

CS 314 FINAL REVIEW — HASH SET DIFFERENCE

Hash Tables/Sets

Write an instance method for the provided `HashSet314` class which will find the difference of this set with an `otherSet` parameter. This method will return a new `HashSet314` object and will leave both `this` and `otherSet` unaltered.

The `HashSet314` class uses a hash table as its internal storage container. There are no duplicate elements in the set. The internal array for the hash table uses linear probing to handle hash collisions. If an element which was previously in the set was removed, its spot in the array will have been replaced with a reference to `EMPTY`, a static, empty `Object`. When creating the new set, you can assume the `HashSet314` class's `add(E val)` method (and all necessary resizing/rehashing) has been implemented correctly.

An element will be present in the resulting set if and only if it is present in `this` but not in `otherSet`.

You may use the following `HashSet314` implementation.

```
public class HashSet314<E> {
    private static final int INITIAL_CAPACITY = 10;
    private static final Object EMPTY = new Object();

    // All non-null elements in this array are guaranteed to
    // be either EMPTY or of type E.
    private Object[] con;
    private int size;

    //HashSet constructor
    public HashSet314(){
        con = (E[]) new Object[INITIAL_CAPACITY];
    }

    //You may use this method, assume it has been implemented here
    public boolean add(E val);
}
```

Notice that the internal array of `HashSet314` is of type `Object[]`. This is necessary to hold on to the reference to `EMPTY`, but you can safely assume that all non-null and non-`EMPTY` reference stored in the array will be to objects of type `E`. (This may result you in making some casts which a compiler would typically call unsafe, but it is mostly unavoidable in this situation).

You may not use methods in the `HashSet314` class except for `add(E val)` and the constructor. You may use the `hashCode()` method and methods from the `Math` class, but do not use any other Java classes or methods.

```
/* Pre: otherSet != null
 * Post: returns a new set which represents this - otherSet.
 *       Both this and otherSet are unaltered by this method call.
 */
public HashSet314<E> difference(HashSet314<E> otherSet){
```