

Data Structures and Algorithms

Sessional II

Offline 7: Hash Table

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Hash Table Size	Collision Resolution Method	Hash1		Hash2	
		# of collisions	Average Probes	# of collisions	Average probes
5000	Chaining	1842	1.5172	1816	1.5137
	Double Hashing	2550	5.8857	2430	6.7051
	Custom Probing	2522	6.0491	2487	6.6641
10000	Chaining	3669	1.5293	3684	1.5318
	Double Hashing	4990	6.7729	5013	6.7136
	Custom Probing	4945	6.1304	5039	6.9001
20000	Chaining	2070	1.2594	2110	1.2655
	Double Hashing	2431	1.3453	2443	1.3557
	Custom Probing	2511	1.3581	2492	1.3526

HASH FUNCTIONS

```
ll Hash1(string str, ll num) {
    const ll div = 1e9 + 7;
    int flag = 37, i = 1;
    ll h_val = 0;

    for (char c : str) {
        h_val = (h_val + (c - 'a' + 1) * i) % div;
        i = (i * flag) % div;
    }
    return (h_val % num + num) % num;
}

ll Hash2(string str, ll num) {
    ll h_val = 0;

    for (int i = 0; i < str.length(); i++)
        h_val = 31 * h_val + str[i];

    h_val = h_val % num;
    if (h_val < 0)
        h_val += num;

    return h_val;
}

ll auxHash(string &str) {
    ll hashValue = Hash1(str, 71);
    return 71 - (hashValue % 71);
}
```