Computer Science 301
Spring Quarter
Lab 8 (August 9)
Due: Friday, 12 August, 2016

Bags are structures very like sets save that they permit multiple instances as members. Like sets, order is irrelevant. For example, the following bag contents are permitted:

$$[a, a, a, b, b, b, b]$$

and

$$[a, a, a, a, b, b, b]$$

Because of this difference between bags and sets, the bag-theoretic operations are somewhat different from those defined for sets. Here are three of them.

1. **Bag-Sum**. The operation Bag-Sum applied to two bags results in a third bag in which all of the elements of both bags are gathered together. Bag-Sum applied to

   $$[a, a, a, a, b, b, b]$$

   and

   $$[a, a, a, b, b, b, b]$$

   results in

   $$[a, a, a, a, b, b, b, a, a, a, b, b, b, b]$$

2. **Bag-Union**. The operation Bag-Union results in a bag that contains the maximum number elements that are contained in the operands. Bag-Union applied to

   $$[a, a, a, a, b, b, b]$$

   and

   $$[a, a, a, b, b, b, b]$$

   results in

   $$[a, a, a, a, b, b, b, b]$$

3. **Bag-Intersection**. The operation Bag-Intersection results in a bag that contains the minimum number of elements that are contained in the bag operands. Bag Intersection applied to

   $$[a, a, a, a, b, b, b]$$

   and

   $$[a, a, a, b, b, b, b]$$

results in
$$[a, a, a, b, b, b]$$

Implement the operations Bag-Sum, Bag-Union and Bag-Intersection.