COSC 3319.01 MWF

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11/28/2022

Lab 3: Option A

# **SUMMARY**

### Main Memory

First 30	40% Burris Linear	40% Bryan Linear	80% Burris Linear	80% Bryan Linear	40% Burris Random	40% Bryan Random	80% Burris Random	80% Bryan Random
Min Probe	1	1	1	1	1	1	1	1
Max	10	4	10	4	11	3	11	3
Average	<mark>3.41</mark>	1.45	<mark>3.41</mark>	1.45	<mark>3.34</mark>	<mark>1.41</mark>	3.34	1.41
Last 30	-	-	-	-	-	-	-	-
Min	1	1	1	1	1	1	1	1
Max	31	6	100	14	22	5	51	13
Average	13.34	2.21	42.76	<mark>6.45</mark>	<mark>8.79</mark>	1.97	21.21	4.31
Expected	1.33	1.33	2.96	2.96	1.28	1.28	2.00	2.00

## Output File

First 30	40% Burris Linear	40% Bryan Linear	80% Burris Linear	80% Bryan Linear	40% Burris Random	40% Bryan Random	80% Burris Random	80% Bryan Random
Min Probe	1	1	1	1	1	1	1	1
Max	11	4	11	4	11	3	11	3
Average	<mark>3.69</mark>	1.45	<mark>3.69</mark>	<mark>1.45</mark>	<mark>3.34</mark>	<mark>1.41</mark>	3.34	1.41
Last 30	-	-	-	-	-	-	-	-
Min	1	1	1	1	1	1	1	1
Max	31	6	102	14	22	5	52	13
Average	<mark>13.79</mark>	2.21	43.66	<mark>6.45</mark>	<mark>8.79</mark>	<mark>1.97</mark>	22.83	4.31
Expected	1.33	1.33	2.96	2.96	1.28	1.28	2.00	2.00

Dr. Burris' hash function exhibits excessive primary clustering during Linear hashing specifically due to the fact that the function does not pull enough values from the String in order to generate a new hash address. Probability-wise, the chance to pull the same third letter in two different five-letter words is much greater than the probability of pulling an identical string of 3 letters from the same two words. Because of this, Dr. Burris' hash function repeatedly calls upon the same hash address, causing massive primary clusters. Another issue with the function is dividing by 256, an even number. This greatly limits the pool of numbers to be generated to only multiples of two, reducing the number of possible hash addresses to be generated.

Although not perfect, my hash function improves upon Dr. Burris' hash significantly. By implementing the methods of square and extract n-bits and the division remainder, every part of the function is guaranteed to host a value. This leads to greater efficiency and speed across the board. I convert my hash from the generated long integer back into an integer and then modulus by the table size +1, which produces a function that is evenly spread through the table in a much more uniform manner. My hash function had nearly half the average probe count across every test generated and was smaller than the expected count in two of the tests. For a specific example, in the 80% linear test, Dr. Burris' hash had an average of 3.69 probes for the first 30 keys while my hash only had 1.45. This difference is massive when comparing the last 30 keys as Dr. Burris manages to have an average probe count of 43.66 while mine only has 6.45.

This hash can be improved upon, however, by modulus the table size -1 instead, creating a prime number that will allow more variety in the generated numbers. Furthermore, it would be beneficial next time to multiply the two string values rather than add them to produce a full 64-bit long integer.

#### DRBURRIS's Hash (40%)

#### Linear Probe

#### Main Memory

Me	emory					
	Paschal	Original	Location:	127	Probes:	2
	Qamruddin	Original	Location:	1	Probes:	1
	Nienberg	Original	Location:	2	Probes:	1
	Acevedo	Original	Location:	1	Probes:	3
	Arauza	Original	Location:	127	Probes:	6
	Crouch	Original	Location:	5	Probes:	1
	Ellington	Original	Location:	4	Probes:	3
	Gurung	Original	Location:	4	Probes:	4
	Joseph	Original	Location:	5	Probes:	4
	Daniels	Original	Location:	9	Probes:	1
:	Farral	Origina	l Location:	9	Probes:	2
:	Carmona	Origina	l Location:	11	Probes:	1
:	Clayton	Origina	l Location:	12	Probes:	1
:	Dustin	Origina	l Location:	11	Probes:	3
:	Zulfiqar	Origina	l Location:	14	Probes:	1
:	Aguirrie	Origina	l Location:	15	Probes:	1
:	Casper	Origina	l Location:	15	Probes:	2
:	Alcantara	Origina	l Location:	17	Probes:	1
:	Davies	Origina	l Location:	16	Probes:	3
:	Dugger	Origina.	l Location:	15	Probes:	5
:	Salkowski	Origina.	l Location:	20	Probes:	1
:	Robert	Origina.	l Location:	17	Probes:	5
:	Octavio	Origina.	l Location:	6	Probes:	17
:	Jeffrey	Origina:	l Location:	2	Probes:	22
:	Jordon	Origina:	l Location:	11	Probes:	14
:	Vinnela	Origina:	l Location:	9	Probes:	17
:	Veronica	Origina:	l Location:	6	Probes:	21
:	Matthew	Origina:	l Location:	2	Probes:	26
:	Michael	Origina:	l Location:	2	Probes:	27
:	Akhila	Original	l Location:	127	Probes	: 31
:	Charles	Origina	l Location:	2	Probes:	29
:	NULL					
		Qamruddin Nienberg Acevedo Arauza Crouch Ellington Gurung Joseph Daniels : Farral : Carmona : Clayton : Dustin : Zulfiqar : Aguirrie : Casper : Alcantara : Davies : Dugger : Salkowski : Robert : Octavio : Jeffrey : Jordon : Vinnela : Veronica : Matthew : Michael : Akhila : Charles	Paschal Original Qamruddin Original Nienberg Original Acevedo Original Arauza Original Crouch Original Ellington Original Joseph Original Daniels Original Carmona Original Clayton Original Clayton Original Casper Original Casper Original Davies Original Davies Original Davies Original Casper Original Casper Original Davies Original Octavio Original Octavio Original Octavio Original Mothael Original Matthew Original Matthew Original Matthew Original Matthew Original Matthew Original	Paschal Original Location: Qamruddin Original Location: Nienberg Original Location: Acevedo Original Location: Arauza Original Location: Crouch Original Location: Ellington Original Location: Gurung Original Location: Joseph Original Location: Carmona Original Location: Clayton Original Location: Zulfiqar Original Location: Casper Original Location: Davies Original Location: Davies Original Location: Davies Original Location: Davies Original Location: Dayder Original Location: Salkowski Original Location: Octavio Original Location: Jeffrey Original Location: Jordon Original Location: Vinnela Original Location: Winnela Original Location: Weronica Original Location: Matthew Original Location: Matthew Original Location: Michael Original Location: Akhila Original Location: Original Location: Original Location: Original Location:	Paschal Original Location: 127 Qamruddin Original Location: 1 Nienberg Original Location: 2 Acevedo Original Location: 1 Arauza Original Location: 127 Crouch Original Location: 5 Ellington Original Location: 4 Gurung Original Location: 4 Joseph Original Location: 5 Daniels Original Location: 9 : Farral Original Location: 9 : Carmona Original Location: 11 : Clayton Original Location: 12 : Dustin Original Location: 12 : Zulfiqar Original Location: 14 : Aguirrie Original Location: 15 : Casper Original Location: 15 : Alcantara Original Location: 15 : Alcantara Original Location: 15 : Alcantara Original Location: 16 : Dugger Original Location: 16 : Dugger Original Location: 17 : Salkowski Original Location: 20 : Robert Original Location: 2 : Jordon Original Location: 9 : Veronica Original Location: 11 : Vinnela Original Location: 2 : Michael Original Location: 2 : Akhila Original Location: 2	Paschal Original Location: 127 Probes: Qamruddin Original Location: 1 Probes: Nienberg Original Location: 2 Probes: Acevedo Original Location: 1 Probes: Arauza Original Location: 127 Probes: Crouch Original Location: 127 Probes: Ellington Original Location: 4 Probes: Gurung Original Location: 4 Probes: Joseph Original Location: 5 Probes: Daniels Original Location: 9 Probes: Carmona Original Location: 9 Probes: Carmona Original Location: 9 Probes: Carmona Original Location: 11 Probes: Clayton Original Location: 12 Probes: Dustin Original Location: 12 Probes: Zulfiqar Original Location: 14 Probes: Casper Original Location: 15 Probes: Aquirrie Original Location: 15 Probes: Casper Original Location: 15 Probes: Davies Original Location: 17 Probes: Davies Original Location: 16 Probes: Davies Original Location: 17 Probes: Davies Original Location: 17 Probes: Salkowski Original Location: 17 Probes: Robert Original Location: 17 Probes: Gashert Original Location: 17 Probes: Jeffrey Original Location: 2 Probes: Jeffrey Original Location: 2 Probes: Jordon Original Location: 1 Probes: Jordon Original Location: 2 Probes: Winnela Original Location: 2 Probes: Matthew Original Location: 2 Probes: Michael Original Location: 2 Probes: Akhila Original Location: 2 Probes:

32 : NULL

33 : NULL

34 : NULL

35 **:** NULL

36:

NULL

37 : NULL

38: NULL

39: NULL

40: NULL

41 : NULL

42 : NULL

43 : NULL

44: NULL

45 : NULL

1

2

3

4

5

6 7

8

9

10

11

12

13

14

15

16

17

18

19

```
46:
       NULL
47 :
       NULL
48:
       NULL
49:
       NULL
50:
       NULL
51:
       NULL
52:
       NULL
53:
       NULL
54:
       NULL
55:
       NULL
56:
       NULL
57:
       NULL
58:
       NULL
59:
       NULL
60:
       NULL
61:
       NULL
62:
       Cook
                             Original Location:
                                                            Probes:
                                                   62
63:
       Red
                             Original Location:
                                                   62
                                                            Probes:
64:
       Ajose
                             Original Location:
                                                   62
                                                            Probes:
65 :
       Buck
                             Original Location:
                                                   62
                                                            Probes:
66:
                             Original Location:
                                                   62
       Clark
                                                            Probes:
                             Original Location:
67 :
       Egbe
                                                   62
                                                            Probes:
68:
       Garza
                             Original Location:
                                                   62
                                                            Probes:
69:
                             Original Location:
       Kelly
                                                   62
                                                            Probes:
70:
       Corey
                             Original Location:
                                                   62
                                                            Probes:
71 :
                             Original Location:
                                                   62
                                                            Probes:
       Adam
72:
       Kyle
                             Original Location:
                                                   62
                                                            Probes:
73:
                             Original Location:
                                                   62
       Scott
                                                            Probes:
74:
       Judy
                             Original Location:
                                                   62
                                                            Probes:
75 :
       Derek
                             Original Location:
                                                   62
                                                            Probes:
76 :
       Lisa
                             Original Location:
                                                   62
                                                            Probes:
77 :
       Todd
                             Original Location:
                                                   62
                                                            Probes:
78 :
       John
                             Original Location:
                                                   62
                                                            Probes:
79:
       James
                             Original Location:
                                                   62
                                                            Probes:
80:
       Chris
                             Original Location:
                                                   62
                                                            Probes:
81 :
       NULL
82:
       NULL
83:
       NULL
84:
       NULL
85 :
       NULL
86:
       NULL
87:
       NULL
88:
       NULL
89:
       NULL
90:
       NULL
91:
       NULL
92:
       NULL
```

93:

94:

NULL

NULL

```
95:
     NULL
96:
      NULL
97:
      NULL
98:
      NULL
99:
      NULL
100:
       NULL
101:
       NULL
102:
       NULL
103:
       NULL
104 : NULL
105 : NULL
106 : NULL
107 :
       NULL
108 : NULL
109:
       NULL
110 : NULL
111:
       NULL
112 : NULL
113 :
      NULL
114:
      NULL
115:
       NULL
116:
       NULL
117 :
       NULL
118 : NULL
119:
       NULL
120 :
       NULL
121 : NULL
122 :
      NULL
123 : NULL
124 :
       NULL
125 : NULL
126:
       NULL
127 :
       Bhandari
                          Original Location: 127
                                                     Probes: 1
Statistics for
                   2 to 31
Min: 1
Max:
     10
Average:
         3.41
Statistics for
                 22 to 51
Min: 1
Max:
     31
Average:
         13.34
```

Expected number of Probes: 1.33117E+00

#### BRYANBENHAM's Hash (40%)

#### Linear Probe

Linea	r Probe					
Main 1	Memory					
0:	NULL					
1:	NULL					
2:	NULL					
3 <b>:</b>	NULL					
4:	NULL					
5 <b>:</b>	NULL					
6 <b>:</b>	NULL					
7:	NULL					
8:	NULL					
9:	NULL					
10 :	NULL					
11 :	Adam		Location:	11		1
12 :	Scott	Original	Location:	11	Probes:	2
13 :	NULL					
14:	Arauza		Location:	14		1
15 <b>:</b>	Clayton	Original	Location:	14	Probes:	2
16:	NULL					
17 :	NULL					
18:	NULL					
19:	NULL					
20 :	NULL					
21 :	NULL					
22 :	NULL				_	
23 :	Corey		Location:	23		1
24:	Derek		Location:	23		2
25:	Carmona	<del>-</del>	Location:	25		1
26:	Zulfiqar 		Location:	25		2
27:	Egbe		Location:	25		3
28:	Gurung		Location:	28		1
29:	Robert		Location:	25		5
30:	Chris	Original	Location:	24	Probes:	7
31:	NULL					
32:	NULL					
33:	NULL					
34:	NULL					
35:	NULL					
36:	NULL NULL					
37:	-	0	Taaatian.	2.0	Decelor	1
38:	Lisa		Location:	38		1
39:	Joseph	<del>=</del>	Location:	39		1
40:	Alcantara	_	Location: Location:	40		1
41 : 42 :	Cook	_	Location: Location:	41 42		1
42 :	Dugger Nienberg		Location:	42		1
44 :	Qamruddin		Location:	43		2
45 :	Acevedo	_	Location:	45 45		1
40:	Acevedo	Original	TOCALTOII:	40	rrones:	Τ

