Pointer (1A)

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

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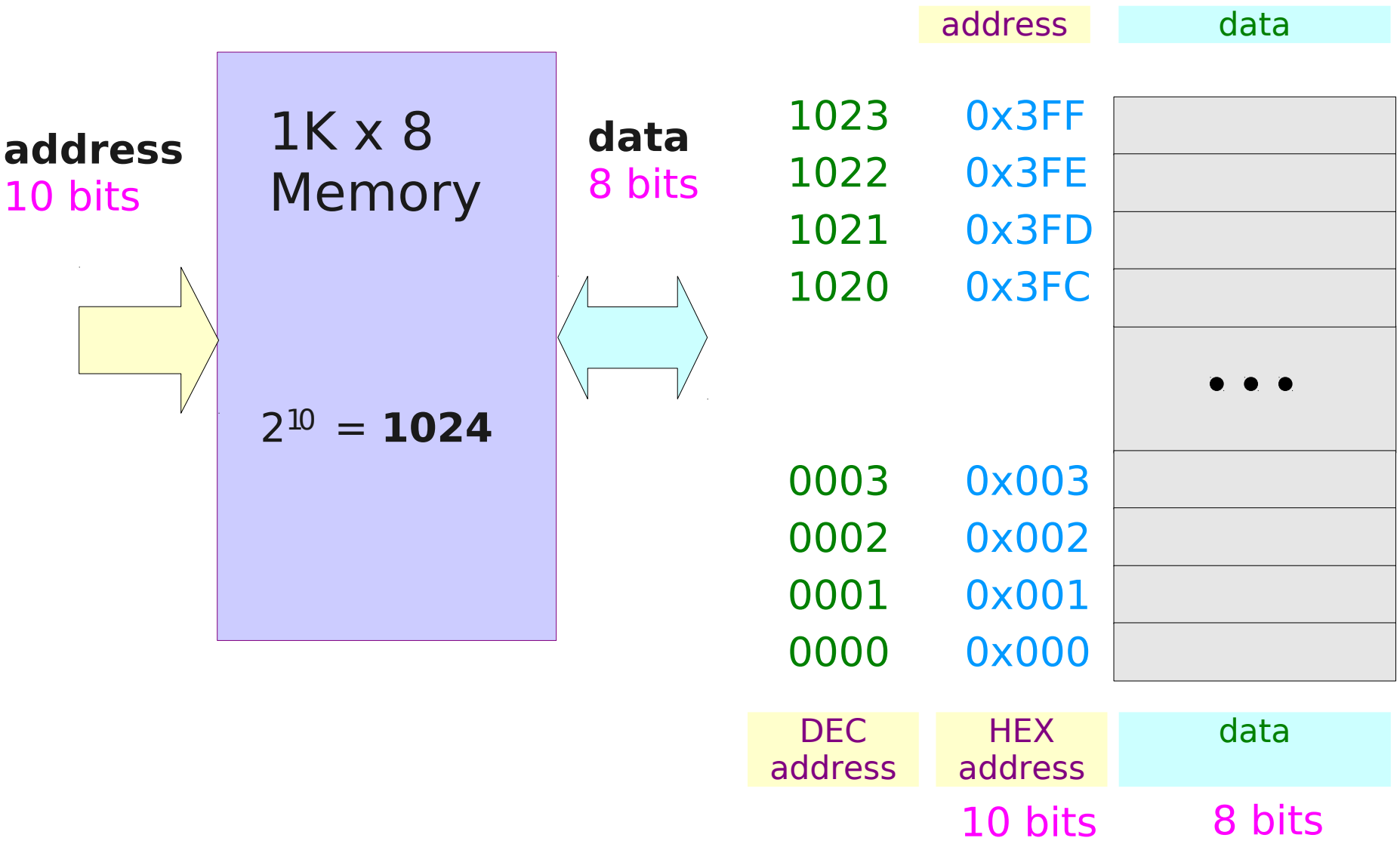
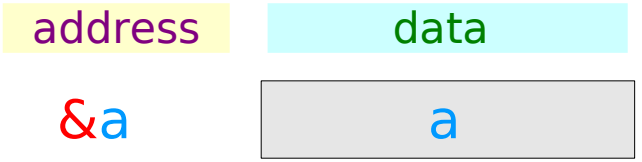
Address and Data in a Memory



