**Lesson 12 – Collection Classes**

* Collection Classes are other ways to manipulate sets of data
  + **Lists**
    - Example: ArrayList, LinkedList, etc.
  + **Sets**
    - Example: HashSet, etc.
  + **Maps**
    - Example: TreeMap, HashMap, etc.
* **List** 
  + An **ordered** collection of elements which may contain duplicated values
    - **List is Dynamic but Array is Static**
* **Set**
  + An **unordered** collection of unique elements
* **Map**
  + An **ordered** collection of **keys** that are linked to an associated **value**
* **List Class**
  + **ArrayList**
    - Keeps elements in order
      * Any element can be accessed by its index
    - Dynamic
      * Size of the ArrayList can be modified
    - Can only be objects (no primitives)
    - Can only be 1D
* **Set Class**
  + **HashSet**
    - Elements are not in any order
      * Elements do not have an index
    - Dynamic
      * Size of HashSet can be modified
    - All elements must be unique
      * Duplicate elements are ignored when added
    - Can only be 1D
* **Map Class**
  + **TreeMap** 
    - Elements are sorted by Key
      * Key Objects must have a compareTo Method
    - Dynamic
      * The size of the TreeMap can be modified
    - Both Keys and Values must be Objects
      * Can be different types of Objects
    - All Keys must be unique
    - Associated Values can be duplicated
      * Multiple Keys can be linked to the same Values
        + Example: 2 Students with the same address
* Processing All Elements
  + Because some of these Classes do not use indices (Maps, Sets) we need another way to loop through all the elements
    - We use a **For Each Loop**
      * Cycles through all elements in the collection by assigning them to a temporary variable
      * Set Example
        + for (elementType name: collectionName) {use name here}
      * Map Example
        + for (String key: mapName.keySet()) {}

Get the key then use the get(key) method to get the value

* Use a Wrapper Class to convert the primitive data type to use it in the Collection Classes
  + This converts the primitive value into an Object