CPRE 556: Scalable Software Engineering   **Homework 4** (20 points)
Assigned: February 16, 2006
Due: Thursday, February 23, 2006 by 10 pm
Name: Fill in on your answer sheet

This homework is intended to make you think about the pointer analysis algorithm presented in the class. The particular algorithm is attributed to Anderson (1994 Ph.D. Thesis). A web search will show that the algorithm and its variations are widely adopted by others.

Refer to the class presentation and assume the following:

1. All the memory allocations are uniquely identified.
2. The tokens include: (a) a unique token for each memory allocation, (b) a unique token for each variable whose address is taken in the program.

Answer the following questions:

1. Apply the Anderson's algorithm to the example in the class notes and verify that you obtain the same final result as given in the notes. Show your work. Note that the given example will need three tokens: one for a malloc (labeled *malloc-1*) and two others for the places where addresses are taken (labeled &Y and &Z).
2. Interpret the results of the algorithm. (Specifically, discuss whether the results make sense to you and why.)
3. Show the result of applying the algorithm to the following program:

    p = &q;
    q = &a;
    r = *p;

4. Show the result of applying the algorithm to the following program:

    p = &q;
    r = *p;
    q = &a;

5. Do you think the results for the programs in #3 and #4 should be the same? Give your reasoning. Does the Anderson's algorithm give the same results or not?