

**CS302 Data Structures**  
**Spring 2008 – Dr. George Bebis**  
**Homework 1**  
**Due Date: 2/05/2008**

1. Given the function definition

```
void Twist(int a, int& b)
{
    int c;

    c = a + 2;
    a = a * 3;
    b = c + a;
}
```

what is the output of the following code fragment that invokes *Twist*? (assume that all variables are of type *int*). Justify your answer.

```
.
r = 1;
s = 2;
t = 3;
Twist(t, s);
cout << r << ' ' << s << ' ' << t << endl;
```

2. (a) When passing a static 2D array to a function, the number of columns must be specified in the function prototype and function heading. Carefully explain why. (b) Give the C++ statements for the dynamic allocation of an array A with 3 rows and 5 columns. Draw a diagram that illustrates the structure of the dynamic array in memory. Carefully explain how the system would find the address of element  $A[i][j]$  using the pointer structure associated with the array.

3. Exercise 18 (page 188)

4. Exercise 19 (page 188)

5. Download, compile, and run *Threshold.cpp* from the CS302 webpage. Using "dimes.pgm" as input, find and print the output for threshold values 32, 64, 128 and 200.