

16.216: ECE Application Programming

Spring 2015

Lecture 31: Key Questions

April 22, 2015

1. **Example:** Given an unsigned `int`, `n`, and a number, `b`, how would you:

- a. Clear all bits of `n`?
- b. Clear the lower 16 bits of `n` (mask out lower bits)?
- c. Flip all bits of `n`?
- d. Flip bit `b` of `n`?
- e. Set bit `b` of `n` (i.e., make sure bit `b` is 1)?
- f. Clear bit `b` of `n` (i.e., make sure bit `b` is 0)?

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3. Describe how to extract a group of bits from a larger value.

4. Describe how to print hexadecimal values.

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7. Show how variables of a given structure type can be declared and initialized.

8. Show how elements within a structure can be accessed.

9. **Example:** What does the following program print?

```
#include <stdio.h>

typedef struct {
    double real;
    double imag;
} Complex;

int main() {
    Complex a = {1, 2};
    Complex b = {3.4, 5.6};
    Complex c, d, e;

    printf("A = %.2lf + %.2lfi\n", a.real, a.imag);
    printf("B = %.2lf + %.2lfi\n", b.real, b.imag);

    c = a;
    d.real = a.real + b.real;
    d.imag = a.imag + b.imag;
    e.real = a.real - b.real;
    e.imag = a.imag - b.imag;

    printf("C = %.2lf + %.2lfi\n", c.real, c.imag);
    printf("D = %.2lf + %.2lfi\n", d.real, d.imag);
    printf("E = %.2lf + %.2lfi\n", e.real, e.imag);

    return 0;
}
```