String

• `.length()` Get the length of the String. $O(1)$.
• `.charAt(i)` Get the char at index $i$. $O(1)$.
• `.split(" ")` Split a string by spaces and store it in a string[].
• `.substring(i, j)` Get the substring between indices $i$ and $j$. Index $i$ is inclusive, and index $j$ is exclusive. $O(1)$. For example:

```java
String x = "abcdefg";
String y = x.substring(2, 4);
// y now has the value "cd"
```

ArrayList<T> // Where T is a type, like String or Integer

• `.add(i, X)` Add element $X$ to the list at index $i$. If no $i$ is provided, add an element to the end of the list. Adding to the end runs in $O(1)$.
• `.get(i)` Get the element at position $i$. Runs in $O(1)$.
• `.set(i, X)` Set the element at position $i$ to the value $X$. $O(1)$.
• `.size()` Get the number of elements. $O(1)$.

HashSet<T> // Where T is a type, like String or Integer

• `.size()` Compute the size. $O(1)$.
• `.add(X)` Add the value $X$ to the set. If it’s already in the set, do nothing. $O(1)$.
• `.contains(X)` Return a boolean indicating if $X$ is in the set. $O(1)$.
• `.remove(X)` Remove $X$ from the set. If $X$ was not in the set, do nothing. $O(1)$.

HashMap<K, V> // Where K and V are the key and value types, respectively.

• `.size()` Compute the size. $O(1)$.
• `.containsKey(X)` Determines if the map contains a value for the key $X$. To get that value, use `.get()`. $O(1)$.
• `.get(X)` Gets the value for the key $X$. If $X$ is not in the map, return null. $O(1)$.
• `.put(k, v)` Map the key $k$ to the value $v$. If there was already a value for $k$, replace it. $O(1)$.
• `.keySet()` Return a Set containing the keys in the map. Useful for iterating over. $O(1)$.

To iterate over a HashSet<T>, use

```java
for (T v : nameOfSet) {
    // v is the current element of the set.
}
```

This can be combined with HashMap’s `.keySet()` to iterate over a HashMap.

$$\sum_{i=1}^n i = \frac{n(n+1)}{2}$$