**Collections Homework**

**Regina Biktimirova**

**4/24/2022 Batch 4**

**What is Java Collections framework?**

The Java collections framework is a set of classes and interfaces that implement commonly reusable collection data structures. Although referred to as a framework, it works in a manner of a library. The collections framework provides both interfaces that define various collections and classes that implement them.

**What is List in Java?**

The List interface specifies the methods required to process an ordered list of objects. There are different implementations provided for the List interface: Vector, ArrayList and LinkedList. Both ArrayList and LinkedList implements List interface. Both ArrayList and LinkedList allows us to store duplicated objects. LinkedList also implements Queue and Deque interfaces and this adds more methods to LinkedList for us to use to process or manipulate data like getFirst(), getLast(), poll(), peek()

**What is Set in Java?**

The Set interface defines the methods required to process an unordered collection of objects in which there is no duplication. HashSet implements Set interface and LinkedHashSet extends to HashSet. Both HashSet and LinkedHashSet eventually implements the Set interface, and they allow ONLY 1 null element. HashSet is an unordered collection of the data set, whereas the LinkedHashSet is an ordered collection of HashSet. HashSet does not provide any method to maintain the insertion order, but LinkedHashSet maintains the insertion order of the elements. We can use TreeSet to sort the elements, and TreeSet does not allow any null elements. HashSet is faster compared to LinkedHashSet and TreeSet and allocates less memory as it does not store insertion point or sorting the elements.

**What is Map in Java?**

Map is a data structure that helps us to store multiple items in a single unit as KEY and VALUE. It maps from key to value . Keys are always unique in a map. A single key only appears once in the Map. A key can map to only one value. Values do not have to be unique. We can use put(key, value) method to add elements to the map and get(key) method to get element.

**What is Iterator in Java?**

An Iterator is an object that can be used to loop through collections, like ArrayList and HashSet. We can use iterator to loop through all collections that extends to Iterable interface. Iterator provides 3 useful methods to use. 1) hasNext() -> returns true if there are more elements in the collection or false otherwise. 2) next() -> gets next element from the collection. 3) remove() -> removes the element from collection that is currently retrieved.

**What are the differences between List, Set and Map?**

The main difference between the List and Set interface in Java is that List allows duplicates while Set doesn't allow duplicates. All implementation of Set honor this contract. While a Map holds two objects per Entry e.g. a key and a value and It may contain duplicate values but keys are always unique.

**When to use List, Set and Map in Java?**

Use Set: If you need group of unique elements.

Use List: If get operations are higher than any other operation.

Use Map: If objects contains the key and value pair.

**What are the similarities and differences between HashMap and HashTable?**

1) HashMap is non synchronized. It is not-thread safe and can't be shared between many threads without proper synchronization code

1) Hashtable is synchronized. It is thread-safe and can be shared with many threads.

2) HashMap allows one null key and multiple null values.

2 )Hashtable doesn't allow any null key or value.

3) HashMap is fast.

3) HashTable is slow.

4) HashMap inherits AbstractMap class.

4) Hashtable inherits Dictionary class.