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CPSC 335-03

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**Programming Assignment 4: Cuckoo Hashing algorithm**

1. **Pseudocode**

tablesize = 17 # cuckoo tables' size

t[tablesize][2][255] #combine the two 1D table into one 2D table

def place\_in\_hash\_tables (string):

placed = false #true means inserted successfully

index = 0 #index 0 is the first table, 1 is the second table

counter = 0

pos = get\_hash\_value(string, index) #calculate the hash value for string

#if not inserted and not out of range

while((!placed ) && (counter < 2\*tablesize)):

# if the hash value at index <pos> in the <index> hash table is available, place the string there

if t[pos][index] = 0

t[pos][index] = string

placed = true

return placed

# if the entry at index <pos> in the <index> hash table is not available

else:

#evict the old string

temp = t[pos][index]

#place the new string there

t[pos][index] = string

#place evicted string to the other table

if index == 0:

index = 1

else:

index = 0

string = temp

# find an available slot in the other table for the evicted string

pos = get\_hash\_value(string, index)

counter ++

return placed

# compute the hash value to find an available slot for a string

def get\_hash\_value(string, index):

pos = 1

#if the string is being inserted in the first table

if index == 0:

#find hash value of the first character of the string

val = string[0] % tablesize

#if string contains only 1 character

if len(string) == 1:

return val;

#if string contains > 1 characters, loop iterates i from 1 to the last element of the string

for i in range(1, len(string)):

# find position

pos \*= 37

pos = pos % tablesize

#find hash value of the whole string

val += string[i] \* pos

val = val % tablesize

 if (val < 0):

val += tablesize

return val

#if the string is being inserted in the second table

else:

#find hash value of the last character of the string

val = string[len(string)-1] % tablesize

#if string contains only 1 character

if (len(string) == 1):

return val

#if string contains > 1 characters, loop iterates i from 1 to the last element of the string

for i in range(1, len(string)) :

# find position

pos \*= 37

pos = pos % tablesize

# find hash value of the whole string

val += s[len(string)-i-1] \* pos

val = val % tablesize

if (val < 0):

val += tablesize

return val

1. **Table**

|  |  |  |
| --- | --- | --- |
|  | **Table T1** | **Table T2** |
| **[0]** | One of the greatest |  |
| **[1]** | Dynamic decision making | Server Problem |
| **[2]** | California |  |
| **[3]** | Algorithm Engineering | Greatest mysteries |
| **[4]** | Quantum Nature of Universe |  |
| **[5]** |  | mysteries in science |
| **[6]** | macroscopic quantum objects | emphasis on |
| **[7]** | In physics and | Self-Stabilization |
| **[8]** | Dynamic Programming | Optimal Tree Construction |
| **[9]** | Online algorithms |  |
| **[10]** | Department of Computer Science |  |
| **[11]** | String Matching | State University |
| **[12]** | Some related problem |  |
| **[13]** | are known | astronomy |
| **[14]** |  | College of Engineering and Computer Science |
| **[15]** | Matrix Searching | Monge Properties |
| **[16]** | Fullerton | to scientists |