

EECE.2160: ECE Application Programming

Summer 2018

Lecture 6: Key Questions

June 6, 2018

QUESTIONS:

1. Describe the basic use and syntax of functions, including return types and arguments.
2. What is a function prototype? When and why is it necessary?
3. Explain the idea of scope and how it relates to functions. Also, explain what happens when function arguments are passed by value.

You may wish to refer to the following example:

```
#include <stdio.h>
#include <math.h>

double hyp(double a, double b);

void main()
{
    double x,y,h;
    printf("Enter two legs of triangle: ");
    scanf("%lf %lf",&x,&y);
    h=hyp(x,y);
    printf("Trgle w legs %lf and %lf has hyp of %lf\n",
           x,y,h);
}

double hyp(double a, double b)
{
    double sum, result;
    sum = a*a + b*b;
    result = sqrt(sum);
    return result;
}
```

4. Explain what a pointer is, and how we can use them in C.
5. Explain the use of passing function arguments by address.

EXAMPLES:

1. What does the following program print?

```
#include <stdio.h>

int f(int a, int b);           // Function prototype

int main() {
    int x = 1;
    int y = 2;
    int result1, result2, result3;

    result1 = f(x, y);
    result2 = f(y, result1);
    result3 = f(result1, result2);

    printf("x = %d, y = %d\n", x, y);
    printf("Result 1: %d\n", result1);
    printf("Result 2: %d\n", result2);
    printf("Result 3: %d\n", result3);

    return 0;
}

int f(int a, int b)           // Function definition
{
    int i;                     // Loop index
    int r = 0;                 // Result

    for (i = 0; i < a; i++)
        r += b;

    return r;
}
```

2. Write a function to do each of the following. Note that only the function name is listed—you must determine the return type and argument list.

a. `printLine()`: Takes an integer, `length`, as an argument and prints “length” dashes on a single line

b. `checkEvenOdd()`: Reads an integer value from the console input (i.e., an integer typed by the user as input) and returns 1 if the value is even, 0 if it's odd

c. `avgFour()`: Takes four double-precision numbers as arguments and returns their average

3. What does the following program print?

```
#include <stdio.h>
#include <math.h>
void get_r_theta(double a, double b,
                 double *adr_r, double *adr_th);

void main()
{
    double x,y,h,r,th;
    printf("Enter x, y components of vector: ");
    scanf("%lf %lf",&x,&y);
    get_r_theta(x,y,&r,&th);
    printf("Vector with x=%lf and y=%lf
           has r=%lf, theta=%lf\n",x,y,r,th);
}

void get_r_theta(double a, double b,
                 double *adr_r, double *adr_th) {
    double sum;
    sum = pow(a,2)+pow(b,2); //or a*a+b*b;
    *adr_r = sqrt(sum);
    *adr_th = atan2(y,x);
}
```