EECE.2160: ECE Application Programming

Spring 2017

Lecture 16: Key Questions
February 27, 2016

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

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

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);
}
```

4. **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;
}
```

5. Write a function that:
   - Given two integer arguments, `x` and `y`, store the quotient and remainder of `x / y` into locations specified by arguments `q` and `r`, respectively.

   - Uses pointers to swap the values of two double-precision variables