



COMPILER DESIGN LAB (CSE-306L)

Symbol Table Implementation by using Hash Table

Group – 3

Symbol Table:

The compiler creates and maintains a data structure to store information about the occurrence of various entities such as variable and function names, objects and classes is known as Symbol table.

Items stored in symbol table:

Variable names and constants, Procedure and function names, Literal constants and strings, Compiler generated temporaries, Labels in source languages.

Symbol table can be implemented in one of the following ways:

1. Linear (sorted or unsorted) list
2. Binary Search Tree
3. Hash table
4. And other ways.

Implementation of symbol table using hash table:

- In hashing two tables are maintained a hash table and a symbol table and are most used method to implement symbol tables.
- A hash table is an array with an index range 0 to table size -1. These entries are pointers pointing to names/labels of the symbol table.
- Insertion and deleting are very fast in hash table. The time complexity is $O(1)$.
- **Insert()** operation is used to store values in hash table. When a new value is stored in hash table, it is assigned an index number. The index is calculated using hash table.
- **Search()** operation helps us to find particular stored data from the hash table. To search for a name/label we use a hash function that will result in an integer between 0 to table size-1.
- **Display()** operation is used display the stored data of hash table using the index values assigned to the stored data.
- **Exit()** operation will terminate the whole process.
- The advantage is quick to search is possible and the disadvantage is that hashing is complicated to implement.