Name:	UID:

1. Always True?

Assume:

```
int x = rand();
int y = rand();
unsigned ux = (unsigned) x;
```

Are the following statements always true?

a. $ux \gg 3 == ux/8$

b. Given $x > 0$,
$((x \ll 5) \gg 6) > 0$

c. $\sim x + x \geq ux$

d. Given $x \;\&\; 15 == 11$, $x \;\&\; 0b0000\ldots1111 == 0b0000\ldots1011$,
then $(\sim((x \gg 3) \;\&\; (x \gg 2)) \ll 31) \geq 0$

e. Given $((x < 0)$ && $(x + x < 0))$,
then $x + ux < 0$

f. Given $((x < 0)$ && $(y < 0)$ && $(x + y > 0))$,
then $((x|y) \gg 30) == -1$

2. Data Lab Practice

Write a function that, given a number n, returns another number where the kth bit from the right is set to 0.

Examples:

- killKthBit(37, 3) = 33 because $37_{10} = 100101_2 \rightarrow 100001_2 = 33_{10}$
- killKthBit(37, 4) = 37 because the 4th bit from the right is already 0.

Allowed Operations: $\sim$ & | ^ $\gg$ $\ll$ $-$ $+$

```
int killKthBit(int n, int k) {




}
```

3. What's the Byte?

Given: x has a 4 byte value of 255, i.e.

$$0x000000FF$$

What is the value of the byte with the lowest address in:

a. big endian system?

b. little endian system?

4. Endianness

a. Suppose we declared the following 4 byte int:
int x = 254;

and we stored it at memory location 0x100 on a little-endian system. What values would be stored in the following memory locations?

0x100	0x101	0x102	0x103

b. Suppose we declared an array of ints:
int arr[] = 1, 2;

and we stored it at memory location 0x100 on a little-endian system. What values would be stored in the following memory locations?

0x100	0x101	0x102	0x103	0x104	0x105	0x106	0x107

c. Suppose we declared a string:
char* s = ”hello”;

and we stored it at memory location 0x100 on a little-endian system. What values would be stored in the following memory locations?

Note: It's a good idea to get familiar with hex encodings of alphabetical characters, but for convenience, the hexadecimal encodings are: h (0x68), e (0x65), l (0x6c), o (0x6f)

0x100	0x101	0x102	0x103	0x104	0x105