

Operators (1A)

Copyright (c) 2011 Young W. Lim.

Permission is granted to copy, distribute and/or modify this document under the terms of the GNU Free Documentation License, Version 1.2 or any later version published by the Free Software Foundation; with no Invariant Sections, no Front-Cover Texts, and no Back-Cover Texts. A copy of the license is included in the section entitled "GNU Free Documentation License".

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

This document was produced by using OpenOffice.

Pre / Post Increment

Pre Increment

```
++x;
```

```
x = x + 1;
```

Assignment w/ Pre Increment

```
y = ++x;
```

Increment *before* assigning

```
{ x = x + 1;  
  ↓  
  y = x;
```

Post Increment

```
x++;
```

```
x = x + 1;
```

Assignment w/ Post Increment

```
y = x++;
```

Increment *after* assigning

```
{ y = x;  
  ↓  
  x = x + 1;
```

Pre / Post Decrement

Pre Decrement

```
--x;
```

$x = x - 1;$

Assignment w/ Pre Decrement

```
y = --x;
```

Increment *before* assigning

$$\left\{ \begin{array}{l} x = x - 1; \\ \quad \downarrow \\ y = x; \end{array} \right.$$

Post Decrement

```
x--;
```

$x = x - 1;$

Assignment w/ Post Decrement

```
y = x--;
```

Increment *after* assigning

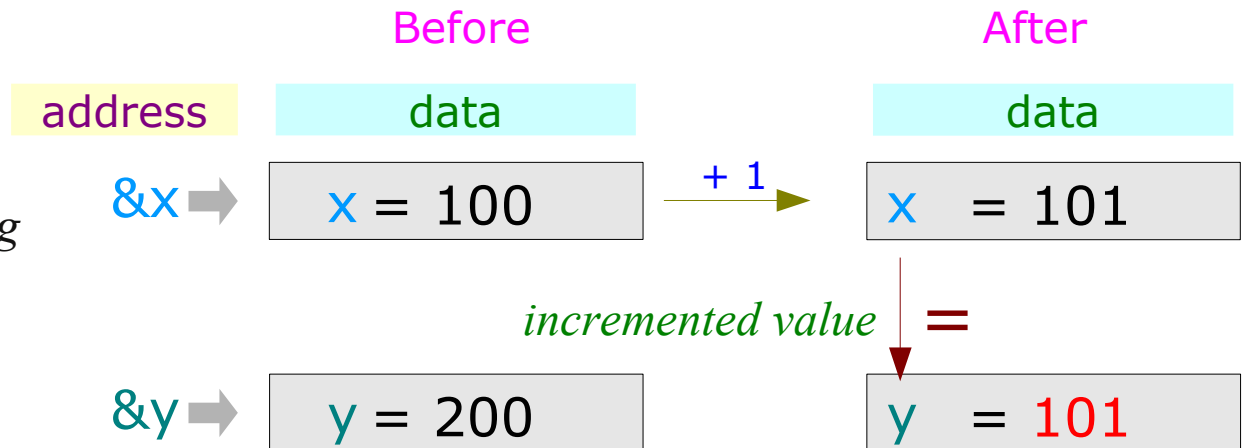
$$\left\{ \begin{array}{l} y = x; \\ \quad \downarrow \\ x = x + 1; \end{array} \right.$$

