**Date: 12-02-2021**

**Hashing with Chaining**

**Done By :** Rohit Karunakaran **Roll no:** 58

**Aim:** Implementation of Hash table with chaining as the collition

**Data Structure Used:** Hash table

**Algorithm for Inserting an element (insert)**

**Input:** Element to be inserted, v. The hash table to which the element is inserted HT, and the hash function h(v)

**Output:** The element inserted in the hash table

**Data Structure:** Hash table

**Steps:**

Step 1: Start

Step 2:key = h(v)

Step 3: new = GetNode(Node)

Step 4: new→data = v

Step 5: new →next =NULL

Step 6: if(HT[key]!=NULL) then

Step 4: HT[key] = new

Step 7: else

Step 1: ptr = HT[key]

Step 2: while(ptr→next != NULL) do

Step 1: ptr = ptr→ next

Step 3: EndWhile

Step 4: ptr →next = new

Step 8: endif

Step 9: Stop

**Program Code:**

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\* Implementiong of Hashing with

\* chaining

\* Done By: Rohit Karunakaran

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#include<stdio.h>

#include<stdlib.h>

#define SIZE 10

typedef struct hash\_node{

int data;

struct hash\_node \*next;

} node;

void insert(node \*\*\*ht, int e){

int pos = e%SIZE;

node \*\*hash\_table = \*ht;

node \*new\_node = (node\*)malloc(sizeof(node));

if(new\_node !=NULL){

new\_node->data = e;

new\_node->next=NULL;

if(hash\_table[pos]==NULL){

hash\_table[pos] = new\_node;

}

else{

node \*ptr = hash\_table[pos];

while(ptr->next!=NULL)ptr = ptr->next;

ptr->next=new\_node;

}

}

}

void show\_the\_hash\_table(node \*\*ht){

int i;

for(i=0;i<SIZE;i++){

node \*ptr = ht[i];

if(ptr!=NULL){

while(ptr->next!=NULL){

printf("%d -> ",ptr->data);

ptr = ptr->next;

}

printf("%d\n",ptr->data);

}

}

}

int main(){

node \*\*hash\_table=(node\*\*)calloc(sizeof(node),SIZE);

int RUN=1;

int elem;

int c;

while(RUN){

printf("\nMENU\n");

printf("1.Insert to hash table\n");

printf("2.Display the hash table\n");

printf("3.Exit\n");

printf("Enter yout choice: ");

scanf("%d",&c);

switch(c){

case 1:

printf("Enter the element you want to enter : ");

scanf("%d",&elem);

insert(&hash\_table, elem);

break;

case 2:

printf("The hash table is : \n");

show\_the\_hash\_table(hash\_table);

break;

case 3:

RUN=0;

break;

}

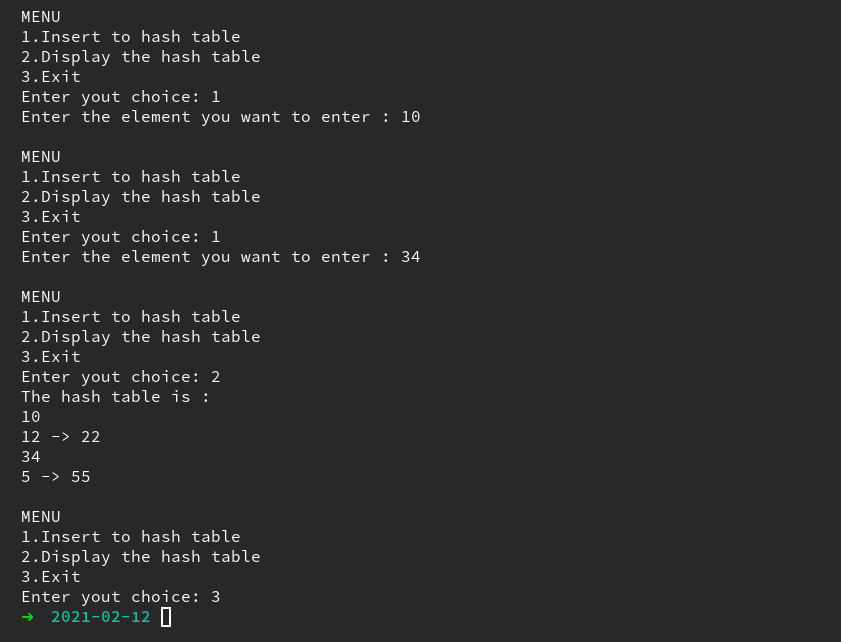
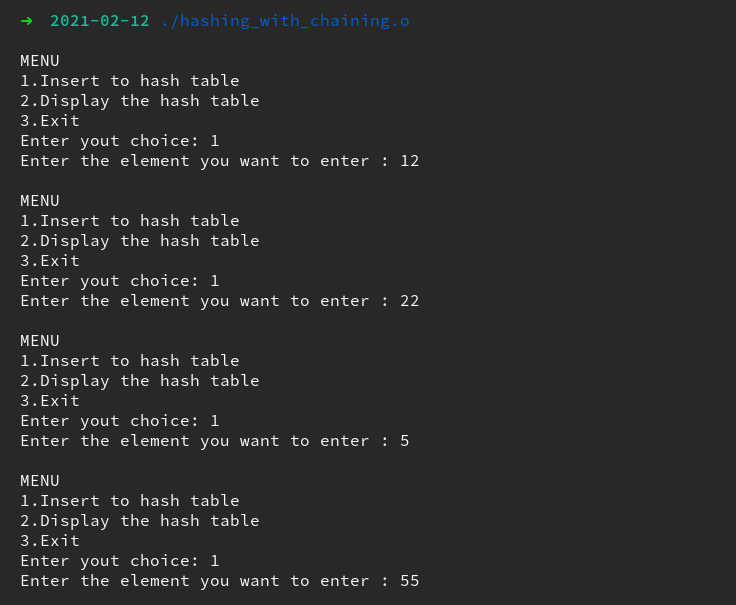
}