46:	Ajose	Original	Location:	43	Probes:	4
47 :	NULL					
48 :	NULL					
49 :	NULL					
50:	NULL					
51 :	NULL					
52 <b>:</b>	NULL					
53 <b>:</b>	NULL					
54 <b>:</b>	Octavio	Original	Location:	54	Probes:	1
55 <b>:</b>	Jordon	Original	Location:	55	Probes:	1
56 <b>:</b>	NULL					
57 <b>:</b>	Ellington	Original	Location:	57	Probes:	1
58 <b>:</b>	Kyle	Original	Location:	57	Probes:	2
59 <b>:</b>	Jeffrey	Original	Location:	57	Probes:	3
60 <b>:</b>	Vinnela	Original	Location:	58	Probes:	3
61 :	NULL					
62 <b>:</b>	NULL					
63 <b>:</b>	Judy	Original	Location:	63	Probes:	1
64 :	NULL					
65 <b>:</b>	NULL					
66 :	NULL					
67 <b>:</b>	NULL					
68 :	NULL					
69 <b>:</b>	NULL					
70 :	NULL					
71 :	NULL					
72 :	Aguirrie		Location:	72	Probes:	1
73 :	Red		Location:	72	Probes:	2
74 :	Casper		Location:	74	Probes:	1
75 <b>:</b>	Michael		Location:	74	Probes:	2
76 <b>:</b>	Dustin		Location:	76	Probes:	1
77 :	James	Original	Location:	72	Probes:	6
78:	NULL					
79 <b>:</b>	NULL					
80 : 81 :	NULL					
82 :	NULL					
83 :	NULL					
84 :	NULL					
85 :	NULL NULL					
86:	NULL					
87 <b>:</b>	NULL					
88 :	Davies	Original	Location:	88	Probes:	1
89:	Daniels		Location:	89	Probes:	1
90 :	Kelly		Location:	90	Probes:	1
91 :	Todd	=	Location:	89	Probes:	3
92 :	Veronica		Location:	90	Probes:	3
93 :	Matthew		Location:	91	Probes:	3
94 :	John		Location:	91	Probes:	4
<i>J</i> 1 •		y-1141				-

```
95 :
       NULL
 96:
       NULL
 97:
       NULL
 98:
       NULL
 99:
       NULL
 100:
        NULL
 101:
        NULL
 102:
        NULL
 103:
        Paschal
                              Original Location:
                                                    103
                                                             Probes:
                                                                       1
 104:
        NULL
 105:
        NULL
 106:
        NULL
 107:
        NULL
 108:
        Bhandari
                              Original Location:
                                                    108
                                                              Probes:
                                                                       1
 109:
        Buck
                              Original Location:
                                                    108
                                                              Probes:
                                                                       2
 110 :
        Clark
                              Original Location:
                                                    109
                                                              Probes:
                                                                       2
 111 :
        Crouch
                              Original Location:
                                                    109
                                                              Probes:
                                                                       3
 112:
        Charles
                              Original Location:
                                                    109
                                                              Probes:
 113:
        NULL
 114:
        NULL
 115 :
        NULL
 116:
        NULL
 117 :
        NULL
 118:
        NULL
 119:
        NULL
 120 :
        NULL
 121 :
        NULL
 122 :
        Salkowski
                              Original Location:
                                                    122
                                                              Probes:
                                                                       1
 123 : Farral
                              Original Location:
                                                    123
                                                              Probes:
                                                                       1
 124:
                              Original Location:
        Akhila
                                                    122
                                                              Probes:
                                                                       3
 125 :
        Garza
                              Original Location:
                                                    125
                                                              Probes:
                                                                       1
 126:
        NULL
 127 :
        NULL
Statistics for
                        2 to 31
Min:
      1
Max:
Average:
           1.45
Statistics for
                       22 to 51
Min:
      1
      6
Max:
Average:
           2.21
```

Expected number of Probes: 1.33117E+00

#### DRBURRIS's Hash (80%)

#### LINEAR Probe

#### Main Memory

maın	Memory			
0:	Paschal	Original Location:	127	Probes: 2
1:	Qamruddin	Original Location:	1	Probes: 1
2:	Nienberg	Original Location:	2	Probes: 1
3 <b>:</b>	Acevedo	Original Location:	1	Probes: 3
4:	Arauza	Original Location:	127	Probes: 6
5:	Crouch	Original Location:	5	Probes: 1
6:	Ellington	Original Location:	4	Probes: 3
7:	Gurung	Original Location:	4	Probes: 4
8:	Joseph	Original Location:	5	Probes: 4
9:	Daniels	Original Location:	9	Probes: 1
10 :	: Farral	Original Location:	9	Probes: 2
11 :	: Carmona	Original Location:	11	Probes: 1
12 :	: Clayton	Original Location:	12	Probes: 1
13 :	: Dustin	Original Location:	11	Probes: 3
14 :	: Zulfiqar	Original Location:	14	Probes: 1
15 :	: Aguirrie	Original Location:	15	Probes: 1
16 :	: Casper	Original Location:	15	Probes: 2
17 :	: Alcantara	Original Location:	17	Probes: 1
18 :	: Davies	Original Location:	16	Probes: 3
19 :	: Dugger	Original Location:	15	Probes: 5
20 :	: Salkowski	Original Location:	20	Probes: 1
21 :	: Robert	Original Location:	17	Probes: 5
22 :	: Octavio	Original Location:	6	Probes: 17
23 :	: Jeffrey	Original Location:	2	Probes: 22
24 :	: Jordon	Original Location:	11	Probes: 14
25 :	: Vinnela	Original Location:	9	Probes: 17
26 :	: Veronica	Original Location:	6	Probes: 21
27 :	: Matthew	Original Location:	2	Probes: 26
28 :	: Michael	Original Location:	2	Probes: 27
29 :	: Akhila	Original Location:	127	Probes: 31
30 :	: Charles	Original Location:	2	Probes: 29
31 :	: Christopher	Original Location:	17	Probes: 15
32 :	: Fernando	Original Location:	11	Probes: 22
33 :	: Batbold	Original Location:	9	Probes: 25
34 :	: Fabulous	Original Location:	12	Probes: 23
35 :	: Misogamist	Original Location:	127	Probes: 37
36 :	: Maiden	Original Location:	11	Probes: 26
37 :	: Constriction	Original Location:	15	Probes: 23
38 :	Necromancer	Original Location:	10	Probes: 29
39 :	: Syncopate	Original Location:	13	Probes: 27
40 :	: Afterwards	Original Location:	20	Probes: 21
41 :		Original Location:	11	Probes: 31
42 :	: Northwest	Original Location:	20	Probes: 23
43 :	: Irreversible	Original Location:	2	Probes: 42
44 :	: Fabricate	Original Location:	0	Probes: 45
45 :	: Staple	Original Location:	2	Probes: 44

46	:	Finagle	Original	Location:	9	Probes:	38
47	:	Screen	Original	Location:	11	Probes:	37
48	:	Perfect	Original	Location:	0	Probes:	49
49	:	parasympathetic	Original	Location:	22	Probes:	28
50	:	poison	Original	Location:	11	Probes:	40
51	:	brutalize	Original	Location:	9	Probes:	43
52	:	ratiocination	Original	Location:	0	Probes:	53
53	:	cauldron	Original	Location:	15	Probes:	39
54	:	prepossess	Original	Location:	16	Probes:	39
55	:	orthodontist	Original	Location:	1	Probes:	55
56	:	magnetic	Original	Location:	17	Probes:	40
57	:	constrain	Original	Location:	15	Probes:	43
58	:	marsupial	Original	Location:	13	Probes:	46
59	:	rationalize	Original	Location:	11	Probes:	49
60	:	toluene	Original	Location:	11	Probes:	50
61	:	sparse	Original	Location:	2	Probes:	60
62	:	Cook	Original	Location:	62	Probes:	1
63	:	Red	Original	Location:	62	Probes:	2
64	:	Ajose	Original	Location:	62	Probes:	3
65	:	Buck	Original	Location:	62	Probes:	4
66	:	Clark	Original	Location:	62	Probes:	5
67	:	Egbe	Original	Location:	62	Probes:	6
68	:	Garza	<del>-</del>	Location:	62	Probes:	7
69	:	Kelly	Original	Location:	62	Probes:	8
70	:	Corey	<del>-</del>	Location:	62	Probes:	9
71	:	Adam	<del>-</del>	Location:	62	Probes:	10
72	:	Kyle	Original	Location:	62	Probes:	11
73	:	Scott	=	Location:	62	Probes:	12
74	:	Judy	<del>-</del>	Location:	62	Probes:	13
75	:	Derek	=	Location:	62	Probes:	14
76	:	Lisa	Original	Location:	62	Probes:	15
77	:	Todd	<del>-</del>	Location:	62	Probes:	16
78	:	John	=	Location:	62	Probes:	17
79	:	James	-	Location:	62	Probes:	18
80	:	Chris	_	Location:	62	Probes:	19
81		Wade		Location:	62	Probes:	20
82	:	Joel	<del>-</del>	Location:	62	Probes:	21
	:	Eye	<del>-</del>	Location:	62	Probes:	22
84	:	Yolk	_	Location:	62	Probes:	23
85	:	Honor		Location:	62	Probes:	24
86	:	Under	<del>-</del>	Location:	62	Probes:	25
87		Jutty	<del>-</del>	Location:	62	Probes:	26
	:	Cook	=	Location:	62	Probes:	27
	:	Rush	<del>-</del>	Location:	62	Probes:	28
90	:	Wine	<del>-</del>	Location:	62	Probes:	29
91	:	mole	<del>-</del>	Location:	62	Probes:	30
92	:	cap		Location:	62	Probes:	31
93		wince		Location:	62	Probes:	32
94		live	<del>-</del>	Location:	62	Probes:	33
			-				

	Inlet	Original Location:	62	Probes: 34
	scat	Original Location:	62	Probes: 35
	vet	Original Location:	62	Probes: 36
· ·	quandary	Original Location:	127	Probes: 100
	dactyl	Original Location:	9	Probes: 91
	nosegay	Original Location:	127	Probes: 102
	NULL			
107 :	NULL			
	NULL			
109 :	NULL			
110 :	NULL			
111 :	NULL			
112 :	NULL			
113 :	NULL			
114 :	NULL			
115 :	NULL			
116:	NULL			
117 :	NULL			
118 :	NULL			
119:	NULL			
120 :	NULL			
121 :	NULL			
122 :	NULL			
123 :	NULL			
124 :	NULL			
125 :	NULL			
126:	NULL			
127 :	Bhandari	Original Location:	127	Probes: 1
Statistic	es for 2 to	31		
Min: 1				
Max: 10	)			
Average:	3.41			
-				
Statistic	es for 73 to	102		
Min: 1				

Expected number of Probes: 2.96154E+00

Max: 100

Average: 42.76

#### BRYANBENHAM's Hash (80%)

	Probe				
Main M	emory				
0:	- Fabricate	Original Location:	125	Probes:	4
1:	NULL				
2:	NULL				
3 <b>:</b>	parasympathetic	Original Location:	3	Probes: 1	
4:	rationalize	Original Location:	4	Probes: 1	
5:	NULL				
6 <b>:</b>	cap	Original Location:	6	Probes: 1	
7:	NULL				
8:	NULL				
9:	NULL				
10 :	NULL				
11 :	Adam	Original Location:	11	Probes:	1
12 :	Scott	Original Location:	11	Probes:	2
13:	NULL				
14 :	Arauza	Original Location:	14	Probes:	1
15 <b>:</b>	Clayton	Original Location:	14	Probes:	2
16:	NULL				
17 :	NULL				
18:	NULL				
19:	NULL				
20 :	NULL				
21 :	NULL				
22 :	Batbold	Original Location:	22	Probes:	1
23 :	Corey	Original Location:	23	Probes:	1
24:	Derek	Original Location:	23	Probes:	2
25 <b>:</b>	Carmona	Original Location:	25	Probes:	1
26 <b>:</b>	Zulfiqar	Original Location:	25	Probes:	2
27:	Egbe	Original Location:	25	Probes:	3
28:	Gurung	Original Location:	28	Probes:	1
29:	Robert	Original Location:	25	Probes:	5
30 : 31 :	Chris	Original Location: Original Location:	24 29	Probes:	7 3
	Fabulous	-	24	Probes: Probes:	9
32 : 33 :	Syncopate Honor	Original Location: Original Location:	26	Probes:	8
33 . 34 :	Screen	Original Location:	23	Probes:	12
35 :	wince	Original Location:	23	Probes:	13
36 :	orthodontist	Original Location:	23	Probes:	14
37 :	constrain	Original Location:	27	Probes:	11
38 :	Lisa	Original Location:	38	Probes:	1
39 :	Joseph	Original Location:	39	Probes:	1
40 :	Alcantara	Original Location:	40	Probes:	1
41 :	Cook	Original Location:	41	Probes:	1
42 :	Dugger	Original Location:	42	Probes:	1
43 :	Nienberg	Original Location:	43	Probes:	1
44:	Qamruddin	Original Location:	43	Probes:	2
45 :	Acevedo	Original Location:	45	Probes:	1
		J - =========	-		

46	:	Ajose	Original	Location:	43	Probes:	4
47	:	Maiden	Original	Location:	40	Probes:	8
48	:	Necromancer	=	Location:	38	Probes:	11
49	:	Staple	=	Location:	45	Probes:	5
50	:	Christopher	Original	Location:	50	Probes:	1
51	:	Cook	=	Location:	41	Probes:	11
52	:	scat	=	Location:	45	Probes:	8
53	:	nosegay	Original	Location:	39	Probes:	15
54	:	Octavio	=	Location:	54	Probes:	1
55	:	Jordon	Original	Location:	55	Probes:	1
56	:	mole	Original	Location:	56	Probes:	1
57	:	Ellington	Original	Location:	57	Probes:	1
58	:	Kyle	=	Location:	57	Probes:	2
59	:	Jeffrey	=	Location:	57	Probes:	3
60	:	Vinnela	=	Location:	58	Probes:	3
61	:	Wade	=	Location:	57	Probes:	5
62	:	Afterwards		Location:	60	Probes:	3
63	:	Judy	_	Location:	63	Probes:	1
64	:	Northwest	_	Location:	59	Probes:	6
65	:	Under	=	Location:	57	Probes:	9
66	:	inlet	_	Location:	56	Probes:	11
67	:	toluene	_	Location:	60	Probes:	8
68	:	Irreversible	_	Location:	68	Probes:	1
69	:	NULL	- 5 -				
70	:	wet	Original	Location:	70	Probes:	1
71	:	NULL	- 5 -				
72		Aguirrie	Original	Location:	72	Probes:	1
73	:	Red	=	Location:	72	Probes:	2
74		Casper	=	Location:	74	Probes:	1
75		Michael	=	Location:	74	Probes:	2
76		Dustin	=	Location:	76	Probes:	1
77		James	_	Location:	72	Probes:	6
78		Rush	=	Location:	73	Probes:	6
79		poison	_	Location:	76	Probes:	4
80		magnetic	=	Location:	75	Probes:	6
81		dactyl		Location:	77	Probes:	5
82		NULL					
83		NULL					
84		NULL					
85		NULL					
86		NULL					
87		Finagle	Original	Location:	87	Probes:	1
88		Davies	=	Location:	88	Probes:	1
89		Daniels		Location:	89	Probes:	1
90		Kelly	=	Location:	90	Probes:	1
91		Todd	_	Location:	89	Probes:	3
92		Veronica		Location:	90	Probes:	3
93		Matthew		Location:	91	Probes:	3
94		John	=	Location:	91	Probes:	4
- 1	•	= =====			-		-

