Department of Computer Science
Ph.D. Proficiency Exam
Winter 2003
Object-Oriented Programming Skills

In this exam, you will write a C++ class **IntSet** that maintains a set of integers and has the following methods:

- IntSet(), the constructor that creates an empty integer set.
- int isMember(int i), check if the input integer i is a member of the set, return 1 if it is, otherwise return 0.
- int insert(int i), insert integer i into the set, return 1 if the insert is successful, and 0 otherwise.
- int delete(int i), delete integer i from the set, return 1 if i is deleted from the set, and 0 if i is not in the set.
- void print(), print out all the elements of the set to the screen.
- IntSet IntSet::union(IntSet S), return the union of this set and the input set S.
- IntSet IntSet::intersection(IntSet S), return the intersection of this set and the input set S.

Other methods or classes are not required but are not prohibited either. You will also write a test program in which you will call these methods to demonstrate that they are correctly implemented. All cases must be tested. For example, for method isMember(int i), you will consider two cases: one case is i is a member of the set, and the other case is that i is not a member of the set.

Instructions:

- Raise your hand if you have any question about the problem.
- Do not use the internet.
- Everybody should provide a **readme.txt** file in which you will provide detailed instructions about how to build and run your program.
- Store all source and executable (including readme file) into the provided floppy disk. It is your responsibility to make sure that the disk contains everything you want to submit, and it is readable without failures.
- Do not write your name on the diskette label. Your diskette will be identified by the pre-assigned number on the label.
- Suggestion: give at least 15 minutes for preparing the readme.txt file and the disk submission because **no late submission will be accepted!**
- Turn in exam questions along with the disk, as well as all scratch papers.
- Do not turn in the envelope the diskette came in.