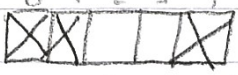
Max Goldberg - Homework 12 11/15/17

1) You will want to store: K key, V value and boolean removed. This will allow you to store values, but instead of deleting them, you can set removed to True.

2) 

Sequence of spots: 0, 1, 4, 4, 1 (repeat)

probe: 0, 1, 4, 9, 16, 25, 36, 49, 64

spot in array: 0, 1, 4, 4, 1, 0, 1, 4, 4, 1

(*) You will fail to add an item if spots 0, 1, and 4 are full.

3)

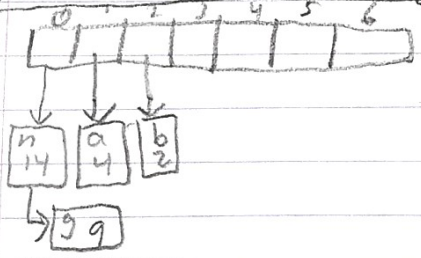
Index:	0	1	2	3	4	5	6
k:	n	a	b	g			
v:	14	4	2	9			

4) It will want to add <g, 10> at index 0, but since 0 is full it checks 1, since 1 is full it checks 2 ..... since 3 is full it checks 4.

	0	1	2	3	4	5	6
k	n	a	b	g	g		
v	14	4	2	9	10		

It checks 0, 1, 2, 3 then adds to 4.

5) $\lambda = items/size = 5/7 = .714$

6) 

7) No, for example, if we increased the array from question 6 to size 11, <n, 14> would map to 4 and <g, 9> would map to 0.

8) assume name and species are both Strings, and year is an int:

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return name.hashCode() + species.hashCode() + year;
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9) $C = \frac{1}{2}\left[1 + \frac{1}{1-\lambda}\right]$

$1.75 = \frac{1}{2}\left[1 + \frac{1}{1 - items/size}\right]$

$3.5 = 1 + \frac{1}{1 - x/100}$

$2.5 = \frac{1}{1 - x/100}$

$2.5 - \frac{2.5x}{100} = 1$

$1.5 = 2.5x/100$

x = items

$150 = 2.5x$

$x = 60$

There are 60 items stored in the table