Assignment no-7

Title - To write a program for implementation of symbol table and perform various operations.

Problem statement - The symbol table is generated by compiler. It is a set of name attribute pairs. Perform the following operations on symbol table.

① Determine if the particular name is in the table
② Retrive the attribute of that name
③ Modify the attribute of that name
④ Insert new name and its attribute
⑤ Delete a naw and its attribute

Objective -

① To understand concept of symbol table
② Why symbol table is needed.

Outcome -

① Use of symbol table
② Various methods of implementing symbol table

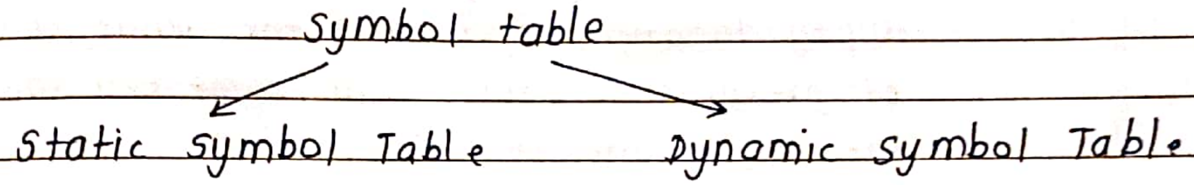
S/W and H/W packages - 64 bit linux, G++/GCC

Concept related theory -

A symbol table is a data structure used by a a language translator such as compiler or interpreter where each identifier in a program's source code is associated with information related to its declaration or appearance in its source.

Symbol table are used to store information related to various entities like as function name, variable name, object, classes, etc.

Symbol table is simply a table which can be either linear or hash table. It maintains an entry for each name in the format:
<symbol name, type attribute>



* Implementation of symbol Table

1. Unordered Array implementation
2. Ordered Array implementation
3. Unordered or ordered list
4. BST
5. Balanced BST
6. Hashing.

Algorithm -

* linear probing without replacement with chaining

① start and make all the chain -1
② Find the respective bucket for given key
  2.1) If the bucket is empty, then insert the key value pair at that location.
  2.2) Else insert the key value pair at next empty location and make the value of chain of previous location with same key equal to the new location.
③ Fill all the buckets in the same manner and make sure the chain gives the location
④ End (Time complexity - O(1))

* linear probing with replacement with chaining

① Start
② Make all the chains of the bucket equal to -1
③ Find the bucket for the given key
  3.1) If the bucket is empty then insert the key value pair at that location
  3.2) Else replace the value store at that location
    3.2.1) if the element hass diff. key
    3.2.2) if the element has same key then store the new key value pair at next vacant location
④ End.

Test cases

Description	Expected	Actual	Result
① Insert -	0 - 78 - (-1)	same	Pass
25,35,36,55,57,	1 - 99 - (2)	as expected	
78,99,89,74	2 - 89 - (-1)		
	3		
Hash function	4 - 74 - (-1)		
key%10	5 - 25 - (6)		
(without replacement)	6 - 35 - (8)		
	7 - 36 - (-1)		
	8 - 55 - (-1)		
	9 - 57 - (-1)		
② Insert	0 - 55	same	Pass
25,35,36,55,57,	1 - 35 - (0)	as expected	
78,99,89,74	2 - 89		
	3		
Hash function	4		
key % 10	5 - 25 (1)		
(with replacement)	6 - 36		
	7 - 57		
	8 - 78		
	9 - 99 (2)		

Conclusion- We were able to implement the symbol table, with chaining successfully.