

hash.c [hashing] - Code::Blocks 20.03

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<global> main() : int

hash.c

```
1  #include <stdio.h>
2  #include <stdlib.h>
3
4  #define TABLE_SIZE 5
5
6  typedef struct {
7      int key;
8      int value;
9  } EmployeeRecord;
10
11
12  EmployeeRecord hashTable[TABLE_SIZE];
13
14  void initializeTable() {
15      for (int i = 0; i < TABLE_SIZE; i++) {
16          hashTable[i].key = -1;
17          hashTable[i].value = -1;
18      }
19  }
20
21
22  int hashFunction(int key) {
23      return key % TABLE_SIZE;
24  }
25
26
27  void insert(int key, int value) {
28      int hashIndex = hashFunction(key);
29      int originalIndex = hashIndex;
30
31
32      while (hashTable[hashIndex].key != -1) {
33          printf("Collision at index %d. Trying next index...\n", hashIndex);
34          hashIndex = (hashIndex + 1) % TABLE_SIZE;
```

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- Projects
- Files
- FSy
- Workspace
- hashing

Logs & others

- Code::Blocks
- Search results
- Cccc
- Build log
- Build messages
- CppCheck/Vera++
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- Cscope
- Debugger
- DoxyBlocks
- Fortran info
- Close

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hash.c

```
31
32 while (hashTable[hashIndex].key != -1) {
33     printf("Collision at index %d. Trying next index...\n", hashIndex);
34     hashIndex = (hashIndex + 1) % TABLE_SIZE;
35
36     if (hashIndex == originalIndex) {
37         printf("Error: Hash table is full. Cannot insert key %d\n", key);
38         return;
39     }
40 }
41
42
43 hashTable[hashIndex].key = key;
44 hashTable[hashIndex].value = value;
45 printf("Inserted key %d at index %d\n", key, hashIndex);
46 }
47
48
49 void displayTable() {
50     printf("\nHash Table:\n");
51     printf("Index\tKey\tValue\n");
52     for (int i = 0; i < TABLE_SIZE; i++) {
53         if (hashTable[i].key != -1)
54             printf("%d\t%d\t%d\n", i, hashTable[i].key, hashTable[i].value);
55         else
56             printf("%d\t--\t--\n", i);
57     }
58 }
59
60 int main() {
61     int n, key, value;
62
63
64     initializeTable();
```

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Projects Files FSy

Workspace

hashing

Logs & others

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<global> main(): int

hash.c

```
56         printf("%d\t--\t--\n", i);
57     }
58 }
59
60 int main() {
61     int n, key, value;
62
63     initializeTable();
64
65     printf("Enter the number of employee records: ");
66     scanf("%d", &n);
67
68
69
70     for (int i = 0; i < n; i++) {
71         printf("Enter key (4-digit) and value for employee %d: ", i + 1);
72         scanf("%d %d", &key, &value);
73
74
75         if (key < 1000 || key > 9999) {
76             printf("Invalid key. Please enter a 4-digit key.\n");
77             i--;
78         } else {
79             insert(key, value);
80         }
81     }
82
83
84     displayTable();
85
86     return 0;
87 }
88
```

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Projects Files FSy

Workspace

hashing

Logs & others

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C:\IBM23CS245\hashing\bin\



```
Enter the number of employee records: 4
Enter key (4-digit) and value for employee 1: 1010 100
Inserted key 1010 at index 0
Enter key (4-digit) and value for employee 2: 2020 200
Collision at index 0. Trying next index...
Inserted key 2020 at index 1
Enter key (4-digit) and value for employee 3: 3030 300
Collision at index 0. Trying next index...
Collision at index 1. Trying next index...
Inserted key 3030 at index 2
Enter key (4-digit) and value for employee 4: 4040 400
Collision at index 0. Trying next index...
Collision at index 1. Trying next index...
Collision at index 2. Trying next index...
Inserted key 4040 at index 3
```

Hash Table:

Index	Key	Value
0	1010	100
1	2020	200
2	3030	300
3	4040	400
4	--	--

```
Process returned 0 (0x0)    execution time : 39.752 s
Press any key to continue.
```

|