Pre / Post Increment Example

```
y = ++x;
```

Increment *before* assigning

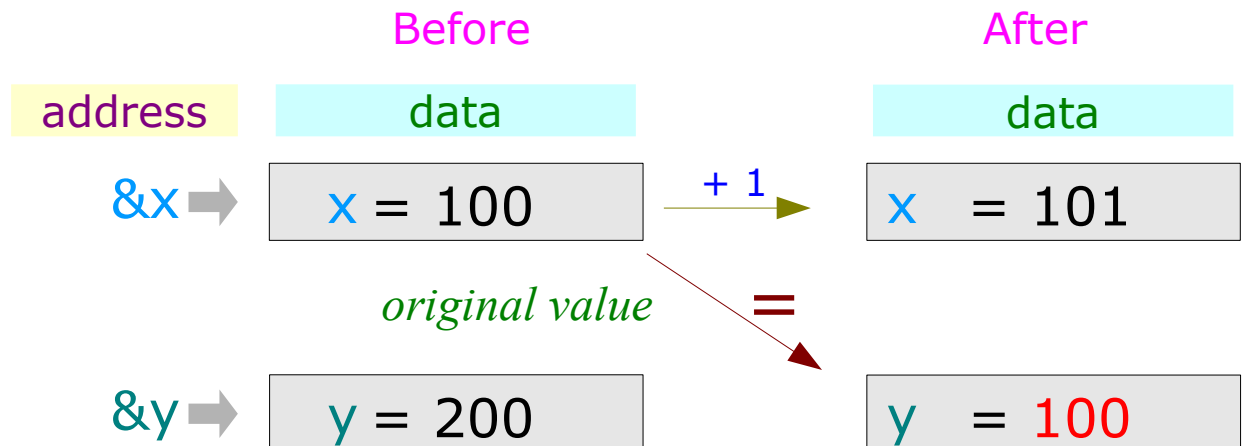
```
{ x = x + 1;  
  ↓  
  y = x;
```



```
y = x++;
```

Increment *after* assigning

```
{ y = x;  
  ↓  
  x = x + 1;
```



Pre / Post -Increment Pointer Variable

```
p = &x;  
y = *++p;
```

```
p = &x;  
y = ++(*p);
```



```
p = &x;  
y = ++*p;
```

```
{  
  p = p + 1;  
  ↓  
  y = *p;  
}
```

```
{  
  *p = *p + 1;  
  ↓  
  y = *p;  
}
```

```
p = &x;  
y = *p++;
```

```
p = &x;  
y = (*p)++;
```

*++, --
higher precedence than **

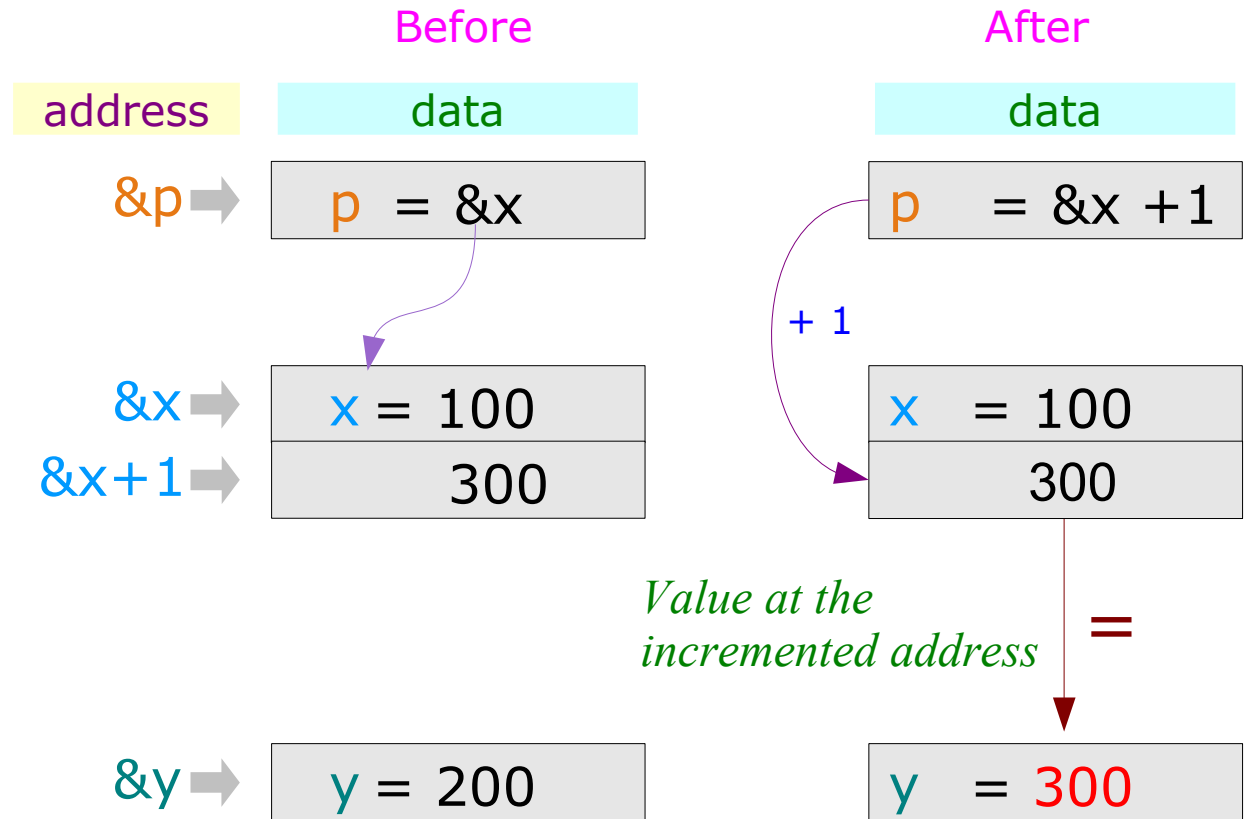
```
{  
  y = *p;  
  ↓  
  p = p + 1;  
}
```

```
{  
  y = *p;  
  ↓  
  *p = *p + 1;  
}
```