95:	Eye	Original Location:	89	Probes:	7
96:	Constriction	Original Location:	89	Probes:	8
97:	Person	Original Location:	91	Probes:	7
98:	Jutty	Original Location:	92	Probes:	7
99:	Wine	Original Location:	88	Probes:	12
100 :	live	Original Location:	87	Probes:	14
101 :	: marsupial	Original Location:	91	Probes:	11
102 :	: NULL				
103 :	Paschal	Original Location:	103	Probes:	1
104 :	: NULL				
105 :	cauldron	Original Location:	105	Probes:	1
106 :	: NULL				
107 :	: Joel	Original Location:	107	Probes:	1
108 :	Bhandari	Original Location:	108	Probes:	1
109 :	Buck	Original Location:	108	Probes:	2
110 :	: Clark	Original Location:	109	Probes:	2
111 :	Crouch	Original Location:	109	Probes:	3
112 :	Charles	Original Location:	109	Probes:	4
113 :	: Misogamist	Original Location:	111	Probes:	3
114 :	brutalize	Original Location:	108	Probes:	7
115 :	prepossess	Original Location:	114	Probes:	2
116 :	sparse	Original Location:	110	Probes:	7
117 :	quandary	Original Location:	109	Probes:	9
118 :	: NULL				
119 :	: NULL				
120 :	Perfect	Original Location:	120	Probes:	1
121 :	ratiocinatior	Original Location:	120	Probes:	2
122 :	: Salkowski	Original Location:	122	Probes:	1
123 :	: Farral	Original Location:	123	Probes:	1
124 :	: Akhila	Original Location:	122	Probes:	3
125 :	: Garza	Original Location:	125	Probes:	1
126 :	: Fernando	Original Location:	122	Probes:	5
127 :	Yolk	Original Location:	122	Probes:	6

Statistics for 2 to 31

Min: 1 Max: 4

Average: 1.45

Statistics for 73 to 102

Min: 1 Max: 14

Average: 6.45

Expected number of Probes: 2.96154E+00

#### DRBURRIS's Hash (40%)

#### RANDOM Probe

Main Mem
----------

Main	Me	emory		
0:		NULL		
1:		Paschal	Original Location: 127 Prob	pes: 2
2:		Nienberg	Original Location: 2 Probes	s: 1
3 <b>:</b>		Qamruddin	Original Location: 1 Probes	s: 2
4:		Ellington	Original Location: 4 Probes	s: 1
5:		Crouch	Original Location: 5 Probes	s: 1
6 <b>:</b>		Arauza	Original Location: 127 Prob	pes: 3
7:		Joseph	Original Location: 5 Probes	s: 2
8:		Acevedo	Original Location: 1 Probes	s: 3
9:		Daniels	Original Location: 9 Probes	s: 1
10	:	Garza	Original Location: 62 Prob	pes: 8
11	:	Carmona	Original Location: 11 Prob	pes: 1
12	:	Clayton	Original Location: 12 Prob	pes: 1
13	:	Dustin	Original Location: 11 Prob	pes: 2
14	:	Zulfiqar		pes: 1
15	:	Aguirrie	Original Location: 15 Prob	pes: 1
16	:	Davies	Original Location: 16 Prob	pes: 1
17	:	Alcantara	Original Location: 17 Prob	pes: 1
18	:	Jordon	Original Location: 11 Prob	pes: 3
19	:	Robert	Original Location: 17 Prob	pes: 2
20	:	Salkowski	Original Location: 20 Prob	pes: 1
21	:	NULL		
22	:	Casper	Original Location: 15 Prob	pes: 3
23	:	Vinnela	Original Location: 9 Probe	es: 6
24	:	Corey	Original Location: 62 Prob	oes: 10
25	:	NULL		
26	:	NULL		
27	:	NULL		
28	:	Akhila	Original Location: 127 Pro	bes: 5
29	:	NULL		
30	:	NULL		
31	:	Jeffrey	Original Location: 2 Probe	es: 5
32	:	NULL		
33	:	NULL		
34	:	Derek	Original Location: 62 Prob	oes: 16
35	:	Veronica	Original Location: 6 Probe	es: 5
36	:	Gurung	Original Location: 4 Probe	es: 4
37	:	NULL		
38	:	Octavio	Original Location: 6 Probe	es: 4
39	:	NULL		
40	:	NULL		
41	:	Farral	Original Location: 9 Probe	es: 4
42	:	NULL		
43	:	NULL		
44	:	NULL		
45	:	NULL		

46	:	NULL					
47	:	Dugger	Original	Location:	15	Probes:	4
48	:	NULL					
49	:	NULL					
50	:	NULL					
51	:	NULL					
52	:	NULL					
53	:	Todd	Original	Location:	62	Probes:	19
54	:	NULL					
55	:	Kelly	Original	Location:	62	Probes:	9
56	:	NULL					
57	:	Judy	Original	Location:	62	Probes:	15
58	:	NULL					
59	:	NULL					
60	:	NULL					
61	:	NULL					
62	:	Cook	Original	Location:	62	Probes:	1
63	:	NULL					
64	:	Red	Original	Location:	62	Probes:	2
65	:	NULL					
66	:	NULL					
67	:	NULL					
68	:	NULL					
69	:	Ajose	Original	Location:	62	Probes:	3
70	:	NULL					
71	:	NULL					
72	:	NULL					
73	:	NULL					
74	:	NULL					
75	:	John	Original	Location:	62	Probes:	21
76	:	Egbe	Original	Location:	62	Probes:	6
77	:	NULL					
78	:	Matthew	Original	Location:	2	Probes:	8
79	:	NULL					
80	:	NULL					
81	:	NULL					
82	:	NULL					
83	:	Scott	Original	Location:	62	Probes:	13
84	:	NULL					
85	:	NULL					
86	:	NULL					
87	:	NULL					
88	:	NULL					
89	:	NULL					
90	:	NULL					
91	:	Clark	Original	Location:	62	Probes:	5
92	:	Charles	Original	Location:	2	Probes:	10
93	:	NULL					
94	:	Buck	Original	Location:	62	Probes:	4

```
95:
       NULL
96:
       NULL
97:
       NULL
98:
       NULL
99:
       NULL
100:
        NULL
101:
        NULL
102:
        NULL
103:
        NULL
104:
        NULL
105:
        NULL
106:
        NULL
107 :
        NULL
108:
        NULL
109:
        NULL
110:
        NULL
111 :
        NULL
112 : Lisa
                             Original Location:
                                                   62
                                                           Probes:
                                                                     18
113 :
        Chris
                             Original Location:
                                                   62
                                                           Probes:
                                                                     23
114:
        NULL
115:
        NULL
116:
        NULL
117 :
        NULL
118 :
        Kyle
                             Original Location:
                                                   62
                                                           Probes:
                                                                     12
119:
        NULL
120 :
        NULL
121 :
        NULL
122 :
        NULL
                             Original Location:
123 :
        Michael
                                                   2
                                                          Probes:
                                                                    9
124:
                             Original Location:
        James
                                                   62
                                                           Probes:
                                                                     22
125 :
        Adam
                             Original Location:
                                                           Probes:
                                                   62
                                                                     11
126:
        NULL
127 :
        Bhandari
                             Original Location:
                                                   127
                                                            Probes:
                                                                      1
Statistics for
```

2 to 31

Min: 1 Max: 11

3.34 Average:

Statistics for 22 to 51

Min: 1 Max: 22

Average: 8.79

Expected number of Probes: 1.27554E+00

#### BRYANBENHAM's Hash (40%)

#### RANDOM Probe

RANDOM						
Main M	emory					
0:	NULL					
1:	NULL					
2:	NULL					
3 <b>:</b>	NULL					
4:	NULL					
5:	NULL					
6 <b>:</b>	NULL					
7:	NULL					
8:	NULL					
9:	NULL					
10 :	NULL					
11 :	Adam	Original	Location:	11	Probes:	1
12:	NULL					
13 :	Scott	Original	Location:	11	Probes:	2
14 :	Arauza	Original	Location:	14	Probes:	1
15 <b>:</b>	NULL					
16:	Clayton	Original	Location:	14	Probes:	2
17 :	NULL					
18:	NULL					
19:	NULL					
20:	NULL					
21 :	NULL					
22 :	NULL					
23 :	Corey	Original	Location:	23	Probes:	1
24:	Chris	Original	Location:	24	Probes:	1
25 <b>:</b>	Carmona	Original	Location:	25	Probes:	1
26:	NULL					
27 <b>:</b>	Zulfiqar	Original	Location:	25	Probes:	2
28:	Gurung	Original	Location:	28	Probes:	1
29:	NULL					
30 <b>:</b>	Derek	Original	Location:	23	Probes:	3
31 :	NULL	_				
32 :	Egbe	Original	Location:	25	Probes:	3
33 :	NULL	_				
34 :	NULL					
35 <b>:</b>	NULL					
36 <b>:</b>	NULL					
37 <b>:</b>	NULL					
38 :	Lisa	Original	Location:	38	Probes:	1
39 :	Joseph	_	Location:	39	Probes:	1
40:	Alcantara	=	Location:	40	Probes:	1
41 :	Cook		Location:	41	Probes:	1
42 :	Dugger	_	Location:	42	Probes:	1
43 :	Nienberg		Location:	43	Probes:	1
44 :	NULL	J		10	110200.	_
45 :	Qamruddin	Original	Location:	43	Probes:	2
10 .	×ami addii	JIIGI		10	110200.	_

46	:	NULL					
47	:	Acevedo	Original	Location:	45	Probes:	2
48	:	NULL					
49	:	NULL					
50	:	Ajose	Original	Location:	43	Probes:	3
51	:	NULL					
52	:	NULL					
53	:	NULL					
54	:	Robert	Original	Location:	25	Probes:	5
55	:	Jordon	Original	Location:	55	Probes:	1
56	:	Octavio	Original	Location:	54	Probes:	2
57	:	Ellington	Original	Location:	57	Probes:	1
58	:	Vinnela	Original	Location:	58	Probes:	1
59	:	Kyle	Original	Location:	57	Probes:	2
60	:	NULL					
61	:	NULL					
62	:	NULL					
63	:	Judy	Original	Location:	63	Probes:	1
64	:	Jeffrey	Original	Location:	57	Probes:	3
65	:	NULL					
66	:	NULL					
67		NULL					
68		NULL					
69		NULL					
70	:	NULL					
71		NULL					
72		Aguirrie	Original	Location:	72	Probes:	1
73		NULL					
74		Casper	Original	Location:	74	Probes:	1
75		NULL					
76		Dustin	Original	Location:	76	Probes:	1
77		NULL					
78		NULL					
79		Red	Original	Location:	72	Probes:	3
80		NULL				_	_
81		Michael	Original	Location:	74	Probes:	3
82		NULL					
83		NULL					
84		NULL					
85		NULL					
86		NULL					
87		NULL	0	Taaabiaa	0.0	Decelor	1
88 89		Davies Daniels	=	Location:	88	Probes: Probes:	1
90				Location: Location:	89 90	Probes:	1 1
90		Kelly Todd	=	Location:	89	Probes: Probes:	2
91		Veronica		Location:	90	Probes:	2
93		Matthew		Location:	90	Probes:	2
94		NULL	OLIGITIAL	LOCACIOII.	<i>)</i>	TIONES.	۷
ノユ	•	140111					

95 : NULL					
96: NULL					
97: NULL					_
98 : John		Original Location:	91	Probes:	3
99 : NULL					
100 : NULL					
101 : NULL					
102 : NULL					
103 : Paschal		Original Location:	103	Probes:	1
104 : James		Original Location:	72	Probes:	4
105 : NULL					
106 : NULL					
107 : NULL					
108 : Bhandari		Original Location:	108	Probes:	1
109 : Clark		Original Location:	109	Probes:	1
110 : Buck		Original Location:	108	Probes:	2
111 : Crouch		Original Location:	109	Probes:	2
112 : NULL					
113 : NULL					
114 : NULL					
115 : NULL					
116 : Charles		Original Location:	109	Probes:	3
117 : NULL					
118 : NULL					
119 : NULL					
120 : NULL					
121 : NULL					
122 : Salkowski		Original Location:	122	Probes:	1
123 : Farral		Original Location:	123	Probes:	1
124 : Akhila		Original Location:	122	Probes:	2
125 : Garza		Original Location:	125	Probes:	1
126 : NULL					
127 : NULL					
Statistics for	2 to	31			
Min: 1					
Max: 3					
Average: 1.41					
Statistics for	22 to	51			
Min: 1					
Max: 5					
Average: 1.97					

Expected number of Probes: 1.27554E+00

#### DRBURRIS's Hash (80%)

#### RANDOM Probe

#### Main Memory

мат	.11	Memory				
0	:	Fabricate	Original Location:	0	Probes:	1
1	:	Paschal	Original Location:	127	Probes:	2
2	:	Nienberg	Original Location:	2	Probes:	1
3	:	Qamruddin	Original Location:	1	Probes:	2
4	:	Ellington	Original Location:	4	Probes:	1
5	:	Crouch	Original Location:	5	Probes:	1
6	:	Arauza	Original Location:	127	Probes:	3
7	:	Joseph	Original Location:	5	Probes:	2
8	:	Acevedo	Original Location:	1	Probes:	3
9	:	Daniels	Original Location:	9	Probes:	1
10	:	Garza	Original Location:	62	Probes:	8
11	:	Carmona	Original Location:	11	Probes:	1
12	:	Clayton	Original Location:	12	Probes:	1
13	:	Dustin	Original Location:	11	Probes:	2
14	:	Zulfiqar	Original Location:	14	Probes:	1
15	:	Aguirrie	Original Location:	15	Probes:	1
16	:	Davies	Original Location:	16	Probes:	1
17	:	Alcantara	Original Location:	17	Probes:	1
18	:	Jordon	Original Location:	11	Probes:	3
19	:	Robert	Original Location:	17	Probes:	2
20	:	Salkowski	Original Location:	20	Probes:	1
21	:	wet	Original Location:	62	Probes:	51
22	:	Casper	Original Location:	15	Probes:	3
23	:	Vinnela	Original Location:	9	Probes:	6
24	:	Corey	Original Location:	62	Probes:	10
25	:	Person	Original Location:	11	Probes:	6
26	:	NULL				
27	:	Afterwards	Original Location:	20	Probes:	3
28	:	Akhila	Original Location:	127	Probes:	5
29	:	Constriction	Original Location:	15	Probes:	6
30	:	brutalize	Original Location:	9	Probes:	13
31	:	Jeffrey	Original Location:	2	Probes:	5
32	:	Cook	Original Location:	62	Probes:	34
33	:	orthodontist	Original Location:	1	Probes:	4
34	:	Derek	Original Location:	62	Probes:	16
35	:	Veronica	Original Location:	6	Probes:	5
36	:	Gurung	Original Location:	4	Probes:	4
37	:	Rush	Original Location:	62	Probes:	35
38	:	Octavio	Original Location:	6	Probes:	4
39	:	Joel	Original Location:	62	Probes:	25
40	:	Maiden	Original Location:	11	Probes:	5
41	:	Farral	Original Location:	9	Probes:	4
42	:	Necromancer	Original Location:	10	Probes:	4
43	:	Fernando	Original Location:	11	Probes:	4
44	:	Fabulous	Original Location:	12	Probes:	4
45	:	Syncopate	Original Location:	13	Probes:	4