return 0;

}

**Result:**

The program was successfully compiled and the required output was obtained.

**Sample input output:**

**Date: 12-02-2021**

**Hashing with Linear Probing**

**Done By :** Rohit Karunakaran **Roll no:** 58

**Aim:** Implementation of Hash table with linear probing as the collition resolution method

**Data Structure Used:** Hash table

**Algorithm for Inserting an element (insert)**

**Input:** Element to be inserted, v. The hash table to which the element is inserted HT with the hash function h(v)

**Output:** The element inserted in the hash table

**Data Structure:** Hash table

**Steps:**

Step 1: Start

Step 2:key = h(v)

Step 3: new = GetNode(Node)

Step 4: new→value = v

Step 6: if(HT[key]!=NULL) then

Step 4: HT[key] = new

Step 7: else

Step 1: new\_key = key+1

Step 2: while(new\_key!=key and HT[new\_key]!=NULL) do

Step 1: new\_key = new\_key+1

Step 3: EndWhile

Step 4: if(new\_key == key) then

Step 1: Print “Insertion not possible”

Step 2: Exit

Step 5: else

HT[new\_key] = new

Step 6: endif

Step 8: endif

Step 9: Stop

**Program Code:**

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\* Hashing with linear probing as the

\* collision resolution method

\*

\* Done By: Rohit Karunakaran

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#include<stdio.h>

#include<stdlib.h>

#define SIZE 10

void insert(int \*\*\*hash\_table, int e,int i){

if(i<=SIZE){

int pos = (e%SIZE+i)%SIZE;

int \*\*ht = \*hash\_table;

if(ht[pos]==NULL){

int\* node = (int\*) malloc(sizeof(int));

\*node = e;

ht[pos] = node;

}

else{

insert(hash\_table,e,i+1);

}

}

else{

printf("INSERTION NOT POSSIBLE!!!!!!\nThe Hash Table is full\n");

return;

}

}

void show\_the\_hash\_table(int \*\*ht){

int i;

for(i=0;i<SIZE;i++){

int \*ptr = ht[i];

if(ptr!=NULL){

printf("(%d) - %d\n",i,\*ptr);

}

}

}

int main(){

int \*\*hash\_table=(int\*\*)calloc(sizeof(int\*),SIZE);

int RUN=1;

int elem;

int c;

while(RUN){

printf("\nMENU\n");

printf("1.Insert to hash table\n");

printf("2.Display the hash table\n");

printf("3.Exit\n");

printf("Enter yout choice: ");

scanf("%d",&c);

switch(c){

case 1:

printf("Enter the element you want to enter : ");

scanf("%d",&elem);

insert(&hash\_table, elem,0);

break;

case 2:

printf("The hash table is : \n");

show\_the\_hash\_table(hash\_table);

break;

case 3:

RUN=0;

break;

}

}

for(int i = 0; i<SIZE;i++){

free(\*(hash\_table+i));

}

free(hash\_table);

return 0;

}

**Result:**

The program is successfully compiled and the required output is obtained

**Sample input output:**

