

# Rajalakshmi Engineering College

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## NeoColab\_REC\_CS23231\_DATA STRUCTURES

### REC\_DS using C\_Week 7\_COD\_Question 3

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

In a messaging application, users maintain a contact list with names and corresponding phone numbers. Develop a program to manage this contact list using a dictionary implemented with hashing.

The program allows users to add contacts, delete contacts, and check if a specific contact exists. Additionally, it provides an option to print the contact list in the order of insertion.

##### ***Input Format***

The first line consists of an integer  $n$ , representing the number of contact pairs to be inserted.

Each of the next  $n$  lines consists of two strings separated by a space: the name of the contact (key) and the corresponding phone number (value).

The last line contains a string *k*, representing the contact to be checked or removed.

### **Output Format**

If the given contact exists in the dictionary:

1. The first line prints "The given key is removed!" after removing it.
2. The next *n* - 1 lines print the updated contact list in the format: "Key: X; Value: Y" where X represents the contact's name and Y represents the phone number.

If the given contact does not exist in the dictionary:

1. The first line prints "The given key is not found!".
2. The next *n* lines print the original contact list in the format: "Key: X; Value: Y" where X represents the contact's name and Y represents the phone number.

Refer to the sample outputs for the formatting specifications.

### **Sample Test Case**

Input: 3

Alice 1234567890

Bob 9876543210

Charlie 4567890123

Bob

Output: The given key is removed!

Key: Alice; Value: 1234567890

Key: Charlie; Value: 4567890123

### **Answer**

// You are using GCC

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

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

```
#include <string.h>
```

```
#define INITIAL_CAPACITY 10
```

```
typedef struct {  
    char key[50];  
    char value[50];  
} KeyValuePair;
```

```
typedef struct {  
    KeyValuePair *pairs;  
    int size;  
    int capacity;  
} Dictionary;
```

```
void initDictionary(Dictionary *dict) {  
    dict->size = 0;  
    dict->capacity = INITIAL_CAPACITY;  
    dict->pairs = (KeyValuePair *)malloc(dict->capacity * sizeof(KeyValuePair));  
}
```

```
int hash(const char *key) {  
    int hash = 0;  
    for (int i = 0; key[i] != '\0'; i++) {  
        hash += key[i];  
    }  
    return hash;  
}
```

```
void insertKeyValuePair(Dictionary *dict, const char *key, const char *value) {  
    if (dict->size == dict->capacity) {  
        dict->capacity *= 2;  
        dict->pairs = (KeyValuePair *)realloc(dict->pairs, dict->capacity *  
sizeof(KeyValuePair));  
    }  
    strcpy(dict->pairs[dict->size].key, key);  
    strcpy(dict->pairs[dict->size].value, value);  
    dict->size++;  
}
```

```
int doesKeyExist(Dictionary *dict, const char *key) {  
    for (int i = 0; i < dict->size; i++) {  
        if (strcmp(dict->pairs[i].key, key) == 0) {  
            return i;  
        }  
    }  
}
```

```
    }  
    }  
    return -1;  
}
```

```
void removeKeyValuePair(Dictionary *dict, const char *key) {  
    int index = doesKeyExist(dict, key);  
    if (index != -1) {  
        for (int i = index; i < dict->size - 1; i++) {  
            strcpy(dict->pairs[i].key, dict->pairs[i + 1].key);  
            strcpy(dict->pairs[i].value, dict->pairs[i + 1].value);  
        }  
        dict->size--;  
        printf("The given key is removed!\n");  
    }  
}
```

```
void printDictionary(Dictionary *dict) {  
    for (int i = 0; i < dict->size; i++) {  
        printf("Key: %s; Value: %s\n", dict->pairs[i].key, dict->pairs[i].value);  
    }  
}
```

```
int main() {  
    Dictionary dict;  
    initDictionary(&dict);  
    int numPairs;  
    scanf("%d", &numPairs);  
    char key[50], value[50];  
    for (int i = 0; i < numPairs; i++) {  
        scanf("%s %s", key, value);  
        insertKeyValuePair(&dict, key, value);  
    }  
    scanf("%s", key);  
    if (doesKeyExist(&dict, key) != -1) {  
        removeKeyValuePair(&dict, key);  
        printDictionary(&dict);  
    } else {  
        printf("The given key is not found!\n");  
        printDictionary(&dict);  
    }  
    free(dict.pairs);  
}
```

```
} return 0;
```

**Status :** Correct

**Marks :** 10/10