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December 6th, 2021

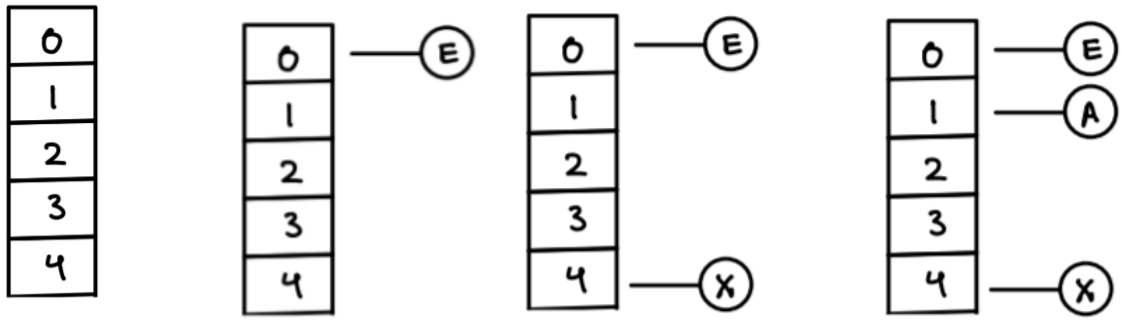
Assignment 11 - Hashing

1. Insert the keys E X A M Q U S T I O N in that order into an initially empty table of M = 5 lists, using separate chaining. Use the hash function 11 k % M to transform the kth letter of the alphabet into a table index. Show the hash table after each insertion.

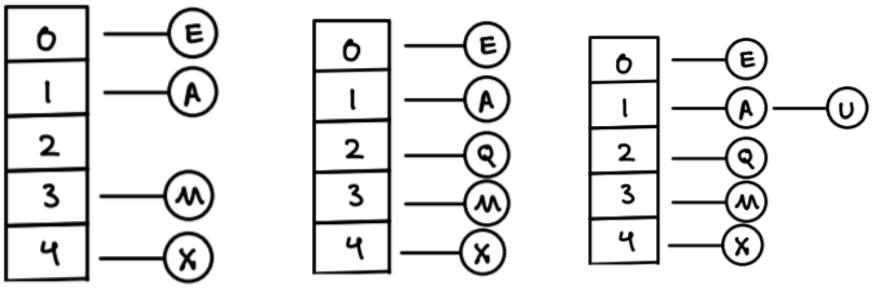
Use A=1, B = 2, … as shown in the following table.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26

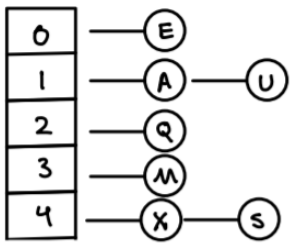
Initial Array: Adding E: (11 x 5) % 5 = 0 Adding X: (11 x 24) % 5 = 4 Adding A: (11 x 1) % 5 = 1



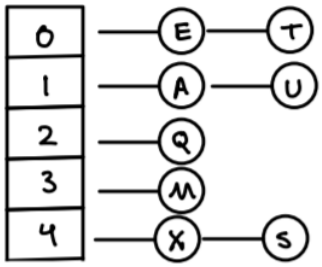
Adding M: (11 x 13) % 5 = 3 Adding Q: (11 x 17) % 5 = 2 Adding U: (11 x 21) % 5 = 1



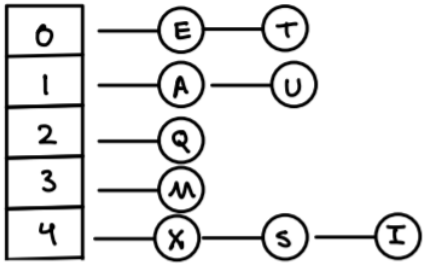
Adding S: (11 x 19) % 5 = 4



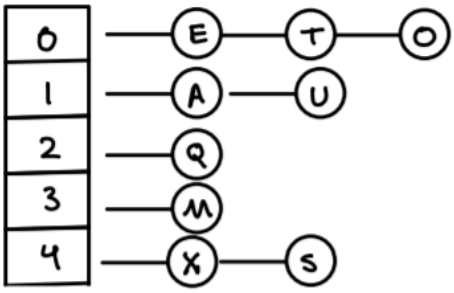
Adding T: (11 x 20) % 5 = 0



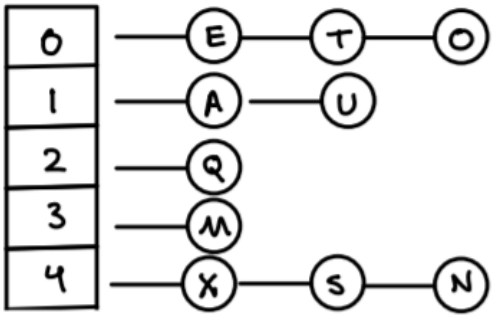
Adding I: (11 x 9) % 5 = 4



Adding O: (11 x 15) % 5 = 0



Adding N: (11 x 14) % 5 = 4

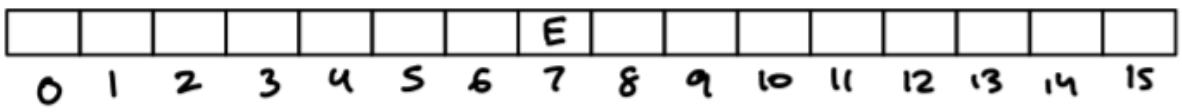


2. Insert the keys E X A M Q U S T I O N in that order into an initially empty table of size M =16 using linear probing. Use the hash function 11 k % M to transform the kth letter of the alphabet into a table index. Show the hash table after each insertion.