Variable

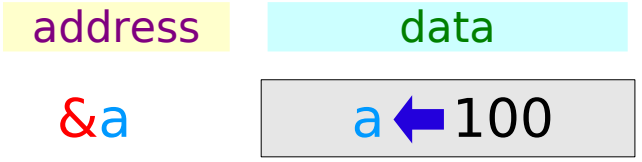
```
int    a;
```

a can hold an *integer*




```
a = 100;
```

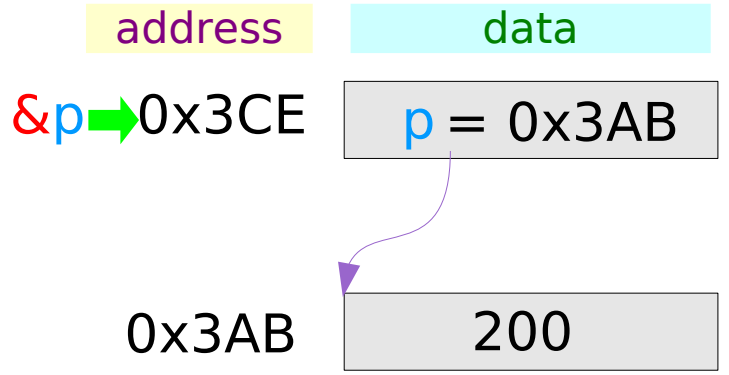
a holds an *integer* 100



Pointer Variable

```
int *    p;
```

p can hold an *address*




```
int   *   p;
```

p can hold an *address*

pointer to int

```
int   *   p;
```

*p can hold an *integer*

int

&p ➡ 0x3CE
p ➡ 0x3AB
*p ➡ 200

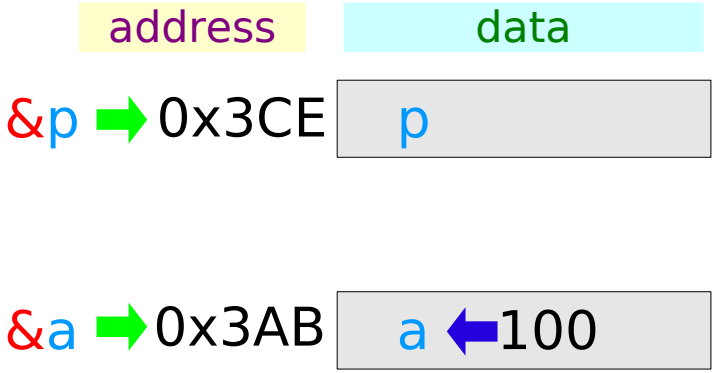
Variable Assignment Example

```
int *      p;
```

