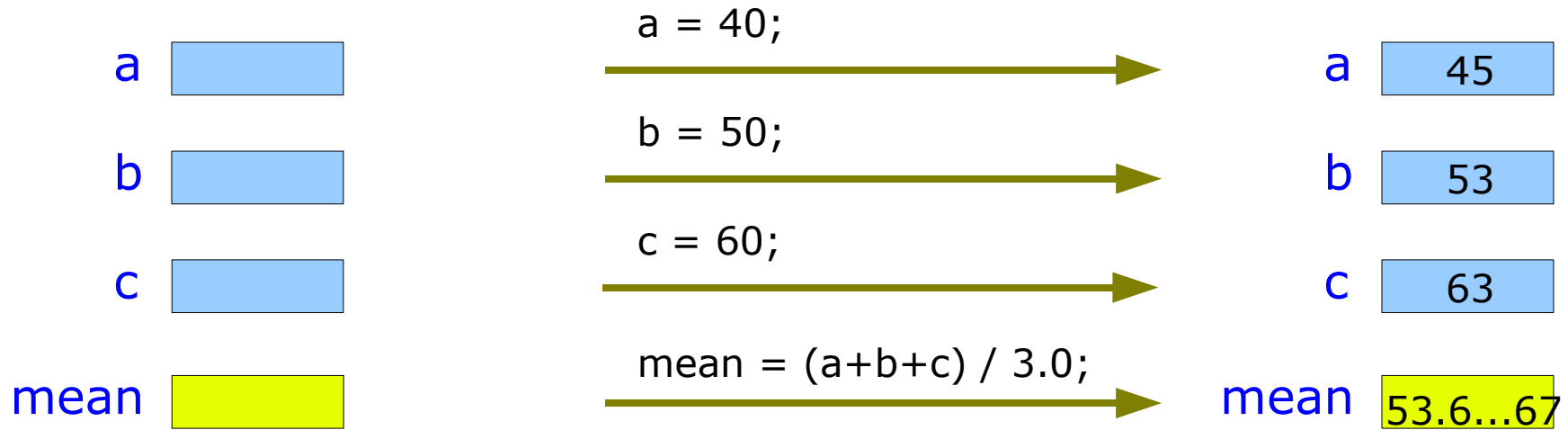
float type

Memory and & operator

a [40]

b [50]

c [60]

mean [50]
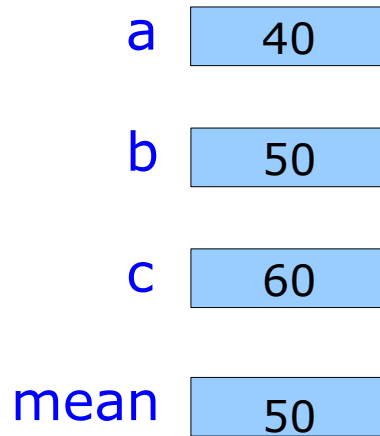
```
a = 40;

where: address of a
what: data 40
```

