

## Comp 121: Data Structures (Spring 2002) Programming Assignment 2 ( Due: 2002/04/02)

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**Objective:** To gain experience in implementing abstract data types (ADT's).

**Goal.** To implement the *dynamic dictionary* ADT as an object template in C++. To gain experience in programming *binary trees*.

The (*dynamic dictionary*) abstract data type is **specified** as follows:

**AbstractDataType** dynamicDictionary {

Instances: finite collections of zero or more ordered pairs of type (*keyType*, *dataType*)

Operations:

Create(): Create an empty dynamic dictionary

Destroy(): Erase a dynamic dictionary

Size(): Return the number of ordered pairs stored in the dynamic dictionary

IsEmpty(): Return *true* if the dynamic dictionary is empty; *false* otherwise

Insert(*k,d*): Insert the ordered pair (*k,d*) into the dynamic dictionary

Remove(*k*): Delete all ordered pairs (*k,d*) in the dynamic dictionary

find(*k*): Return the data value *d* if the ordered pair (*k,d*) is in the dynamic dictionary

}

You are to **implement** this ADT in the C++ programming language using the binary search tree as the underlying data structure. Credit will be awarded for efficient implementation. Extensively **test** your ADT, using the **black-box** testing technique. As with all programming assignments, *you must submit a cover sheet, design plan, etc.*