

Graphs, all for hash tables with N=100,000 data items entered, but with the table size (H) adjusted to show the effects of fullness (λ) on performance. Graphs show number of linked-lists expected of each size.

N = 100,000; fullness = 0.01 (so H = 10000000)

```
0: 9900498 |*****
1:   99005 |*
2:    495 |*
3:     2 |*
```

N = 100,000; fullness = 0.05 (so H = 2000000)

```
0: 1902459 |*****
1:   95123 |****
2:   2378 |*
3:    40 |*
```

N = 100,000; fullness = 0.1 (so H = 1000000)

```
0: 904837 |*****
1:  90484 |*****
2:   4524 |*
3:   151 |*
4:    4 |*
```

N = 100,000; fullness = 0.2 (so H = 500000)

```
0: 409365 |*****
1:  81873 |*****
2:   8187 |**
3:   546 |*
4:   27 |*
5:    1 |*
```

N = 100,000; fullness = 0.3 (so H = 333333)

```
0: 246939 |*****
1:  74082 |*****
2:  11112 |****
3:   1111 |*
4:    83 |*
5:    5 |*
```

N = 100,000; fullness = 0.4 (so H = 250000)

```
0: 167580 |*****
1:  67032 |*****
2:  13406 |*****
3:   1788 |*
4:   179 |*
5:    14 |*
6:    1 |*
```

N = 100,000; fullness = 0.5 (so H = 200000)

```
0: 121306 |*****
1:  60653 |*****
2:  15163 |*****
3:   2527 |**
4:    316 |*
5:    32  |*
6:     3  |*
```

N = 100,000; fullness = 0.6 (so H = 166667)

```
0: 91469 |*****
1: 54881 |*****
2: 16464 |*****
3:  3293 |**
4:   494 |*
5:   59  |*
6:    6  |*
7:    1  |*
```

N = 100,000; fullness = 0.7 (so H = 142857)

```
0: 70941 |*****
1: 49658 |*****
2: 17380 |*****
3:  4055 |***
4:   710 |*
5:   99  |*
6:   12  |*
7:    1  |*
```

N = 100,000; fullness = 0.8 (so H = 125000)

```
0: 56166 |*****
1: 44933 |*****
2: 17973 |*****
3:  4793 |****
4:   959 |*
5:   153 |*
6:   20  |*
7:    2  |*
```

N = 100,000; fullness = 0.9 (so H = 111111)

```
0: 45174 |*****
1: 40657 |*****
2: 18296 |*****
3:  5489 |*****
4:  1235 |**
5:   222 |*
6:   33  |*
7:    4  |*
```

N = 100,000; fullness = 1 (so H = 100000)
0: 36788 |*****
1: 36788 |*****
2: 18394 |*****
3: 6131 |*****
4: 1533 |**
5: 307 |*
6: 51 |*
7: 7 |*
8: 1 |*

N = 100,000; fullness = 1.1 (so H = 90909)
0: 30261 |*****
1: 33287 |*****
2: 18308 |*****
3: 6713 |*****
4: 1846 |***
5: 406 |*
6: 74 |*
7: 12 |*
8: 2 |*

N = 100,000; fullness = 1.2 (so H = 83333)
0: 25099 |*****
1: 30119 |*****
2: 18072 |*****
3: 7229 |*****
4: 2169 |***
5: 520 |*
6: 104 |*
7: 18 |*
8: 3 |*

N = 100,000; fullness = 1.3 (so H = 76923)
0: 20964 |*****
1: 27253 |*****
2: 17715 |*****
3: 7676 |*****
4: 2495 |***
5: 649 |*
6: 141 |*
7: 26 |*
8: 4 |*
9: 1 |*

N = 100,000; fullness = 1.4 (so H = 71429)

```
0: 17614 |*****
1: 24660 |*****
2: 17262 |*****
3: 8055  |*****
4: 2819  |****
5: 789   |**
6: 184   |*
7: 37    |*
8: 6     |*
9: 1     |*
```

N = 100,000; fullness = 1.5 (so H = 66667)

```
0: 14876 |*****
1: 22313 |*****
2: 16735 |*****
3: 8367  |*****
4: 3138  |*****
5: 941   |**
6: 235   |*
7: 50    |*
8: 9     |*
9: 2     |*
```