46	:	magnetic	Original	Location:	17	Probes:	5
47	:	Dugger	Original	Location:	15	Probes:	4
48	:	prepossess	Original	Location:	16	Probes:	4
49	:	Christopher	Original	Location:	17	Probes:	4
50	:	NULL					
51	:	scat	Original	Location:	62	Probes:	45
52	:	Northwest	Original	Location:	20	Probes:	4
53	:	Todd	Original	Location:	62	Probes:	19
54	:	parasympathetic	Original	Location:	22	Probes:	4
55	:	Kelly	Original	Location:	62	Probes:	9
56	:	NULL					
57	:	Judy	Original	Location:	62	Probes:	15
58	:	Wade	Original	Location:	62	Probes:	24
59	:	Wine	Original	Location:	62	Probes:	37
60	:	NULL					
61	:	NULL					
62	:	Cook	Original	Location:	62	Probes:	1
63	:	NULL					
64	:	Red	Original	Location:	62	Probes:	2
65	:	Irreversible	Original	Location:	2	Probes:	11
66	:	Misogamist	Original	Location:	127	Probes:	7
67	:	Honor	Original	Location:	62	Probes:	29
68	:	NULL					
69	:	Ajose	Original	Location:	62	Probes:	3
70	:	NULL					
71	:	constrain	Original	Location:	15	Probes:	12
72	:	Eye	Original	Location:	62	Probes:	26
73	:	NULL					
74	:	rationalize	Original	Location:	11	Probes:	11
75	:	John	Original	Location:	62	Probes:	21
76	:	Egbe	Original	Location:	62	Probes:	6
77	:	NULL					
78	:	Matthew	Original	Location:	2	Probes:	8
79	:	nosegay	Original	Location:	127	Probes:	20
80	:	marsupial	Original	Location:	13	Probes:	7
81	:	NULL					
82	:	Jutty	Original	Location:	62	Probes:	32
83	:	Scott	Original	Location:	62	Probes:	13
84	:	Under	Original	Location:	62	Probes:	30
85	:	Batbold	Original	Location:	9	Probes:	8
86	:	inlet	Original	Location:	62	Probes:	44
87	:	Screen	Original	Location:	11	Probes:	8
88	:	NULL					
89	:	quandary	Original	Location:	127	Probes:	10
90	:	ratiocination	Original	Location:	0	Probes:	10
91	:	Clark	Original	Location:	62	Probes:	5
92	:	Charles	Original	Location:	2	Probes:	10
93	:	live	Original	Location:	62	Probes:	43
94	:	Buck	Original	Location:	62	Probes:	4

95 :	NULL				
96:	NULL				
97 :	mole	Original Location:	62	Probes:	39
98:	NULL				
99:	Finagle	Original Location:	9	Probes:	10
100:	NULL				
101 :	poison	Original Location:	11	Probes:	10
102:	sparse	Original Location:	2	Probes:	16
103:	NULL				
104:	Staple	Original Location:	2	Probes:	14
105 :	cauldron	Original Location:	15	Probes:	10
106:	cap	Original Location:	62	Probes:	40
107 :	NULL				
108:	NULL				
109:	Yolk	Original Location:	62	Probes:	27
110 :	NULL				
111 :	toluene	Original Location:	11	Probes:	16
112 :	Lisa	Original Location:	62	Probes:	18
113 :	Chris	Original Location:	62	Probes:	23
114 :	NULL				
115 :	NULL				
116:	NULL				
117 :	NULL				
118 :	Kyle	Original Location:	62	Probes:	12
119 :	NULL				
120 :	wince	Original Location:	62	Probes:	42
121 :	Perfect	Original Location:	0	Probes:	9
122 :	dactyl	Original Location:	9	Probes:	17
123 :	Michael	Original Location:	2	Probes:	9
124 :	James	Original Location:	62	Probes:	22
125 :	Adam	Original Location:	62	Probes:	11
126 :	NULL				
127 :	Bhandari	Original Location:	127	Probes:	1

Statistics for 2 to 31

Min: 1 Max: 11

Average: 3.34

Statistics for 73 to 102

Min: 1 Max: 51

Average: 21.21

Expected number of Probes: 2.00023E+00

#### BRYANBENHAM's Hash (80%)

#### RANDOM Probe

RAND	MC	Probe				
	Μe	emory				
0:		NULL				
1:		Fernando	Original Location:	122	Probes:	3
2:		NULL				
3 <b>:</b>		parasympathetic	Original Location:	3	Probes: 1	-
4:		inlet	Original Location:	56	Probes:	8
5:		NULL				
6:		cap	Original Location:	6	Probes: 1	
7:		NULL				
8:		Yolk	Original Location:	122	Probes:	6
9:		NULL				
10	:	quandary	Original Location:	109	Probes:	5
11	:	Adam	Original Location:	11	Probes:	1
12		NULL	3			
13	:	Scott	Original Location:	11	Probes:	2
14	:	Arauza	Original Location:	14	Probes:	1
15		NULL	011911101 100001011.		110000.	_
16		Clayton	Original Location:	14	Probes:	2
17		NULL	011911101 100001011.		110000.	_
18		NULL				
19		NULL				
20		NULL				
21		Perfect	Original Location:	120	Probes:	5
22		Batbold	Original Location:	22	Probes:	1
23		Corey	Original Location:	23	Probes:	1
24		Chris	Original Location:	24	Probes:	1
25			Original Location:	25	Probes:	1
26		Carmona		24	Probes:	2
27		Syncopate	Original Location:	25	Probes:	2
		Zulfiqar	Original Location:			
28		Gurung	Original Location:	28	Probes:	1
29		Fabulous	Original Location:	29	Probes:	1
30		Derek	Original Location:	23	Probes:	3
31		NULL		٥٦	D 1	2
32		Egbe	Original Location:	25	Probes:	3
33		Honor	Original Location:	26	Probes:	3
34		constrain	Original Location:	27	Probes:	3
35		NULL				
36		rationalize	Original Location:	4	Probes:	4
37		Screen	Original Location:	23	Probes:	6
38		Lisa	Original Location:	38	Probes:	1
39		Joseph	Original Location:	39	Probes:	1
40	:	Alcantara	Original Location:	40	Probes:	1
41	:	Cook	Original Location:	41	Probes:	1
42		Dugger	Original Location:	42	Probes:	1
43	:	Nienberg	Original Location:	43	Probes:	1
44	:	orthodontist	Original Location:	23	Probes:	13
45	:	Qamruddin	Original Location:	43	Probes:	2

46	:	nosegay	Original	Location:	39	Probes:	3
47	:	Acevedo	Original	Location:	45	Probes:	2
48	:	Cook	Original	Location:	41	Probes:	3
49	:	NULL					
50	:	Ajose	Original	Location:	43	Probes:	3
51	:	NULL					
52	:	Christopher	Original	Location:	50	Probes:	2
53	:	NULL					
54	:	Robert	Original	Location:	25	Probes:	5
55	:	Jordon	Original	Location:	55	Probes:	1
56	:	Octavio	Original	Location:	54	Probes:	2
57	:	Ellington	Original	Location:	57	Probes:	1
58	:	Vinnela	Original	Location:	58	Probes:	1
59	:	Kyle	Original	Location:	57	Probes:	2
60	:	Afterwards	Original	Location:	60	Probes:	1
61	:	Northwest	Original	Location:	59	Probes:	2
62	:	toluene	Original	Location:	60	Probes:	2
63	:	Judy	Original	Location:	63	Probes:	1
64	:	Jeffrey	Original	Location:	57	Probes:	3
65	:	NULL					
66	:	NULL					
67	:	NULL					
68	:	Irreversible	Original	Location:	68	Probes:	1
69	:	Maiden	Original	Location:	40	Probes:	5
70	:	Necromancer	Original	Location:	38	Probes:	4
71	:	Under	Original	Location:	57	Probes:	6
72	:	Aguirrie	Original	Location:	72	Probes:	1
73	:	Rush	Original	Location:	73	Probes:	1
74	:	Casper	Original	Location:	74	Probes:	1
75	:	magnetic	Original	Location:	75	Probes:	1
76	:	Dustin	Original	Location:	76	Probes:	1
77	:	Staple	Original	Location:	45	Probes:	4
78	:	poison	Original	Location:	76	Probes:	2
79	:	Red	Original	Location:	72	Probes:	3
80	:	NULL					
81	:	Michael	Original	Location:	74	Probes:	3
82	:	ratiocination	Original	Location:	120	Probes:	10
83	:	NULL					
84	:	marsupial	Original	Location:	91	Probes:	9
85	:	mole	Original	Location:	56	Probes:	5
86	:	Wade	Original	Location:	57	Probes:	5
87	:	Finagle	Original	Location:	87	Probes:	1
88	:	Davies	Original	Location:	88	Probes:	1
89	:	Daniels		Location:	89	Probes:	1
90	:	Kelly	Original	Location:	90	Probes:	1
91	:	Todd	Original	Location:	89	Probes:	2
92	:	Veronica	Original	Location:	90	Probes:	2
93	:	Matthew	Original	Location:	91	Probes:	2
94	:	Jutty	Original	Location:	92	Probes:	2

95 :	Wine	Original Location:	88	Probes:	3
96:	Eye	Original Location:	89	Probes:	3
97 :	NULL				
98:	John	Original Location:	91	Probes:	3
99:	wince	Original Location:	23	Probes:	8
100:	NULL				
101 :	NULL				
102:	wet	Original Location:	70	Probes:	4
103:	Paschal	Original Location:	103	Probes:	1
104 :	James	Original Location:	72	Probes:	4
105 :	cauldron	Original Location:	105	Probes:	1
106:	dactyl	Original Location:	77	Probes:	5
107 :	Joel	Original Location:	107	Probes:	1
108 :	Bhandari	Original Location:	108	Probes:	1
109:	Clark	Original Location:	109	Probes:	1
110 :	Buck	Original Location:	108	Probes:	2
111 :	Crouch	Original Location:	109	Probes:	2
112 :	scat	Original Location:	45	Probes:	7
113 :	Misogamist	Original Location:	111	Probes:	2
114 :	prepossess	Original Location:	114	Probes:	1
115 :	brutalize	Original Location:	108	Probes:	3
116:	Charles	Original Location:	109	Probes:	3
117 :	sparse	Original Location:	110	Probes:	3
118 :	NULL				
119 :	live	Original Location:	87	Probes:	4
120 :	Person	Original Location:	91	Probes:	5
121 :	Constriction	Original Location:	89	Probes:	4
122 :	Salkowski	Original Location:	122	Probes:	1
123 :	Farral	Original Location:	123	Probes:	1
124 :	Akhila	Original Location:	122	Probes:	2
125 :	Garza	Original Location:	125	Probes:	1
126 :	NULL				
127 :	Fabricate	Original Location:	125	Probes:	2

Statistics for 2 to 31

Min: 1 Max: 3

Average: 1.41

Statistics for 73 to 102

Min: 1 Max: 13

Average: 4.31

Expected number of Probes: 2.00023E+00

#### DRBURRIS's Hash (40%)

#### LINEAR Probe

36 : NULL

38 : NULL

42 : NULL 43 : NULL 44 : NULL 45 : NULL 46 : NULL

NULL

NULL

NULL

NULL

37 :

39:

40 :

41 :

#### Output File

Output	File				
1:	Qamruddin	Original Location:	1	Probes:	1
2:	Nienberg	Original Location:	2	Probes:	1
3 <b>:</b>	Acevedo	Original Location:	1	Probes:	3
4:	Arauza	Original Location:	127	Probes:	6
5 <b>:</b>	Crouch	Original Location:	5	Probes:	1
6 <b>:</b>	Ellington	Original Location:	4	Probes:	3
7:	Gurung	Original Location:	4	Probes:	4
8:	Joseph	Original Location:	5	Probes:	4
9:	Daniels	Original Location:	9	Probes:	1
10 :	Farral	Original Location:	9	Probes:	2
11 :	Carmona	Original Location:	11	Probes:	1
12:	Clayton	Original Location:	12	Probes:	1
13 :	Dustin	Original Location:	11	Probes:	3
14:	Zulfiqar	Original Location:	14	Probes:	1
15 <b>:</b>	Aguirrie	Original Location:	15	Probes:	1
16:	Casper	Original Location:	15	Probes:	2
17 :	Alcantara	Original Location:	17	Probes:	1
18 :	Davies	Original Location:	16	Probes:	3
19:	Dugger	Original Location:	15	Probes:	5
20 :	Salkowski	Original Location:	20	Probes:	1
21 :	Robert	Original Location:	17	Probes:	5
22 :	Octavio	Original Location:	6	Probes:	17
23 :	Jeffrey	Original Location:	2	Probes:	22
24 :	Jordon	Original Location:	11	Probes:	14
25 <b>:</b>	Vinnela	Original Location:	9	Probes:	17
26:	Veronica	Original Location:	6	Probes:	21
27 <b>:</b>	Matthew	Original Location:	2	Probes:	26
28 :	Michael	Original Location:	2	Probes:	27
29 :	Akhila	Original Location:	127	Probes:	: 31
30 <b>:</b>	Charles	Original Location:	2	Probes:	29
31 :	NULL				
32 :	NULL				
33 :	NULL				
34 :	NULL				
35 <b>:</b>	NULL				
0.0					

```
47 :
      NULL
48:
      NULL
49:
      NULL
50:
      NULL
51:
      NULL
52:
      NULL
53:
      NULL
54:
      NULL
55:
      NULL
56:
      NULL
57:
      NULL
58:
      NULL
59:
      NULL
60:
      NULL
61 :
      NULL
62:
                            Original Location:
      Cook
                                                   62
                                                          Probes:
                                                                    1
63:
      Red
                             Original Location:
                                                          Probes:
                                                   62
                                                                    2
64:
      Paschal
                             Original Location:
                                                  127
                                                                     2
                                                           Probes:
65:
      Ajose
                             Original Location:
                                                   62
                                                          Probes:
                                                                    4
66:
      Buck
                             Original Location:
                                                   62
                                                          Probes:
                                                                    5
67:
      Clark
                             Original Location:
                                                   62
                                                          Probes:
                                                                    6
68:
      Egbe
                             Original Location:
                                                   62
                                                          Probes:
                                                                    7
69:
      Garza
                             Original Location:
                                                   62
                                                          Probes:
                                                                    8
70:
                                                                    9
      Kelly
                             Original Location:
                                                   62
                                                          Probes:
71 :
      Corey
                             Original Location:
                                                   62
                                                          Probes:
                                                                    10
72:
                             Original Location:
                                                   62
      Adam
                                                          Probes:
                                                                    11
73 :
      Kyle
                             Original Location:
                                                   62
                                                          Probes:
                                                                   12
74:
                             Original Location:
                                                   62
                                                                    13
      Scott
                                                          Probes:
75 :
      Judy
                             Original Location:
                                                   62
                                                          Probes:
                                                                   14
76 :
      Derek
                             Original Location:
                                                   62
                                                          Probes:
                                                                    15
77 :
      Lisa
                             Original Location:
                                                   62
                                                          Probes:
                                                                    16
78 :
      Todd
                            Original Location:
                                                                    17
                                                   62
                                                          Probes:
79 :
      John
                             Original Location:
                                                   62
                                                          Probes:
                                                                    18
80:
      James
                             Original Location:
                                                   62
                                                                    19
                                                          Probes:
81 :
      NULL
82:
      NULL
83:
      NULL
84:
       1234567890123456
                            Original Location:
                                                  84
                                                          Probes:
                                                                    1
85 :
      NULL
86:
      NULL
87 :
      NULL
88:
      NULL
89:
      NULL
90:
      NULL
91:
      NULL
92:
      NULL
93:
      NULL
94:
      NULL
95:
      NULL
```

```
96: NULL
97:
      NULL
98:
      NULL
99:
      NULL
100:
      NULL
101:
       NULL
102:
       NULL
103:
       NULL
104:
       NULL
105 : NULL
106 : NULL
107 : NULL
108 :
       NULL
109 : NULL
110 :
      NULL
111 : NULL
112 :
       NULL
113 : NULL
114:
      NULL
115:
      NULL
116:
       NULL
117 :
       NULL
118:
       NULL
119 : NULL
120 :
       NULL
121 :
       NULL
122 : NULL
123 : NULL
124 : NULL
125 :
      NULL
126 : NULL
127 :
       Bhandari
                     Original Location: 127 Probes: 1
128 :
       NULL
Statistics for 2 to 31
Min:
     1
Max:
     11
Average:
         3.69
Statistics for
                22 to 51
Min:
     1
Max:
     31
Average:
         13.79
```

