

CSE208 (Data Structures and Algorithms II Sessional)

Offline: Hash Table

#1805022

Md. Tamimul Ehsan

Hash Function 1:

```
long long hashFunction(string s){
    long long hash = 0;
    for(long long i = s.size() - 1; i >= 0; i--){
        hash = (hash * 137 + s[i]) % 1000000007;
    }
    return hash;
}
```

Hash Function 2:

```
long long hashFunction(string s){
    long long hash = 0;
    for(long long i = s.size() - 1; i >= 0; i--){
        hash = (hash * 281 + s[i]) % 1000000009;
    }
    return hash;
}
```

Auxiliary Hash Function:

```
long long auxHashFunction(string s){
    long long hash = 0;
    for(int i = s.size() - 1; i >= 0; i--){
        hash = (hash * 31 + s[i]) % 7919;
    }
    return hash;
}
```

Custom Probing:

```
int hashIndex = (hashFunction(s) + 43*i*auxHashFunction(s) + 47*i*i)%N;
```

Hash Table Size: 10007

	Hash1		Hash2	
	Number of collisions	Average probes	Number of collisions	Average probes
Chaining Method	3675	1.447	3696	1.495
Double Hashing	58255	5.119	60901	5.235
Custom Probing	57773	4.523	59275	5.795

Hash Table Size: 20009

	Hash1		Hash2	
	Number of collisions	Average probes	Number of collisions	Average probes
Chaining Method	2180	1.251	2085	1.258
Double Hashing	3961	0.375	3814	0.41
Custom Probing	3922	0.361	3742	0.398

Hash Table Size: 30103

	Hash1		Hash2	
	Number of collisions	Average probes	Number of collisions	Average probes
Chaining Method	1504	1.178	1425	1.14
Double Hashing	2182	0.233	2053	0.205
Custom Probing	2158	0.222	2089	0.181

Hash Table Size: 50087

	Hash1		Hash2	
	Number of collisions	Average probes	Number of collisions	Average probes
Chaining Method	953	1.101	911	1.085
Double Hashing	1199	0.127	1149	0.096
Custom Probing	1179	0.121	1128	0.103