Assignment - 5

1) Explain chaining method under the open hasing (closed addressing) with example

→ Chaining is a collision resolution technique commonly used in open hasing.

- When a collision occurs, the new key-value pair is simply added to the linked list at the corresponding index.

(i) Initialization :
- Create an empty array where each slot is capable of holding multiple elements.

(ii) Hash Function :
- Use a hash function to map keys to indices in the hash table.

(iii) Collision Handling - Chaining :
- When a collision occurs, add the new key value pair to the linked list at that index.
- Each slot in the hash table maintains its own linked list, allowing multiple elements to co-exist at the same index.

(iv) Storage of Collisions :
- The linked list at each index holds all the key-value pairs that hash to that index

(v) Searching, Insertion, Deletion.

- Searching involves hashing the key to find its index and then traversing the linked list at that index.
- Insertion entails hashing the key to find the indexing and adding the key-value pair to the linked list at that index.
- Deletion involves finding the key's index & removing the corresponding key-value pair from the linked list.

2) Explain the linear probing method in closed hashing with example.

→ In closed hasing, all elements are stored in the hash table, and when a collision occurs, the algorithm searches for the next available slot within the hash table.

- In linear probing, when a collision occurs, the algorithm looks for the next available slot in a linear fashion. If the slot at the hashed index is occupied, the algorithm proceeds to the next slot until an empty slot is found.

Ex.

1) Initialization

3.) Explain Quadratic Probing.

→ One way of reducing "primary clustering" is to use quadratic probing to resolve collision.

- Suppose the "key" is mapped to the location i and the cell i is already occupied. In quadratic probing, the location i, i+1, i+4, i+9 ... are examined to find the first empty cell where the key is to be inserted.

- This table reduces primary clustering.

4.) Explain Double hashing.

→ This method requires two hashing functions f1 & f2.

- The problem of clustering can easily be handled through double hashing.
- Function f1 is known as primary hash function.
- In case the address obtained by f1 is already occupied by a key, the f2 is evaluated.
- The second function f2 is used to compute the increment to be added to the address obtained by the first hash function f1 in case of collision.

Q. List the various items which can be stored in a symbol table.

→ Symbol Name : name of variable, function or other program entity.

- Data Type : type of variable and return type
- memory Address : where the variable stored in memory
- Scop Information : Scope of variable
- Initialization status : whether the variable has been initialized.
- Size information : size of data structure
- Function signature : The types and order of Parameters of function
- Linkage Information : Info about how the symbol is linked.