# **Character Frequency**

* When counting the frequency of a String, it is important to ask if we are using ASCII or Unicode.

## **Unicode**

* If we are using Unicode, we can use a HashMap to count the character frequency.

HashMap<Character, Integer> map = new HashMap<Character, Integer>();

String s = "aasjjikkk";

for (int i = 0; i < s.length(); i++) {

char c = s.charAt(i);

Integer val = map.get(c);

if (val != null) {

map.put(c, new Integer(val + 1));

}

else {

map.put(c, 1);

}

}

## **ASCII**

**Any Character Frequency**

* If we are using ASCII, we can use an **integer array** to count the frequency of each character in a string.
* We can count the number of each unique character in a string by having a frequency array of size 128. 128 covers all possible ASCII values.

**int[] frequency = new int[128];**

* Each time we encounter an ASCII character, we increment it.

**int[] frequency[‘a’]++;**

* This example increments the array at index 97 by 1.
* This means there is 1 instance of ‘a’ in a string.

A picture containing graphical user interface

Description automatically generated

**Letter Frequency**

* If the constraints say that we are only using **letters**, we can use an integer array of size 26 (number of letters in the alphabet).
* To index the **count of a letter**, simply index the frequency array using the character.

**int count =** **frequency[26];**

* We can increase the count of a letter by 1 using the increment operator.
* However, we need to zero out the values starting from the first letter in the alphabet – ‘a’.

**frequency[‘a’ – ‘a’]++;**

**is equal to**

**frequency[0]++;**

* If we are only using lowercase letters, then to index the count of a character, we can index the frequency array using the character minus ‘a’.
* The following will get the letter frequency of the letter c: **int count =** **frequency[‘c’ – ‘a’];**
* If we are only using uppercase letters, then to index the count of a character, we can index the frequency array using the character minus ‘A’.
* The following will get the letter frequency of the letter C: **int count =** **frequency[‘C’ – ‘A’];**
* We can increment the count of a letter by using the increment operator:

Lower case example: **int count =** **frequency[‘c’ – ‘a’];**

Upper case example: **int count =** **frequency[‘C’ – ‘A’];**