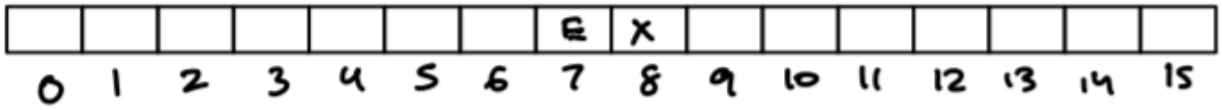
Use A=1, B = 2, … as shown in the following table.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26

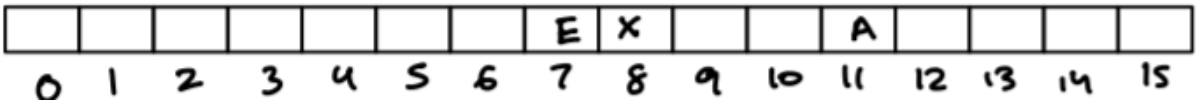
Adding E: (11 x 5) % 16 = 7



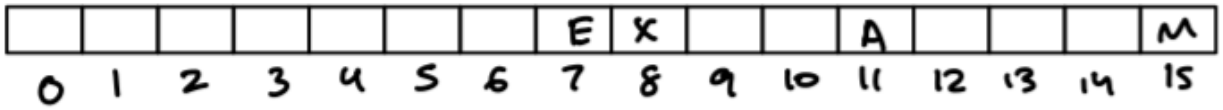
Adding X: (11 x 24) % 16 = 8



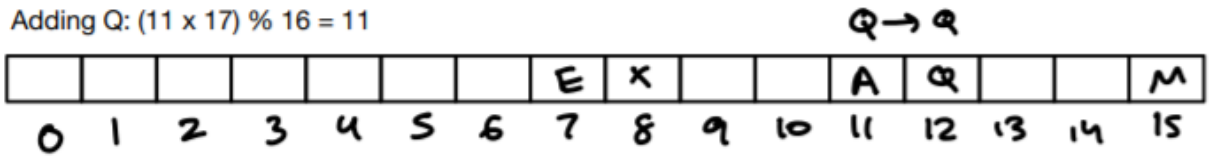
Adding A: (11 x 1) % 16 = 11



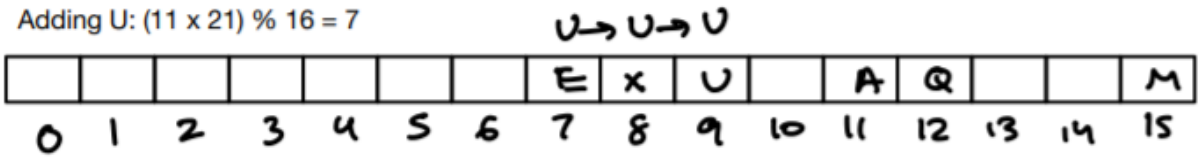
Adding M: (11 x 13) % 16 = 15



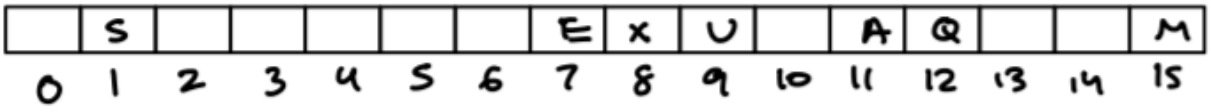
Adding Q: (11 x 17) % 16 = 11



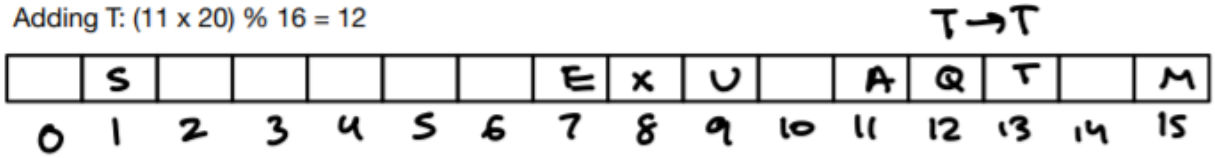
Adding U: (11 x 21) % 16 = 7



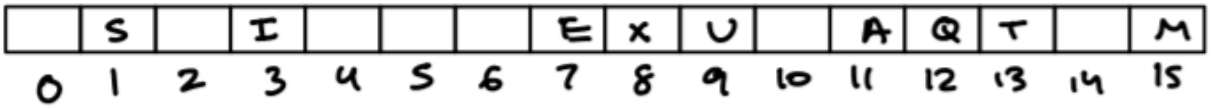
Adding S: (11 x 19) % 16 = 1



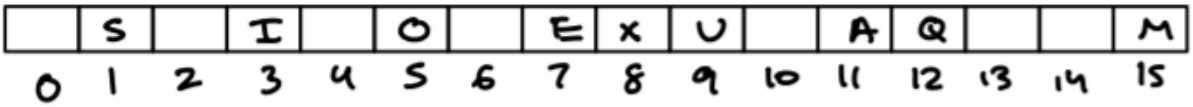
Adding T: (11 x 20) % 16 = 12



Adding I: (11 x 9) % 16 = 3



Adding O: (11 x 15) % 16 = 5



Adding N: (11 x 14) % 16 = 10