Expected number of Probes: 1.33117E+00

#### BRYANBENHAM's Hash (40%)

#### LINEAR Probe

LINEAR	Probe					
Output	File					
1:	NULL					
2:	NULL					
3 <b>:</b>	NULL					
4:	NULL					
5:	NULL					
6 <b>:</b>	NULL					
7:	NULL					
8:	NULL					
9:	NULL					
10 :	NULL					
11 :	Adam	Original	Location:	11	Probes:	1
12 :	Scott	Original	Location:	11	Probes:	2
13:	NULL					
14 :	Arauza	Original	Location:	14	Probes:	1
15 <b>:</b>	Clayton	Original	Location:	14	Probes:	2
16:	NULL					
17 <b>:</b>	NULL					
18:	NULL					
19:	1234567890123456	Original	Location:	19	Probes:	1
20 :	NULL					
21 :	NULL					
22 :	NULL					
23 :	Corey		Location:	23	Probes:	1
24:	Derek		Location:	23	Probes:	2
25 <b>:</b>	Carmona		Location:	25	Probes:	1
26 <b>:</b>	Zulfiqar	<del>-</del>	Location:	25	Probes:	2
27 <b>:</b>	Egbe	<del>-</del>	Location:	25	Probes:	3
28 :	Gurung		Location:	28	Probes:	1
29 :	Robert	Original	Location:	25	Probes:	5
30:	NULL					
31 :	NULL					
32 :	NULL					
33 :	NULL					
34 :	NULL					
35 <b>:</b>	NULL					
36:	NULL					
37 <b>:</b>	NULL	0 1 1 1		2.0	- ·	-
38:	Lisa		Location:	38	Probes:	1
39:	Joseph	_	Location:	39	Probes:	1
40:	Alcantara	<del>-</del>	Location:	40	Probes:	1
41 :	Cook	_	Location:	41	Probes:	1
42:	Dugger	-	Location:	42	Probes:	1
43:	Nienberg		Location:	43	Probes:	1
44:	Qamruddin		Location:	43	Probes:	2
45 :	Acevedo	_	Location:	45	Probes:	1
46:	Ajose	Original	Location:	43	Probes:	4

47	:	NULL					
48	:	NULL					
49	:	NULL					
50	:	NULL					
51	:	NULL					
52	:	NULL					
53	:	NULL					
54	:	Octavio	Original	Location:	54	Probes:	1
55	:	Jordon		Location:	55	Probes:	1
56	:	NULL	5				
57		Ellington	Original	Location:	57	Probes:	1
58		Kyle	_	Location:	57	Probes:	2
59		Jeffrey	=	Location:	57	Probes:	3
60		Vinnela		Location:	58	Probes:	3
61		NULL	Originar	HOCACIOII.	50	iiobeb.	9
62		NULL					
63		Judy	Original	Location:	63	Probes:	1
64		NULL	Oliginal	nocación.	03	rrobes.	_
65							
66		NULL NULL					
67		NULL					
68		NULL					
69		NULL					
70		NULL					
71		NULL				_	
72		Aguirrie		Location:	72	Probes:	1
73		Red		Location:	72	Probes:	2
74		Casper	=	Location:	74	Probes:	1
75		Michael	=	Location:	74	Probes:	2
76		Dustin	=	Location:	76	Probes:	1
77		James	Original	Location:	72	Probes:	6
78		NULL					
79	:	NULL					
80	:	NULL					
81		NULL					
82	:	NULL					
83	:	NULL					
84	:	NULL					
85	:	NULL					
86	:	NULL					
87	:	NULL					
88	:	Davies	Original	Location:	88	Probes:	1
89	:	Daniels	Original	Location:	89	Probes:	1
90	:	Kelly	Original	Location:	90	Probes:	1
91	:	Todd	Original	Location:	89	Probes:	3
92	:	Veronica	Original	Location:	90	Probes:	3
93	:	Matthew	Original	Location:	91	Probes:	3
94	:	John	Original	Location:	91	Probes:	4
95	:	NULL					

96 <b>:</b>	NULL					
97 :	NULL					
98 :	NULL					
99 :	NULL					
100:	NULL					
101 :	NULL					
102:	NULL					
103:	Paschal		Original Location:	103	Probes:	1
104 :	NULL					
105 :	NULL					
106:	NULL					
107:	NULL					
108:	Bhandari		Original Location:	108	Probes:	1
109:	Buck		Original Location:	108	Probes:	2
110:	Clark		Original Location:	109	Probes:	2
111 :	Crouch		Original Location:	109	Probes:	3
112 :	Charles		Original Location:	109	Probes:	4
113 :	NULL					
114:	NULL					
115 :	NULL					
116:	NULL					
117 :	NULL					
118 :	NULL					
119 :	NULL					
120 :	NULL					
121 :	NULL					
122 :	Salkowski		Original Location:	122	Probes:	1
123 :	Farral		Original Location:	123	Probes:	1
124 :	Akhila		Original Location:	122	Probes:	3
125 :	Garza		Original Location:	125	Probes:	1
126:	NULL					
127 :	NULL					
128 :	NULL					
		0	0.1			
	ics for	2 to	31			
Min:						
Max:	<del>-</del>					
Average	: 1.45					
Statist	ics for	22 to	51			
Min:						
Max:	6					

Expected number of Probes: 1.33117E+00

Max: 6

Average: 2.21

#### DRBURRIS's Hash (80%)

#### LINEAR Probe

#### Output File

Output	rile				
1:	Qamruddin	Original Location:	1	Probes:	1
2:	Nienberg	Original Location:	2	Probes:	1
3 <b>:</b>	Acevedo	Original Location:	1	Probes:	3
4:	Arauza	Original Location:	127	Probes:	6
5 <b>:</b>	Crouch	Original Location:	5	Probes:	1
6 <b>:</b>	Ellington	Original Location:	4	Probes:	3
7:	Gurung	Original Location:	4	Probes:	4
8:	Joseph	Original Location:	5	Probes:	4
9:	Daniels	Original Location:	9	Probes:	1
10 :	Farral	Original Location:	9	Probes:	2
11 :	Carmona	Original Location:	11	Probes:	1
12:	Clayton	Original Location:	12	Probes:	1
13 :	Dustin	Original Location:	11	Probes:	3
14:	Zulfiqar	Original Location:	14	Probes:	1
15 <b>:</b>	Aguirrie	Original Location:	15	Probes:	1
16:	Casper	Original Location:	15	Probes:	2
17 :	Alcantara	Original Location:	17	Probes:	1
18 :	Davies	Original Location:	16	Probes:	3
19:	Dugger	Original Location:	15	Probes:	5
20 :	Salkowski	Original Location:	20	Probes:	1
21 :	Robert	Original Location:	17	Probes:	5
22 :	Octavio	Original Location:	6	Probes:	17
23 :	Jeffrey	Original Location:	2	Probes:	22
24 :	Jordon	Original Location:	11	Probes:	14
25 <b>:</b>	Vinnela	Original Location:	9	Probes:	17
26 <b>:</b>	Veronica	Original Location:	6	Probes:	21
27 <b>:</b>	Matthew	Original Location:	2	Probes:	26
28 :	Michael	Original Location:	2	Probes:	27
29:	Akhila	Original Location:	127	Probes:	: 31
30:	Charles	Original Location:	2	Probes:	29
31 :	Christopher	Original Location:	17	Probes:	15
32 :	Fernando	Original Location:	11	Probes:	22
33 <b>:</b>	Batbold	Original Location:	9	Probes:	25
34 :	Fabulous	Original Location:	12	Probes:	23
35 <b>:</b>	Misogamist	Original Location:	127	Probes	: 37
36 <b>:</b>	Maiden	Original Location:	11	Probes:	26
37 <b>:</b>	Constriction	Original Location:	15	Probes:	23
38 :	Necromancer	Original Location:	10	Probes:	29
39 <b>:</b>	Syncopate	Original Location:	13	Probes:	27
40 :	Afterwards	Original Location:	20	Probes:	21
41 :	Person	Original Location:	11	Probes:	31
42 :	Northwest	Original Location:	20	Probes:	23
43 :	Irreversible	Original Location:	2	Probes:	42
44:	Fabricate	Original Location:	0	Probes:	45
45 :	Staple	Original Location:	2	Probes:	44
46:	Finagle	Original Location:	9	Probes:	38

47		Screen	Original	Togation.	11	Probes:	37
	:	Perfect		Location: Location:	0	Probes:	49
49	:	parasympathetic	=	Location:	22	Probes:	28
	:	poison	=	Location:	11	Probes:	40
51		brutalize	=	Location:	9	Probes:	43
-	:	ratiocination	=	Location:	0	Probes:	53
-	:	cauldron	=	Location:	15	Probes:	39
	:	prepossess	_	Location:	16	Probes:	39
-	:	orthodontist	=	Location:	1	Probes:	55
	:	magnetic	=	Location:	17	Probes:	40
57	•	constrain	=	Location:	15	Probes:	43
-	:	marsupial	_	Location:	13	Probes:	46
59	:	rationalize		Location:	11	Probes:	49
	:	toluene	=	Location:	11	Probes:	50
	:	sparse	=	Location:	2	Probes:	60
-	:	Cook	_	Location:	62	Probes:	1
-	:	Red	=	Location:	62	Probes:	2
	:	Paschal	=	Location:	127	Probes:	2
65	:	Ajose	_	Location:	62	Probes:	4
	•	Buck	=	Location:	62	Probes:	5
	:	Clark	=		62	Probes:	6
-	:		_	Location:	62	Probes:	7
	•	Egbe Garza	=	Location: Location:	62	Probes:	8
	:	Kelly		Location:	62	Probes:	9
	:	Corey	=	Location:	62	Probes:	10
	:	Adam	=	Location:	62	Probes:	11
	•	Kyle		Location:	62	Probes:	12
_	:	Scott	=	Location:	62	Probes:	13
	:		=	Location:	62	Probes:	14
76	•	Judy Derek	_	Location:	62	Probes:	15
77	:	Lisa	_		62	Probes:	16
	:	Todd		Location:	62	Probes:	17
_	•	John	=	Location:	62	Probes:	18
80	:	James	=	Location:	62	Probes:	19
81	•	Chris	=	Location: Location:	62	Probes:	20
82		Wade		Location:	62	Probes:	21
83		Joel	=	Location:	62	Probes:	22
84			=	Location:	84	Probes:	1
85		1234567890123456	_	Location:	62	Probes:	24
86		Eye Yolk			62	Probes:	25
87		Honor		Location: Location:	62		26
			=	Location:	62	Probes:	27
89	:	Under	_		62	Probes: Probes:	28
	:	Jutty		Location: Location:	62	Probes:	
		Cook	_				29
91 92		Rush Wine	=	Location:	62 62	Probes: Probes:	30 31
92		mole		Location: Location:	62	Probes:	32
93				Location:	62		
		cap	=			Probes:	33
95	•	wince	original	Location:	62	Probes:	34

96 : 97 :	live	Original Location:	62 62	Probes: 35
	inlet	Original Location:		Probes: 36
98:	scat	Original Location:	62	Probes: 37
99:	wet	Original Location:	62	Probes: 38
100:	quandary	Original Location:	127	Probes: 102
101:	dactyl	Original Location:	9	Probes: 93
102 : 103 :	NULL NULL			
103 :	NULL			
104 :	NULL			
106:	NULL			
100:				
107 :	NULL NULL			
100 :	NULL			
110 :				
111 :	NULL NULL			
112:	NULL			
112 :	NULL			
114:	NULL			
115 :	NULL			
115 · 116 :	NULL			
117:	NULL			
117 :	NULL			
119:	NULL			
120 :	NULL			
121:	NULL			
122 :	NULL			
123 :	NULL			
123 <b>.</b> 124 <b>:</b>	NULL			
124 · 125 :	NULL			
125 <b>.</b> 126 <b>:</b>	NULL			
120 <b>.</b> 127 <b>:</b>	Bhandari	Original Location:	127	Probes: 1
127 :	NULL	Original Locacion.	141	ilones. I
120 .	110111			

Statistics for 2 to 31

Min: 1 Max: 11

Average: 3.69

Statistics for 73 to 102

Min: 1 Max: 102

Average: 43.66

Expected number of Probes: 2.96154E+00

## BRYANBENHAM's Hash (80%)

#### LINEAR Probe

Output I	7 i l 🗅

Output	File				
1:	Fabricate	Original Location:	125	Probes:	5
2:	NULL		2	- 1	1
3:	parasympathetic	Original Location:	3	Probes:	1
4:	rationalize	Original Location:	4	Probes:	1
5 <b>:</b>	NULL			_	
6 <b>:</b>	cap	Original Location:	6	Probes:	1
7:	NULL				
8:	NULL				
9:	NULL				
10:	NULL				
11:	Adam	Original Location		Probes:	1
12:	Scott	Original Location	: 11	Probes:	2
13:	NULL				
14:	Arauza	Original Location		Probes:	1
15 :	Clayton	Original Location	: 14	Probes:	2
16:	NULL				
17:	NULL				
18:	NULL				
19:	1234567890123456	Original Location	: 19	Probes:	1
20 :	NULL				
21 :	NULL				
22 :	Batbold	Original Location	: 22	Probes:	1
23 :	Corey	Original Location	: 23	Probes:	1
24:	Derek	Original Location	: 23	Probes:	2
25 <b>:</b>	Carmona	Original Location	: 25	Probes:	1
26:	Zulfiqar	Original Location	: 25	Probes:	2
27 :	Egbe	Original Location	: 25	Probes:	3
28:	Gurung	Original Location	: 28	Probes:	1
29 :	Robert	Original Location	: 25	Probes:	5
30 :	Chris	Original Location	: 24	Probes:	7
31 :	Fabulous	Original Location	: 29	Probes:	3
32 :	Syncopate	Original Location	: 24	Probes:	9
33 :	Honor	Original Location	: 26	Probes:	8
34 :	Screen	Original Location	: 23	Probes:	12
35 <b>:</b>	wince	Original Location	: 23	Probes:	13
36 <b>:</b>	orthodontist	Original Location	: 23	Probes:	14
37 <b>:</b>	constrain	Original Location	: 27	Probes:	11
38:	Lisa	Original Location	: 38	Probes:	1
39:	Joseph	Original Location	: 39	Probes:	1
40 :	Alcantara	Original Location	: 40	Probes:	1
41 :	Cook	Original Location	: 41	Probes:	1
42:	Dugger	Original Location	: 42	Probes:	1
43 :	Nienberg	Original Location	: 43	Probes:	1
44 :	Qamruddin	Original Location		Probes:	2
45 :	Acevedo	Original Location		Probes:	1
46:	Ajose	Original Location		Probes:	4
	-	-			

47	:	Maiden	Original	Location:	40	Probes:	8
48	:	Necromancer	Original	Location:	38	Probes:	11
49	:	Staple	Original	Location:	45	Probes:	5
50	:	Christopher	Original	Location:	50	Probes:	1
51	:	Cook	Original	Location:	41	Probes:	11
52	:	scat	Original	Location:	45	Probes:	8
53	:	NULL					
54	:	Octavio	Original	Location:	54	Probes:	1
55	:	Jordon	Original	Location:	55	Probes:	1
56	:	mole	Original	Location:	56	Probes:	1
57	:	Ellington	Original	Location:	57	Probes:	1
58	:	Kyle	Original	Location:	57	Probes:	2
59	:	Jeffrey	Original	Location:	57	Probes:	3
60	:	Vinnela	Original	Location:	58	Probes:	3
61	:	Wade	Original	Location:	57	Probes:	5
62	:	Afterwards	Original	Location:	60	Probes:	3
63	:	Judy	Original	Location:	63	Probes:	1
64	:	Northwest	Original	Location:	59	Probes:	6
65	:	Under	Original	Location:	57	Probes:	9
66	:	inlet	Original	Location:	56	Probes:	11
67	:	toluene	Original	Location:	60	Probes:	8
68	:	Irreversible	Original	Location:	68	Probes:	1
69	:	NULL					
70	:	wet	Original	Location:	70	Probes:	1
71	:	NULL					
72	:	Aguirrie	Original	Location:	72	Probes:	1
73	:	Red	Original	Location:	72	Probes:	2
74	:	Casper	Original	Location:	74	Probes:	1
75	:	Michael	Original	Location:	74	Probes:	2
76	:	Dustin	Original	Location:	76	Probes:	1
77	:	James	Original	Location:	72	Probes:	6
78	:	Rush	Original	Location:	73	Probes:	6
79	:	poison	Original	Location:	76	Probes:	4
	:	magnetic	Original	Location:	75	Probes:	6
81	:	dactyl	Original	Location:	77	Probes:	5
82	:	NULL					
83	:	NULL					
84		NULL					
85	:	NULL					
86	:	NULL					
87	:	Finagle		Location:	87	Probes:	1
88		Davies	_	Location:	88	Probes:	1
89	:	Daniels	=	Location:	89	Probes:	1
90		Kelly	=	Location:	90	Probes:	1
91		Todd	=	Location:	89	Probes:	3
92		Veronica		Location:	90	Probes:	3
93		Matthew		Location:	91	Probes:	3
94		John	=	Location:	91	Probes:	4
95	:	Eye	Original	Location:	89	Probes:	7

96:	Constriction	Original Location:	89	Probes:	8
97 :	Person	Original Location:	91	Probes:	7
98:	Jutty	Original Location:	92	Probes:	7
99 :	Wine	Original Location:	88	Probes:	12
100 :	live	Original Location:	87	Probes:	14
101 :	marsupial	Original Location:	91	Probes:	11
102 :	NULL				
103 :	Paschal	Original Location:	103	Probes:	1
104 :	NULL				
105 :	cauldron	Original Location:	105	Probes:	1
106:	NULL				
107 :	Joel	Original Location:	107	Probes:	1
108 :	Bhandari	Original Location:	108	Probes:	1
109 :	Buck	Original Location:	108	Probes:	2
110 :	Clark	Original Location:	109	Probes:	2
111 :	Crouch	Original Location:	109	Probes:	3
112 :	Charles	Original Location:	109	Probes:	4
113 :	Misogamist	Original Location:	111	Probes:	3
114 :	brutalize	Original Location:	108	Probes:	7
115 :	prepossess	Original Location:	114	Probes:	2
116 :	sparse	Original Location:	110	Probes:	7
117 :	quandary	Original Location:	109	Probes:	9
118 :	NULL				
119 :	NULL				
120 :	Perfect	Original Location:	120	Probes:	1
121 :	ratiocination	Original Location:	120	Probes:	2
122 :	Salkowski	Original Location:	122	Probes:	1
123 :	Farral	Original Location:	123	Probes:	1
124 :	Akhila	Original Location:	122	Probes:	3
125 :	Garza	Original Location:	125	Probes:	1
126:	Fernando	Original Location:	122	Probes:	5
127 :	Yolk	Original Location:	122	Probes:	6
128 :	NULL				

Min: 1 Max: 4

Average: 1.45

Statistics for 73 to 102

Min: 1 Max: 14

Average: 6.45

Expected number of Probes: 2.96154E+00

## DRBURRIS's Hash (40%)

#### RANDOM Probe

Out	put.	File

rite					
Paschal	Original :	Location:	127	Probes:	2
Nienberg	Original :	Location:	2	Probes:	1
Qamruddin	Original :	Location:	1	Probes:	2
Ellington	Original :	Location:	4	Probes:	1
Crouch	Original :	Location:	5	Probes:	1
Arauza	Original :	Location:	127	Probes:	3
Joseph	Original :	Location:	5	Probes:	2
Acevedo	Original :	Location:	1	Probes:	3
Daniels	Original :	Location:	9	Probes:	1
Garza	Original	Location:	62	Probes:	8
Carmona	Original	Location:	11	Probes:	1
Clayton	Original	Location:	12	Probes:	1
Dustin	Original	Location:	11	Probes:	2
Zulfiqar	Original	Location:	14	Probes:	1
Aguirrie	Original	Location:	15	Probes:	1
Davies	Original	Location:	16	Probes:	1
Alcantara	=		17	Probes:	1
Jordon			11	Probes:	3
Robert	=		17	Probes:	2
Salkowski	_		20	Probes:	1
NULL	_				
Casper	Original	Location:	15	Probes:	3
Vinnela			9	Probes:	6
Corev	=			Probes:	10
<del>-</del>	,				
	Original	Location:	127	Probes:	5
	2				
Jeffrev	Original	Location:	2	Probes:	5
-	- , -				
Derek	Original	Location:	62	Probes:	16
	=				5
			4		4
<del>-</del>	- , -				
	Original	Location:	6	Probes:	4
	- , -				
	Original	Location:	9	Probes:	4
	- 5		-		
_ · · · · · · · · · · · · · · · · · · ·					
	Paschal Nienberg Qamruddin Ellington Crouch Arauza Joseph Acevedo Daniels Garza Carmona Clayton Dustin Zulfiqar Aguirrie Davies Alcantara Jordon Robert Salkowski NULL Casper	Paschal Original Nienberg Original Qamruddin Original Ellington Original Crouch Original Arauza Original Joseph Original Acevedo Original Garza Original Carmona Original Clayton Original Zulfiqar Original Alcantara Original Alcantara Original Salkowski Original Salkowski Original NULL Casper Original Vinnela Original Corey Original NULL NULL NULL NULL NULL NULL NULL NUL	Paschal Original Location: Nienberg Original Location: Qamruddin Original Location: Ellington Original Location: Crouch Original Location: Arauza Original Location: Acevedo Original Location: Daniels Original Location: Carmona Original Location: Carmona Original Location: Clayton Original Location: Custin Original Location: Custin Original Location: Custin Original Location: Dustin Original Location: Dustin Original Location: Dustin Original Location: Dusin Original Location: Aguirrie Original Location: Davies Original Location: Alcantara Original Location: Alcantara Original Location: Salkowski Original Location: NULL Casper Original Location: NULL NULL NULL NULL NULL NULL NULL NUL	Paschal Original Location: 127 Nienberg Original Location: 2 Qamruddin Original Location: 1 Ellington Original Location: 4 Crouch Original Location: 5 Arauza Original Location: 5 Arauza Original Location: 5 Acevedo Original Location: 1 Daniels Original Location: 9 Garza Original Location: 11 Clayton Original Location: 12 Dustin Original Location: 12 Dustin Original Location: 11 Zulfiqar Original Location: 14 Aguirrie Original Location: 15 Davies Original Location: 15 Davies Original Location: 16 Alcantara Original Location: 17 Jordon Original Location: 17 Salkowski Original Location: 17 Salkowski Original Location: 17 Sult Original Location: 17 Vinnela Original Location: 9 Corey Original Location: 62 NULL NULL NULL NULL NULL NULL NULL Original Location: 62 Veronica Original Location: 6 Gurung Original Location: 6 Gurung Original Location: 6 NULL NULL NULL NULL NULL NULL NULL NUL	Paschal Original Location: 127 Probes: Nienberg Original Location: 2 Probes: Qamruddin Original Location: 1 Probes: Ellington Original Location: 4 Probes: Crouch Original Location: 5 Probes: Arauza Original Location: 127 Probes: Arauza Original Location: 5 Probes: Arauza Original Location: 5 Probes: Acevedo Original Location: 5 Probes: Daniels Original Location: 9 Probes: Garza Original Location: 62 Probes: Carmona Original Location: 11 Probes: Clayton Original Location: 12 Probes: Dustin Original Location: 12 Probes: Dustin Original Location: 14 Probes: Aguirrie Original Location: 15 Probes: Davies Original Location: 16 Probes: Alcantara Original Location: 17 Probes: Alcantara Original Location: 16 Probes: Alcantara Original Location: 17 Probes: Salkowski Original Location: 17 Probes: Salkowski Original Location: 17 Probes: NULL Original Location: 17 Probes: Vinnela Original Location: 9 Probes: NULL NULL NULL NULL NULL NULL Original Location: 62 Probes: NULL NULL NULL Original Location: 62 Probes: NULL NULL NULL NULL NULL NULL NULL NUL

47 :	Dugger	Original	Location:	15	Probes:	4
48 :	NULL					
49:	NULL					
50:	NULL					
51 :	NULL					
52:	NULL					
53:	Todd	Original	Location:	62	Probes:	19
54:	NULL					
55 <b>:</b>	Kelly	Original	Location:	62	Probes:	9
56 <b>:</b>	NULL	0 - 1 - 1 - 1	T +	60	D1	1 -
57 <b>:</b>	Judy	Original	Location:	62	Probes:	15
58 : 59 :	NULL					
60 :	NULL NULL					
61 :	NULL					
62 :	Cook	Original	Location:	62	Probes:	1
63:	NULL	Originar	nocación.	02	TIODES.	_
64:	Red	Original	Location:	62	Probes:	2
65 :	NULL	Oliginal	Locacion:	02	110005.	۷
66:	NULL					
67 :	NULL					
68 :	NULL					
69 :	Ajose	Original	Location:	62	Probes:	3
70 :	NULL	- 5 -				
71 :	NULL					
72 <b>:</b>	NULL					
73 <b>:</b>	NULL					
74:	NULL					
75 <b>:</b>	John	Original	Location:	62	Probes:	21
76 <b>:</b>	Egbe		Location:	62	Probes:	6
77 :	NULL					
78 <b>:</b>	Matthew	Original	Location:	2	Probes:	8
79:	NULL					
80:	NULL					
81 :	NULL					
82 :	NULL					
83:	Scott		Location:	62	Probes:	13
84 :	1234567890123456	Original	Location:	84	Probes:	1
85 :	NULL					
86:	NULL					
87 :	NULL					
88 :	NULL					
89:	NULL					
90:	NULL	0 1 1 3		60	- 1	_
91:	Clark		Location:	62	Probes:	5
92:	Charles	Uriginal	Location:	2	Probes:	10
93:	NULL	001-1	Togotion	60	Danalasas	Λ
94:	Buck	Original	Location:	62	Probes:	4
95 :	NULL					

```
96:
     NULL
97:
      NULL
98 : NULL
99:
    NULL
100 : NULL
101:
     NULL
102 : NULL
103 : NULL
104 : NULL
105 : NULL
106 : NULL
107 : NULL
108 : NULL
109 : NULL
110 : NULL
111 : NULL
112 : Lisa
                         Original Location: 62 Probes: 18
113 : NULL
114 : NULL
115 : NULL
116 : NULL
117 : NULL
118 : Kyle
                         Original Location:
                                            62
                                                  Probes:
                                                           12
119 : NULL
120 : NULL
121 : NULL
122 : NULL
                         Original Location:
123 : Michael
                                            2
                                                  Probes:
                                                          9
124 : James
                         Original Location:
                                            62
                                                  Probes:
                                                           22
125 : Adam
                         Original Location:
                                            62
                                                  Probes:
                                                           11
126 : NULL
127:
      Bhandari
                        Original Location:
                                            127 Probes: 1
128 : NULL
```

Min: 1 Max: 11

Average: 3.34

Statistics for 22 to 51

Min: 1 Max: 22

Average: 8.79

Expected number of Probes: 1.27554E+00

## BRYANBENHAM's Hash (40%)

# RANDOM Probe

RANDOM	Probe					
Output	File					
1:	NULL					
2:	NULL					
3 <b>:</b>	NULL					
4:	NULL					
5:	NULL					
6 <b>:</b>	NULL					
7:	NULL					
8:	NULL					
9:	NULL					
10:	NULL					
11:	Adam	Original	Location:	11	Probes:	1
12:	NULL				_	_
13:	Scott		Location:	11	Probes:	2
14:	Arauza	Original	Location:	14	Probes:	1
15:	NULL			1.4	- 1	^
16:	Clayton	Original	Location:	14	Probes:	2
17 : 18 :	NULL					
18 : 19 :	NULL	0	Taaabiaa.	1.0	Decales	1
20 :	1234567890123456 NULL	Original	Location:	19	Probes:	1
21 :	NULL					
22 :	NULL					
23 :	Corey	Original	Location:	23	Probes:	1
24 :	NULL	Originar	Locacion.	25	TTODES.	_
25 :	Carmona	Original	Location:	25	Probes:	1
26:	NULL	01191141	200002011	20	110000.	_
27 <b>:</b>	Zulfiqar	Original	Location:	25	Probes:	2
28 :	Gurung		Location:	28	Probes:	1
29 :	NULL	3				
30 <b>:</b>	Derek	Original	Location:	23	Probes:	3
31 :	NULL					
32 :	Egbe	Original	Location:	25	Probes:	3
33 <b>:</b>	NULL					
34 :	NULL					
35 <b>:</b>	NULL					
36 <b>:</b>	NULL					
37 :	NULL					
38 :	Lisa		Location:	38	Probes:	1
39 :	Joseph	_	Location:	39	Probes:	1
40:	Alcantara		Location:	40	Probes:	1
41 :	Cook		Location:	41	Probes:	1
42 :	Dugger	=	Location:	42	Probes:	1
43:	Nienberg	Original	Location:	43	Probes:	1
44:	NULL	0 ! ! -	±	4.0	D ,	_
45 :	Qamruddin	Original	Location:	43	Probes:	2
46:	NULL					