address | data

address of a
&a → 4500

address of b
&b → 4510

address of c
&c → 4520

address of mean
&mean → 4530

40
50
60
50

Memory and Pointer

address   data

a   40

b   50

c   60

mean   50

address of a → 4500   40
&a

address of b → 4510   50
&b

address of c → 4520   60
&c

address of mean → 4530   50
&mean
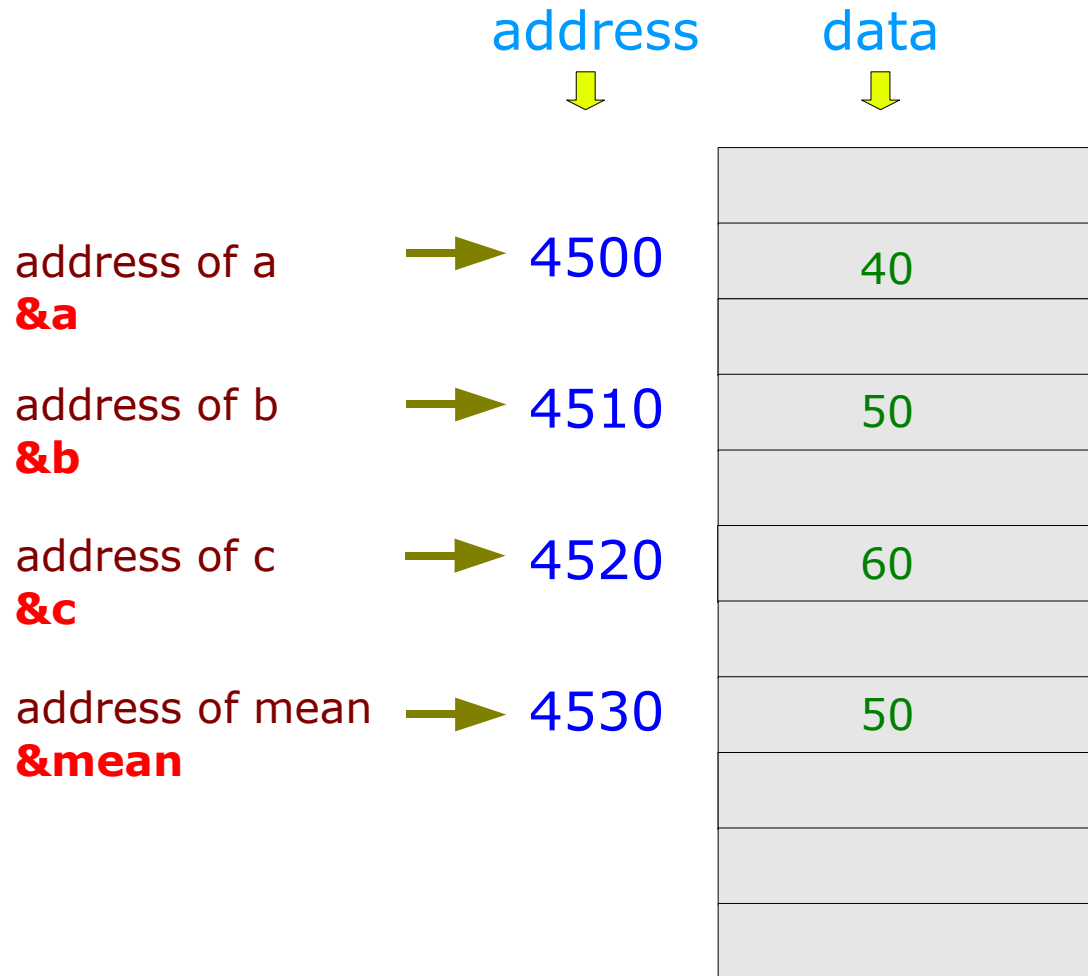
address of a_ptr → 4580   4500
&a_ptr
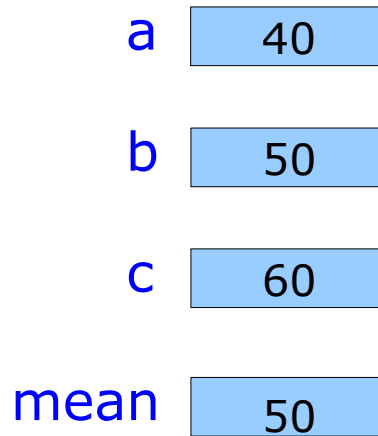
a_ptr = &a;

where: addr of a_ptr
what: data &a
      (addr of a)

Memory and * operator

a [40]

b [50]

c [60]

mean [50]

address   data

	address	data
address of a **&a**	→ 4500	**55**
address of b **&b**	→ 4510	50
address of c **&c**	→ 4520	60
address of mean **&mean**	→ 4530	50
address of a_ptr **&a_ptr**	→ 4580	4500
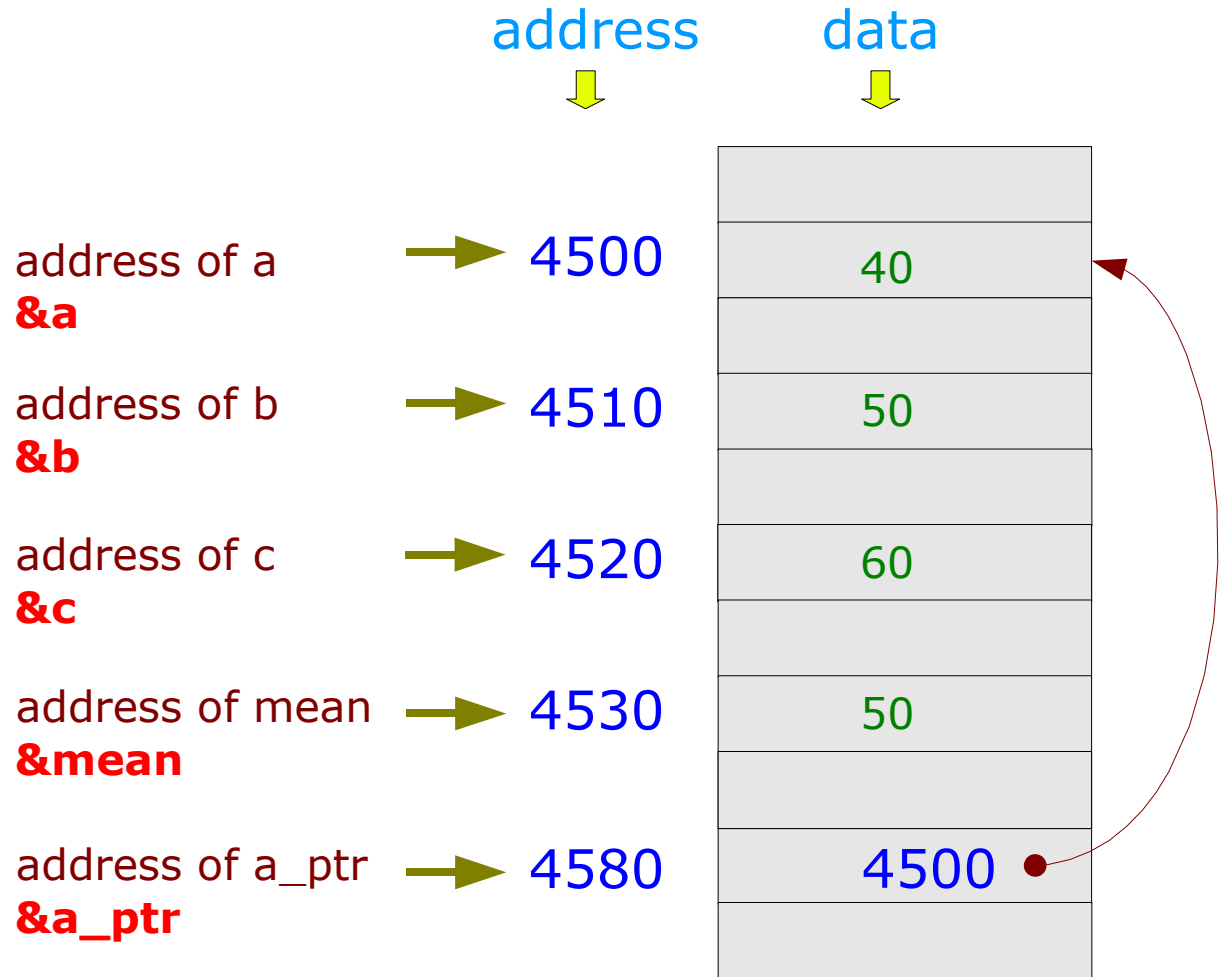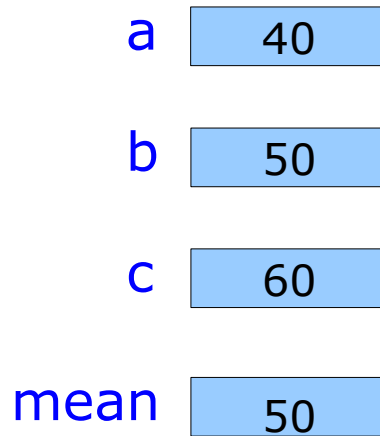
*a_ptr = 55;

where: data of a_ptr
(→ another addr)
what: data 55
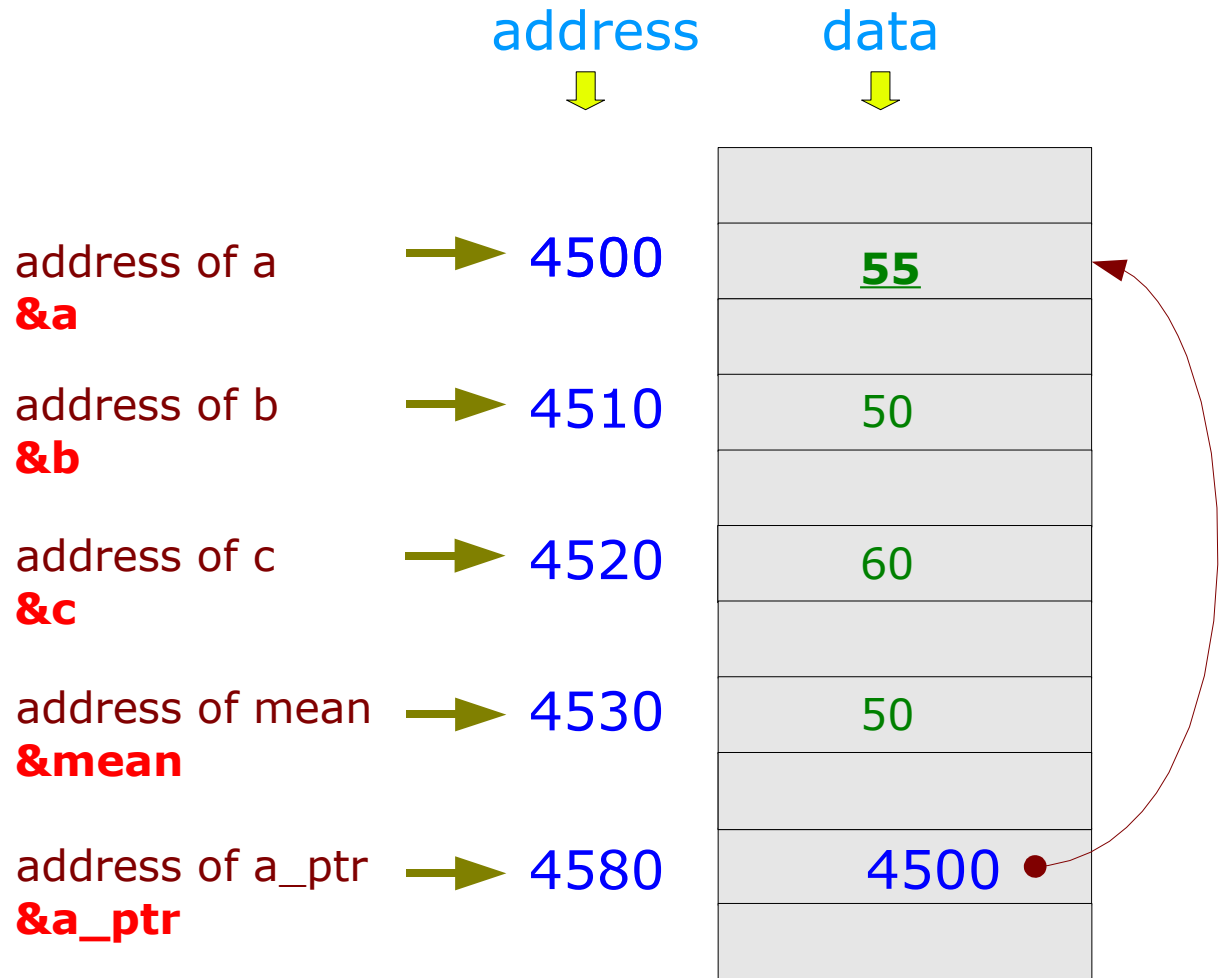
Pointer Type

int   a;

&a   [value of a]

a holds *data*

int   *a_ptr;

a_ptr holds *address*
*a_ptr holds *data*

&a_ptr   [value of a_ptr ●]

value of a_ptr   [*a_ptr]
(→ *an address*)

Printf Function

The mean of three numbers
a = 40
b = 50
c = 60
mean(40, 50, 60) => 50

```
printf("The mean of three numbers \n");
printf("a = %d \n", a);
printf("b = %d \n", b);
printf("c = %d \n", c);
printf("mean (%d, %d, %d) => %d \n", a, b, c, mean);
```

Main Function

```
main (void)
{
    int     a, b, c;
    int     mean;

    a = 40;
    b = 50;
    c = 60;

    mean = (a + b + c) / 3;

    printf("The mean of three numbers \n");
    printf("a = %d \n", a);
    printf("b = %d \n", b);
    printf("c = %d \n", c);
    printf("mean (%d, %d, %d) => %d \n", a, b, c, mean);

}
```

References

[1] Essential C, Nick Parlante
[2] Efficient C Programming, Mark A. Weiss
[3] C A Reference Manual, Samuel P. Harbison & Guy L. Steele Jr.
[4] C Language Express, I. K. Chun