Pre-Increment Example (1)

```
p = &x;  
y = *++p;
```

```
{ p = p + 1;  
  ↓  
  y = *p;
```

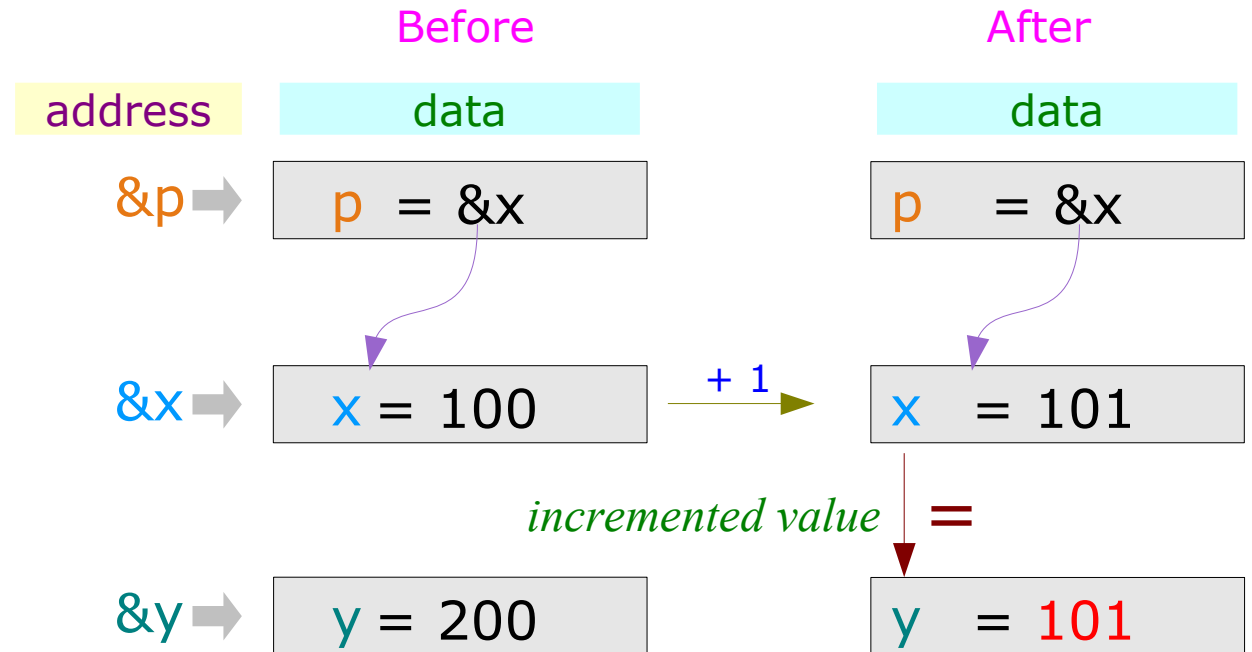


Pre-Increment Example (2)

```
p = &x;  
y = ++(*p);
```

↔ $y = ++*p;$

{ $*p = *p + 1;$
 ↓
 $y = *p;$

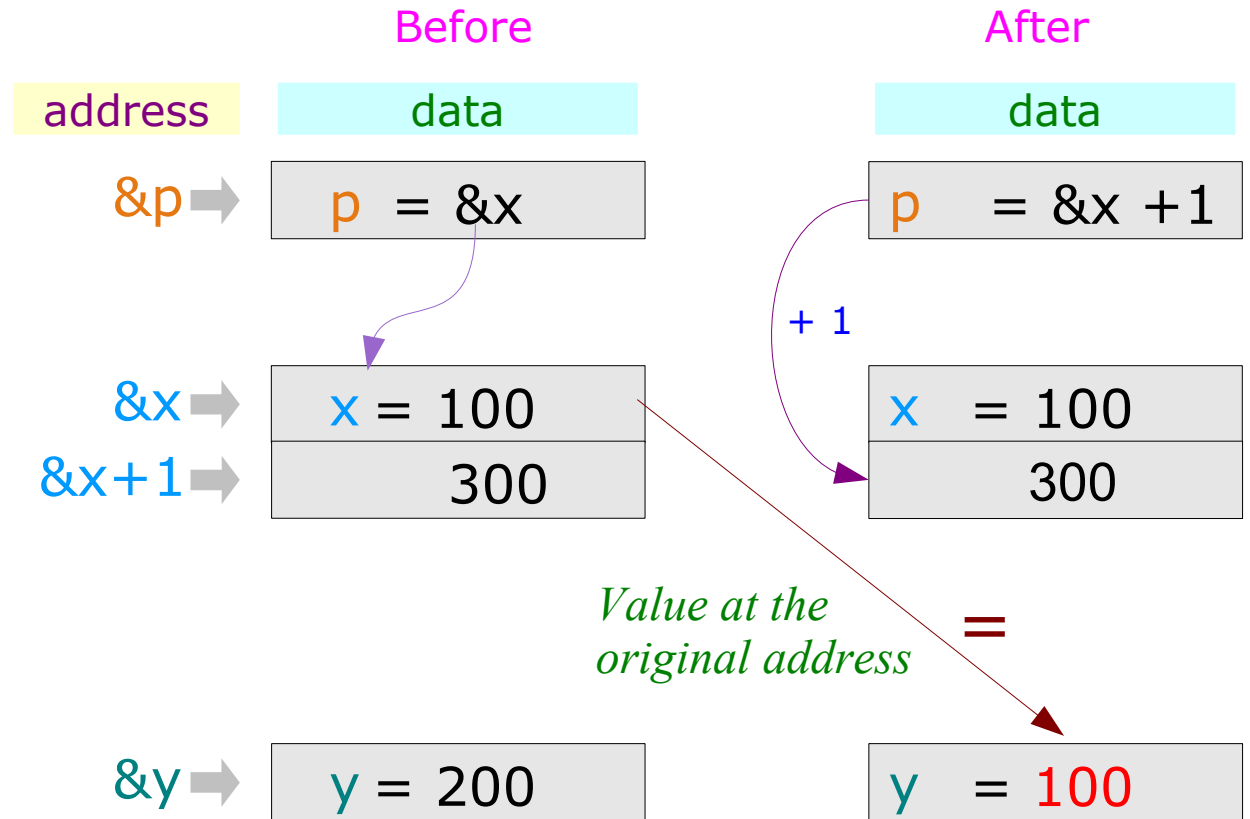


$++$, $--$
higher precedence than $*$

Pre-Increment Example (3)

```
p = &x;  
