16.216: ECE Application Programming

Fall 2012

Lecture 19: Key Questions
October 22, 2012

1. Briefly describe some of the useful ANSI C libraries, including specifics on the math library.

2. **Example:** Write a function for each of the following:

a. Given the other two sides, calculate and return the length of the hypotenuse of a right triangle

i. Remember, $c^2 = a^2 + b^2$

b. Given a number in degrees, calculate and return its sine

- Remember:
  - Sine function takes an argument in radians
  - (# in degrees) = (180 / π) * (# in radians)
  - π = 4.0 * arctan (1.0)

3. Explain the use of arrays: what an array represents, how to define an array, and how to access values within the array.

4. Explain how the following example works:

```
int main(void)
{
  int x[8];
  int i;

   // get 8 values into x[]
   for (i=0; i<8; i++)
   {
        printf("Enter test %d:",i+1);
        scanf("%d",&x[i]);
   }
}
```

5. What happens if we change the loop condition to `i <= 8`? How can we avoid this problem?

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

```
int main() {
      int arr[10];
      int i;

      printf("First loop:\n");
      for (i = 0; i < 10; i++) {
            arr[i] = i * 2;
            printf("arr[%d] = %d\n", i, arr[i]);
      }

      printf("\nSecond loop:\n");
      for (i = 0; i < 9; i++) {
            arr[i] = arr[i] + arr[i + 1];
            printf("arr[%d] = %d\n", i, arr[i]);
      }
      return 0;
}
```