16.216: ECE Application Programming

Fall 2012

Lecture 16: Key Questions October 15, 2012

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

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

1. 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);
```

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

```
int f(int *a, int *b);
int main() {
   int x = 1;
   int y = 2i
   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;
}
```

- 3. 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