// FILE: IntSet.h - header file for IntSet class

// CLASS PROVIDED: IntSet (a container class for a set of

// int values)

//

// CONSTANT

// static const int DEFAULT\_CAPACITY = \_\_\_\_

// IntSet::DEFAULT\_CAPACITY is the initial capacity of an

// IntSet that is created by the default constructor (i.e.,

// IntSet::DEFAULT\_CAPACITY is the highest # of distinct

// values "an IntSet created by the default constructor"

// can accommodate).

//

// CONSTRUCTOR

// IntSet(int initial\_capacity = DEFAULT\_CAPACITY)

// Post: The invoking IntSet is initialized to an empty

// IntSet (i.e., one containing no relevant elements);

// the initial capacity is given by initial\_capacity if

// initial\_capacity is >= 1, otherwise it is given by

// IntSet:DEFAULT\_CAPACITY.

// Note: When the IntSet is put to use after construction,

// its capacity will be resized as necessary.

//

// CONSTANT MEMBER FUNCTIONS (ACCESSORS)

// int size() const

// Pre: (none)

// Post: Number of elements in the invoking IntSet is returned.

// bool isEmpty() const

// Pre: (none)

// Post: True is returned if the invoking IntSet has no relevant

// elements, otherwise false is returned.

// bool contains(int anInt) const

// Pre: (none)

// Post: true is returned if the invoking IntSet has anInt as an

// element, otherwise false is returned.

// bool isSubsetOf(const IntSet& otherIntSet) const

// Pre: (none)

// Post: True is returned if all elements of the invoking IntSet

// are also elements of otherIntSet, otherwise false is

// returned.

// By definition, true is returned if the invoking IntSet

// is empty (i.e., an empty IntSet is always isSubsetOf

// another IntSet, even if the other IntSet is also empty).

// void DumpData(std::ostream& out) const

// Pre: (none)

// Post: Contents of the invoking IntSet have been inserted into

// out with 2 spaces separating one item from another if

// if there are 2 or more items.

// IntSet unionWith(const IntSet& otherIntSet) const

// Pre: (none)

// Post: An IntSet representing the union of the invoking IntSet

// and otherIntSet is returned.

// Note: Equivalently (see postcondition of add), the IntSet

// returned is one that initially is an exact copy of the

// invoking IntSet but subsequently has all elements of

// otherIntSet added.

// IntSet intersect(const IntSet& otherIntSet) const

// Pre: (none)

// Post: An IntSet representing the intersection of the invoking

// IntSet and otherIntSet is returned.

// Note: Equivalently (see postcondition of remove), the IntSet

// returned is one that initially is an exact copy of the

// invoking IntSet but subsequently has all of its elements

// that are not also elements of otherIntSet removed.

// IntSet subtract(const IntSet& otherIntSet) const

// Pre: (none)

// Post: An IntSet representing the difference between the invoking

// IntSet and otherIntSet is returned.

// Note: Equivalently (see postcondition of remove), the IntSet

// returned is one that initially is an exact copy of the

// invoking IntSet but subsequently has all elements of

// otherIntSet removed.

//

// MODIFICATION MEMBER FUNCTIONS (MUTATORS)

// void reset()

// Pre: (none)

// Post: The invoking IntSet is reset to become an empty IntSet.

// (i.e., one containing no relevant elements).

// bool add(int anInt)

// Pre: (none)

// Post: If contains(anInt) returns false, anInt has been

// added to the invoking IntSet as a new element and

// true is returned, otherwise the invoking IntSet is

// unchanged and false is returned.

// bool remove(int anInt)

// Pre: (none)

// Post: If contains(anInt) returns true, anInt has been

// removed from the invoking IntSet and true is

// returned, otherwise the invoking IntSet is unchanged

// and false is returned.

//

// NON-MEMBER FUNCTIONS

// bool operator==(const IntSet& is1, const IntSet& is2)

// Pre: (none)

// Post: True is returned if is1 and is2 have the same elements,

// otherwise false is returned; for e.g.: {1,2,3}, {1,3,2},

// {2,1,3}, {2,3,1}, {3,1,2}, and {3,2,1} are all equal.

// Note: By definition, two empty IntSet's are equal.

//

// VALUE SEMANTICS

// Assignment and the copy constructor may be used with IntSet

// objects.

#ifndef INT\_SET\_H

#define INT\_SET\_H

#include <iostream>

class IntSet

{

public:

static const int DEFAULT\_CAPACITY = 1;

IntSet(int initial\_capacity = DEFAULT\_CAPACITY);

IntSet(const IntSet& src);

~IntSet();

IntSet& operator=(const IntSet& rhs);

int size() const;

bool isEmpty() const;

bool contains(int anInt) const;

bool isSubsetOf(const IntSet& otherIntSet) const;

void DumpData(std::ostream& out) const;

IntSet unionWith(const IntSet& otherIntSet) const;

IntSet intersect(const IntSet& otherIntSet) const;

IntSet subtract(const IntSet& otherIntSet) const;

void reset();

bool add(int anInt);

bool remove(int anInt);

private:

int\* data;

int capacity;

int used;

void resize(int new\_capacity);

};

bool operator==(const IntSet& is1, const IntSet& is2);

#endif