Due Date: 17.03.2019, 23:55

CENG112 – Data Structures
Homework #1

In this homework you are expected to implement a "PicnicBagApp" using Java. This homework will cover the topics below;

1. **Arrays**
2. **File I/O**
3. **Bag ADT (Abstract Data Type)**
4. **Generics**

Before adding items into your picnic bag, you should select one of the three types of bag sizes; *small=5*, *medium=10*, and *large=15*. Size of the bag should be initialized based on the selected bag size. In addition to your picnic bag, you will have three types of trash bags; *Plastic*, *Paper*, and *Organic*. The picnic bag will contain items that should be selected from the "*Inventory Bag*". Your *Inventory Bag* is a container of items, which is parsed from "*CENG112_Homework1_Bags_Inventory.txt*" file. The user should select an item from the *Inventory Bag* and transfer the item into the *picnic bag*. Each line in the "*CENG112_Homework1_Bags_Inventory.txt*" describes the item's name, disposable type, and the amount. The format of each line is given as;

item_name,disposable_type,item_amount

For instance, if there is such line given below, it means that there is an item called "apple", which is an "organic" disposable type and there are seven apples in the inventory;

...
apple,organic,7
...

After adding items into the *picnic bag*, you should update the number of items in the inventory, and then the user goes to picnic. The user selects the item from the *picnic bag* and *consumes/removes* the selected item. Based on the consumed item type, the user disposes the item into one of the corresponding types of trash bag. For instance, let's assume the user has consumed one "*cup*" that is "*plastic*" disposable type. Then, the user transfers the item from *picnic bag* to the "*Plastic Trash Bag*".

When the picnic is over, the user prints the disposed items and the number of disposed items in each trash bag. Then, dumps all trash bags to be used for another time.

Your code must have the interface, class and method implementations given below. The bullets **(I)**, **(C)**, and **(M)** stand for **interface**, **class**, **method** respectively.

```
I. IBag
      M. public boolean add(T newItem);
      M. public boolean isEmpty();
      M. public boolean isFull();
      M. public T removeByIndex(int index);
      M. public T remove();
      M. public T remove(T item);
      M. public int getItemCount();
      M. public int getIndexOf(T item);
      M. public boolean contains(T item);
      M. public void displayItems();
      M. public void dump(); // removes all the items from the bag
      M. public boolean transferTo(IBag<T> targetBag, T item);
C. PicnicBagApp
      M. public static void main(String[] args);
C. FileIO
      M. public static InventoryBag<Item> readInventory();
C. Item
      M. public String toString();
      M. public boolean equals(Object obj);
C. PicnicBag implements IBag
      M. public boolean consume(T item, IBag<T>[] trashBags);
C. InventoryBag implements IBag
C. OrganicTrashBag implements IBag
C. PaperTrashBag implements IBag
C. PlasticTrashBag implements IBag
```

NOTE: While implementing your program please make sure that **your program is user friendly**. Try to **make your user inputs simpler**. For example, in a selection process rather asking the user to write or type a long string, make the selections with numbers. Thereby, it would be easier for us to evaluate your homework, but also easy for you to test your program.

Assignment Rules

1. In this lecture's homework, there is **no cheating allowed**. If any cheating has been detected, they **will be graded as 0** and there will be no further discussion on this.
2. You are expected to submit your homework in groups. Therefore, **only one of you** will be sufficient to submit your homework.
3. Make sure you export your homework as an **Eclipse project**. You can use other IDEs as well, however, you must test if it is supported by Eclipse.
4. Make sure that your ".txt" files (if there is any) are in your project after you exported it.
5. Please submit your homework through CMS.
6. You are **not allowed to use Collections Framework**. You should implement the data structures on your own.
7. **Late submissions are strictly not allowed!** Thereby, do not send us email to allow your lately submitted homework.
8. Please be informed that your submissions may be anonymously used in software testing and maintenance research studies. Your names and student IDs will be replaced with non-identifying strings. If you do not want your submissions to be used in research studies, please inform the instructor (Dr. Tuglular) via e-mail.
9. Please export your Java Project as the given format with your assigned group ID. **If you do not follow the given format you will lose points from your homework**. This format is necessary for us to write and run our tests on your homework.

   Example:
   Project Name: G2_CENG112_HW1
   Zipped Project Name: G2_CENG112_HW1.zip (Your group IDs will be announced on CMS).