

EECE.2160: ECE Application Programming

Spring 2017

Lecture 23: Key Questions

March 22, 2017

1. (Review) Describe how character arrays can be used to represent strings in C, as well as the string library functions frequently used to work with strings.

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

```
int main() {
    char s1[15];
    int n1;
    char s2[10] = ".216";
    int n;

    strncpy(s1, "16", 15);
    n1 = strlen(s1);
    printf("s1 = %s\n", s1);
    printf("Length of s1 = %d\n\n", n1);

    printf("%c\n\n", s1[1]);

    strncat(s1,s2,10);
    n1 = strlen(s1);
    printf("s1 = %s\n", s1);
    printf("Length of s1 = %d\n\n", n1);

    // Assume user inputs: ABC ABD
    printf("Enter two strings:");
    scanf("%s%s", s1, s2);
    n = strncmp(s1, s2, 15);
    if (n > 0)
        printf("%s > %s\n", s1, s2);
    else if (n < 0)
        printf("%s < %s\n", s1, s2);
    else
        printf("%s == %s\n", s1, s2);
    return 0;
}
```

3. Describe what a structure is in C, and how structures can be useful.

4. Explain how we can essentially declare our own types using structures.

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

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

7. **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 = %.21f + %.21fi\n", a.real, a.imag);
    printf("B = %.21f + %.21fi\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 = %.21f + %.21fi\n", c.real, c.imag);
    printf("D = %.21f + %.21fi\n", d.real, d.imag);
    printf("E = %.21f + %.21fi\n", e.real, e.imag);

    return 0;
}
```