OFFLINE (HASHING)

Report

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Hash Functions:

1. Hash1:

```
long long p = 223, h = 0;
for(char c : key)h = (h * p + c) % m;
return h;
```

2. Hash2:

```
long long p = 0x811C9DC5 % m, h = 0;
for(char c : key)h = ((h * p) ^ c) % m;
return h;
```

3. AuxHash:

```
long long h = 0, a = 2, b = 3;
for(char c : key){
    h = (h * a + c) % m;
    a = (a + b) % m;
    swap(a, b);
}
return h;
```

Table 1: Performance of various techniques for collision resolution with two different hash functions. (For table size, N = 12007)

	Hash 1		Hash 2	
	Number of Collisions	Average Probes	Number of Collisions	Average Probes
Chaining Method	4074	1.381	4089	1.416
Double Hashing	11162	2.119	11465	2.182
Custom Probing	11329	2.107	11593	2.205

Table 2: Performance of various techniques for collision resolution with two different hash functions. (For table size, N = 20011)

	Hash 1		Hash 2	
	Number of Collisions	Average Probes	Number of Collisions	Average Probes
Chaining Method	2534	1.232	2502	1.253
Double Hashing	3775	1.383	3801	1.398
Custom Probing	3837	1.330	3706	1.378

Table 3: Performance of various techniques for collision resolution with two different hash functions. (For table size, N = 30011)

	Hash 1		Hash 2	
	Number of Collisions	Average Probes	Number of Collisions	Average Probes
Chaining Method	1603	1.177	1704	1.172
Double Hashing	2106	1.228	2218	1.216
Custom Probing	2069	1.224	2176	1.229

Table 4: Performance of various techniques for collision resolution with two different hash functions. (For table size, N = 100003)

	Hash 1		Hash 2	
	Number of Collisions	Average Probes	Number of Collisions	Average Probes
Chaining Method	515	1.040	556	1.044
Double Hashing	559	1.045	595	1.046
Custom Probing	555	1.046	601	1.051

Table 5: Performance of various techniques for collision resolution with two different hash functions. (For table size, N = 1000003)

	Hash 1		Hash 2	
	Number of Collisions	Average Probes	Number of Collisions	Average Probes
Chaining Method	55	1.01	54	1.008
Double Hashing	55	1.01	54	1.008
Custom Probing	56	1.01	23	1.008