

Review Questions

- ❖ Compute the result of the following expressions for `char c = 0x81;`
 - `c ^ c`
 - `~c & 0xA9`
 - `c || 0x80`
 - `!!c`
- ❖ Compute the value of signed `char sc = 0xF0;`
(Two's Complement)

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Bitmasks

- ❖ Typically, binary bitwise operators (`&`, `|`, `^`) are used with one operand being the “input” and other operand being a specially-chosen **bitmask** (or *mask*) that performs a desired operation
- ❖ Operations for a bit b (answer with 0, 1, b , or \bar{b}):

$$b \& 0 = \underline{\hspace{1cm}} \qquad b \& 1 = \underline{\hspace{1cm}}$$

$$b | 0 = \underline{\hspace{1cm}} \qquad b | 1 = \underline{\hspace{1cm}}$$

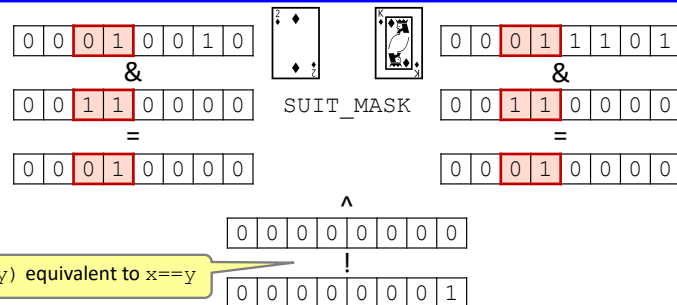
$$b \wedge 0 = \underline{\hspace{1cm}} \qquad b \wedge 1 = \underline{\hspace{1cm}}$$

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Compare Card Suits

```
#define SUIT_MASK 0x30

int sameSuitP(char card1, char card2) {
    return !((card1 & SUIT_MASK) ^ (card2 & SUIT_MASK));
    //return (card1 & SUIT_MASK) == (card2 & SUIT_MASK);
}
```

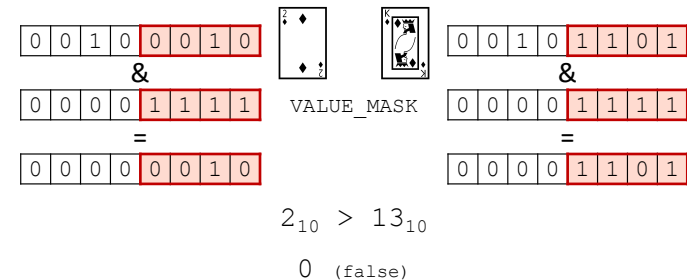


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Compare Card Values

```
#define VALUE_MASK 0x0F

int greaterValue(char card1, char card2) {
    return ((unsigned int)(card1 & VALUE_MASK) >
            (unsigned int)(card2 & VALUE_MASK));
}
```



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Polling Question

- ❖ Take the 4-bit number encoding $x = 0b1011$
 - ❖ Which of the following numbers is NOT a valid interpretation of x using any of the number representation schemes discussed today?
 - Unsigned, Sign and Magnitude, Two's Complement
- A. -4
 B. -5
 C. 11
 D. -3
 E. We're lost...

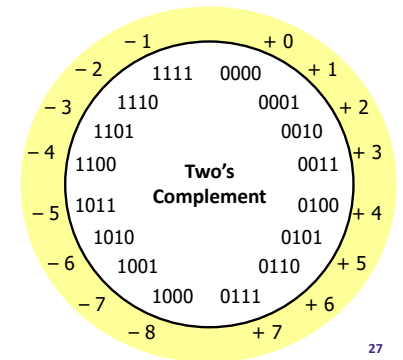
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Two's Complement is Great (Review)

- ✓ Roughly same number of (+) and (-) numbers
- ✓ Positive number encodings match unsigned
- ✓ Single zero
- ✓ All zeros encoding = 0

❖ Simple negation procedure:

- Get negative representation of any integer by taking bitwise complement and then adding one!
 $(\sim x + 1 == -x)$



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