47 :	Acevedo	Original	Location:	45	Probes:	2
48:	NULL					
49:	NULL	0	T +	12	Declara	2
50 :	Ajose	Original	Location:	43	Probes:	3
51 : 52 :	NULL NULL					
53 :	NULL					
54 <b>:</b>	Robert	Original	Location:	25	Probes:	5
55 :	Jordon	_	Location:	55	Probes:	1
56 <b>:</b>	Octavio	=	Location:	54	Probes:	2
57 <b>:</b>	Ellington	=	Location:	57	Probes:	1
58 :	Vinnela	=	Location:	58	Probes:	1
59 <b>:</b>	Kyle		Location:	57	Probes:	2
60 :	NULL	OLIGINAL	Locacion.	57	110000.	_
61 :	NULL					
62 :	NULL					
63 :	Judy	Original	Location:	63	Probes:	1
64 :	Jeffrey		Location:	57	Probes:	3
65 :	NULL	011911101	200002011.	0 ,	110000.	
66 :	NULL					
67 <b>:</b>	NULL					
68 :	NULL					
69 :	NULL					
70 :	NULL					
71 :	NULL					
72 <b>:</b>	Aguirrie	Original	Location:	72	Probes:	1
73 <b>:</b>	NULL	_				
74:	Casper	Original	Location:	74	Probes:	1
75 <b>:</b>	NULL					
76 <b>:</b>	Dustin	Original	Location:	76	Probes:	1
77 :	NULL					
78 <b>:</b>	NULL					
79 :	Red	Original	Location:	72	Probes:	3
80:	NULL					
81 :	Michael	Original	Location:	74	Probes:	3
82 :	NULL					
83:	NULL					
84 :	NULL					
85 :	NULL					
86:	NULL					
87 :	NULL					
88 :	Davies	=	Location:	88	Probes:	1
89:	Daniels		Location:	89	Probes:	1
90:	Kelly		Location:	90	Probes:	1
91:	Todd	_	Location:	89	Probes:	2
92:	Veronica		Location:	90	Probes:	2
93:	Matthew	Original	Location:	91	Probes:	2
94:	NULL					
95 :	NULL					

96:	NULL				
96 :	NULL				
98 :	John	Original Location:	91	Probes:	3
99 :	NULL	Original Location.	91	riones.	3
100:	NULL				
100 :	NULL				
102:	NULL				
102:	Paschal	Original Location:	103	Probes:	1
103 :	James	Original Location:	72	Probes:	4
104 :	NULL	Original Location.	12	riones.	4
106:	NULL				
100:	NULL				
107 :	Bhandari	Original Location:	108	Probes:	1
100 :	Clark	Original Location:	100	Probes:	
110 :	Buck	Original Location:	109	Probes:	
111 :	Crouch	Original Location:	109	Probes:	
112:	NULL	Original Location.	109	riones.	۷
112 :	NULL				
113:	-				
114:	NULL NULL				
116:	Charles		109	Declara	3
110:		Original Location:	109	Probes:	3
117:	NULL				
	NULL				
119 : 120 :	NULL				
	NULL				
121 : 122 :	NULL Salkowski	Onininal Tanahian.	122	Declara	1
		Original Location:		Probes:	
123:	Farral	Original Location:	123	Probes:	_
124:	Akhila	Original Location:	122	Probes:	2
125:	Garza	Original Location:	125	Probes:	1
126:	NULL				
127:	NULL				
128 :	NULL				

Min: 1 Max: 3

Average: 1.41

Statistics for 22 to 51

Min: 1 Max: 5

Average: 1.97

Expected number of Probes: 1.27554E+00

## DRBURRIS's Hash (80%)

## RANDOM Probe

## Output File

Output	rile					
1:	Paschal	Original Lo	ocation:	127	Probes:	2
2:	Nienberg	Original Lo	ocation:	2	Probes:	1
3 <b>:</b>	Qamruddin	Original Lo	ocation:	1	Probes:	2
4:	Ellington	Original Lo	ocation:	4	Probes:	1
5 <b>:</b>	Crouch	Original Lo	ocation:	5	Probes:	1
6 <b>:</b>	Arauza	Original Lo	ocation:	127	Probes:	3
7:	Joseph	Original Lo	ocation:	5	Probes:	2
8:	Acevedo	Original Lo	ocation:	1	Probes:	3
9:	Daniels	Original Lo	ocation:	9	Probes:	1
10 :	Garza	Original 1	Location:	62	Probes:	8
11 :	Carmona	Original 1	Location:	11	Probes:	1
12:	Clayton	Original 1	Location:	12	Probes:	1
13 :	Dustin	Original 1	Location:	11	Probes:	2
14 :	Zulfiqar	Original 1	Location:	14	Probes:	1
15 :	Aguirrie	Original 1	Location:	15	Probes:	1
16:	Davies	Original 1	Location:	16	Probes:	1
17 :	Alcantara	Original 1	Location:	17	Probes:	1
18:	Jordon	Original 1	Location:	11	Probes:	3
19:	Robert	Original 1	Location:	17	Probes:	2
20 :	Salkowski	Original 1	Location:	20	Probes:	1
21 :	scat	Original 1	Location:	62	Probes:	51
22 :	Casper	Original 1	Location:	15	Probes:	3
23 :	Vinnela	Original 1	Location:	9	Probes:	6
24 :	Corey	Original 1	Location:	62	Probes:	10
25 <b>:</b>	Person	Original 1	Location:	11	Probes:	6
26 <b>:</b>	NULL					
27 <b>:</b>	Afterwards	Original 1	Location:	20	Probes:	3
28 :	Akhila	Original 1	Location:	127	Probes:	5
29:	Constriction	Original 1	Location:	15	Probes:	6
30 :	brutalize	Original 1	Location:	9	Probes:	13
31 :	Jeffrey	Original 1	Location:	2	Probes:	5
32 :	Fabricate	Original 1	Location:	0	Probes:	4
33 :	orthodontist	Original 1	Location:	1	Probes:	4
34 :	Derek	Original 1	Location:	62	Probes:	16
35 <b>:</b>	Veronica	Original 1	Location:	6	Probes:	5
36 <b>:</b>	Gurung	Original 1	Location:	4	Probes:	4
37 <b>:</b>	Jutty	Original 1	Location:	62	Probes:	35
38:	Octavio	Original 1	Location:	6	Probes:	4
39 <b>:</b>	Joel	Original 1	Location:	62	Probes:	25
40 :	Maiden	Original 1	Location:	11	Probes:	5
41 :	Farral	Original 1	Location:	9	Probes:	4
42 :	Necromancer	Original 1	Location:	10	Probes:	4
43 :	Fernando	Original 1	Location:	11	Probes:	4
44:	Fabulous	Original 1	Location:	12	Probes:	4
45 <b>:</b>	Syncopate	Original 1	Location:	13	Probes:	4
46:	magnetic	Original 1	Location:	17	Probes:	5

47	:	Dugger	Original	Location:	15	Probes:	4
48	:	prepossess	Original	Location:	16	Probes:	4
49	:	Christopher	Original	Location:	17	Probes:	4
50	:	NULL					
51	:	live	Original	Location:	62	Probes:	45
52	:	Northwest	Original	Location:	20	Probes:	4
53	:	Todd	Original	Location:	62	Probes:	19
54	:	parasympathetic	Original	Location:	22	Probes:	4
55	:	Kelly	Original	Location:	62	Probes:	9
56	:	NULL					
57	:	Judy	Original	Location:	62	Probes:	15
58	:	Wade	Original	Location:	62	Probes:	24
59	:	Cook	Original	Location:	62	Probes:	37
60	:	dactyl	Original	Location:	9	Probes:	23
61	:	NULL					
62	:	Cook	Original	Location:	62	Probes:	1
63	:	NULL					
64	:	Red	Original	Location:	62	Probes:	2
65	:	Irreversible	Original	Location:	2	Probes:	11
66	:	Misogamist	Original	Location:	127	Probes:	7
67	:	Honor	Original	Location:	62	Probes:	29
68	:	NULL					
69	:	Ajose	Original	Location:	62	Probes:	3
70	:	NULL					
71	:	constrain	Original	Location:	15	Probes:	12
72	:	Eye		Location:	62	Probes:	26
73	:	NULL	_				
74	:	rationalize	Original	Location:	11	Probes:	11
75	:	John	Original	Location:	62	Probes:	21
76	:	Egbe	Original	Location:	62	Probes:	6
77	:	NULL					
78	:	Matthew	Original	Location:	2	Probes:	8
79	:	NULL					
80	:	inlet	Original	Location:	62	Probes:	50
81	:	NULL					
82	:	Under	Original	Location:	62	Probes:	32
83	:	Scott		Location:	62	Probes:	13
84	:	1234567890123456	Original	Location:	84	Probes:	1
85	:	Batbold	Original	Location:	9	Probes:	8
86	:	wince	Original	Location:	62	Probes:	44
87	:	Screen	Original	Location:	11	Probes:	8
88	:	NULL					
89	:	marsupial	Original	Location:	13	Probes:	8
90	:	ratiocination	Original	Location:	0	Probes:	10
91	:	Clark	<del>-</del>	Location:	62	Probes:	5
92	:	Charles	<del>-</del>	Location:	2	Probes:	10
93	:	cap	Original	Location:	62	Probes:	43
94	:	Buck		Location:	62	Probes:	4
95	:	NULL					

96:	NULL				
97 :	Rush	Original Location:	62	Probes:	39
98:	NULL				
99:	Finagle	Original Location:	9	Probes:	10
100 :	NULL				
101 :	poison	Original Location:	11	Probes:	10
102 :	sparse	Original Location:	2	Probes:	16
103 :	NULL				
104 :	Staple	Original Location:	2	Probes:	14
105 :	cauldron	Original Location:	15	Probes:	10
106 :	Wine	Original Location:	62	Probes:	40
107 :	NULL				
108 :	NULL				
109 :	Yolk	Original Location:	62	Probes:	27
110 :	wet	Original Location:	62	Probes:	52
111 :	toluene	Original Location:	11	Probes:	16
112 :	Lisa	Original Location:	62	Probes:	18
113 :	Chris	Original Location:	62	Probes:	23
114 :	NULL				
115 :	NULL				
116 :	NULL				
117 :	NULL				
118 :	Kyle	Original Location:	62	Probes:	12
119 :	NULL				
120 :	mole	Original Location:	62	Probes:	42
121 :	Perfect	Original Location:	0	Probes:	9
122 :	quandary	Original Location:	127	Probes:	15
123 :	Michael	Original Location:	2	Probes:	9
124 :	James	Original Location:	62	Probes:	22
125 :	Adam	Original Location:	62	Probes:	11
126 :	NULL				
127 :	Bhandari	Original Location:	127	Probes:	1
128 :	NULL				

Min: 1 Max: 11

Average: 3.34

Statistics for 73 to 102

Min: 1 Max: 52

Average: 22.83

Expected number of Probes: 2.00023E+00

## BRYANBENHAM's Hash (80%)

46 : NULL

RANDOM Probe							
Output				_			
1:	Fernando	Original Location	n: 122	Probes:	3		
2:	NULL		_				
3 <b>:</b>	parasympathetic	Original Location		Probes:	1		
4:	inlet	Original Location	n: 56	Probes:	8		
5 <b>:</b>	NULL						
6 <b>:</b>	cap	Original Location	n: 6	Probes:	1		
7:	NULL						
8:	Yolk	Original Location	n: 122	Probes:	6		
9:	NULL						
10 :	quandary	Original Location	on: 109	Probes:	5		
11:	Adam	Original Location	on: 11	Probes:	1		
12:	NULL						
13 :	Scott	Original Location	on: 11	Probes:	2		
14:	Arauza	Original Location	on: 14	Probes:	1		
15 <b>:</b>	NULL						
16:	Clayton	Original Location	on: 14	Probes:	2		
17 :	NULL	_					
18:	NULL						
19:	1234567890123456	Original Location	on: 19	Probes:	1		
20 :	NULL	. ,					
21 :	Perfect	Original Location	on: 120	Probes:	5		
22 :	Batbold	Original Location		Probes:	1		
23 :	Corey	Original Location		Probes:	1		
24 :	Chris	Original Location		Probes:	1		
25 :	Carmona	Original Location		Probes:	1		
26:	Syncopate	Original Location		Probes:	2		
27 <b>:</b>	Zulfiqar	Original Location		Probes:	2		
28 :	Gurung	Original Location		Probes:	1		
29 :	Fabulous	Original Location		Probes:	1		
	Derek	<del>-</del>		Probes:	3		
30:		Original Location	011; 23	Propes:	3		
31:	NULL	0-1-1-1	2.5	D 1	2		
32 :	Egbe	Original Location		Probes:	3		
33 :	Honor	Original Location		Probes:	3		
34 :	constrain	Original Location	on: 27	Probes:	3		
35 :	NULL						
36 <b>:</b>	rationalize	Original Location		Probes:	4		
37 :	Screen	Original Location		Probes:	6		
38 :	Lisa	Original Location		Probes:	1		
39 :	Joseph	Original Location		Probes:	1		
40 :	Alcantara	Original Location		Probes:	1		
41 :	Cook	Original Location		Probes:	1		
42 :	Dugger	Original Location		Probes:	1		
43 :	Nienberg	Original Location		Probes:	1		
44:	orthodontist	Original Location	on: 23	Probes:	13		
45 <b>:</b>	Qamruddin	Original Location	on: 43	Probes:	2		
16.	NITIT T						

47	:	Acevedo	Original	Location:	45	Probes:	2
48	:	Cook	Original	Location:	41	Probes:	3
49	:	NULL					
50	:	Ajose	Original	Location:	43	Probes:	3
51	:	NULL					
52	:	Christopher	Original	Location:	50	Probes:	2
53	:	NULL					
54	:	Robert	Original	Location:	25	Probes:	5
55	:	Jordon	Original	Location:	55	Probes:	1
56	:	Octavio	Original	Location:	54	Probes:	2
57	:	Ellington	Original	Location:	57	Probes:	1
58	:	Vinnela	Original	Location:	58	Probes:	1
59	:	Kyle	Original	Location:	57	Probes:	2
60	:	Afterwards	Original	Location:	60	Probes:	1
61	:	Northwest	Original	Location:	59	Probes:	2
62	:	toluene	Original	Location:	60	Probes:	2
63	:	Judy	Original	Location:	63	Probes:	1
64	:	Jeffrey	Original	Location:	57	Probes:	3
65	:	NULL					
66	:	NULL					
67	:	NULL					
68	:	Irreversible	Original	Location:	68	Probes:	1
69	:	Maiden	Original	Location:	40	Probes:	5
70	:	Necromancer	Original	Location:	38	Probes:	4
71	:	Under	Original	Location:	57	Probes:	6
72	:	Aguirrie	Original	Location:	72	Probes:	1
73	:	Rush	Original	Location:	73	Probes:	1
74	:	Casper	Original	Location:	74	Probes:	1
75	:	magnetic	Original	Location:	75	Probes:	1
76	:	Dustin	Original	Location:	76	Probes:	1
77	:	Staple	Original	Location:	45	Probes:	4
78	:	poison	Original	Location:	76	Probes:	2
79	:	Red	Original	Location:	72	Probes:	3
80	:	NULL					
81	:	Michael	Original	Location:	74	Probes:	3
82	:	ratiocination	Original	Location:	120	Probes:	10
83	:	NULL					
84	:	marsupial	Original	Location:	91	Probes:	9
85	:	mole	Original	Location:	56	Probes:	5
86	:	Wade	Original	Location:	57	Probes:	5
87	:	Finagle	Original	Location:	87	Probes:	1
88	:	Davies	Original	Location:	88	Probes:	1
89	:	Daniels	Original	Location:	89	Probes:	1
90	:	Kelly	Original	Location:	90	Probes:	1
91	:	Todd	Original	Location:	89	Probes:	2
92	:	Veronica	Original	Location:	90	Probes:	2
93	:	Matthew	Original	Location:	91	Probes:	2
94	:	Jutty	Original	Location:	92	Probes:	2
95	:	Wine	Original	Location:	88	Probes:	3

