System-oriented Programming

Picasso

**int main() {**

**int i = 8 ;** // an int is represented by 32 bits. 8 in hex = 0x08

**char c1 = ‘@’ ;** // a char is represented by 8 bits (1 parity bit + 7) = 1 byte

**char c2 = ‘A’ ;** // ‘@’ in ASCII = 64 = 0x40 ‘A’ in ASCII = 65 = 0x41

**char s[5] = ‘’@A’’ ;** // array of 5 chars = 5 bytes = 5 \* 8 bits = 40 bits.

**}**

# Symbolic names and values

s

|  |  |
| --- | --- |
| i | 8 |
| c1 | @ |
| c2 | A |
|  | @A |

# Symbolic names and possible hexadecimal values of the adresses

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variable | | Address | | |
| name | value | name | possible value  (hex-base) | possible value  (10-base) |
| i | 8 | &i | 0x00 | 0 |
| c1 | @ | &c1 | 0x04 | 4 |
| c2 | A | &c2 | 0x08 | 8 |
|  | @A | s | 0x0C | 12 |

# Big and little endian : symbolic memory cell and address values

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Address | Big endian | | | |  | Little endian | | | | Address |
| 0x00 | 0 | 0 | 0 | 8 |  | 0 | 0 | 0 | 8 | 0x00 |
| 0x04 | @ | \*\*\* | \*\*\* | \*\*\* |  | \*\*\* | \*\*\* | \*\*\* | @ | 0x04 |
| 0x08 | A | \*\*\* | \*\*\* | \*\*\* |  | \*\*\* | \*\*\* | \*\*\* | A | 0x08 |
| 0x0C | @ | A | \0 | \*\*\* |  | \*\*\* | \0 | A | @ | 0x0C |
| 0x10 | \*\*\* | \*\*\* | \*\*\* | \*\*\* |  | \*\*\* | \*\*\* | \*\*\* | \*\*\* | 0x10 |

# Big and Little endian : hexadecimal memory cell and address values

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Address | Big endian | | | |  | Little endian | | | | Address |
| 0x00 | 0x00 | 0x00 | 0x00 | 0x08 |  | 0x00 | 0x00 | 0x00 | 0x08 | 0x00 |
| 0x04 | 0x40 | \*\*\* | \*\*\* | \*\*\* |  | \*\*\* | \*\*\* | \*\*\* | 0x40 | 0x04 |
| 0x08 | 0x41 | \*\*\* | \*\*\* | \*\*\* |  | \*\*\* | \*\*\* | \*\*\* | 0x41 | 0x08 |
| 0x0C | 0x40 | 0x41 | 0x00 | \*\*\* |  | \*\*\* | 0x00 | 0x41 | 0x40 | 0x0C |
| 0x10 | \*\*\* | \*\*\* | \*\*\* | \*\*\* |  | \*\*\* | \*\*\* | \*\*\* | \*\*\* | 0x10 |

Notes : We colored the variables, for more understanding, i.e. char s[5] uses 5 bytes…