p can hold an *address*

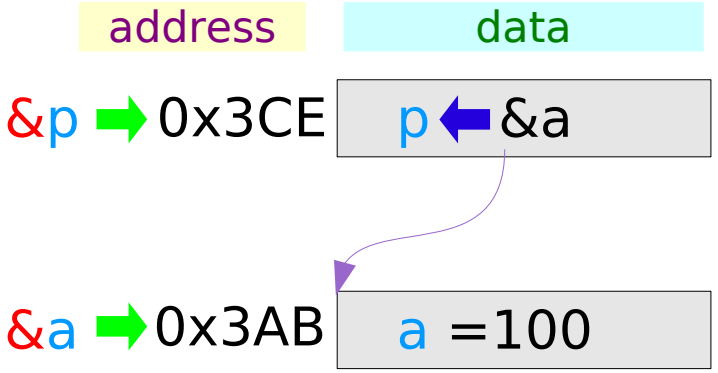
```
int        a = 100;
```

a holds an *integer* 100




```
p  =  &a;
```

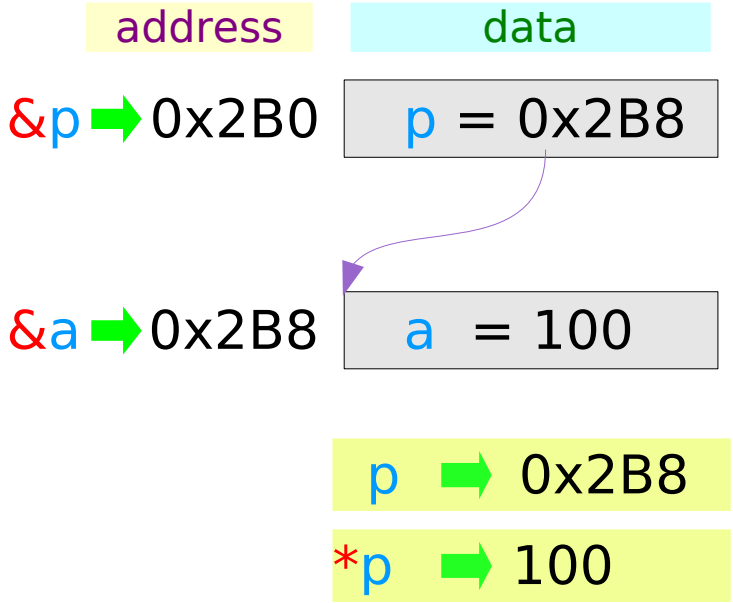
p holds the *address* of a



* and & Operator

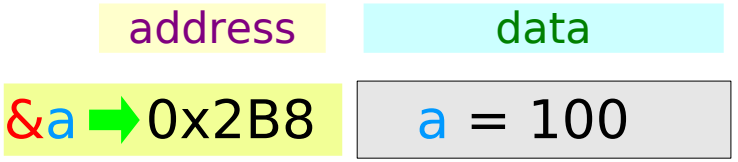
* address

returns the value
that is stored at the address



& variable

returns the address of a
location where the
variable's value is stored



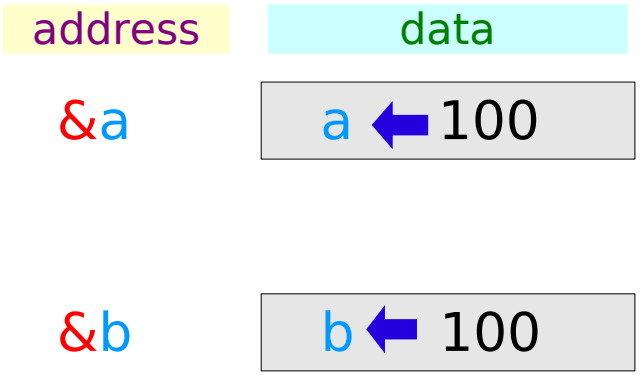
Variable Initialization

```
int     a = 100 ;

int     b =  a ;
```

a can hold an *integer*

b can hold an *integer*



a and b have the same integer value

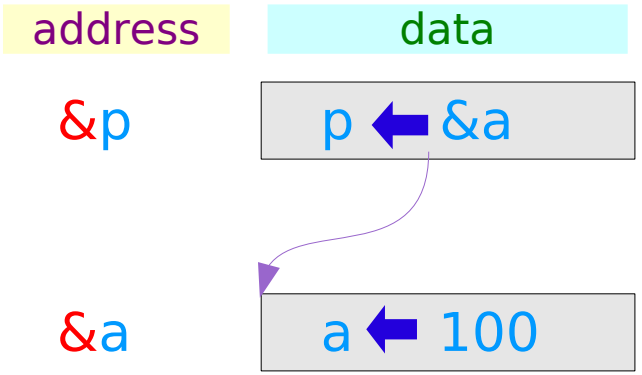
Pointer Variable Initialization

```
int     a = 100 ;

int *   p = & a ;
```

p can hold an *address*

p is initialized with the *address* of the integer variable a



a and *p have the same integer value, since &a and p have the same address

Reference Variable Initialization (C++)

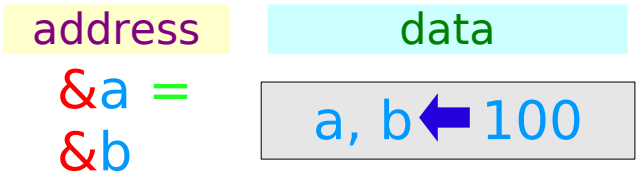
```
int     a = 100 ;

int &   b = a ;
```

b's address is initialized with a's address

b acts like an integer variable

b holds an *integer*



variable b is an ***alias*** of a

a and b have the same integer value, since &a and &b have the same address

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