96:	Eye	Original Location:	89	Probes:	3
97 :	NULL				
98:	John	Original Location:	91	Probes:	3
99:	wince	Original Location:	23	Probes:	8
100 :	NULL				
101 :	NULL				
102 :	wet	Original Location:	70	Probes:	4
103 :	Paschal	Original Location:	103	Probes:	1
104 :	James	Original Location:	72	Probes:	4
105 :	cauldron	Original Location:	105	Probes:	1
106:	dactyl	Original Location:	77	Probes:	5
107 :	Joel	Original Location:	107	Probes:	1
108:	Bhandari	Original Location:	108	Probes:	1
109:	Clark	Original Location:	109	Probes:	1
110 :	Buck	Original Location:	108	Probes:	2
111 :	Crouch	Original Location:	109	Probes:	2
112 :	scat	Original Location:	45	Probes:	7
113 :	Misogamist	Original Location:	111	Probes:	2
114 :	prepossess	Original Location:	114	Probes:	1
115 :	brutalize	Original Location:	108	Probes:	3
116 :	Charles	Original Location:	109	Probes:	3
117 :	sparse	Original Location:	110	Probes:	3
118 :	NULL				
119 :	live	Original Location:	87	Probes:	4
120 :	Person	Original Location:	91	Probes:	5
121 :	Constriction	Original Location:	89	Probes:	4
122 :	Salkowski	Original Location:	122	Probes:	1
123 :	Farral	Original Location:	123	Probes:	1
124 :	Akhila	Original Location:	122	Probes:	2
125 :	Garza	Original Location:	125	Probes:	1
126:	NULL				
127 :	Fabricate	Original Location:	125	Probes:	2
128 :	NULL				

Min: 1 Max: 3

Average: 1.41

Statistics for 73 to 102

Min: 1 Max: 13

Average: 4.31

Expected number of Probes: 2.00023E+00

# CODE

```
--in hashing.ads
with Ada.Direct IO;
with Ada. Text IO; use Ada. Text IO;
with Ada. Unchecked Conversion;
with Direct IO;
with Ada. Numerics. Elementary Functions; use Ada. Numerics. Elementary Functions;
package hashing is
   type probeMethod is (linear, random);
   type hashVersion is (drBurris, bryanBenham);
   type method is (main, file);
   subtype slice is String(1..8);
   subtype hashWord is String(1..16);
   package LongIntIO is new Ada.Text_IO.Integer_IO(Standard.Long_Integer); use
LongIntIO;
   type inputData is record
      key : Integer;
      initialAddress : Integer;
      probes : Integer := 1;
      data : hashWord;
   end record;
  package inputIO is new Ada.Direct_IO(hashWord);
   use inputIO;
  package outputIO is new Ada.Direct IO(inputData);
   use outputIO;
   fileName : String := "words.txt";
   outFile : String := "results.txt";
   InputFile : inputIO.File Type;
   outputFile : outputIO.File Type;
   type mainArray is array (1..128) of inputData;
   nullHash : inputData := (data =>"
                                                     ", initialAddress => 0,
probes => 0, key => 0);
  mainArr : mainArray := (others =>nullHash);
   type itemArray is array (Integer range <>) of inputData;
```

```
function offset (R: in out integer) return Integer;
   function bryanKey (stringHash : String) return Integer;
   function burriskey (stringhash : String) return Integer;
   procedure hash (percent : Float; probeLR : probeMethod; whosHash :
hashVersion; implementation : method);
  procedure mainMemory (percent : Float; probeLR : probeMethod; whosHash :
hashVersion);
  procedure oFile (percent : Float; probeLR : probeMethod; whosHash :
hashVersion);
  procedure average (lower : integer; upper : integer; probeLR : probeMethod;
whosHash : hashVersion; implementation : method);
  procedure theoretical (keyValue : Integer; probeLR : probeMethod);
end hashing;
--in hashing.adb
with Ada. Numerics. Elementary Functions; use Ada. Numerics. Elementary Functions;
with Ada. Integer Text IO; use Ada. Integer Text IO;
with Ada.Text IO; use Ada.Text IO;
with Ada. Unchecked Conversion;
package body hashing is
   function offset (R: in out Integer) return Integer is
  begin
     R := (5*R);
      R := R \mod (2**9);
      return R/4;
   end offset;
   function sliceToLong is new Ada.Unchecked Conversion(slice, Long Integer);
   function charToLong is new Ada. Unchecked Conversion (character,
Long Integer);
   function longToInt is new Ada. Unchecked Conversion (Long Integer, integer);
   function burrisKey (stringHash : String) return Integer is
      char1 : character := stringHash(1);
      char2 : character := stringHash(3);
      char3 : character := stringHash(6);
      keyValue : Long_Integer;
  begin
      keyValue := charToLong(char1) / 256 + charToLong(char2) / 256;
      keyValue := keyValue + charToLong(char3) + 30;
      keyValue := abs(keyValue) mod 129;
```

```
return longToInt(keyValue);
   end burrisKey;
   function bryanKey (stringHash : String) return Integer is
      pragma Suppress(Overflow check);
      str1 : slice := stringHash(1..8);
      str2 : slice := stringHash(9..16);
      extractHash : Long Integer;
      extractHash := sliceToLong(str1) / 2**12 + sliceToLong(str2) / 2**12;
      extractHash := abs(extractHash) mod 129;
      return longToInt(extractHash);
   end bryanKey;
   procedure hash (percent : Float; probeLR : probeMethod; whosHash :
hashVersion; implementation : method) is
  begin
      put(hashVersion'Image(whosHash)); put line("'s Hash");
      put(probeMethod'Image(probeLR)); put line(" Probe");
      if implementation = main then
         put line("Main Memory");
         new line;
         mainMemory(percent, probeLR, whosHash);
      else
         put line("Output File");
         new line;
         oFile(percent, probeLR, whosHash);
      end if;
   end hash;
   procedure mainMemory (percent : Float; probeLR : probeMethod; whosHash :
hashVersion) is
      percentCap : Integer := Integer(Float'Floor(Float(128) * percent));
      offsetNum : Integer := 0;
      words : hashWord;
  begin
      Open(File => InputFile,
           Mode => In File,
           Name => fileName);
      declare
         hashTable : itemArray(0..127) := (others => nullHash);
      begin
         for I in 1..percentCap loop
            declare
```

```
hashRecords : inputData;
               R : Integer := 1;
            begin
               Read(inputFile, words, inputIO.Count(I));
               hashRecords.data := words(1..16);
               if whosHash = drBurris then
                  hashRecords.initialAddress := burrisKey(hashRecords.data);
               else
                  hashRecords.initialAddress := bryanKey(hashRecords.data);
               end if;
               while hashTable((hashRecords.initialAddress + offsetNum) mod
128).data /= nullHash.data loop
                  if probeLR = linear then
                     offsetNum := offsetNum + 1;
                  else
                     offsetNum := offset(R);
                  end if;
                  hashRecords.probes := hashRecords.probes + 1;
               end loop;
               hashTable((hashRecords.initialAddress + offsetNum) mod 128) :=
hashRecords;
            end;
         end loop;
         for I in 0..127 loop
            if hashTable(I).data /= nullHash.data then
               put(Integer'Image(I)); put(": "); put(hashTable(I).data);
               put("Original Location: ");
put(Integer'Image(hashTable(I).initialAddress));
               put(" Probes: "); put(Integer'Image(hashTable(I).probes));
New line;
            else
               put(Integer'Image(I)); put(": "); put line("NULL");
            end if;
         end loop;
         new line;
         average(1, 29, probeLR, whosHash, main);
         new line;
         average(percentCap-29, percentCap, probeLR, whosHash, main);
         new line;
         theoretical (percentCap, probeLR);
         Close(inputFile);
      end;
   end mainMemory;
```

```
procedure oFile (percent : Float; probeLR : probeMethod; whosHash :
hashVersion) is
      percentCap : Integer := Integer(Float'Floor(Float(128) * percent));
      hashRecords : inputData;
      initAdd : Integer;
      tempRecord : inputData;
  begin
      Open (File => InputFile,
           Mode => In File,
           Name => fileName);
      Create(File => outputFile,
             Mode => Inout File,
             Name => outFile);
      for I in 1..128 loop
         outputIO.Write(outputFile, nullHash, outputIO.Count(I));
      end loop;
      for I in 1..percentCap loop
         declare
            offsetNum : Integer := 0;
            words : hashWord;
            R : Integer := 1;
         begin
            inputIO.Read(inputFile, words, inputIO.Count(I));
            hashRecords.data := words(1..16);
            if whosHash = drBurris then
               hashRecords.initialAddress := burrisKey(hashRecords.data);
            else
               hashRecords.initialAddress := bryanKey(hashRecords.data);
            end if;
            loop
               initAdd := (hashRecords.initialAddress + offsetNum) mod 128;
               if initAdd = 0 then
                  initAdd := 64;
               end if;
               outputIO.Read(outputFile, tempRecord, outputIO.Count(initAdd));
               exit when tempRecord = nullHash;
               hashRecords.probes := hashRecords.probes + 1;
               if probeLR = linear then
                  offsetNum := offsetNum + 1;
               else
                  offsetNum := offset(R);
               end if;
            end loop;
            outputIO.Write(outputFile, hashRecords, outputIO.Count(initAdd));
         end;
      end loop;
      for I in 1..128 loop
```

```
outputIO.Read(outputFile, tempRecord, outputIO.Count(I));
         if tempRecord /= nullHash then
            put(Integer'Image(I)); put(": "); put(tempRecord.data);
                        Original Location:
put(Integer'Image(tempRecord.initialAddress));
            put("
                         Probes:
put(Integer'Image(tempRecord.probes)); New line;
         else
            put(Integer'Image(I)); put(": "); put line("
                                                                      NULL
");
         end if;
      end loop;
     new line;
      average(1, 29, probeLR, whosHash, file);
     new line;
      average(percentCap-29, percentCap, probeLR, whosHash, file);
     new line;
      theoretical (percentCap, probeLR);
      Close(outputFile);
   end oFile;
procedure average (lower: Integer; upper : Integer; probeLR : probeMethod;
whosHash : hashVersion; implementation : method) is
     min : Integer := 1;
     max : Integer := 1;
      avg : Float := 0.0;
  begin
      for i in lower..upper loop
         declare
            words : hashWord;
            offsetNum : Integer := 0;
            tempRecord : inputData;
            hashTable : itemArray(0..127) := (others => nullHash);
            R : Integer := 1;
         begin
            Read(inputFile, words, inputIO.Count(I));
            tempRecord.data := words(1..16);
            if whosHash = drBurris then
               tempRecord.initialAddress := burrisKey(tempRecord.data);
            else
               tempRecord.initialAddress := bryanKey(tempRecord.data);
            end if;
            if implementation = main then
               while hashTable((tempRecord.initialAddress + offsetNum) mod
128).data /= tempRecord.data loop
                  if probeLR = linear then
                     offsetNum := offsetNum + 1;
```

```
else
                     offsetNum := offset(R);
                  end if;
                  tempRecord.probes := tempRecord.probes + 1;
               end loop;
            else
               declare
                  initAdd : Integer := 0;
                  superTempRecord : inputData;
               begin
                  loop
                     initAdd := (tempRecord.initialAddress + offsetNum) mod
128;
                     if initAdd = 0 then
                        initadd := 64;
                     end if:
                     outputIO.Read(outputFile, superTempRecord,
outputIO.Count(initAdd));
                     exit when superTempRecord.data = tempRecord.data;
                     tempRecord.probes := tempRecord.probes + 1;
                     if probeLR = linear then
                        offsetNum := offsetNum + 1;
                     else
                        offsetNum := offset(R);
                     end if;
                  end loop;
               end;
            end if;
            if tempRecord.probes < min then
               min := tempRecord.probes;
            elsif tempRecord.probes > max then
               max := tempRecord.probes;
            end if;
            declare
               tempAvg : Float;
            begin
               tempAvg := Float(tempRecord.probes / 128);
                 avg := avg + tempAvg;
            end;
         end;
      end loop;
      new line;
      put("Statistics for "); put(lower); put(" to ");
put_line(Integer'Image(upper));
      put("Min: "); put_line(Integer'Image(min));
     put("Max: "); put line(Integer'Image(max));
      put("Average :"); put(Float'Image(avg));
   end average;
```

```
procedure theoretical (keyValue : Integer; probeLR : probeMethod) is
      alpha, E : Float;
  begin
      alpha := (Float(keyValue) / Float(128));
      if probeLR = linear then
         E := (1.0 - alpha / 2.0) / (1.0 - alpha);
      else
         E := -(1.0 / alpha) * (Log(1.0 - alpha));
      end if;
      new line;
      put("Expected number of probes: "); put line(Float'Image(E));
   end theoretical;
end hashing;
--in main.adb
with Ada.Text IO; use Ada.Text IO;
with Ada. Unchecked Conversion;
with hashing; use hashing;
procedure main is
begin
   -- PART C
   -- OA
  hashing.hash(0.40, linear, drBurris, main);
   --new line;
   --hashing.hash(0.40, linear, bryanBenham, main);
   --new line;
   -- QB
   --hashing.hash(0.80, linear, drBurris, main);
   --new line;
   --hashing.hash(0.80, linear, bryanBenham, main);
   -- QC
   --new line;
   --hashing.hash(0.40, random, drBurris, main);
   --new line;
   --hashing.hash(0.40, random, bryanBenham, main);
   --new line;
   --hashing.hash(0.80, random, drBurris, main);
   --new line;
   --hashing.hash(0.80, random, bryanBenham, main);
   -- PART B
```

```
--new_line;
--hashing.hash(0.40, linear, drBurris, file);
--new_line;
--hashing.hash(0.40, linear, bryanBenham, file);
--new line;
--hashing.hash(0.80, linear, drBurris, file);
--new line;
--hashing.hash(0.80, linear, bryanBenham, file);
--new_line;
--hashing.hash(0.40, random, drBurris, file);
--new line;
--hashing.hash(0.40, random, bryanBenham, file);
--new line;
--hashing.hash(0.80, random, drBurris, file);
--new line;
--hashing.hash(0.80, random, bryanBenham, file);
```

end main;