

## Example Comparing 3 Storage Techniques

*Sequentially*



*Sorted*



*Hashed*

1

	sequential	sorted	hashed
$h(\text{key}) = \text{key} \% \text{capacity}$ $\text{capacity} == 100$			
data 50003 33099 79606 10104 14001	[0] -1	[0] -1	[0] -1
	[1] -1	[1] -1	[1] -1
	[2] -1	[2] -1	[2] -1
	[3] -1	[3] -1	[3] -1
	[4] -1	[4] -1	[4] -1
	[5] -1	[5] -1	[5] -1
	[6] -1	[6] -1	[6] -1
	[7] -1	[7] -1	[7] -1
	[98] -1	[98] -1	[98] -1
	[99] -1	[99] -1	[99] -1

2

	sequential	sorted	hashed
data <b>50003</b> 33099 79606 10104 14001	[0] 50003	[0] 50003	[0] -1
	[1] -1	[1] -1	[1] -1
	[2] -1	[2] -1	[2] -1
	[3] -1	[3] -1	[3] 50003
	[4] -1	[4] -1	[4] -1
	[5] -1	[5] -1	[5] -1
	[6] -1	[6] -1	[6] -1
	[7] -1	[7] -1	[7] -1
	[98] -1	[98] -1	[98] -1
	[99] -1	[99] -1	[99] -1

3

	sequential	sorted	hashed
data <b>50003</b> <b>33099</b> 79606 10104 14001	[0] 50003	[0] 33099	[0] -1
	[1] 33099	[1] 50003	[1] -1
	[2] -1	[2] -1	[2] -1
	[3] -1	[3] -1	[3] 50003
	[4] -1	[4] -1	[4] -1
	[5] -1	[5] -1	[5] -1
	[6] -1	[6] -1	[6] -1
	[7] -1	[7] -1	[7] -1
	[98] -1	[98] -1	[98] -1
	[99] -1	[99] -1	[99] 33099

4

	sequential	sorted	hashed
data 50003 33099 79606 10104 14001	[0] 50003	[0] 33099	[0] -1
	[1] 33099	[1] 50003	[1] -1
	[2] 79606	[2] 79606	[2] -1
	[3] -1	[3] -1	[3] 50003
	[4] -1	[4] -1	[4] -1
	[5] -1	[5] -1	[5] -1
	[6] -1	[6] -1	[6] 79606
	[7] -1	[7] -1	[7] -1
	[98] -1	[98] -1	[98] -1
	[99] -1	[99] -1	[99] 33099

5

	sequential	sorted	hashed
data 50003 33099 79606 10104 14001	[0] 50003	[0] 10104	[0] -1
	[1] 33099	[1] 33099	[1] -1
	[2] 79606	[2] 50003	[2] -1
	[3] 10104	[3] 79606	[3] 50003
	[4] -1	[4] -1	[4] 10104
	[5] -1	[5] -1	[5] -1
	[6] -1	[6] -1	[6] 79606
	[7] -1	[7] -1	[7] -1
	[98] -1	[98] -1	[98] -1
	[99] -1	[99] -1	[99] 33099

6

	sequential	sorted	hashed
data 50003 33099 79606 10104 14001	[0] 50003	[0] 10104	[0] -1
	[1] 33099	[1] 14001	[1] 14001
	[2] 79606	[2] 33099	[2] -1
	[3] 10104	[3] 50003	[3] 50003
	[4] 14001	[4] 79606	[4] 10104
	[5] -1	[5] -1	[5] -1
	[6] -1	[6] -1	[6] 79606
	[7] -1	[7] -1	[7] -1
	[98] -1	[98] -1	[98] -1
	[99] -1	[99] -1	[99] 33099

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	hashed
data 50003 33099 79606 10104 14001 <b>77003</b>	[0] -1
	[1] 14001
	[2] -1
	[3] 50003 collision
	[4] 10104
	[5] 77003 next available
	[6] 79606
	[7] -1
	[98] -1
	[99] 33099

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data		hashed	
50003		[0] -1	
33099		[1] 14001	
79606		[2] -1	
10104		[3] 50003	found ??
14001		[4] 10104	
search for 77003		[5] 77003	how to find it
		[6] 79606	
		[7] -1	
		[8]	
		[9]	
		[98] -1	
		[99] 33099	

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data		hashed	
50003		[0] -1	
33099		[1] 14001	
79606		[2] -1	
10104		[3] 50003	
14001		[4] 10104	
remove 77003		[5] 77003	set to -1 ?
		[6] 79606	
		[7] -1	
		[8]	
		[9]	
		[98] -1	
		[99] 33099	

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data

50003

33099

79606

10104

14001

search for **77003**

hashed

[0]	-1
[1]	14001
[2]	-1
[3]	50003
[4]	10104
[5]	-1
[6]	79606
[7]	-1
[8-97]	
[98]	-1
[99]	33099

stop search ?

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hashed (-1 never used)  
(-2 previously used)

[0]	-1
[1]	14001
[2]	-1
[3]	50003
[4]	10104
[5]	-2
[6]	79606
[7]	-1
[8]	
[9]	
[10]	
[11]	
[12]	
[13]	
[14]	
[15]	
[16]	
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[91]	
[92]	
[93]	
[94]	
[95]	
[96]	
[97]	
[98]	
[99]	33099

data  
50003  
33099  
79606  
10104  
14001  
search for **77003**

stop search ?