y = *p++;
```

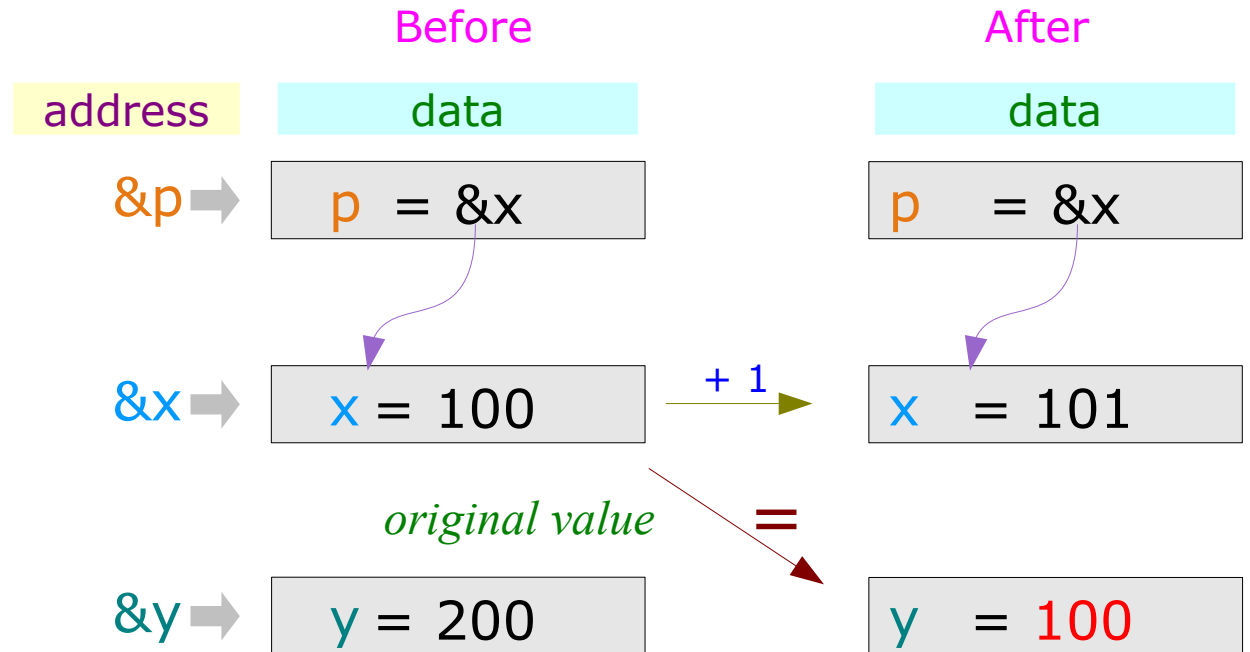
```
{ y = *p;  
  p = p + 1;
```



Post-Increment Example (4)

```
p = &x;  
y = (*p)++;
```

```
{  
  y = *p;  
  ↓  
  *p = *p + 1;  
}
```



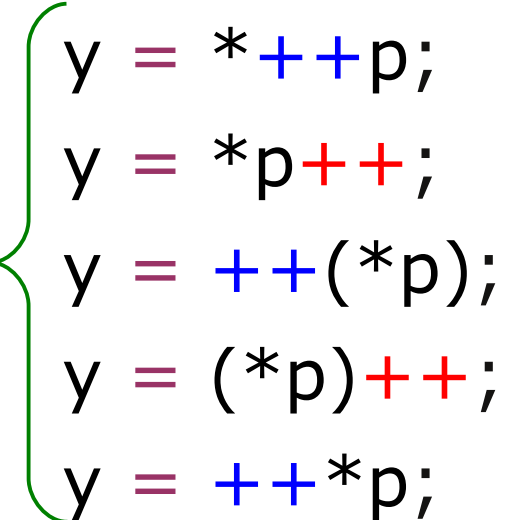
Example Code

```
int main (void)
{
    int xa = 300;
    int x  = 100;
    int xb = 400;
    int y  = 200;
    int *p;

    P = &x;

    printf("&x=%p &y=%p &p=%p\n", &x, &y, &p);
    printf("x=%d y=%d *p=%d p=%p\n", x,y,*p,p);
    
    printf("&x=%p &y=%p &p=%p\n", &x, &y, &p);
    printf("x=%d y=%d *p=%d p=%p\n", x,y,*p,p);

    return 0;
}
```



- y = *++p;
- y = *p++;
- y = ++(*p);
- y = (*p)++;
- y = ++*p;

Array

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