CSE208 : Data Structure and Algorithms II Sessional

Offline 5: Hash Table

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Section : A
Level – 2, Term – 2
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Hash functions:

hash function 1:

```cpp
}
unsigned int Random::hash1(string key)
{
    const int temp = 1783;
    unsigned int hash = 1;
    for (int i = 0; i < key.size(); i++)
        hash += (key[i] * (int)pow(temp, i));
    return hash;
}
```

hash function 2

```cpp
unsigned int Random::hash2(string key)
{
    unsigned int hash = 101010113;
    int seed = 1783043;
    for (int i = 0; i < key.size(); ++i)
    {
        hash = ((hash << 5) ^ (hash >> 27)) ^ key[i];
        hash = (hash * seed) + key[i];
    }
    return hash;
}
```

auxiliary hash function:

```cpp
unsigned int Random::aux_hash(string key)
{
    unsigned int hash = 101010113;
    int seed = 1783043;
    for (int i = 0; i < key.size(); ++i)
    {
        hash = ((hash << 7) ^ (hash >> 39)) ^ key[i];
        hash = (hash * seed) + key[i];
        hash += (key[i] * (int)pow(seed % hash, i));
        hash = (hash * seed) * (hash + seed) + key[i];
    }
    return hash;
}
```

Data table:

Number of inputs: 10000

Table size: 10007

	Hash 1		Hash 2	
	Collisions	Average Probes	Collisions	Average Probes
Separate Chaining	3781	1.529	3686	1.5102
Double Hashing	62309	7.23	63650	7.365
Custom Probing	59328	6.932	58271	6.8271

Table size: 20011

	Hash 1		Hash 2	
	Collisions	Average Probes	Collisions	Average Probes
Separate Chaining	2170	1.2575	2061	1.2391
Double Hashing	3863	1.3863	3745	1.3745
Custom Probing	3774	1.3774	3827	1.3827

Table size: 30011

	Hash 1		Hash 2	
	Collisions	Average Probes	Collisions	Average Probes
Separate Chaining	1644	1.1879	1535	1.1721
Double Hashing	2359	1.2359	2236	1.2236
Custom Probing	2397	1.2397	2230	1.223

Table size: 40009

	Hash 1		Hash 2	
	Collisions	Average Probes	Collisions	Average Probes
Separate Chaining	1185	1.1275	1110	1.1187
Double Hashing	1558	1.1558	1479	1.1479
Custom Probing	1540	1.154	1451	1.1451