N = 100,000; fullness = 1.6 (so H = 62500)

```
0: 12619 |*****
1: 20190 |*****
2: 16152 |*****
3: 8614  |*****
4: 3446  |*****
5: 1103  |**
6: 294   |*
7: 67    |*
8: 13    |*
9: 2     |*
```

N = 100,000; fullness = 1.7 (so H = 58824)

```
0: 10746 |*****
1: 18269 |*****
2: 15528 |*****
3: 8799  |*****
4: 3740  |*****
5: 1271  |***
6: 360   |*
7: 87    |*
8: 19    |*
9: 4     |*
```

N = 100,000; fullness = 1.8 (so H = 55556)

```
0: 9183 |*****
1: 16530 |*****
2: 14877 |*****
3: 8926 |*****
4: 4017 |*****
5: 1446 |***
6: 434 |*
7: 112 |*
8: 25 |*
9: 5 |*
```

N = 100,000; fullness = 1.9 (so H = 52632)

```
0: 7872 |*****
1: 14957 |*****
2: 14209 |*****
3: 8999 |*****
4: 4275 |*****
5: 1624 |****
6: 514 |*
7: 140 |*
8: 33 |*
9: 7 |*
```

N = 100,000; fullness = 2 (so H = 50000)

```
0: 6767 |*****
1: 13534 |*****
2: 13534 |*****
3: 9022 |*****
4: 4511 |*****
5: 1804 |****
6: 601 |**
7: 172 |*
8: 43 |*
9: 10 |*
10: 2 |*
```

N = 100,000; fullness = 2.5 (so H = 40000)

```
0: 3283 |*****
1: 8208 |*****
2: 10261 |*****
3: 8551 |*****
4: 5344 |*****
5: 2672 |*****
6: 1113 |***
7: 398 |*
8: 124 |*
9: 35 |*
10: 9 |*
11: 2 |*
```

N = 100,000; fullness = 3 (so H = 33333)

```
0: 1660 |*****
1: 4979 |*****
2: 7468 |*****
3: 7468 |*****
4: 5601 |*****
5: 3361 |*****
6: 1680 |*****
7: 720 |***
8: 270 |*
9: 90 |*
10: 27 |*
11: 7 |*
12: 2 |*
```

N = 100,000; fullness = 3.5 (so H = 28571)

```
0: 863 |*****
1: 3020 |*****
2: 5284 |*****
3: 6165 |*****
4: 5395 |*****
5: 3776 |*****
6: 2203 |*****
7: 1101 |*****
8: 482 |**
9: 187 |*
10: 66 |*
11: 21 |*
12: 6 |*
13: 2 |*
```

N = 100,000; fullness = 4 (so H = 25000)

```
0: 458 |**
1: 1832 |*****
2: 3663 |*****
3: 4884 |*****
4: 4884 |*****
5: 3907 |*****
6: 2605 |*****
7: 1489 |*****
8: 744 |***
9: 331 |**
10: 132 |*
11: 48 |*
12: 16 |*
13: 5 |*
14: 1 |*
```

N = 100,000; fullness = 5 (so H = 20000)

```
0: 135 |*
1: 674 |****
2: 1684 |*****
3: 2807 |*****
4: 3509 |*****
5: 3509 |*****
6: 2924 |*****
7: 2089 |*****
8: 1306 |*****
9: 725 |****
10: 363 |**
11: 165 |*
12: 69 |*
13: 26 |*
14: 9 |*
15: 3 |*
16: 1 |*
```

N = 100,000; fullness = 10 (so H = 10000)

```
0: 0 |
1: 5 |*
2: 23 |*
3: 76 |*
4: 189 |**
5: 378 |****
6: 631 |*****
7: 901 |*****
8: 1126 |*****
9: 1251 |*****
10: 1251 |*****
11: 1137 |*****
12: 948 |*****
13: 729 |*****
14: 521 |*****
15: 347 |****
16: 217 |***
17: 128 |**
18: 71 |*
19: 37 |*
20: 19 |*
21: 9 |*
22: 4 |*
23: 2 |*
24: 1 |*
```