Bharatiya Vidya Bhavan's

Sardar Patel Institute of Technology

(Autonomous Institute Affiliated to University of Mumbai)

Name: Jhaveri Varun Nimitt

UID: 2023800042

Batch: CSE A Batch C

Experiment No.: 10

Aim: Hashing

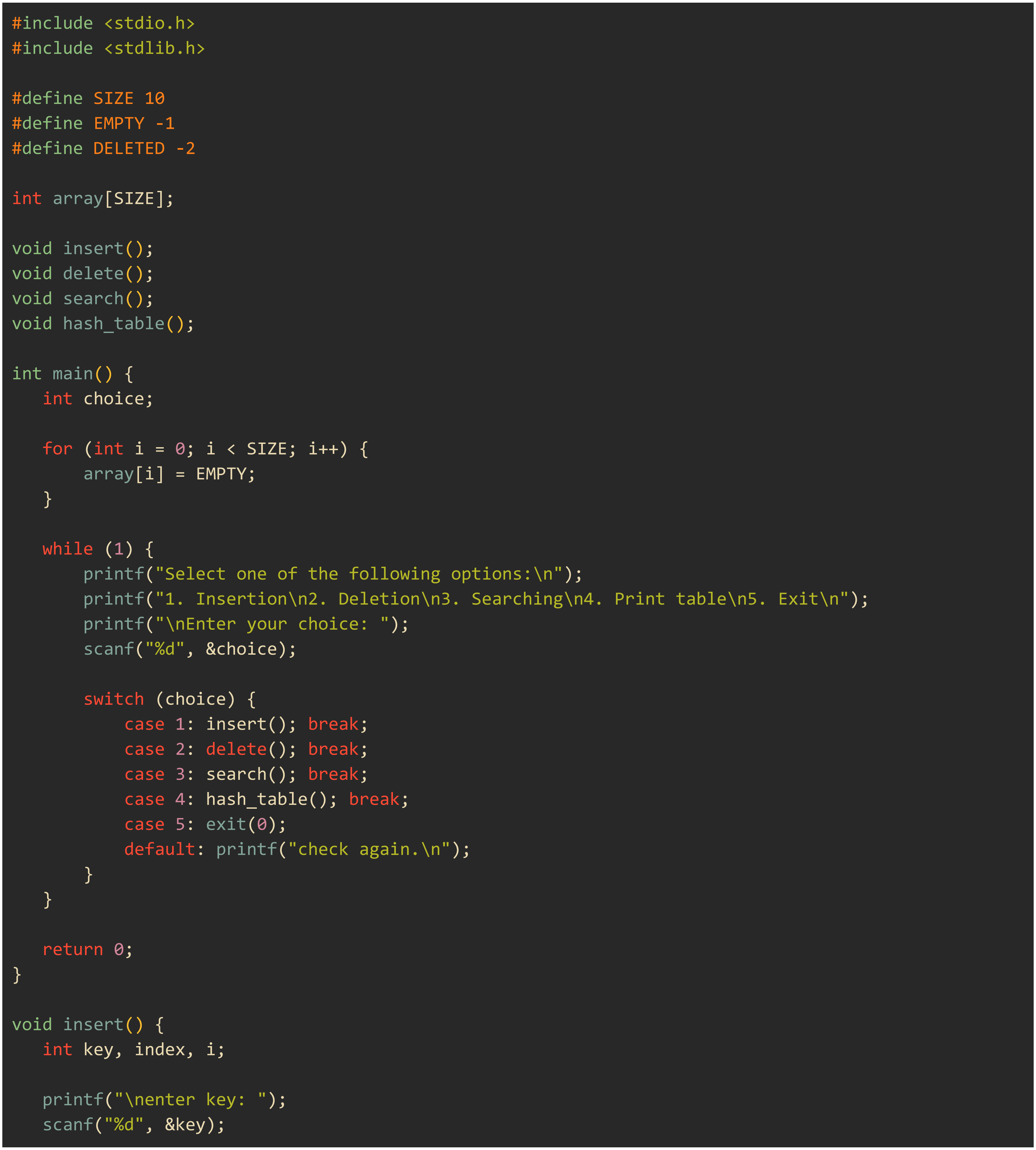
Problem:

Linear Probing, UID: 6-10

h(k,i) = (h1(k) + i) mod m

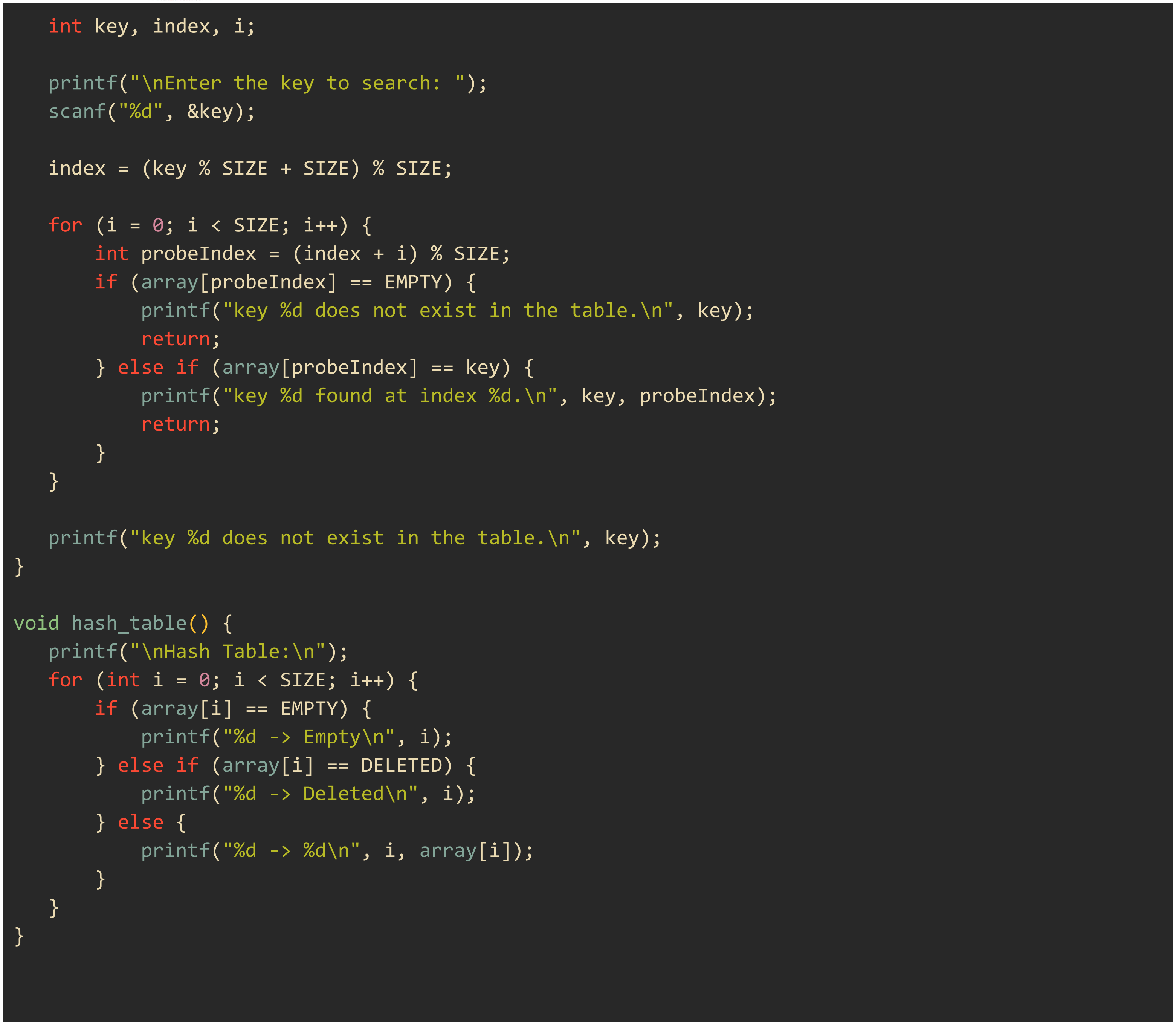
i=0,1,2,...

Solution:



```c
#include <stdio.h>
#include <stdlib.h>

#define SIZE 10
#define EMPTY -1
#define DELETED -2

int array[SIZE];

void insert();
void delete();
void search();
void hash_table();

int main() {
   int choice;

   for (int i = 0; i < SIZE; i++) {
       array[i] = EMPTY;
   }

   while (1) {
       printf("Select one of the following options:\n");
       printf("1. Insertion\n2. Deletion\n3. Searching\n4. Print table\n5. Exit\n");
       printf("\nEnter your choice: ");
       scanf("%d", &choice);

       switch (choice) {
           case 1: insert(); break;
           case 2: delete(); break;
           case 3: search(); break;
           case 4: hash_table(); break;
           case 5: exit(0);
           default: printf("check again.\n");
       }
   }

   return 0;
}

void insert() {
   int key, index, i;

   printf("\nenter key: ");
   scanf("%d", &key);
```

```
    index = (key % SIZE + SIZE) % SIZE;

    for (i = 0; i < SIZE; i++) {
        int probeIndex = (index + i) % SIZE;
        if (array[probeIndex] == key) {
            printf("Key %d already exists at index %d ie duplicate.\n", key, probeIndex);
            return;
        }
    }

    for (i = 0; i < SIZE; i++) {
        int probeIndex = (index + i) % SIZE;
        if (array[probeIndex] == EMPTY || array[probeIndex] == DELETED) {
            array[probeIndex] = key;
            printf("Key %d inserted at index %d.\n", key, probeIndex);
            return;
        }
    }

    printf("Hash table is full.\n");
}

void delete() {
    int key, index, i;

    printf("\nEnter the key to delete: ");
    scanf("%d", &key);

    index = (key % SIZE + SIZE) % SIZE;

    for (i = 0; i < SIZE; i++) {
        int probeIndex = (index + i) % SIZE;
        if (array[probeIndex] == EMPTY) {
            printf("key %d does not exist in the table.\n", key);
            return;
        } else if (array[probeIndex] == key) {
            array[probeIndex] = DELETED;
            printf("Key %d deleted from index %d.\n", key, probeIndex);
            return;
        }
    }

    printf("key %d does not exist in the table.\n", key);
}

void search() {
```



```
    int key, index, i;

    printf("\nEnter the key to search: ");
    scanf("%d", &key);

    index = (key % SIZE + SIZE) % SIZE;

    for (i = 0; i < SIZE; i++) {
        int probeIndex = (index + i) % SIZE;
        if (array[probeIndex] == EMPTY) {
            printf("key %d does not exist in the table.\n", key);
            return;
        } else if (array[probeIndex] == key) {
            printf("key %d found at index %d.\n", key, probeIndex);
            return;
        }
    }

    printf("key %d does not exist in the table.\n", key);
}

void hash_table() {
    printf("\nHash Table:\n");
    for (int i = 0; i < SIZE; i++) {
        if (array[i] == EMPTY) {
            printf("%d -> Empty\n", i);
        } else if (array[i] == DELETED) {
            printf("%d -> Deleted\n", i);
        } else {
            printf("%d -> %d\n", i, array[i]);
        }
    }
}
```

OUTPUT :

https://imgur.com/a/LcqUJ5T

Handwritten stuff: