

16.216: ECE Application Programming

Fall 2014

Lecture 15: Key Questions

October 10, 2014

1. **Example:** Write a function to do each of the following:
 - a. Prints a series of `LINE_LENGTH` dashes on a single line, where `LINE_LENGTH` is a predefined constant (using `#define`)
 - b. Reads a value from the console input and returns 1 if the value is even, 0 if it's odd
 - c. Takes four numbers as arguments and returns their average

2. Explain what a pointer is, and how we can use them in C.

3. Explain the use of passing function arguments by address.

4. 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);
}
```

5. **Example:** What does the following print?

```
int f(int *a, int *b);

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)
{
    int copyB = *b;
    while (*a > 1) {
        *b += copyB;
        (*a)--;
    }
    return *b;
}
```