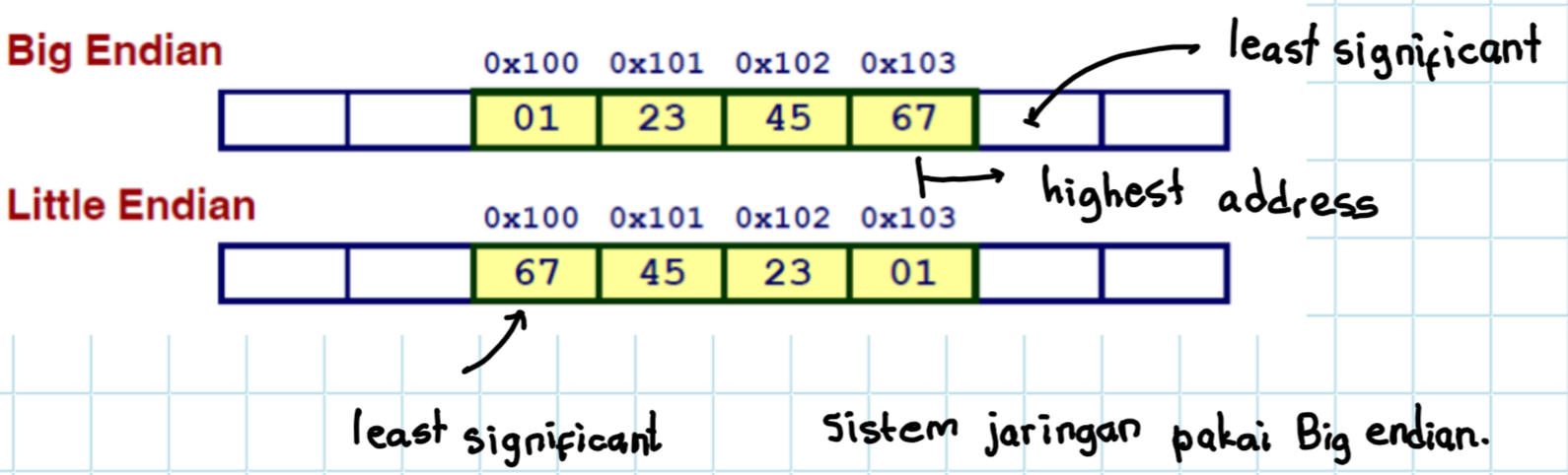
Organisasi dan Arsitektur Komputer

Encoding Byte Values

- Byte = 8 bit
- 00000000_2 hingga 11111111_2
- Desimal 0 – 255
- Hexadesimal 00 – FF
  - 0xdeadbeef
  - 0xc0ffeeee

C Data Type	Typical 32-bit	Intel IA32	x86-64
char	1	1	1
short	2	2	2
int	4	4	4
long	4	4	8
long long	8	8	8
float	4	4	4
double	8	8	8
long double	8	10/12	10/16
pointer	4	4	8

dihitung berdasarkan byte



Sistem jaringan pakai Big endian.

```
int a = 15213;
0x11ffffcb8 0x6d
0x11ffffcb9 0x3b
0x11ffffcba 0x00
0x11ffffcbb 0x00
```

little endian

dibaca 0x00003b6d

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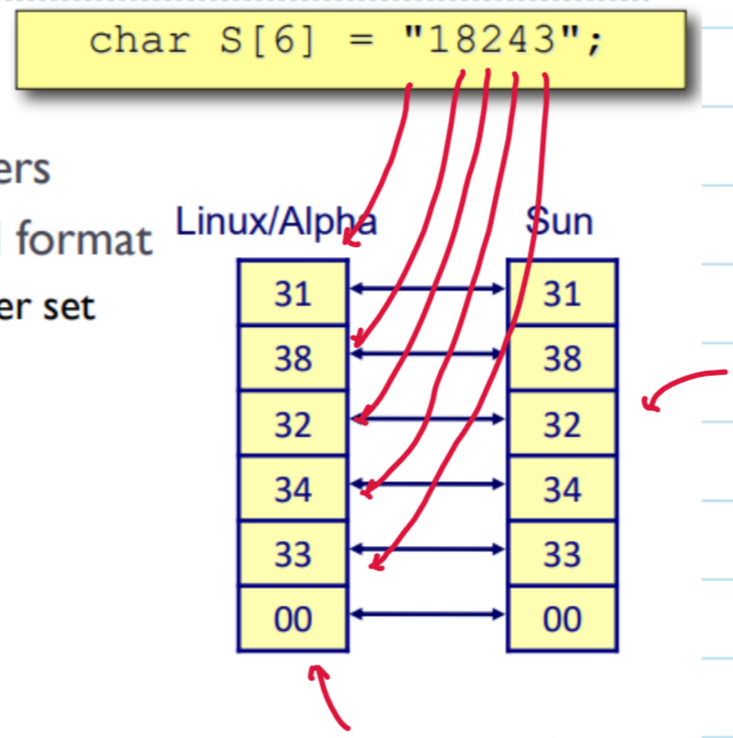
Interpretasi bilangan integer

mencari nilai minus dengan Two complement

- dikomplemen
- ditambah 1 di byte terakhir

Representing Strings

- Strings in C
  - Represented by array of characters
  - Each character encoded in ASCII format
    - Standard 7-bit encoding of character set
    - Character "0" has code 0x30
      - Digit *i* has code 0x30+*i*
  - String should be null-terminated
    - Final character = 0
- Compatibility
  - Byte ordering not an issue



Tidak ada little / big endian

ditutup dengan null

- Operate on Bit Vectors
  - Operations applied bitwise

```
  01101001      01101001      01101001
& 01010101    | 01010101    ^ 01010101    ~ 01010101
  --------      --------      --------      --------
  01000001      01111101      00111100      10101010
and             or            xor           neg
```

logical operation

&& = 0 jadi false, selain 0 jadi true

|| = ———— "————

! =

Shift Operations

- Left Shift: x << y
  - Shift bit-vector x left y positions
    - Throw away extra bits on left
  - Fill with 0's on right
- Right Shift: x >> y
  - Shift bit-vector x right y positions
    - Throw away extra bits on right
  - Logical shift
    - Fill with 0's on left
  - Arithmetic shift
    - Replicate most significant bit on left
- Undefined Behavior
  - Shift amount < 0 or ≥ word size

Argument x	01100010
<< 3	00010000
Log. >> 2	00011000
Arith. >> 2	00011000

Argument x	10100010
<< 3	00010000
Log. >> 2	00101000
Arith. >> 2	11101000

tergantung signed atau unsigned (khusus right shift)