Documentation

The github link to my repository:

https://github.com/VescanAntonia/University-Computer-Science/tree/main/Semester%205/Formal%20languages%20and%20compiler%20design

I implemented a SymbolTable with a given capacity, a fixed prime number. It is designed to work on a collection of strings, divided in separate buckets. Each bucket is an ArrayList and the SymbolTable provides methods to add, look for an element's position and two hash functions for an element that we want to add.

The hash function for the String elements receives an element and returns the position of the bucket that the element is supposed to go into. It first sets the value of the hash to 0, then for each character in the key, we multiply the current hash by 31 (a prime number) and then add the ASCII value of the character. After that, we take the absolute value of hash to ensure it's non-negative, and then calculate the modulo with the capacity to determine the bucket index. The hash function for the Integer elements has the same purpose, the only difference is made by the way the position is calculated, which in this situation is the key%capacity.

The add function receives an element and has the purpose to add the element to the SymbolTable to the position given by the hash function. The function returns false if the element is already in the SymbolTable. If the element is not already in the SymbolTable we get the position of the element by applying the hash function on it. We get the bucket that corresponds to the optained position and add the given element. Then we return true if the element was added.

The lookUp function receives an element and has the purpose to look for the given element in the SymbolTable. Firstly, we apply the hash function on the element to get the bucket id in which it is supposed to be. Then we get the bucket corresponding to the position we got. We iterate through all the elements of the bucket and check if the given element equals the current element in the bucket list. When we find the element we return the position in the bucket list. If we dont find the element we return -1.